June 26-27, 2014

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ACBS 2014

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Proceedings of

National Conference
On
"Advancements in Computer & Business Studies"

ACBS-2014

26th – 27th June 2014

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Deptt. Of CSE

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Website Developed By : Er. Girish Kumar(Asstt. Prof- DCA)

Samdeesh, Manpriya Kaur, Simranjit Singh
(B-Tech CSE, 8th Sem)

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Address for correspondence

Amritsar College of Engineering & Technology

12 Km Stone,Amritsar-Jalandhar G.T. Road,

Amritsar-143001,(Pb.) INDIA

Phone : 0183-5069532,5069530,5010429 Fax : 0183-5069535

Email :contact@acetamritsar.org

Website : www.acetamritsar.org

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ACBS-2014

26th – 27th June 2014

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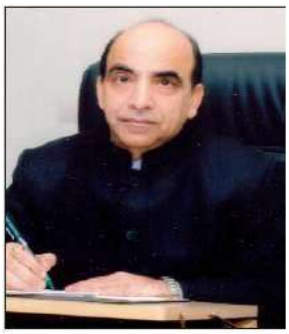

MESSAGE

I am pleased to learn that the Departments of CSE, IT, MCA & MBA of ACET Amritsar have taken the initiative in organizing the two days National Conference on "Advancements in Computer & Business Studies (ACBS-2014)".

I am confident that the Professional expertise backed up by the experience of the Management & Faculty of this Institute would ensure that the event turns out to be a grand success and all the Conference Objectives are realized in the best interest of the academia.

The Conference is being held in Amritsar, which is the place of spiritual importance in Punjab and I hope the delegates will have a comfortable stay and they will enjoy the traditional hospitality offered by the Institute.

I compliment the organizers of ACBS-2014 for holding this event and wish all success to the conference.

Dr. Rajnish Arora
Vice Chancellor
Punjab Technical University
Jalandhar

MESSAGE

I am delighted to pen this message for the Proceedings of two days National Conference on "Advancements in Computer & Business Studies (ACBS-2014)" jointly being hosted by the Departments of CSE, IT, MCA & MBA of Amritsar College of Engineering and Technology on June 26-27, 2014.

I am sure that deliberations in the conference would bring out innovative ideas and suggestions for the improvement of technology in related domains in the best interest of all stakeholders of professional education.

I convey my heartiest greetings to the delegates and organizers associated with the conference and hope that it turns out to be a grand success.

I also take the opportunity to congratulate the Departments of CSE, IT, MCA & MBA for organizing this event and convey my greetings to the organizers and wish a grand success in the endeavor for the event.

Advocate Amit Sharma
Chairman & CEO
ACET, ACHMT Amritsar

MESSAGE

It is a matter of great pleasure that a National Conference on "Advancements in Computer & Business Studies (ACBS-2014)" is being jointly hosted by Departments of CSE, IT, MCA & MBA of Amritsar College of Engineering and Technology on June 26-27, 2014.

The purpose of the conference is to unveil high quality research and experience which will set a milestone in transforming the mind set of researchers, academicians and students. Since the inception of this premier institute , the main focus has always been to improve the quality of education and encourage the researchers and knowledge seekers by organizing conferences, seminars, workshops and invited guest lectures etc., and undoubtedly the current conference on Computer and Business Studies is part of our endeavor to take a step forward in this direction.

I would like to congratulate the Departments of CSE, IT, MCA, MBA for organizing this conference. I pray that the conference turn out to be a grand success.

Ragini Sharma
Director (Finance)
ACET, ACHMT Amritsar

MESSAGE

It is indeed a matter of pride for me that the Departments of CSE, IT, MCA & MBA of Amritsar College of Engineering and Technology are organizing the National Conference on "Advancements in Computer & Business Studies (ACBS-2014)".

I am confident that this conference organized at the institute will further open floodgates of knowledge to faculty & students in comprehending the applications of technology along with the latest concepts and up to date techniques, which in the longer run will provide necessary support & motivation in their future endeavors.

I also extend heartiest congratulation to my colleagues in the Institute, who have made commendable efforts and taken the initiative of getting published the proceedings of the conference for the larger benefit of the academic community.

Dr. Om Kumar Harsh
Group Director
ACET, ACHMT Amritsar

MESSAGE

On Behalf of Amritsar College of Engineering and Technology, I welcome all the participants to "National Conference on Advancements in Computer & Business Studies (ACBS-2014)".

The main aim of our Institute is to educate young minds to be equipped for the future challenges. Our mission is to groom students in accordance with latest Technologies. I am proud to say that our Institute is working tirelessly to make students ready to march towards these challenges. I wish that this conference would serve our agenda for improvements in our teaching curriculum so that students successfully match the market requirements in the global scenario.

I am sure that this conference will pave the way for providing a forum to the researchers, academicians and students to express their innovative and creative research skills. This event will spread the light of awareness about the latest and upcoming fields and research areas in Computer and Business Studies.

I pray for the institute to accomplish its mission. I congratulate the students and the staff of the departments of CSE, IT, MCA & MBA for organizing this event. I also wish that such events should be a routine feature.

Dr. V.K. Banga
Principal

MESSAGE

It is a matter of great pleasure for me that Departments of CSE, IT, MCA & MBA of our college are organizing a National Conference on "Advancements in Computer & Business Studies (ACBS-2014)" on June 26-27, 2014.

It is outcome of indeterminable efforts put by the organizers in planned manner within a stipulated period. This conference is an effort to meet the emerging technological challenges in the areas of Computer & Business Studies, which is very important for national development.

The Conference will provide the ideal forum to stimulate ideas and establish collaborations. It is not an easy job for the organizers of this national conference of such a magnitude, and I would like to thank all the members of the organizing committee for their hard work.

I wish the conference a great success.

Dr. H.S. Gill
Principal, AC

MESSAGE

I am extremely delighted that Departments Of CSE, IT, MCA and MBA of Amritsar College of Engineering and Technology, Amritsar are organizing a national conference on "Advancements in Computer & Business studies" on 26-27 June 2014.

This conference will help the research scholars exchanging the ideas through enlightened deliberations and their fruitful implementation both in industry and academics. Expert lectures delivered during the conference will certainly add to the professional skills of the delegates.

I also take the opportunity to thank the Management, Group Director, Principal and staff of ACET for their encouragement and continued support without which this event would not have been a grand success.

I convey my heartiest thanks to all the organizers of this National Conference to make this event an unforgettable one.

Col.(Retd.) Gurmukh Singh
(HOD- CSE & DSA)
Program Committee Chair
ACBS-2014

MESSAGE

It is a matter of great honor that Departments of CSE, IT, MCA and MBA of ACET Amritsar are jointly hosting a National Conference on "Advancements in Computer & Business Studies" (ACBS-2014) on 26th – 27th June 2014.

We at ACET have a mission to achieve academic excellence and responsive of changes in environment through an academic autonomy and prepare out budding engineering and managers for global competition and to nurture with core inner values.

The main objective of the conference is to exhibit the technical dexterity of the budding technocrats, research scholars, representatives from academia and industry. Besides this, the event provides a premiere forum for the dissemination of current technical ideas about the recent developments in Computer and Business Studies. The event focuses on the ingenuity of the charismatic research scholars to be mustered under one roof with a national outlook. It aims and aspires to bring technical faculty across the state/country in pace with the latest developed tools that are currently being used in context to Computer Engineering and Business Studies.

I wish to convey my sincere thanks to all who have contributed for the conference in whatsoever little way through encouragement and valuable suggestions.

I hope that the sincere efforts, zeal and vigor of the members of organizing departments would be prolific enough in making this venture a grant feat.

Amarpreet Singh
(Associate Prof.-CSE)
Organizing Secretary
ACBS-2014

MESSAGE

I feel proud that Amritsar College of Engineering and Technology, Amritsar is organizing a national conference on "Advancements in Computer & Business studies" on 26-27 June 2014.

In today's era, new developments are occurring almost on daily basis. These developments are changing the shape of society. Considering the fast pace of globalization, the need of the hour is to provide a platform where experts may share the advances in this field.

In a short period of time the conference has received an overwhelming response from various researchers across the country. The papers received in this conference have been closely reviewed by the experts committee and selected on the basis of originality, significance and clarity for the objectives of conference. I am confident that the conference will become a unique experience for academicians, professionals, researchers and students to acquire latest knowledge in the related field.

Ms. Dipti Malhotra
Asst. Prof.
HOD (MCA)

MESSAGE

It is a matter of honor that Amritsar College of Engineering and Technology, Amritsar is organizing a national conference on "Advancements in Computer & Business studies" on 26-27 June 2014.
The urge to look for advancements in research and experimental techniques today is felt in almost every domain of science engineering and management. This conference is a platform where scholars can share their views and ideas on the subjects related to the objectives of conference.

It would be a matter of great satisfaction, not only to the organizer but the whole research community in the country, if some useful thoughts and directions for prospective development can come out from deliberations of this conference.

We would like to make this conference a memorable event by offering sufficient opportunities and hope that you will enjoy the hospitality.

Mr. Sandeep Kad
Associate Professor
HOD (IT)

MESSAGE

It gives me immense pleasure that Amritsar College of Engineering and Technology, Amritsar is organizing a national conference on "Advancements in Computer & Business studies" on 26-27 June 2014.

Significant contribution by researcher's academicians from all over the country has done a commendable effort towards the betterment of the society and mankind. Knowledge by sharing undoubtedly enhances many folds and at ACET we work with this philosophy.

I hope your experience of being a part of this conference will be wonderful. ACET will be a venue where exchange of ideas finds you a global partner for collaboration by which you can explore your research experiences. Hopefully, the conference discussion, presentations and contributions play a significant role to update the knowledge in concerned field.

Dr. Maninder Singh Gill
Associate Professor
HOD (MBA)

MESSAGE

It is a matter of great pleasure for me that Departments of CSE, IT, MCA & MBA of our college are organizing a National Conference on "Advancements in Computer & Business Studies (ACBS-14)" on June 26-27, 2014.

Today's global society is exchanging knowledge and technology at a extraordinary speed. In this environment of fast moving technology, Computer Science and Technology have become the two sides of a coin. They are closely intertwined and so combined with each other that to be effective we should view them together.

I am very thankful to o

ur President, Secretary, Advisors and Principal for continuous motivation and support to organize such an national level conference. I express my sincere thanks towards members of Organizing Committee, Student Organizers and College Staff for their technical association in organizing this national conference. I extend my thanks to the sponsors of this event for their cooperation.

I extend my personal kudos to the all organizers of this National Conference and wish them to make this Conference and event, very hard to forget and long to cherish.

Best Wishes.

Girish Kumar

Convener

ACBS-2014

MESSAGE

It gives me immense pleasure to announce that our department is organizing a National Level Conference on "Advancements in Computer & Business Studies (ACBS-2014)" on 26th – 27th of June, 2014. I am of the considered view that this conference will play a vital role in creating new scientific computerized ideas in our life.

The objective of this conference is to provide concrete platform which will encourage and support academicians, Research students, Faculties, industry experts and engineers to carry and accomplish their research targets. Definitely to your valued research papers and active participation will increase the core value of our conference.

Such like conferences always enhance our knowledge and skills and should take place vigorously and continuously. Finally I feel grateful to the Hon'ble Management, Principal, HOD and staff of ACET for extending their help and cooperation in all spheres without which this event would not have taken the present shape.

With respectful regards.

Er.Pavitar Singh
Convener
ACBS-2014

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National Conference
On
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National Conference On

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June 26-27, 2014

PART B - Advancements in Business Studies

Clustering techniques in Data Mining: A Survey

Asstt. Prof Sanjiv Datta
PG Department of Computer Science
DAV College, Amritsar
dattasanjiv@rediffmail.com

Abstract- The overall goal of data mining process is to extract information from a large data set and transform it into an understandable form for further use. Clustering is important in data analysis and data mining applications.
Clustering is a division of data into groups of similar objects. It represents many data objects by few clusters, and hence, it models data by its clusters. Main task ofclustering are explorative data mining, and a commontechnique for statistical data analysis used in many fields,including machine learning, pattern recognition, imageanalysis, information retrieval, and bioinformatics. It can be achieved byvarious algorithms that differ significantly in their notionof what constitutes a cluster and how to efficiently findthem. The appropriate clustering algorithm andparameter settings including values such as the distancefunction to use, a density threshold or the number ofexpected clusters depend on the individual data set andintended use of the results. Cluster analysis as such is notan automatic task, but an iterative process of knowledgediscovery or interactive multi-objective optimization. Itwill often be necessary to modify preprocessing andparameters until the result achieves the desired properties.In this paper we represent a survey of clusteringtechniques in data mining. The clustering techniques arecategorized based upon different approaches. The goal of this survey is to provide a comprehensive review of different clustering techniques in data mining.

Keywords: Hierarchical Clustering, Partitioning Relocation Clustering, Density-Based Partitioning, Grid-Based

I. INTRODUCTION

Data mining is the process of analyzing data from different perspectives and summarizing it into useful information. Data mining involves the anomaly detection, association rule learning, classification, regression, summarization and clustering. In this paper, clustering analysis is done. Clustering is a division of data into groups of similar objects.Each group, called cluster, consists of objects that are similar between themselves anddissimilar to objects of other groups. Representing data by fewer clusters necessarily loses certain fine details (akin to lossy data compression), but achieves simplification. It represents many data objects by few clusters, and hence, it models data by its clusters. Data modeling puts clustering in a historical perspective rooted in mathematics, statistics, and numerical analysis. A good clustering algorithm is able to identity clusters irrespective of their shapes. Other requirements of clustering algorithms are scalability, ability to deal with noisy data, insensitivity to the order of input records, etc. Data mining is a multi-step process. It requires accessing and preparing data for a data mining algorithm, mining the data, analyzing results and taking appropriate action. The accessed data can be stored in one or more operational databases, a data warehouse or a flat file. In data mining the data is mined using two learning approaches i.e. supervised learning or unsupervised clustering.

From a machine learning perspective clusters correspond tohidden patterns, the search for clusters is unsupervised learning, and the resulting systemrepresents a data concept. Therefore, clustering is unsupervised learning of a hidden dataconcept. Data mining deals with large databases that impose on clustering analysisadditional severe computational requirements.

This survey emphasis is on clustering in data mining. Such clustering is characterizedby large datasets with many attributes of different types. Though we do not even try toreview particular applications, many important ideas are related to the specific fields.Clustering in data mining was brought to life by intense developments in informationretrieval and text mining [Cutting et al. 1992; Steinbach et al. 2000; Dhillon et al. 2001],spatial database applications, for example, GIS or astronomical data, [Xu et al. 1998;Sander et al. 1998; Ester et al. 2000], sequence and heterogeneous data analysis [Cadez et al. 2001], Web applications [Cooley et al. 1999; Heer& Chi 2001; Foss et al. 2001], DNA analysis in computational biology [Ben-Dor&Yakhini 1999], and many others. They resulted in a large amount of application-specific developments that are beyond our scope, but also in some general techniques. These challenges led to the emergence of powerful broadly applicable data mining clustering methods surveyed below.

II. TYPES OF CLUSTERS

1.Well-separated clusters-: A cluster is a set of points so that any point in a cluster is nearest (or more similar) to every other point in the cluster as compared to any other point that is not in the cluster.
2. Center-based clusters-: A cluster is a set of objects such that an object in a cluster is nearest (more similar) to the “center” of a cluster, than to the center of any other cluster. The center of a cluster is often a centroid.
3. Contiguous clusters -:A cluster is a set of points so that a point in a cluster is nearest (or more similar) to one or more other points in the cluster as compared to any point that is not in the cluster.

4. Density-based clusters-**:**A cluster is a dense region of points, which is separated by according to the low-density regions, from other regions that is of high density.
5. Shared Property or Conceptual Clusters-; Finds clusters that share some common property or represent a particular concept.

Important issues in clustering algorithms

Following are the properties of clustering algorithms we are concerned with in data mining:

- Type of attributes algorithm can handle
- Scalability to large datasets
- Ability to work with high dimensional data
- Ability to find clusters of irregular shape
- Handling outliers
- Time complexity (when there is no confusion, we use the term complexity)
- Data order dependency
- Labeling or assignment (hard or strict vs. soft of fuzzy)
- Reliance on a priori knowledge and user defined parameters
- Interpretability of results

While we try to keep these issues in mind, realistically, we mention only few with everyalgorithm we discuss. The above list is in no way exhaustive. For example, we alsodiscuss such properties as ability to work in pre-defined memory buffer, ability to restartand ability to provide an intermediate solution.

III. DIFFERENT CLUSTERING ALGORITHMS

1.Hierarchical Clustering

Hierarchical clustering builds a cluster hierarchy or, in other words, a tree of clusters,also known as a dendrogram. Every cluster node contains child clusters; sibling clusterspartition the points covered by their common parent. Such an approach allows exploringdata on different levels of granularity. Hierarchical clustering methods are categorizedinto agglomerative (bottom-up) and divisive (top-down) [Jain &Dubes 1988; Kaufman&Rousseeuw 1990]. An agglomerative clustering starts with one-point (singleton)clusters and recursively merges two or more most appropriate clusters. A divisiveclustering starts with one cluster of all data points and recursively splits the mostappropriate cluster. The process continues until a stopping criterion (frequently, therequested number k of clusters) is achieved.

Advantages of hierarchical clusteringinclude:

- Embedded flexibility regarding the level of granularity
- Ease of handling of any forms of similarity or distance
- Consequently, applicability to any attribute types

Disadvantages of hierarchical clustering are related to:

- Vagueness of termination criteria
- The fact that most hierarchical algorithms do not revisit once constructed
- (intermediate) clusters with the purpose of their improvement

One of the most striking developments in hierarchical clustering is the algorithm BIRCH.Since scalability is the major achievement of this blend strategy, this algorithm isdiscussed in the section Scalable VLDB Extensions. However, data squashing used byBIRCH to achieve scalability, has independent importance. Hierarchical clustering oflarge datasets can be very sub-optimal, even if data fits in memory. Compressing datamay improve performance of hierarchical algorithms.

While these methods are fairly easy to understand, the results are not always easy to use, as they will notproduce a unique partitioning of the data set, but a hierarchy the user still needs to choose appropriateclusters from. The methods are not very robust towards outliers, which will either show up asadditional clusters or even cause other clusters to merge (known as "chaining phenomenon", inparticular with single-linkage clustering). In the data mining community these methods are recognized as a theoretical foundation of cluster analysis, but often considered obsolete. They did however provideinspiration for many later methods such as density based clustering [2] and [6].

2. Partitioning Relocation Clustering

In this section we survey data partitioning algorithms, which divide data into severalsubsets. Because checking all possible subset systems is computationally infeasible,certain greedy heuristics are used in the form of iterative optimization. Specifically, thismeans different relocation schemes that iteratively reassign points between the k clusters. Unlike traditional hierarchical methods, in which clusters are not revisited after being constructed, relocation algorithms gradually improve clusters. With appropriate data, this results in high quality clusters.One approach to data partitioning is to take a conceptual point of view that identifies thecluster with a certain model whose unknown parameters have to be found. Morespecifically, probabilistic models assume that the data comes from a mixture of severalpopulations whose distributions and priors we want to find. One clear advantage of
probabilistic methods is the interpretability of the constructed clusters. Having concisecluster representation also allows inexpensive computation of intra-clusters measures offit that give rise to a global objective function .

2.1 K-Medoids Method

In k-medoids methods a cluster is represented by one of its points. We have already mentioned that this is an easy

solution since it covers any attribute types and that medoids have embedded resistance against outliers since peripheral cluster points do not affect them. When medoids are selected, clusters are defined as subsets of points close to respective medoids, and the objective function is defined as the averaged distance or another dissimilarity measure between a point and its medoid.

Two early versions of k-medoid methods are the algorithm PAM (Partitioning AroundMedoids) and the algorithm CLARA (Clustering LARge Applications) [Kaufman &Rousseeuw 1990]. PAM is iterative optimization that combines relocation of pointsbetween perspective clusters with re-nominating the points as potential medoids. Theguiding principle for the process is the effect on an objective function, which, obviously,is a costly strategy. CLARA uses several (five) samples, each with 40+2k points, whichare each subjected to PAM. The whole dataset is assigned to resulting medoids, theobjective function is computed, and the best system of medoids is retained.

Further progress is associated with Ng & Han [1994] who introduced the algorithm CLARANS (Clustering Large Applications based upon RANdomized Search) in the context of clustering in spatial databases.

2.2 K-Means Method

The k-means algorithm [Hartigan 1975; Hartigan& Wong 1979] is by far the mostpopular clustering tool used in scientific and industrial applications. The name comesfrom representing each of k clusters C by the mean (or weighted average) c of itspoints, the so-called centroid. While this obviously does not work well with categoricalattributes, it has the good geometric and statistical sense for numerical attributes. Thesum of discrepancies between a point and its centroid expressed through appropriatedistance is used as the objective function.

Therefore, k-means algorithm can be derived from general probabilistic framework (see sub-section probabilistic Clustering) [Mitchell 1997]. Note that only means are estimated. A simple modification would normalize individual errors by cluster radii (cluster standard deviation), which makes a lot of sense when clusters have different dispersions.

Most k-means-type algorithms require the number of clusters k to be specified in advance, which isconsidered to be one of the biggest drawbacks of these algorithms. Furthermore, the algorithms preferclusters of approximately similar size, as they will always assign an object to the nearest centroid. Thisoften leads to incorrectly cut borders in between of clusters (which is not surprising, as the algorithmoptimized cluster centers, not cluster borders). K-means has a number of interesting theoreticalproperties. On one hand, it partitions the data space into a structure known as Voronoi diagram. On theother hand, it is conceptually close to nearest neighbor classification and as such popular in machine learning [3] and [8].

3.Density-Based Partitioning

An open set in the Euclidean space can be divided into a set of its connected components. The implementation of this idea for partitioning of a finite set of points requires concepts of density, connectivity and boundary. They are closely related to a point's nearest neighbors. A cluster, defined as a connected dense component, grows in any direction that density leads. Therefore, density-based algorithms are capable of discovering clusters of arbitrary shapes. Also this provides a natural protection against outliers. Some cluster shapes that present a problem for partitioning relocation clustering (e.g., k-means), but these are handled properly by density-based algorithms. They also have good scalability. These outstanding properties are tempered with certain inconveniencies.

From a very general data description point of view, a single dense cluster consisting of two adjacent areas with significantly different densities (both higher than a threshold) is not very informative. Another drawback is a lack of interpretability. An excellent introduction to density based methods is contained in the textbook [Han &Kamber 2001].

3.1 DBSCAN (Density Based Spatial Clustering Applications with Noise)

DBSCAN is a density based clustering method designed to find clusters of arbitrary shape [1]. The density of an object is measured by the number of objects close to it. It uses two input parameters; ε and *MinPts*. Ɛ is used to define ε neighborhood of an object, which is the space within a circle of radius ε at that object. *MinPts*is used to define the minimum number of points that should be in the ε neighborhood of an object if it is to be considered as a core object. The two input parameters are used to define the notion of density reachable points which are points such that points of finite sequence of core objects exist between them so that each successor belongs to a ε neighborhood of the previous core object. A point is said to have density connectivity to another point if they both are density reachable from a common core object [4]. The algorithm works as follows:

(1) All objects are marked as unvisited.
(2) Randomly visit an unvisited object *x*. If *x* has at least *MinPts*number of objects in its ε neighborhood, then a new cluster *N* is created for it. Otherwise it is marked as a noise point.
(3) If cluster is created, we iteratively visit each point *y* in this newly formed cluster, if it is unvisited, mark it as visited and if this point has *MinPts*number of points in its neighborhood, we add those points to the cluster *N*. If *y* is not a member of any cluster, it is added to the created cluster *N*.
(4) Repeat steps 2 and 3 until all objects are visited.

3.2 OPTICS (Ordering Points to Identify Clustering Structure)

DBSCAN burdens the user from choosing the input parameters. Moreover, different parts of data could require different parameters [5]. OPTICS is a variation of DBSCAN which was designed to surmount these challenges. OPTICS does not explicitly produce a data set clustering [7]. It instead gives us cluster ordering such that objects which are in a denser cluster are closer in a list. OPTICS stores two additional attributes; Core Distance and Reachability

Distances which are used to derive the ordering such that clusters with higher density will be finished first. It has the same time complexity as the DBSCAN.

4. Grid-Based Methods

In the previous section crucial concepts of density, connectivity, and boundary were used which required elaborate definitions. Another way of dealing with them is to inherit the topology from the underlying attribute space. To limit the search combinations, multirectangular segments are considered. Recall that a segment (also cube, cell, region). is a direct Cartesian product of individual attribute sub-ranges (contiguous in case of numerical attributes). Since some binning is usually adopted for numerical attributes, methods partitioning space are frequently called grid-based methods. The elementary segment corresponding to single-bin or single-value sub-ranges is called a unit. Overall, we shift our attention from data to space partitioning. Data partitioning isinduced by points. membership in segments resulted from space partitioning, while space partitioning is based on grid-characteristics accumulated from input data. One advantage of this indirect handling (data grid-data space-partitioning data-partitioning) isthat accumulation of grid-data makes grid-based clustering techniques independent ofdata ordering. In contrast, relocation methods and all incremental algorithms are verysensitive with respect to data ordering. While density-based partitioning methods workbest with numerical attributes, grid-based methods work with attributes of different types.

To some extent, the grid-based methodology reflects a technical point of view. Thecategory is eclectic: it contains both partitioning and hierarchical algorithms.

Grid-based clustering where the data space is quantized into finite number of cells which form the grid structure and perform clustering on the grids. Grid based clustering maps the infinite number of data records in data streams to finite numbers of grids. Grid based clustering is the fastest processing time that typically depends on the size of the grid instead of the data. The grid based methods use the single uniform grid mesh to partition the entire problem domain into cells and the data objects located within a cell are represented by the cell using a set of statistical attributes from the objects. These algorithms have a fast processing time, because they go through the data set once to compute the statistical values for the grids and the performance of clustering depends only on the size of the grids which is usually much less than the data objects. The grid-based clustering algorithms are STING, Wave Cluster, and CLIQUE. All these methods use a uniform grid mesh to cover the whole problem. For the problems with highly irregular data distributions, the resolution of the grid mesh must be too fine to obtain a good clustering quality. A finer mesh can result in the mesh size close to or even exceed the size of the data objects, which can significant increase the computation load for clustering.

A. STING (Statistical Information Grid)

STING works with numerical attributes. It is a multi-resolution clustering technique [10]. Information such as mean, maximum and minimum are pre computed and stored in rectangular cells [4]. Parameters at the higher level cells are drawn from the parameters of the bottom level cells. For each cell, there are attribute independent parameters and attribute dependent parameters. First, a layer is determined from which query processing is to begin. This layer may consist of small number of cells. For each cell in this layer we check its pertinence by computing confidence internal. Irrelevant cells are removed and this process is repeated until the bottom layer is reached [9].

The quality of clustering produced by this method is directly related to the granularity of the bottom most layers, approaching the result of DBSCAN as granularity reaches zero [4].

IV. CONCLUSION & FUTURE SCOPE

The overall goal of the data mining process is to extract information from a large data set and transform it into an understandable form for further use. Clustering is important in data analysis and data mining applications. It is a common techniquefor statistical data analysis, which is used in manyfields, including machine learning, data mining, pattern recognition, imageanalysis and bioinformatics. Clustering isthe classification of similar objects into differentgroups, or more precisely, the partitioning of a dataset into subsets (clusters), so that the data in eachsubset (ideally) share some common trait – oftenproximity according to some defined distancemeasure.It is the task of grouping a set of objects so that objects in the same group are more similar to each other than to those in other groups (clusters). Clustering can be done by the different no. of algorithms such as hierarchical, partitioning, grid and density based algorithms. During the survey, wealso find some points that can be furtherimprovement in the future using advanced clusteringtechnique to achieve more efficient accuracy in resultand reduce the time taken for data and/ orinformation retrieval from large data set.

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The Role of Genetic Algorithm in Soft Computing

Jasmeen Kaur
M.tech,Scholar
ACET, AMRITSAR
Jais2432134@gmail.com

Navneet Kaur
M.tech,Scholar
ACET, AMRITSAR
Navneetsethi2102@gmail.com

Abstract-In the last few years genetic algorithms have attracted considerable attention because they represent a new method of stochastic optimization with some interesting properties like learning in neural networks is an optimization process by which the error function of a network is minimized. ***This paper describes the various aspects and working of Genetic Algorithm in detail.***

1. Introduction

Genetic algorithms are stochastic search methods managing a population of simultaneous search positions. A conventional genetic algorithm consists of
three essential elements:
• a coding of the optimization problem
• a mutation operator
• a set of information-exchange operators
Genetic Algorithm developed by Holland in 1975, manipulate fixed length binary string representations, using crossover operators that combine segments of candidate solution to generate new chromosome. They are better than conventional algorithm in that there are robust. Unlike older Artificial Intelligence systems, they do not break easily even if the inputs are changed slightly or in the presence of reasoning noise. GA works with a coded version of parameters. They start the search procedure from database of chromosome which makes them suitable individuals for parallel processing. The search mechanism of GA follows a step by step algorithm by an iterative procedure having its main goal the improvement of the fitness measure of the individuals. It acts as a input stage that maps sensor or other inputs, such as switches to the appropriate member functions and truth values. Input should be sufficient to describe current status of system. It requires appropriate relationship between inputs and outputs. It represents output control values in suitable form for system control. It requires expert knowledge used instead differential equations to describe a system. This knowledge can be expressed in a very natural way using linguistic variables which are described by fuzzy sets. It maps measured inputs of crisp value into fuzzy linguistic values to be used by a fuzzy reasoning mechanism. The encoding mechanism permits the representation of the variables belonging to the search space in such a way that it carries all the required information of a particular population.

2. Various Operators in GA

SELECTION OPERATOR: The idea is to give preference to better individuals pass on their genes to the next generations. Selection is a method that randomly picks chromosome out of the population according to their evaluation function. The higher the fitness function, the more possibility an individual would be selected. Selection is the component which guides the algorithm. Selection is the component which guides the algorithm to the solution by preferring individuals with high fitness over those with row fitness. It can be deterministic operation, but in most implementation it has random components. The classical selection operator for GA described by Goldberg is roulette wheel. In roulette wheel, the slots are not equally wide, i.e. different outcomes can occur with different probabilities. The diagram describes how roulette wheel works i.e. each member of the pool is assigned space on a roulette wheel proportional to its fitness. The members with the greatest fitness have the highest probability of selection. This selection technique works only for GA which maximizes its objective function.

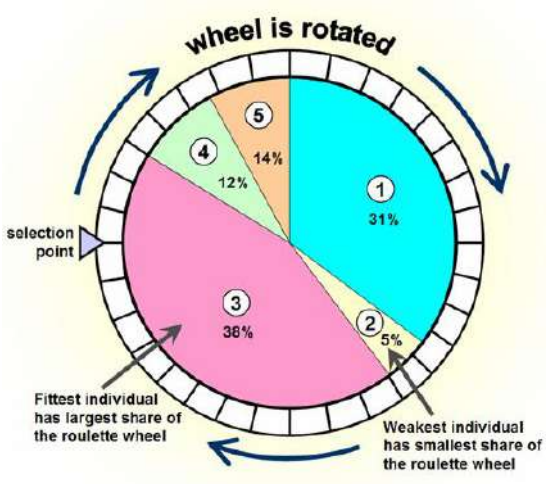

Fig1: *Roulette wheel approach: based on fitness*

Depending on the actual problem, other selection schemes than the roulette wheel can be useful.

CROSSOVER OPERATOR: It is on operator that represents mating between different chromosomes. Two individuals are chosen from the database using the selection operator according to its fitness value. A crossover along the bit strings is randomly selected. The values of two strings are exchanged up to that point. After crossover, two new individuals created from this mating are put into the new energy functions of the database. This process is likely to create even better individuals. One point crossover is a simple method for Genetic Algorithm which operator on binary strings.

MUTATION OPERATOR: It is based on random modification on the previous individuals. The coding of the optimization problem produces the required discretization of the variable values (for optimization of real functions) and makes their simple management in a population of search points possible. Normally the maximum number of search points, i.e., the population size, is fixed at the beginning. The mutation operator determines the probability with which the data structures are modified. This can occur spontaneously (as in stochastic search) or only when the strings are combined to generate a new population of search points. In binary strings a mutation corresponds to a bit flip.With some low probability, a potion of the new individuals will have some of their bits flipped. In Genetic Algorithm, mutation can be realized as a random deformation of the strings with a certain probability. The positive effect is Presentation of genetic diversely & local maxima can be avoided.

1110110001 → 1110010001

3. Genetic Algorithm

Each solution is represented in genetic algorithm is represented through a chromosome, which is just an abstract representation. Reproduction operators are applied directly on the chromosome & are used to perform mutations & recombination over solutions of the problem. Appropriate representation and reproduction operators are the determine factors, as the behavior of the GA is extremely dependent on it. It can be extremely difficult to find a representation that having the structure of search space according to the properties of the problem.

Step 1:- An initial database is created from a random selection of solutions which are analogous to chromosomes.

Step 2:- A value for fitness is assigned to each solution i.e. chromosome depending on how close it actually to solving the problem.

Step 3:- Those chromosome with a higher fitness value are more likely to reproduce chromosome according to crossover and mutation operator.

Step 4:- If the new chromosome contains a solution that produces an output that is close enough or equal to the desired answerer then the problem has been solved. If it is not, then the new chromosome will go through the same process as previous individuals did. This will continue until a solution is reached.

GA works with a coded version of parameters. They start the search procedure from database of chromosome which makes them suitable individuals for parallel processing. The search mechanism of GA follows a step by step algorithm by an iterative procedure having its main goal the improvement of the fitness measure of the individuals. The encoding mechanism permits the representation of the variables belonging to the search space in such a way that it carries all the required information of a particular population. The two most used formats for encoding the variables are the binary format and the floating point format. Traditionally floating point format has been used to represent the individuals when dealing with optimization problems. Binary format represents search space that may solve the problem. A binary encoded chromosome has a lot more elements than an individual represented by a floating point. It is also called fundamental theorem of GA. It is introduced by Holland in the mid-1970, represents the formal foundation for genetic Algorithms. The basic idea behind the schema theorem is to represent a template or prototype of symbols 0,1 and * in general chromosomes. This idea is then generalized as belonging to the symbols. For instance, the schema (1*0*1) matches the following chromosomes.

4. Applications of GA

It is best useful and efficient when the search space is large & complex. It does not base on mathematical analysis. It can handle orbit ray kinds of constraints that handle weighted components of the fitness function to adapt the scheduler for requirements. It can be applied to many scientific, engineering problems.

- **Parameter Estimation**: - It can be applied to numerical applications that can handle adaptability and robustness according to the recursive weight vectors.
- **Image Processing:** - It can also be used for image analysis applications. Due to large image data size, it suffers from heavy computational complexity. The main idea is to represent 3D points using a fitness function.
- **Task scheduling:** - Task scheduling in multiprocessor systems can be used with digital signal processing algorithm on a distributed system. Multiprocessor scheduling is to assign a set of tasks for a multiprocessor system to minimize overall scheduling length.
- **Mobile Manipulator:** - It is applicable for planning Omni- directional mobile manipulator path. It depends upon various cost functions, range on the distance between two stations. This path planning method is also useful for path generation with time constraints.
- **Automation of Programming:** - It has been used to evolve computer programs for specific tasks & to design other computational structures i.e. cellular automata.
- **Robot Learning:** - It has been used for many machine learning applications including classification & prediction. It has been also used to design neural networks.
- **Economic Models: -** It have been used to model processes of innovation i.e. emergence of economic markets as well as for creating models of social systems.

5. Conclusion

In summary, a neural network is presented multiple neurons that having the capability to generate new neurons with a pattern on its input nodes, and the network produces an output pattern based on its learning algorithm during the training phase. Once trained, the neural network can be applied to classify new input patterns.

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A Proposed Tool for Detecting Code Smells

Amandeep Kaur
Assistant Professor
Punjab College Of Technical Education,
Baddowal, Ludhiana
Email id- amandeep@pcte.edu.in
Mob. No: 9814562296

Abstract*— Software development is an area which is into action for the last fifteen to twenty years. As rapidly as the software development took place, with the same ratio the trend of analyzing the code raised. Smells are the unessential part of a good code or they themselves are bad code. In result, the detection and correction of smells requirement have drawn the attention of both researchers and practitioners who have defined and proposed various techniques to detect code and design smells in code. Instead of those efforts, none of these approaches handle the precariousness of the detection process. The basic problem with the smells is if they are detected by the user, it is very difficult to remove them on runtime. Our work would be proposing such system which can implement a completely different architecture if we get smell.

***Index Terms*— Smell, Code, System, Architecture.**

I. INTRODUCTION

Software development is a field which is in action for decades. Preparing code for Software is not a difficult task, but preparing an efficient code is complicated one. To change the code is to make internal structure of the code easier to understand and economic to modify, without changing the behavior and desired response. No Software is free from smells.

A code smell can be said as the drawback of the code. The code should not just be sufficient cable of producing the appropriate result but also it should be written in such a format that, it should take minimum effort to produce the appropriate result. Presence of code and design smells can affect the quality of a program.

Code and design smells are “bad" solutions to recurring implementation and design problems that impede the maintenance and evolution of programs. Code smells are usually symptoms of larger design smells, *e.g.*, anti patterns [11]. When studying smells we do not debar that, in a particular circumstance, a smell could be the best way to actually implement or design a (part of a) program. For example, automatically generated parsers are often Spaghetti Code, *i.e.*, very large classes with very long methods. Only quality analysts can evaluate their impact in their setting.

The definitions of smells [10] are often loosely specified, because quality assessment is a human-centric process that requires contextual data. As a result, there is always a level of precariousness on whether a code (class) in a program is a smell or not. Therefore, detection results should be reported with a probability with respect to the degree of precariousness of the detection process. This precariousness accounts for the loose definitions and the similarity of the code (class) with the smell. There exist many approaches to specify and detect smells.

II. SCOPE OF STUDY

Software which runs efficiently in terms of memory management saves a lot of memory. A good memory saver technique saves the system of running processes which are not necessary. Saving a system from not running unwanted processes saves a lot of power consumption as well as it save the heavy problem of global warming. Perfect written codes, save the system from outer attacks also and it also saves the software from unwanted maintenance costs.

Objectives of Study:

A. Improving Quality of the Software.
B. Primary Objective is to improve the performance of the Software by improving the Quality of Code.
C. Less Power Consumption thus contributes towards the solution of Global warming Problem.
D. Security of the software from unwanted attacks.
E. Long term returns by saving maintenance cost.

III. PROPOSED WORK

We would like to propose a Bayesian approach to manage this precariousness. First of all, we present a taxonomic process to convert existing detection rules into a probability based model. We would exemplify this process by preparing a prototype to detect occurrences of the anti patterns. Second, we will present results of the validation of the model: Basis for this model are two open-source programs, Gantt Project v1.10.2 and Xerces v2.7.0, and will be used to measure its accuracy.

Third, we compare our model with another approach to show that it will generate the same candidate classes while ordering them in order to minimize the quality analysts' effort. At the end, we will show that when detection results are available through past techniques; our model can be culminated using machine learning techniques to order an improved context-specific detection. Software quality is important because of the

complexity and pervasion of software systems. Moreover, the current trends in outsourcing development and maintenance require means to measure quality with granularity. Object-oriented quality is adversely impacted by code and design smells [11]; their detection and correction at early stage would help the development and maintenance processes and will generate benefits in long run.

IV. Algorithm and Proposed Solution

The previous developers have used JAVA as a platform to detect and to work over the smell detection and its removal. We would be doing it better with .NET framework and for that purpose we would be using NEAREST NEIGHBOUR ALGORITHM which would be a little influenced with CART algorithm. Basically we would be creating the clusters for smells.

Clustering and Nearest Neighbour Algorithm: Clustering is heterogeneous within same group but homogenous among different groups and in n-dimensional space clustering is usually defined by assigning one predictor to each dimension.

In nearest neighbour algorithm predictors are mapped to dimensions but then those dimensions are either stretched or compressed based on their importance in making the predictions. The compression of a dimension makes that dimension less important where as stretching of a dimension effectively makes that dimension (and hence predictor) more important than others. Then these dimensions are used in calculating the distance.

Hierarchical and Non-Hierarchical Clustering**:** There are two main types of clustering techniques, Hierarchical and Non-Hierarchical ones. The hierarchical clustering techniques create a tree of clusters from small preceding big ones. Clustering is an unsupervised learning technique (as discussed earlier), and as such, there is no absolute discussion. For the same reason and also considering the type of particular application of the clustering, fewer or greater numbers of clusters may be required. With a hierarchy of clusters defined, it will be possible to choice the number of clusters that are required. In extent case, it is possible to acquire clusters as many records are there in the database. In this case the records within the cluster are similar to each other (since there is only one) and surely different from the rest clusters. But the main idea is to find the useful clusters may be that point is missing to identify useful patterns in the database that could summarize and makes it easier to understand. If number of clusters created, are equal to the number of records present in the database, then that cluster may not be easily understandable, because it contains more complexity. It is the concept of worst case. So main aim is to, easily understand the patterns, so in this case number of clusters generated should be less than count of original records. It is decided on the basis of interpretation. The advantage of hierarchical clustering methods is it allows the end user to choose from two choices i.e. many or a few clusters.

Hierarchical clustering is usually viewed as a tree, Where the smallest clusters merge together to create the next highest level of clusters and those at that level merge together to create the next highest level of clusters and so on. When a hierarchy of clusters like this is created the user can determine what the right number of clusters is? In maximum extent case, it is possible to acquire clusters as many records are there in the database. In this case the records within the cluster are similar to each other (since there is only one) and surely different from the rest clusters. But the main idea is to find the useful clusters may be that point is missing to identify useful patterns in the database that could summarize and makes it easier to understand. This hierarchy of clusters is created through the algorithm that builds the clusters. There are two main types of hierarchical clustering algorithms:

- Agglomerative - Agglomerative clustering techniques start clusters as there are records and each cluster contains just one record. The clusters that lies nearest to each other are merged together to generate the next largest cluster. This process is continued until a hierarchy of clusters is complete with just a single cluster containing all the records at the top i.e. at root level of the hierarchy.
- Divisive - Divisive clustering techniques consider very minute details in the beginning and are the total opposite of agglomerative techniques. It starts with collection of all the records in one cluster i.e. at the root and then splits that cluster into smaller pieces and so on. It works on more detailed level with highest granularity level.

In Non-Hierarchical Clustering basically two non-hierarchical clustering techniques are available and moreover both of them are very fast to compute on the database. They derive their name from the fact that the database must be processed once in order to create the clusters (i.e. each record is only read from the database not more than once). The other class of techniques are called reallocation methods. They get their name from the movement (movement is done in more than once) or "reallocation" of records from one cluster to another in order to create far better clusters. The reallocation techniques do use multiple passes through the database but are relatively fast in comparison to the hierarchical techniques. Defining the number of clusters rather than having them driven by the data itself might seem to be a bad idea as there might be some distinct and observable clustering of the data into a set of clusters about which the user might not be aware of.

Hierarchical clustering has positives over non-hierarchical techniques as no support for interaction of user is required to decide the number of clusters (determined by examining the existence and type of data) and hence the number of clusters formed can be increased or decreased by simple moving towards root and leaf level hierarchy.

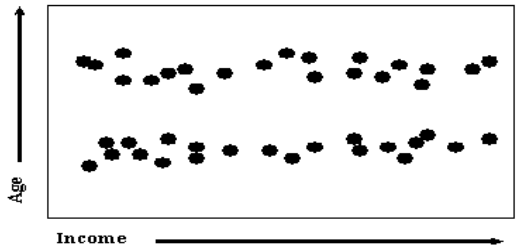
1. The hierarchy is created using one of the two given approaches i.e. agglomerative or divisive one.
2. The clusters that lies nearest to each other are merged together to generate the next largest cluster.
3. This process is continued until a hierarchy of clusters is complete with just a single cluster containing all the records at the top i.e. at root level of the hierarchy (Agglomerative clustering). The total opposite of agglomerative techniques, starts with collection of all the records in one cluster i.e. at the root and then splits that cluster into smaller pieces and so on.

It works on more detailed level with highest granularity level (Divisive clustering).

The main point of distinction between two techniques is their ability to favor long, complex clusters that are linked together record by record, at very minute level, or to favor the detection of the more classical, compact or spherical cluster, including all individual record level clusters at one place. Nobody would like to have such a long chain of clusters and looks little strange too, but in a very few cases user want these patterns to be explored from the database. Clusters are formed generally using Euclidean clusters between data items available, but sometimes there is an underlying distance between space and spherical clusters as clusters creation does not depend upon distance from the centre of the clusters, but on data items to be linked together. Consider the example shown in Figure 1 or in Figure 2. In these cases there are two clusters that are not very spherical (shape wise), but could be detected by the single pass technique.

When looking at the layout of the data in Figure 1 there appears to be two flat clusters running parallel to each along the income axis. We cannot use the complete link or Ward's method to return these two clusters to the user. These techniques rely on calculating distance between the clusters using centre of clusters and then picking the average distance between records. Where ever there is the minimum distance, there a cluster is formed using those nearby locating clusters. Points that are far away from these centers would necessarily fall into a new cluster.

If we are using a 2-Dimension space then in that case, clusters are made visible only if points in one cluster are tightly linked to points in the same cluster but loosely linked with points in some other clusters. Clusters, which are at a minimum distance, are considered to be tightly linked, where as far away clusters are considered to be loosely linked.



[8]Figure 1: An example of elongated clusters

It would not be recovered by the complete link or Ward's methods but would be by the single-link method.

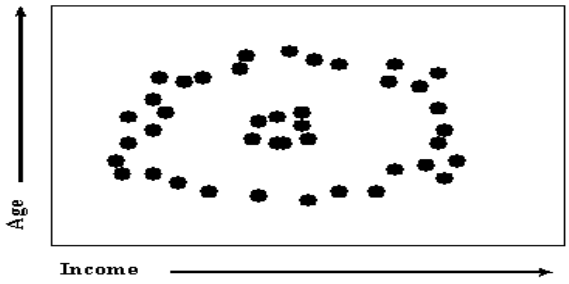


Figure 2: An example of nested clusters [8]

N*ested clusters, not recoverable by the complete link or Ward's methods, but would be by the single-pass link method.*

Such articles are of great use for company managers or other representatives who are the decision makers. However, due to a large database of news articles published, it is a complex and time consuming task to categorize and mine relevant information quickly and accurately. Many researchers have devoted their work for developing the text classification system for this very purpose. News-story categorization system is developed, which is a rule based expert system and main source for generation of rule is human base expertise. Maximum interaction between human and System is required to think of about existing rules and generating new rules out of it. This process requires more hard and small work from the part of indexing experts, Existence of huge set of rules need more time like for instance, if we talk about MYCIN or DENDRAL i.e. Rule Based Expert System, have taken years and years to make their working accurate and effective. It requires coverage of all set of rules. On the other hand, uses of statistical approach (based on keyword extraction from training texts) can also generating a knowledge base. This is an economical approach as more rules can bre covered in minimum possible time, but the problem is how to gather such a large training text set. It shows that relatively knowledge-poor machine learning algorithm outperforms human beings in a text classification task. This suggests that automated text categorization techniques are reaching a level of performance at which they can compete with humans not only in terms of cost-effectiveness and speed, but also in terms of accuracy of classification.

V. Expected Results

We would be trying to create such a system which can detect smells out of the code and if the smell is detected, it would be classifying them into clusters and it would take a reference from the created reference pattern which would have been implemented into the code snap file and then if all goes well it would replace the smell with the appropriate code. Our basic aim is to perform better than the previous implemented results.

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Joint Effect of Team Structure and Software Architecture in Open Source Software Development

Jasveen Kaur Amandeep Kaur
Guru Nanak Dev University, Asr
jasveen12690@yahoo.com

***Abstract*—This study is going to provide directions to open source practitioners to better organize their projects to achieve greater performance. In this research, we try to understand socio-technical interactions in a system development context by examining the joint effect of developer team structure and open source software architecture on OSS development performance. We hypothesize that developer team structure and software architecture significantly moderate each other's effect on OSS development performance. Empirical evidence supports our hypotheses and suggests that Larger teams tend to produce more favorable project performance when the project being developed has a high level of structural interdependency while projects with a low level of structural interdependency require smaller teams in order to achieve better project performance. Moreover, centralized teams tend to have a positive impact on project performance when the OSS project has a high level of structural interdependency. However, when a project has a low level of structural interdependency, centralized teams can impair project performance.**

***Keywords*—Open source software, collaboration network, social network analysis, software architecture,**

I. INTRODUCTION

In recent years, Open Source Software(OSS) development has caused great changes in software world. The software developers collaborate voluntarily to develop software that they or their organizations need [1]. Compared with traditional software development, OSS development is unique in that it is self-organized by voluntary developers. Moreover, OSS projects automatically generate detailed and public logs of developer activities and project outputs in the form of repositories, allowing a clear view of their inner working details [1]. These unique aspects of OSS have inspired studies regarding motivations of individual participants, governance of OSS projects [3],organizational learning in OSS projects[2], architecture of OSS code [4], in OSS projects. These OSS studies have increasingly pointed toward the inseparable role of the social and the technical aspects in shaping OSS development processes and outcomes[9]. Previous OSS studies suggest that OSS development is particularly suited for an examination of combined effects of the social and the technical in a system development context [5] [6] [7] since it promotes

interactions between software developers and software artifacts. This study focuses on OSS developer team structure as the social aspect and software architecture as the technical aspect of OSS projects. Our general research question is: **what is the joint effect of developer team structure and OSS project architecture on OSS development performance?** The answer to our research question can serve as a step towards integrating the separate lines of work on OSS development's social and technical dimensions into a coherent research literature and also helping OSS practitioners to understand the strengths and weaknesses of the OSS development process.

II. SOCIO-TECHNICAL INTERACTIONS IN OSS

1)Social—Development Team Structure:

Open source software development is a kind of distributed software development that has a large amount of contributors.

We conceptualize the development team structure according to social network theory. Social network theory models individual actors as nodes of a graph joined by their relationships depicted as links between the nodes [8].When relationships are defined as collaborations on a task, the social network is specified as a collaboration network.We choose to generate collaboration networks on an intraproject level; that is, each collaboration network include developers of a single OSS project as nodes and collaboration incidences on tasks (i.e. source code files) of the same project as links.

In OSS projects, the basic unit of work is a file in the OSS distributed version control system (DVCS) like git. Hence, a collaboration incidence occurs when two developers make code commits to the same sourcecode file. A collaboration network refers to the graph made of open source developers as nodes and the collaboration incidences on the same file as links.

We characterize OSS collaboration network structure by two commonly used measures: network size and network centralization. Network size is the number of nodes in a graph. It indicates the overall scope of the collaboration network.

Network centralization indicates the extent to which a network is centralized around one or a few nodes. Centralization of a network is measured in comparison to the most central network—the star network. In the star network, one central node connects to all of the other nodes while all other nodes are only connected to the central node. Any deviation from this structure indicates a reduction in network centralization.

2)Technical—Software Architecture:

In recent years, the study of software architecture (SA) has emerged as an autonomous discipline requiring its own concepts, formalisms, methods, and tools. SA represents a very promising approach since it handles the design and analysis of complex distributed systems and tackles the problem of scaling up in software engineering. Through suitable abstractions, it provides the means to make large applications manageable.

An important technical aspect of software development projects is the structural interdependency among processing elements of the software being developed. Software structural interdependency is "the strength of association established by a connection from one module to another." [4]. In other words, software architecture is a formal way to describe the structural interdependency of a software system in terms of components and their interconnections. By decomposing the overall task into parts and then designing, implementing, or maintaining each individual part, software architecture or software structural interdependency provides a feasible way to develop and manage large systems. It reduces the complexity of software development projects to associations.

3)Interaction Between Team Structure and Software Architecture:

In this study, interaction between the social and the refers to the mutually moderating relationship between team structure (network size and centralization) and software architecture (structural interdependency) in OSS development. In other words, we conceptualize socio-technical interactions in OSS projects as multiplicative interaction of team structure and software architecture.

III. HYPOTHESES

A. Network Size and Structural Interdependency

Network size has mixed implications to information processing capabilities of a team. On one hand, larger networks incur higher coordination and communication cost.On the other hand, larger networks carry more diverse expertise and are better at specialization and division of labour among team members.The overall effect of network size on task performance depends on the structural interdependency of OSS projects. Projects with a lower level of structural interdependency do not take full advantage of the diverse expertise and perspectives in a large team while these projects have to bear the increased communication cost in such a team. Network size can therefore have a negative impact on the project performance of these projects. In a project with a high level of structural interdependency, capabilities of a large team in processing a heavy load of diverse information can produce salient project performance gains, compensating for the communication cost associated with a large team. The negative impact of network size on project performance can therefore be reduced in this scenario.

Reciprocating effects of network size on project performance, impact of software structural interdependency on project performance can vary across development teams with different network size. In traditional software development, where team size tends to be small, software structural interdependency is often found to increase software development effort which in turn can impair project performance. However, recent OSS research suggests that OSS development may resist the negative effect of software structural interdependency on development effort due to its self-organized nature. With the motive to adjust development team structure according to project characteristics, an OS team can recruit new members when a high level of structural interdependency is perceived. This will allow the project to take advantage of information processing capabilities afforded by a large collaboration network. On the other hand, when a team is unwilling or unable to recruit additional members for a project with a high level of structural interdependency, project performance may be impaired as a result of insufficient information processing capabilities in this team. Therefore,

Hypothesis1: Collaboration network size and software structural interdependency mutually and positively moderate each other's impact on OSS project performance; that is, impact of network size on project performance is more likely to be positive when software structural interdependency is higher, and impact of software structural interdependency on project performance is more likely to be favorable when network size increases.

B. Network Centralization and Structural Interdependency

Similar to network size, network centralization has mixed effects on information processing capabilities of a team. A centralized team is better at identifying and consolidating expertise in a team. It incurs lower coordination cost than a chain-like network (low network centralization). However, a centralized team structure imposes significant information processing load on the central nodes. This can hamper the effectiveness of the whole team. Projects with a low

level of structural interdependency do not require much consolidation among knowledge domains. Thus centralization of project team with low structural interdependency has no much importance, leading to suboptimal project performance. However, as the structural interdependency of a project increases, the advantage of a centralized team structure in identifying and consolidating expertise from a wider range of knowledge domains becomes important. This advantage enables a more centralized team to achieve better performance.

On the other hand, the tendency for software structural interdependency to negatively affect project performance can be particularly strong in a team with chain-like structure (low centralization) since such a team is relatively ineffective for knowledge consolidation.This tendency can be reduced by a centralized team since such a team can identify diverse information and coordinate information processing activities. Therefore,

Hypothesis 2: Collaboration network centralization and software structural interdependency mutually and positively moderate each other's impact on OSS project performance; that is, impact of network centralization on project performance is more likely to be positive in projects with a higher level of structural interdependency, and impact of software structural interdependency on project performance is more likely to be favorable when network centralization increases.

IV. IMPLEMENTATION

The data for the study is collected from Github. Git is a distributed version control and source code management (SCM) system with an emphasis on speed. Every Git working directory is a full-fledged repository with complete history and full version tracking capabilities, not dependent on network access or a central server. When you get a copy of the repository, you do not just get the snapshot, but the whole repository itself.

A. Data Collection

From hundreds of OSS projects hosted at Github, we selected a sample of 15 projects for analysis. We selected the sample projects that were registered between Jan 2006 and Nov 2006 and that have atleast ten developers in the collaboration network. This ensures that the sampled projects have sufficient elapsed time since starting so that significant amount of development activity has already taken place.

1) *Collaboration Network Structure*: As discussed earlier, we use network size and network centralization to measure collaboration network structure. Network Size is measured by the total count of nodes in the network. The network centralization measure follows the approach proposed by Freeman [8]. It expresses the degree of inequality in a network as a percentage of that of a perfect star network of the same size. The higher the value, the more centralized the network is. We employed the widely used social network analysis software UCINET6 to compute the structure metrics for the collaboration networks in our sample.

2) *Software Structural Interdependency*: Although automatic tools(e.g., Lattix) are available for evaluating software architecture, these tools are usually limited to a few programming languages such as C/C++ and Java. The overwhelming amount of source code and the wide range of programming languages in our sample prevent us from measuring software structural interdependency either manually or using the automatic tool. We measure software structural interdependency by taking the average number of source code files per folder in the Git tree. A large number of task files per folder indicates a high level of structural interdependency since files grouped into the same folder are typically related.

3) *OSS Development Performance*: In OSS projects, performance cannot be measured by parameters such as cost of development and development within schedule because OSS projects generally do not involve a budget or a deadline. Prior research on OSS development has employed various OSS project performance measures such as OSS developers' perceived project success, the percentage of resolved bugs, increase in lines of code (LoC), promotion to higher ranks in an OSS project, the number of subscribers associated with a project, and number of code commits. Among these measures, we choose the number of code commits per developer per day as our measure of OSS development performance. A code commit refers to a change in the working directory through adding, deleting, or changing software code.

4) *Control Variables:* We controlled for the following variables based on the previous literature:

Product Size: In the software engineering literature, product size has been identified as an important factor in manpower, time, and productivity of a project. Therefore, product size is used as a control variable. According to the literature, we measure product size as the total LoC of an OSS project.

Programming Language: S/w programming language is another well-recognized factor that may affect software performance. Many projects employ more than one language. Java,C++, and C are the most frequently used. Due to the limited sample size, we created four dummy (binary) variables: "Java," "C++," and "C" to account for the top three most frequently used languages, and "other" to represent all the other languages.A project receives a value of 1 for a language dummy variable if it uses the language in consideration, a value of 0 otherwise. In other words, a project has four language values, one for each of the four dummy variables. The "other" language variable was left out of the regression model in order to prevent dummy variable trap.

License Type: OSS projects use different licensing schemes and the specific license type used may affect

developer motivation and project success due to commercial or noncommercial nature of a license. License type is measured as a binary variable. All projects with the most popular OSS license, the GPL (general public license, usually indicating a noncommercial OSS product) license, are given a value of 1. All other projects have a value of 0.

B. *Data analysis*

We apply linear regression model to verify our hypotheses. This model employs the ordinary least squares (OLS) technique in hypothesis testing. It captures a linear relationship between the expected value of dependent variable and each independent variable (when the other independent variables are held fixed). Here, the number of code commits per developer per day, network size and product size are log transformed to account for the nonlinear relationship between project performance and network size and product size. A log transformation of these variables would arbitrarily truncate out meaningful data points. We have used IBM SPSS statistical tool for analysis and results.

C. *Results*

The model incorporates several interaction effects. Interaction effects represent the combined effects of variables on the dependent measure. When an interaction effect is present, the impact of one variable depends on the level of the other variable. We have taken code commits per developer per day as the dependent variable and product of software structural interdependency and network size as a first interaction variable and product of software structural interdependency and network centralization as the second interaction variable. In such models, multicollinearity is a common problem.We attempted to correct for multicollinearity by centering the interacting variables on their mean. Centering just means subtracting a single value (here mean) from all of your data points. The descriptive statistics for the resulting dataset are shown in Table I. The results of the regression analysis are reported in Table II. Note that the mean values in Table I are uncentred values.

TABLE I

DESCRIPTIVE STATISTICS

	No. of observations					
	Valid	Missing	Mean	Std. Deviation	Minimum	Maximum
codecommits	15	0	.2989	.4789	.0098	1.9000
Network size	15	0	2.6557	.8992	-1.7807	1.8893
N/w centralization	15	0	.1694	.1441	-.1495	.4305
SSI	15	0	3.9189	3.9189	-6.3811	6.0189
Product size	15	0	10.4221	1.8959	8.0380	13.2020
Licence	15	0	.4667	.5164	.0000	1.0000
C	15	0	.2000	.4140	.0000	1.0000
Cplus	15	0	.2667	.4577	.0000	1.0000
Java	15	0	.2000	.4140	.0000	1.0000

TABLE II

RESULTS OF LINEAR REGRESSION MODEL[a]

		Unstandardized Coefficients		Standardized Coefficients		
	Variable	B	Std. Error	Beta	Significance	Hypothesis
1	(Constant)	-.9857	.1309		.0433	
	SSI * Networksize	.0465	.0495	.4021	.0401	Supported
	SSI * N/w centralization	.1140	.5570	-.1419	.0848	Supported
	SSI	-.0062	.0597	-.5050	.0300	
	Network size	-.6325	.2870	1.1874	.0920	
	Network centralization	-.2036	.9232	-.6126	.0350	
	Product size	-.0579	.1115	-.2294	.0631	
	Licence	-.3221	.3766	-.3473	.0441	

	C	-.0311	.4419	-.0268	.0947
	Cplus	.1046	.5625	.1000	.0861
	Java	-.2838	.3973	-.2453	.0515

a. Dependent Variable: codecommits

H1 says that collaboration network size and software structural interdependency mutually and positively moderate each other's impact on OSS project performance. This concerns the coefficient of the interaction term of network size and software structural interdependency. As shown in Table II this coefficient is positive and significant (β = 0.0465) in our model testing results. Hence H1 is supported.

Following Aiken and West [10], we calculated simple slopes of the effect of network size on the number of code commits per developer per day at three values of software structural interdependency (SSI): SSI-high = 3.918, SSI-mean = 0, SSI-low = −3.918. These three values are one standard deviation above the mean, the mean, and one standard deviation below the mean of centered SSI values, respectively.

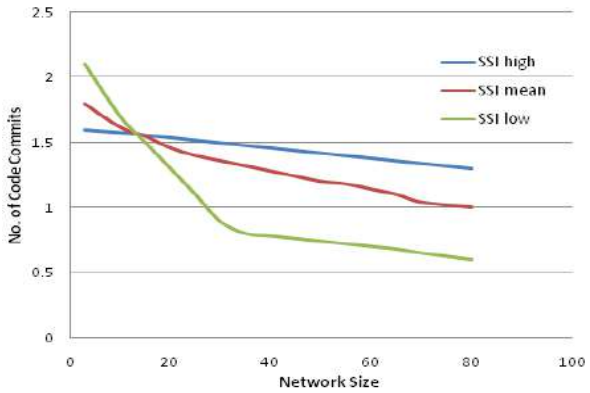

Fig. 1. Simple Slopes of Network Size.

Fig.1 shows that network size tends to have a negative effect on project performance in terms of the number of code commits per developer per day. However, this negative effect can be mitigated by the interaction between network size and software structural interdependency since the negative simple slopes of network size become less steep as the structural interdependency values increase. In order to find the SSI value at which the effect of network size on project performance turns from negative to positive,we equate the derivative of the number of code commits with respect to network size to zero(-0.6325+ 0.0465∗SSI =0). Since the result of this equation is centered SSI value, we add the mean of SSI to this result to gain a precise view of the inflection point. The result indicates that when there are more than 18 files per folder in a project, the effect of network size of project performance turns positive.

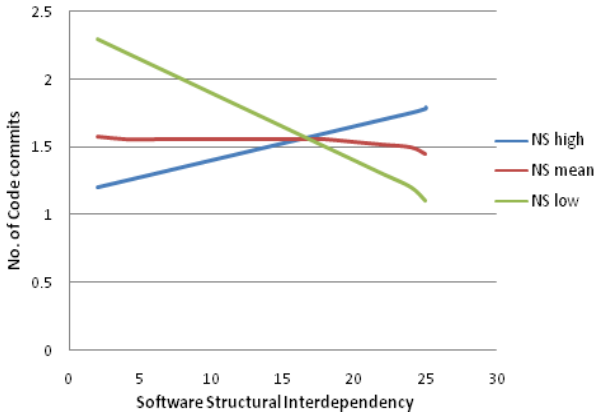

Fig.2. Simple Slopes of SSI

To gain a complete view of the mutually moderating effect of network size and SSI, we also computed the simple slopes of the effect of SSI on the number of code commits per developer per day at one standard deviation above the mean (NS-high = 0.8992), the mean (NS-mean = 0), and one standard deviation below the mean (NS-low = −0.8992) values of network size.

With respect to the effect of software structural interdependency on project performance, Fig 2 reveals that this effect is negative in small development teams but positive in large teams. Therefore, the interaction of network size and structural interdependency plays a key role in the relationship between project characteristics and project performance. By equating the derivative of the number of code commits with respect to SSI to zero (−0.0062 + 0.0465∗Network-Size = 0) and adding the mean value of network size to this result, we found that when there are more than 16 members in a project team,the effect of SSI on project performance becomes positive.

H2 proposes that collaboration network centralization and software structural interdependency mutually and positively moderate each other's impact on OSS project performance. As shown in Table III, the coefficient of the interaction term of network centralization and software structural interdependency is positive and significant (β = 0.1140). Thus, H2 is supported. Following the same simple slope finding approach for H1, we calculated the simple slopes of the effect of network centralization (NC) on the number of code commits per developer per day at SSI-high, SSI-mean, and SSI-low values .

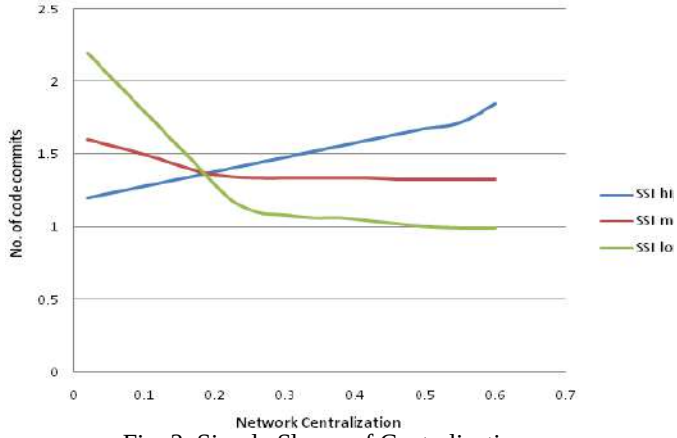

Fig. 3. Simple Slopes of Centralization.

Meanwhile, the simple slopes of the effect of SSI on the number of code commits per developer per day at one standard deviation above the mean (NC-high = 0.1441), the mean (NC-mean = 0), and one standard deviation below the mean (NC-low = −0.1441) values of network centralization are calculated.

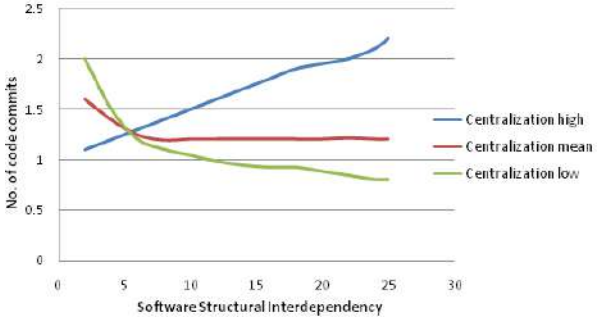

Fig. 4. Simple Slopes of SSI

Figs. 3 and 4 suggest that network centralization and software structural interdependency reciprocally remedy each other's negative effect on project performance. Setting the derivative of the number of code commits with respect to network centralization to zero ($-0.2036 + 0.1140 * SSI = 0$), we found that at a moderate level of software structural interdependency (more than 6 CVS files per folder) the effect of network centralization turns from negative to positive. The derivative analysis of the number of code commits with respect to SSI ($-0.0062 + 0.1140 *$ Network-Centralization $= 0$) reveals that 0.22 degree of network centralization is the inflection point where the effect of structural interdependency turns from negative to positive.

VI. CONCLUSION

This study conceptualizes and empirically evaluate the role of socio-technical interactions in OSS projects. To OSS practitioners, the main implication of our findings is that they can gain the best of both worlds by adopting a hybrid software development process that incorporates strengths of both traditional software development model and recent OSS model. OSS developers can combine team size and centralization in different ways in order to maximize performance gains from their respective interaction effects with software architecture. Moreover, the inflection points found in our study can be used as qualitative benchmarks for OSS practitioners to evaluate social technical interactions in their projects.

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A Survey Of Security Issues In Wireless Sensor Networks

Vivek Aggarwal

Assistant Professor, DAV College, Amritsar

vivek_aggar@yahoo.com

Abstract **–** Wireless sensor networks have recently received a high level of attention due to their wide applications in military and civilian operations. Wireless sensor networks processing sensitive data are facing the risks of data manipulation, data fraud and sensor destruction or replacement. Wireless sensor networks suffer from many constraints, like low computation capability, less storage capacity, limited energy resources, liability to physical capture, and the use of insecure wireless communication channels. These constraints make "security" in WSNs a challenge. Most of the protocols designed for wireless sensor networks consider energy efficiency but not security as a goal. This paper presents security goals and requirements, various attacks faced by wireless sensor networks, some countermeasures against those attacks.

Keywords— WSN, cryptography, security, attacks.

I. INTRODUCTION

Wireless sensors nodes are made up of small electronic devices which are capable of sensing physical or environmental states, such as pressure, temperature, humidity, sound, vibration, motion or speed. These sensor nodes cooperatively pass their data through the network to a main location. It is very important to protect that sensitive data from unauthorized access and adversaries. Therefore security in Wireless Sensor Networks is of great importance to ensure the success of an application and secure data transmission. Moreover, analysis of security requirements gives right directions to develop or implement the proper safeguards against the security violations. The communication among sensor nodes is done by using wireless transceivers due to which they are vulnerable to security attacks. Sensor nodes may also be physically captured or destroyed by the adversaries. The uses of sensor network in various applications emphasis on secure routing .

Routing protocols proposed for WSNs cope well with the dynamically changing topology. However, they do not solve the problems when adversary or compromised nodes are present in the network. The security problems cannot be considered separately and must be taken into account for the specification of all the functionalities of the network. Since, research on protocols is still going on, there is no single standard routing protocol which can be taken as secure. However, it is difficult to provide security in WSN using public-key cryptography because of very limited computing power so; most of the proposed security solutions for WSN are based on symmetric key cryptography. The main aspects of wireless sensor network security can be classified into four major categories: the obstacles security of sensor networks, the requirements for making the network secure, the various attacks and their defensive measures. Secure routing protocols are concerned with how a node sends messages to other nodes or a base station.

II. SECURITY ISSUES

An individual sensor node in a WSN is inherently resource constrained. All sensor nodes in a WSN have limited processing capability, storage capacity, and communication bandwidth. Some of the security issues are defined below in brief:

A. *Energy capacity is limited*

Since sensor nodes are battery powered having limited energy capacity. Energy poses a big challenge for network designers in hostile environment where it is impossible to access the sensors and recharge their batteries. When the energy of a sensor reaches a certain threshold level, the sensor will become faulty and will not be able to function properly, which will have a major impact on the network performance.

B. *Storage Space is limited*

A sensor is a tiny device with only a small amount of memory and storage space for the code. In order to build an effective security mechanism, it is necessary to limit the code size of the security algorithm.

C. *Communication is unreliable*

As the sensor nodes communicate through connectionless protocols and the network security is based on a defined communication protocol. Packets may get damaged due to errors occurred in channel or packets dropped at highly congested nodes which results is lost or missing packets.

III. SECURITY REQUIREMENTS

Sensor networks are vulnerable to various attacks like any other conventional network but due to limited resources and unique applications it require some extra security requirements such as confidentiality, integrity, authenticity, data freshness, anonymity and availability of services. The security requirements of a wireless sensor network can be classified as follows:

A. *Authentication:*

A sensor network exchanges sensitive data which helps in making important decisions. The receiver needs to ensure that

the data used in any decision-making process originates from the correct source. So, authentication ensures that the communication between two nodes is genuine. A malicious node cannot masquerade as a trusted network node.

B. *Integrity*

Data in transit can be changed by the adversaries. Data loss or damage can even occur without the presence of a malicious node due to the harsh communication environment. It ensures that the information exchanged between two nodes is not modified in transit either due to malicious intent or by accident.

C. *Data Confidentiality:*

Data confidentiality is the most important issue in network security. Every network with any security focus will typically address this problem first. In sensor networks, the confidentiality relates to the following:

• A sensor network should not leak sensor readings to its neighbors. Especially in a military application, the data stored in the sensor node may be highly sensitive.

• In many applications nodes communicate highly sensitive data, e.g., key distribution; therefore it is extremely important to build a secure channel in a wireless sensor network.

• Public sensor information, such as sensor identities and public keys, should also be encrypted to some extent to protect against traffic analysis attacks.

The standard approach for keeping sensitive data secret is to encrypt the data with a secret key that only intended receivers possess, thus achieving confidentiality.

D. *Data Freshness:*

Though the confidentiality and data integrity are assured, we also need to ensure the freshness of each message. Data freshness ensures that the data is recent and no adversary can replay old messages. This requirement is specifically important when shared-key cryptographic mechanisms are used because shared keys need to be changed with time.

IV. POSSIBLE ATTACKS ON ROUTING LAYER AND THEIR COUNTERMEASURES IN WSN

WSNs are vulnerable to various types of attacks. Most of the routing protocols proposed for sensor networks are not designed to handle security related issues. Therefore there is a lot of scope for attacks on them. There are two types of classification for attacks in WSN. Table I shows different possible attacks on each layer. As the data is transmitted or routed through network layer according to the routing protocols.

TABLE I

TABLE OF DIFFERENT ATTACKS ON EACH LAYER

LAYER	ATTACKS
Physical layer	Jamming, interceptions, eavesdropping, tampering
Link layer	Collision, exhaustion, unfairness, traffic analysis
Network layer	Spoofing, Sybil, wormhole, sinkhole, HELLO flood, acknowledgement spoofing, selective forwarding.
Transport layer	Flooding, session hijacking
Application layer	Repudiation, data corruption, cloning

To secure the sensitive data, different techniques can be used such as data encryption by using cryptographic techniques. It is important to understand the attacks on routing layer to countermeasures them. Table II summarizes different attacks on routing layer and their countermeasures.

TABLE II
ATTACKS ON NETWORK LAYER AND THEIR DEFENSIVE MEASURES

ATTACKS	DEFENSIVE TECHNIQUES
Spoofed, altered and replaying of routing info.	Authentication, Encryption
Sybil attack	Authentication
Selective Forwarding	Redundancy, Probing, Multipath
Sinkhole	Authentication, Monitoring, Redundancy
Wormhole	Monitoring, Flexible routing protocols
HELLO flood	Two way authentication, 3- way handshake, link bi-directionality verification, authenticated broadcast.

V. A REVIEW OF SECURE ROUTING PROTOCOLS

There is a lot of work has been already done in routing but there is no such protocol which consider security as a prime goal. This section includes some routing protocols which are designed to consider security as a goal.

Secure Cluster Based Multipath Routing Protocol (SCMRP) is a proactive, hierarchical multipath secure routing protocol. The SCMRP model provides the security in routing the data using the effective key management technique like unique pair wise key distribution. The SCMRP model sends NeighBoR DETection (NBR DET) packet to construct the neighbor list in each node. Every node sends the neighbor list information to the base station. The base station generates the pair-wise key for every link in the network. These packets, neighbor list and pair-wise key received by the base station consume high energy in the resource constrained WSNs.

A Digital Signature-Based Secure Node Disjoint Multipath Routing Protocol is proposed in which security is provided by using the digital signature crypto system. The digital signature is generated by using the MD5 hash function and RSA algorithm. The security ensures the correctness of data, non-repudiation and authentication. It prevents data to be tampered or altered routing, selective forwarding, and sinkhole kind of attacks.

Another way to provide security in WSNs with pubic key techniques for user authentication and establishment of session key. The communication between user and base station is done through public key cryptography whereas between base station and sensor nodes is done through shared private key. In

the proposed protocol RSA cryptosystem is used. Basically it uses three entities named as:

1. CA (Certified Authority) which is an entity trusted by all sensor nodes and it has public and private key pairs;

2. EA (External Agent) communicated with the WSN having a public and private key pair where the public-key must be certified by CA; and

3. BS (Base Station) controls the local wireless network and acts as a gateway between the external environment and wireless senor network.

The protocol is assembled in three main phases: a) Registration phase: The user or EA registers its public key with a base station and the EA must have a certification from a certified authority which is trusted by the wireless sensor network. b) Authentication phase is where the base station authenticates the external agent. It can be achieved by encrypting the communication request and nonce of the user with user's private key: "ciphertext1". The checksum is calculated: "chk". Then both the ciphertext1 and chk are encrypted with the base station's public key which ensures that only the BS can decrypt it. In this way it provides secrecy of the message. c) Session key establishment phase: the message containing the session key is encrypted with the publicly available key of external agent by using the RSA algorithm. The cipher text is then transmitted to the EA and when the user receives the cipher text, he decrypts the message with the help of its private key and validates it. After validation the user starts communication with the sensor nodes.

The Three-Tier Security Scheme gives a three-tier framework which allows the use of pair-wise key predistribution scheme as its basic component. It works on two stages: first is Static and mobile polynomial predistribution and second is discovering key between mobile node and stationary node. This security scheme uses two separate polynomial pools of keys. One is for mobile sink to gain access to the network. Polynomials from this pool are used to establish the authentication between mobile sinks and stationary access nodes, which will enable these mobile sinks to access the sensor network for data gathering. The second polynomial pool is used for authentication and pair-wise key establishment between the sensor nodes and stationary nodes. By using two separate key pools and having less no. of stationary access nodes which carry polynomials from the mobile pool in the network may obstruct an attacker from gathering sensor data, by deploying a replicated mobile sink. It protects the network from replicated mobile sink attacks.

V. CONCLUSION

This paper outlined the issues, goals and requirements of security in wireless sensor networks. Additionally it includes a review of different threats associated with sensor networks and their defensive measures. Then routing in wireless sensor networks was discussed. As most of the routing protocols are not designed taking security issues into account, most of them are prone to different types of attacks. Some routing protocols which have been designed taking security as a goal are described briefly. The previous work which has been performed for making routing protocols secure was also discussed in brief. In the future we intend to evaluate these protocols under variety of routing attacks and map these protocols to the appropriate applications.

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Using Genetic Algorithm to Solve 0/1 Knapsack Problem

Prabhjot Kaur Chahal
Department of Computer Science & Engineering
Guru Nanak Dev University
Amritsar, India
Prabh0480@gmail.com

Jasmeet Kaur
Department of Computer Science
PEC University of Technology,
Chandigarh, India
Jasmeet.saini1990@gmail.com

Abstract: **In this paper we are trying to explain and solve the 0/1 Knapsack Problem using Genetic Algorithms (GAs) .The Knapsack Problem is an example of a combinatorial optimization problem, which seeks to maximize the benefit of objects in a knapsack without exceeding its capacity.**
The paper contains various sections are there which will be describing the topic as: introductory part, under which comes the brief concepts of Genetic Algorithms and the 0/1 Knapsack Problem, explanation of it with the help of an example and implementation of the 0/1 Knapsack Problem using GAs. The main focus of the paper is on the implementation of the algorithm for solving the problem. The roulette-wheel selection function is used. This problem occurs in many ways in real-life, such as cryptography, finance, etc.

Keywords: genetic algorithm, knapsack problem, mutation, crossover, selection, chromosomes, encoding

I.INTRODUCTION

Using Genetic Algorithms to solve the 0-1Knapsack problem where one has to maximize the benefit of objects in a knapsack without exceeding its capacity. Since the Knapsack problem is a NP problem, so the approaches such as dynamic programming, backtracking, branch and bound, etc. are not very useful for solving it. Genetic Algorithms definitely rule them all and prove to be the best approach in obtaining solutions to problems traditionally thought of as computationally infeasible such as the Knapsack problem.

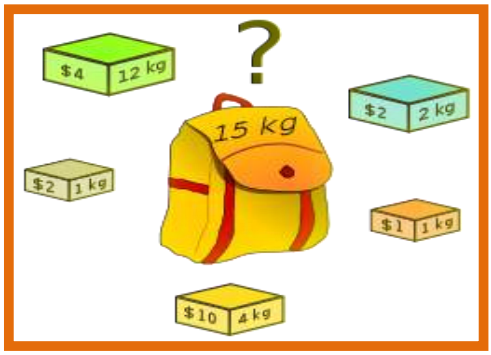

Figure 1: Depicts the problem of Knapsack

Basic concepts of GA

GA begins with a set of candidate solutions (chromosomes) called population. A new population is created from solutions of an old population in hope of getting a better population. Solutions which are chosen to form new solutions (offspring) are selected according to their fitness. The more suitable the solutions are the bigger chances they have to reproduce. This process is repeated until some condition is satisfied [1]

Elements used in GA

Most GA methods are based on the following elements, populations of chromosomes, selection according to fitness, crossover to produce new offspring, and random mutation of new offspring [2].

- *Chromosomes*

The chromosomes in GAs represent the space of candidate solutions. Possible chromosomes encodings are binary, permutation, value, and tree encodings. For the Knapsack problem, we use binary encoding, where every chromosome is a string of bits, 0 or 1.

- *Fitness function*

GA requires a fitness function which allocates a score to each chromosome in the current population. Thus, it can calculate how well the solutions are coded and how well they solve the problem [2].

- *Selection*

The selection process is based on fitness. Chromosomes that are evaluated with higher values (fitter) will most likely be selected to reproduce, whereas, those with low values will be discarded. The fittest chromosomes may be selected several times, however, the number of chromosomes selected to reproduce is equal to the population size, therefore, keeping the size constant for every generation. This phase has an element of randomness just like the survival of organisms in nature. The mostly used selection methods are: roulette-wheel, rank selection, steady-state selection, and some others. Moreover, to increase the performance of GAs, the selection methods are enhanced by elitism. Elitism is a method, which first copies a few of the top scored chromosomes to the new population and then continues generating the rest of the population. Thus, it prevents loosing the few best found solutions.

- *Crossover*

Crossover is the process of combining the bits of one chromosome with those of another. This is to create an

offspring for the next generation that inherits traits of both parents. Crossover randomly chooses a locus and exchanges the sub-sequences before and after that locus between two chromosomes to create two offspring [2]. For example, consider the following parents and a crossover point at position 3:

Parent 1: 1 0 0 | 0 1 1 1
Parent 2: 1 1 1 | 1 0 0 0
Offspring 1: 1 0 0 1 0 0 0
Offspring 2: 1 1 1 0 1 1 1

In this example, Offspring 1 inherits bits in position 1, 2, and 3 from the left side of the crossover point from Parent 1 and the rest from the right side of the crossover point from Parent 2. Similarly, Offspring 2 inherits bits in position 1, 2, and 3 from the left side of Parent 2 and the rest from the right side of Parent 1.

- *Mutation*

Mutation is performed after crossover to prevent falling all solutions in the population into a local optimum of solved problem. Mutation changes the new offspring by flipping bits from 1 to 0 or from 0 to 1. Mutation can occur at each bit position in the string with some probability, usually very small (e.g. 0.001). For example, consider the following chromosome with mutation point at position 2:

Not mutated chromosome: 1 *0* 0 0 1 1 1
Mutated: 1 *1* 0 0 1 1 1

The 0 at position 2 flips to 1 after mutation.

1) Steps in simple GA

1.**Start**: Randomly generate a population of N chromosomes.
2. **Fitness**: Calculate the fitness of all chromosomes.
3. Create a new population:
   a.**Selection**: According to the selection method select 2 chromosomes from the population.
   b.**Crossover**: Perform crossover on the 2 chromosomes selected.
   c.**Mutation**: Perform mutation on the chromosomes obtained.
4. **Replace**: Replace the current population with the new population.
5. **Test:** Test whether the end condition is satisfied. If so, stop. If not, return the best solution in current population and go to Step 2.

Each iteration of this process is called generation.

II.LITERATURE SURVEY

The researches Maya Hristakeva, Dipti Shrestha [3] of Genetic Algorithm have solved 0/1 knapsack problem and defining knapsack problem (KP) as:

The KP problem is an example of a combinatorial optimization problem, which seeks for a best solution from among many other solutions. It is concerned with a knapsack that has positive integer volume (or capacity) **V.** There are **n** distinct items that may potentially be placed in the knapsack. Item **i** has a positive integer volume **Vi** and positive integer benefit **Bi.** In addition, there are **Qi** copies of item **i** available, where quantity **Qi** is a positive integer satisfying $1 \leq \mathbf{Qi} \leq \infty$.

Let **Xi** determines how many copies of item **i** are to be placed into the knapsack. The goal is to:
Maximize:

$$\sum_{i=1}^{N} \mathbf{Bi\ Xi}$$

Subject to the constraints

$$\sum_{i=1}^{N} \mathbf{Vi\ Xi} \leq \mathbf{V}$$

And

$$\mathbf{0 \leq Xi \leq Qi.}$$

If one or more of the **Qi** is infinite, the KP is **unbounded***;* otherwise, the KP is **bounded** [3]. The bounded KP can be either 0-1 KP or Multi-constraint KP. If **Qi** = 1 for **i** = 1, 2, ….,**N**, the problem is a **0-1 knapsack problem** In the current paper, we have worked on the bounded **0 1 KP,** where we cannot have more than one copy of an item in the knapsack.

Dr. Richard Spillman [4] developed a new approach to find solutions to the subset sum problem. The subset problem is an NP complete problem which has applications in bin packing [5], cryptography, research operations etc and a genetic algorithm can easily solve this problem.

It has been shown that the approach can efficiently produce large solutions (10,000 elements or more) subset run problems.

Sami Khuri, Thomas Back, Jorg Heitkotter [6] gave a methodology of solving the NP-complete problem, the 0/1 multiple knapsack problem by allowing the breeding and participation of infeasible strings in the population. In this research GS based algorithms are argumented with Domain specific knowledge, which is different from the many other GA based algorithms.

III.EXAMPLE OF 0/1 KP

Suppose we have a knapsack that has a capacity of 13 cubic inches and several items of different sizes and different benefits. We want to include in the knapsack only these items that will have the greatest total benefit within the constraint of the knapsack's capacity. There are three potential items (labeled 'A,' 'B,' 'C'). Their volumes and benefits are as follows:

Item	A	B	C
Benefit	4	3	5
Volume	6	7	8

We seek to maximize the total benefit:

$$\sum_{i=1}^{3} \mathbf{Bi\ Xi = 4X_1 + 3X2 + 5X_3}$$

Subject to the constraints:

$$\sum_{i=1}^{3} \mathbf{Vi\ Xi = 6X1 + 7X2 + 8X3 \leq 13}$$

And

Xi Є {0,1}, for i = 1, 2, …, n..

For this problem there are 2^3 possible subsets of items:

A B C Volume of the set Benefit of the set

A	B	C
0	0	0
0	0	1
0	1	0
0	1	1
1	0	0
1	0	1
1	1	0
1	1	1

Volume of the set	Benefit of the set
0	0
8	5
7	3
15	-
6	4
14	-
13	7
21	-

In order to find the best solution we have to identify a subset that meets the constraint and has the maximum total benefit. In our case, only rows given in italics satisfy the constraint. Hence, the optimal benefit for the given constraint (V = 13) can only be obtained with one quantity of A, one quantity of B, and zero quantity of C, and it is 7.

IV.WORKING

First the pseudo code is given below, on the basis of which we illustrate each and every step of the code in the genetic algorithm. And we show the implementation.

1) Pseudo Code

```
begin
Initialize population;
for n = 1 to iterations j number do
begin
for i = 1 to popsize do
for j = 1 to knapsads number do
if exceed (pop[i],j)
than eliminate(pop[i],j)
//Find non dominated solutions from population;
for selection nitmber = 1 to popsize 1 2 do
begin
Random select two individuals pop[indl] and
Crossover(pop[mo7]. pop[ind2]);
Two offspring o/j? and off2 are obtained;
//The offspring enter the population of the new generation;
End;
End;
```

2) Illustration

a. Encoding

In the encoding scheme, randomly the items are selected. If the item is selected then that is represented as 1 and if item is not selected then that is represented as 0.

Encoding: 0 = not exist, 1 = exist in the Knapsack Chromosome

1010110

Item	1	2	3	4	5	6	7
Chrom	1	0	1	0	1	1	0
Exist?	Y	N	Y	n	Y	y	n

From the above figure the items selected are 1, 3, 5, 6.

Suppose randomly populations are generated and are represented as chromosomes. Generate random population of n chromosomes:

a) 0101010
b) 1100100
c) 0100011

b. Fitness and Selection

For the first chromosome the total benefit [7] and weights are to be calculated.

0101010

Item	1	2	3	4	5	6	7
Chrom	0	1	0	1	0	1	0
Benefit	5	8	3	2	7	9	4
Weight	7	8	4	10	4	6	4

The total benefit = (8+2+9) = 19
And total weight = (8+10+6) =24

Then we have to check whether these items can be selected or not. As the weight exceeds our maximum capacity so we cannot select these items for further steps.

Similarly for the third chromosome **0100011**

The total benefit = (8 + 9 + 4) = 21
And total weight = (8 + 6 + 4) = 18

From the above discussion it is clear that the second and third chromosomes are selected as parent upon which the crossover will be operated in order to get the child chromosome.

c. Crossover and Mutation

The selected chromosomes are
PARENT 1: 1 1 0 0 1 0 0
PARENT 2: 0 1 0 0 0 1 1

After crossover the resultant offspring will be
CHILD 1: 1 1 0 0 0 1 1
CHILD 2: 0 1 0 0 1 0 0

If we put the mutation over the child 2 and on the last bit then 0 will be converted to bit 1.

Before Mutation :

0 1 0 0 1 0 0

After Mutation:

0 1 0 0 1 0 1

After the crossover is finished, the new offspring are kept in the new population. If the end condition is there then the process will stop there otherwise again the fitness calculation and selection will occur to find out the better solution [8] [9].

V.CONCLUSION

We have shown how Genetic Algorithms can be used to find good solutions for the 0-1 Knapsack Problem. Genetic algorithms reduce the complexity of the KP from exponential to linear, which makes it possible to find approximately optimal solutions for an NP problem. The results from the program show that the implementation of a good selection method and elitism are very important for the good performance of a genetic algorithm.

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Item	1	2	3	4	5	6	7
Chrom	0	1	0	0	0	1	1
Benefit	5	8	3	2	7	9	4
Weight	1	8	4	10	4	6	4

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Role of Ethical Hacking in Information Security

Jasmeet Kaur
Department of CSE
PEC University of Technology
Chandigarh, India
Jasmeet.saini1990@gmail.com

Prabhjot kaur Chahal
Computer Science Department
GNDU, Amritsar
Amritsar, India
Prabh0480@gmail.com

Abstract*— With the increasing use of the internet and concerns about its security, there is considerable need for computer experts to work in ethical hacking. Ethical hacking is the use of hacking skills to determine vulnerabilities in computer systems at the request of the company that owns the system, and then responsible reporting is done to aware the owners. This paper includes the brief difference between ethical hacking and non-ethical hacking and various type of hacking techniques. Role of ethical hackers in enterprise security architecture will also be discussed in this paper.

***Index Terms*— Ethical Hackers, Information Security.**

I. INTRODUCTION

Hackers and Crackers [1] are seems to be same, but a great difference exists between them. Both hackers and crackers have lots of knowledge and experience about computers but only difference is how they are using their knowledge. Hackers are good guys having strong ethics and use their knowledge in positive direction; on the other hand crackers are bad guys who use their knowledge for illegal and negative purposes. Crackers can be hackers but vice versa is not always possible. Hacking is considered as modifying computer hardware and software illegally to full personal gains. For example- Stealing data, distributing viruses, breaks security codes to gain unauthorized network access etc. [2] Hacking is basically done by crackers. Ethical hacking is identifying the vulnerabilities in the security systems and does responsible reporting to the owners of the systems instead of taking advantage of it. Ethical Hacking is testing resources for good cause and betterment of technology. It is also known as penetrating testing, intrusion testing and red-teaming.

A. Types of hackers

***White hat hacker*:** White hat hacker [4] is a person who performs ethical hacking. They find out security weaknesses in a computer system or network using their knowledge of hacking and hacker toolset. Instead of taking malicious advantage of it, they implement countermeasures and allow system's owner to fix the problem before it can be taken advantage by others. They are also called penetration tester.

Black hat hacker: Black hat hacker [4] is a person who performs unethical hacking. These are criminal hackers or crackers who use their skills or knowledge for illegal and malicious purposes. They break into a computer system or network and violate the same integrity of the remote machine.

Grey hat hacker: Grey hat hacker [4] is a person who sometimes acts legally and sometimes not. They break the security weakness in a computer system in order to bring the weaknesses to the attention of the owner. Unlike black hat they improve the computer and network security. Unlike white hat they publish the vulnerabilities and give other crackers the opportunity to exploit the system. They are hybrid between white hat hackers and black hat hackers.

II. CATEGORIZATION OF HACKING

B. System hacking: System hacking is done through various attacks like [4]:-

1) Brute force attack: A Brute force attack is trial and error method used to obtain user password or PIN. Basically it is trying a random approach by *attempting different passwords* and hoping that one works. Brute force randomly generate passwords and related hashes. It is also known as dictionary attack, might try all the words in the dictionary. Various tools are available to perform this attack on the Windows SAM file like Cain and Able.

2) Keyloggers: Keyloggers are hardware device and software program that record the real time activity of a computer user, including the keyboard keys they press. Keyloggers either save the information in a file to be read later, or transmit to a predetermined destination accessible to the hacker. Once a keylogger program is installed on the target machine, it runs continually in the background.

3) Live BootDisk attack: Attackers can get access to the computer's processing power, internet and various other tasks without the need of a username or password. Attackers can remove passwords or set new passwords on the user accounts.

C. Network hacking: Network hacking includes various attacks like[4]:-

1) Network sniffing: Sniffing is the process of gathering traffic from a network as they pass and storing them to analyze later. A sniffer device can read, monitor and capture network data exchange and read network packets. It is a passive attack.

2) Man in the middle attack: The attack in which the attacker makes independent connections with the victims and relays messages between them, making them believe that they are talking directly to each other over a private connection, when in fact the entire conversation is controlled by the attacker.

3) DNS spoofing: DNS spoofing is a technique that tricks a DNS server into believing that it has received authentic informat when in reality it has not. When a user requests a certain website URL, the address is looked up on a DNS server to find the corresponding IP address. If the DNS server has been compromised, the user is redirected to a website other than the one that was requested, such as a fake website.

4) Viruses and worms: Viruses and worms are self replicating programs or code fragments that attack to other programs and machines. Both viruses and worms attempt to shut down networks by flooding them with massive amount of bogus traffic. Worms spread from computer to computer, but unlike virus it has the capability to travel without any human action.

D. Server hacking :It is done through various attacks like [4]:-

1) SQL injection: SQL injection is a code injection technique that exploits vulnerabilities in a web server database and allow the attacker to gain access to the database and read, modify, or delete the information.

2) DoS: Denial of Services attack give hacker a way to bring down the network without gaining the access to it. In this attack hacker send the huge amount of data packets to the target system, which cannot be handled by it and thus cause it to either crash, reboot or deny services to legitimate users.

3) DDoS: Distributed Denial of Services is a DoS attack that is carried out by several computer or several attackers acting in concert. DDoS is more difficult to block because it uses multiple change in source IP address.

E. Email hacking: It includes attacks like:-

1) Phishing: This is one of the technique to hack the email Passwords. This method involves the use of fake login pages that look and feel like almost identical to that of legitimate website. Once the login details are entered on such fake login page that information are stolen away by the hacker.

2) Email forging: Email forging allows an attacker to disguise the source of an email and send it to the victim. Most attackers use this technique to fool the victim into believing that somebody else has sent the particular email.

3) Mail bombing: Mail bombing is a technique in which attacker floods victim's email account with an extremely large Number of meaningless emails.

Two types of mail bombing are:-

- Mass mail bombing
- List Linking mail bombing

F. Wireless hacking: It is done through various attacks like [4]:-

1) War driving: War driving is detecting the wireless networks and checking out their properties using various wireless devices and related tools. War driving is of two types:- Active war Driving Passive war Driving.

2) Wireless network sniffing: Sniffing is gathering traffic from a network by capturing the data as they pass. It is easier to sniff wireless networks than wired ones. Sniffing helps in finding the access points that allow anyone to connect.

3) Jamming the air waves: Various appliances such as microwave ovens, cordless phones operate on the 2.4GHz radio frequency. An attacker can release large amount of noise using these devices and jam the airwaves so that the signal to noise drops so low that the wireless.

III. STEPS PERFORMED BY ETHICAL HACKER

G. Performing Reconnaissance: It refers to the first pre-attack phases [1] of the hacking process which includes systematic attempt to locate, gather, identify and record information about the target. The hackers seek to find out as much information as possible about the target. Types of Reconnaissance:-

- Social Engineering
- Site(physical) Reconnaissance
- Internet Reconnaissance
- IP/Network Reconnaissance
- DNS Reconnaissance

H. Scanning and Enumeration: It is consider as second pre attack phase which includes discovering systems on the networks and taking a look at what open ports and applications may be running. In scanning hackers actually go into the network and start touching device to find more about it. It also includes vulnerability assessment, that is usually carried out by a network scanner. Some type of automated scanning products are used. Most of these products can also test for the type of operating system and application software running and the versions, user accounts and services that are also running. The end result is a report that provides a list of each systems vulnerabilities and corresponding counter-\ measures to mitigate the associated risks.

I. Penetrating testing:

This is the phase where real hacking take place. Vulnerabilities discovered during the reconnaissance and scanning phase are now exploited to gain access. When ethical hackers are carrying out a penetration test, their ultimate goal is usually to break into a system and hop from system to system until they own the domain. The penetrating testing activities include various steps as follows:-

1) Form two or three teams:

- Red team: The attack team
- White team: Network administration, the victim
- Blue team: Management coordinating and overseeing the test (optional)

2) Establish the ground rules:

- Testing objectives.
- What to attack.

- Who knows what about the other team (Are both teams aware of the other?)
- Start and stop dateser.
- Legal issues.
- Just because a client asks for it, doesn't mean that its legal.
- The ethical hacker must know the relevant local, state, and federal laws and how they pertain to testing procedure.
- Confidentiality/Nondisclosure.
- Reporting requirements.
- Formalized approval and written agreement with signatures and contact information.
- Keep this document handy during testing procedure.

J. *Passive scanning:* Gather as much information about the target as possible while maintaining zero contact between the penetration tester and the target. Passive scanning can include interrogating:

- The company's website and source code
- Social networking sites
- Databases
- Newsgroups
- Google, Monster.com, etc.

K. Active scanning: Probe the targets public exposure with scanning tools, which might include:

- Commercial scanning tools
- Banner grabbing
- Social engineering
- War dialling
- DNS zone transfers
- Sniffing traffic
- Wireless war driving

L. Attack surface enumeration: Probe the target network to identify, enumerate, and document each exposed device:

- Network mapping
- Router and switch locations
- Perimeter firewalls
- LAN, MAN, and WAN connections

M. Exploiting the uncovered vulnerabilities: Execute the appropriate attack tools targeted at the suspected exposures.

- Some may not work.
- Some may kill services or even kill the server.
- Some may be successful.

N. Escalation of privilege: Escalate the security context so the ethical hacker has more control.

- Gaining root or administrative rights
- Using cracked password for unauthorized access
- Carrying out buffer overflow to gain local versus remote control

O. Documentation and reporting: Document everything found, how it was found, the tools that were used, vulnerabilities that were exploited, the timeline of activities, and successes, etc.

IV. STEPS PERFORMED BY UN-ETHICAL HACKER DIFFERENTLY

P. Target selection:

- Motivations would be due to a grudge or for fun or profit.
- There are no ground rules.

Q. Intermediaries:

- The attacker launches his attack from a different system (intermediary) than his own to make tracking back to him more difficult in case the attack is detected.
- There may be several layers of intermediaries between the attacker and the victim.
- Intermediaries are often victims of the attacker as well.

R. Next the attacker will procede with penetration testing steps described previously:

- Passive scanning
- Active scanning
- Target system selection
- Fingerprinting
- Exploiting the uncovered vulnerabilities
- Escalation of privilege

S. Preserving access: This involves uploading and installing a root kit, backdoor, Trojan applications to assure that the attacker can regain access at a later time.

T. Covering his tracks:

- Hiding uploaded files
- Hiding the active processes that allow the attacker to regain access
- Disabling messages to security software and system logs to hide malicious processes and actions

U. Hardening the system: After taking ownership of a system, an attacker may fix the open vulnerabilities so no other attacker can use the system for other purposes.

V. VARIOUS ROLES OF ETHICAL HACKER

A. In protecting domestic network: In order to be a legal hacker, [6] hacker must be a so called Certified Ethical Hacker where certification is conditional upon completion of a program and test [3]. The certification is offered by the International Council of Commerce (EC-Council). But mostly hackers need not to be certified, they opt hacking for fun and their interest. Various teams of ethical hackers work for organisations, such groups are called red team.

- Information Design Assurance Red Team (IDART) has been place since 1996 and provides services for the government, military and other industries.

- The goal of NSA's red team is to try and gain unauthorized access to various sections within the department of Defence.

Many companies such as Google, RSA and Sony were affected by highly sophisticated cyber attacks that resulted in major security breaches and data loss. Data security breaches can involve massive amounts of sensitive customer data such as credit cards numbers, social security numbers, passwords etc.

- 77 million customers records were leaked in 2011 Sony Network data breach.
- In 2011 network security and encryption company RSA reported serious vulnerabilities that affected millions of its Secure ID tokens.
- In 2010 a complex cyber attack named operation Aurora, targeted Google's valuable property as well as sensitive data.
- In 2010 one of the most sophisticated worms called Stuxnet targeted Iranian nuclear production capabilities.

B. *In an Enterprise security Architecture:* Many organisations currently use automated testing tools and internal resources to access their security systems [1]. Assessment process gets complicated because automated testing tools lists all types of countless vulnerabilities rather than identifying high risk security vulnerabilities. This causes less effective findings and high labour costs necessary to identify useful assessment data. On the other hand ethical hackers are perfect in testing using tools because they are knowledgeable experts and can easily detect the high risk vulnerabilities and report them to the owners.

VI. CONCLUSION

Role of ethical hackers is very essential for the growth and security of the organisations. Ethical hackers are required to test whether a company's security settings are secure, to protect the sensitive information in the company's database, to protect database itself, to protect the business interest of the company, to protect the company from being misused by its clients. To keep system continually update and also train the IT team about proper internet security.

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Natural Language Interfaces to Databases– An Introduction

Renu Sharma
PG Deptt. Of Computer Sc. & IT
D.A.V. College, Amritsar
Email: renusharma1978@yahoo.com

Abstract— This paper is an introduction to natural language interfaces to databases (NLIDBs). A brief overview of the history of NLIDBs is first given. Some advantages and disadvantages of NLIDBs are then discussed. An introduction to some of the linguistic problems NLIDBs have to confront follows, for the benefit of readers less familiar with computational linguistics. The paper ends with conclusion of possible future scope of NIDB.

I. INTRODUCTION

A natural language interface to a database (NLIDB) is a system that allows the user to access information stored in a database by typing requests expressed in some natural language (e.g. English). The following example is a dialogue between the user and LOQUI, a commercially available NLIDB , the system's responses are slightly simplified. Throughout this paper messages printed by a NLIDB are shown in this typeface; user entries are shown in this typeface.

> Who works on 3 projects?
B. Vandecapelle, C. Willems, D. Sedlock, J.L. Binot, L. Debille, ...
> Which of them are project leaders?
D. Sedlock, J.L. Binot
> Documents describing their projects?
BIM LOQUI: "The LOQUI NLIDB", "BIM LOQUI"
MMI2: "Technical Annex"

The purpose of this paper is to serve as an introduction to some key concepts,problems, methodologies, and lines of research in the area of natural language interfaces to databases.

II.Some history

Prototype NLIDBs had already appeared in the late sixties and early seventies. The best-known NLIDB of that period is LUNAR, a natural language interface to a database containing chemical analyses of moon rocks. LUNAR and other early natural language interfaces were each built having a particular database in mind, and thus could not be easily modified to be used with different databases. By the late seventies several more NLIDBs had appeared. RENDEZVOUS engaged the user in dialogues to help him/her formulate his/her queries. LADDER page47 could be used with large databases, and it configured to interface to different underlying database management systems (DBMSs). LADDER used semantic Grammars a technique that interleaves syntactic and semantic processing. Although semantic grammars helped to implement systems with impressive characteristics, the resulting systems proved difficult to port to different application domains. Indeed, a different grammar had to be developed whenever LADDER was configured for a new application. As researchers started to focus on portable NLIDBs, semantic grammars were gradually abandoned. PLANES page50and PHILIQA1were some of the other NLIDBs that appeared in the late seventies.

III. Advantages & disadvantages

This section discusses some of the advantages and disadvantages of NLIDBs, comparing them to formal query languages, form-based interfaces, and graphical interfaces.

Access to the information stored in a database has traditionally been achieved using formal query languages, such as SQL. Let us assume, for example, that the following tables are stored in a relational database:

Employees table

Employee	department	phone
Thompson	Sales	2317
Richardson	accounting	2554
. . .	. . .	. . .

Departments Table

department	Manager	city
Sales	Ferguson	London
accounting	Richardson	Bristol
. . .	. . .	. . .

The first table, employees table, shows the department and phone number of each employee. The second table, departments table, shows the manager of each department, and the city where each department is located. A list showing each employee's manager can be created using the SQL query:

```
SELECT employeestable.employee,
departments table.manager
FROM employees_table, departments table_
WHERE employees table.department =
departments table.department
```

The SQL query above instructs the database system to report

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all possible pairs consisting of an employee value and a manager value, such that the employee value comes from a row in employees table, the manager value comes from a row in departments table, and the two rows have the same department value.

In form-based interfaces pre-defined forms consisting of fields are used. The user fills the information which is already known in the corresponding fields, and the system completes the remaining fields by querying the underlying database. A user wishing to learn the manager of an employee named *"Thompson"* could fill in the pre-defined form "Employee Information Form" as shown below on the left. The system would respond by filling the remaining fields as shown below.

Employee Information Form

Employee:	*Thompso*
Department:	
Phone:	
Manager:	

Employee Information Form

Employee:	Thompson
Department:	Sales
Phone:	2317
Manager:	Ferguson

If there are two or more answers (e.g. more than one employee called *"Thompson"*), the system responds by generating a stack of filled forms, one form per possible answer.

IV. Some advantages of NLIDBs

No artificial language: One advantage of NLIDBs is supposed to be that the user is not required to learn an artificial communication language. Formal query languages are difficult to learn and master, at least by non-computer-specialists. Graphical interfaces and form-based interfaces are easier to use by occasional users; still, invoking forms, linking frames, selecting restrictions from menus, etc. constitute artificial communication languages, that have to be learned and mastered by the end-user. In contrast, an ideal NLIDB would allow queries to be formulated in the user's native language. This means that an ideal NLIDB would be more suitable for occasional users, since there would be no need for the user to spend time learning the system's communication language.

In practice, current NLIDBs can only understand limited subsets of natural language. Therefore, some training is still needed to teach the end-user what kinds of questions the NLIDB can or cannot understand. In some cases, it may be more difficult to understand what sort of questions an NLIDB can or cannot understand, than to learn how to use a formal query language, a form-based interface, or a graphical interface.

Better for some questions: It has been argued that there are kinds of questions (e.g. questions involving negation, or quantification) that can be easily expressed in natural language, but that seem difficult (or at least tedious) to express using graphical or form-based interfaces. For example, *"Which department has no programmers?"* (negation), or *"Whichcompany supplies every department?"* (universal quantification), can be easily expressed in natural language, but they would be difficult to express in most graphical or form-based interfaces. Questions like the above can, of course, be expressed in database query languages like SQL, but complex database query language expressions may have to be written.

Discourse: Another advantage of NLIDBs, mentioned in and, concerns natural language interfaces that support anaphoric and elliptical expressions. NLIDBs of this kind allow the use of very brief, underspecified questions, where the meaning of each question is complemented by the discourse context. In formal query languages, graphical interfaces, and form-based interfaces this notion of discourse context is usually not supported.

V. Some Disadvantages of NLIDBs

Linguistic coverage not obvious: A frequent complaint against NLIDBs is that the sys-tem's linguistic capabilities are not obvious to the user . As already mentioned, current NLIDBs can only cope with limited subsets of natural language. Users find it difficult to understand (and remember) what kinds of questions the NLIDB can or cannot cope with. For example, MASQUE page44 is able to understand *"What are the capitals of the countries bordering the Baltic* and *bordering Sweden?"*, which leads the user to assume that the system can handle all kinds of conjunctions (false positive expectation). However, the question *"What are the capitals of the countries bordering the Baltic* and *Sweden?"* cannot be handled. Similarly, a failure to answer a particular query can lead the user to assume that "equally difficult" queries cannot be answered, while in fact they can be answered (false negative expectation).

Linguistic vs. conceptual failures: When the NLIDB cannot understand a question, it is often not clear to the user whether the rejected question is outside the system's *linguistic* coverage, or whether it is outside the system's *conceptual* coverage. Thus, users often try to rephrase questions referring to concepts the system does not know , because they think that the problem is caused by the system's limited linguistic coverage. In other cases, users do not try to rephrase questions the system could conceptually handle, because they do not realise that the particular phrasing of the question is outside the linguistic coverage, and that an alternative phrasing of the same question could be answered. Some NLIDBs attempt to solve this problem by providing diagnostic messages, showing the reason a question cannot be handled (e.g. unknown word, syntax too complex, unknown concept, etc.)

Users assume intelligence: As pointed out in , NLIDB users

are often misled by the system's ability to process natural language, and they assume that the system is intelligent, that it has common sense, or that it can deduce facts, while in fact most NLIDBs have no reasoning abilities. This problem does not arise in formal query languages, form-based interfaces, and graphical interfaces, where the capabilities of the system are more obvious to the user.

Inappropriate medium: it has been argued that natural language is not an appropriate medium for communicating with a computer system. Natural language is claimed to be too verbose or too.

ambiguous for human-computer interaction. NLIDB users have to type long questions, while in form-based interfaces only fields have to be filled in, and in graphical interfaces most of the work can be done by mouse-clicking. Natural language questions are also often ambiguous, while formal, form-based, or graphical queries never have multiple meanings.

Tedious configuration: NLIDBs usually require tedious and lengthy configuration phases before they can be used. In contrast, most commercial database systems have built-in formal query language interpreters, and the implementation of form-based interfaces is largely automated.

VI. Conclusion

There are some disadvantages of NLIDBs, but with the researches going on in this topic, some effective NLIDBs will be definitely available in future that can be used in common applications.

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CELLULAR TECHNOLOGY: A COMPARATIVE STUDY ON 3G AND 4G

Er. Vansh Raheja

[*]**B.Tech (ECE), Department of Electronics and Communication Engineering, Lovely Professional University, Phagwara, Jalandhar, rraheja.vansh@gmail.com,**

(M)-07307630695

Abstract- In this modern era of technology a human life is completely depend upon that. The use of technology and change or advancement in technology is on the high level. Without technology a person cannot imagine their life. Most of the work in human life becomes easy because of technology. A person can now talk to each other within or outside the country through various sources given by technology that are mobile phones. Laptops etc. In a day to day life a person uses some common things which are the result of technology like laptops, mobile phone, televisions etc. This paper also deals with some of the technologies which are recently used now a days that are 3g and 4g. 3g stands for Third Generation and 4g stands for Fourth Generation. These both are wireless technologies which are in existence. Except 3g and 4g this paper also explains some other wireless technologies which are used like 1G, 2G, 2.5 G and 2.75G. The main objective of the paper is to discuss the difference between the recent technologies that are 3g and 4g. This difference is explained on the basis of some points like Architecture, Speed, Existence Complaint Technologies, Switching and Multiple Access Techniques.

Keywords: 3g (Third Generation), 4g (Fourth Generation), Difference between 3g and 4g

I. INTRODUCTION

A. WHAT IS 3G?

3g stands for third generation. It is an extended version of 2.75G, 2.5G and many others. 3g is defined as that which provides more speed, high data rate and various other services which are not provided by second generation.

B. WHAT IS 4G?

4g stands for fourth-generation. It is an extended version of 3g. 4g provides more data rate than of 3g.

C. OTHER TECHNOLOGIES

In this modern era of technology there are various technologies starts from 1G, 2G, 2.5G, 2.75G, 3g, and 4g etc. 'G' stands for generation. The explanation of these technologies is as below:

- **1G (First Generation):** 1G is an analogy technique which means there are only voice services and it does not provide data services.1G provides only speed of 9.6KBPS. The main disadvantages of 1G are that it provide limited services, having low band width and provide low efficiency.
- **2G (Second Generation**): 2G technology is digital technology. It is an extended version of 1G. It is defined as that it provides both voice call and data call. It provides more priority to voice call as compared to data call.
- **2.5G:** In this GPRS technology is used. GPRS stands for General Packet Radio Services. GPRS is defined as data overlay over the voice based GSM cellular network. It consists of IP based backbone and wireless access network. Because of GPRS it provides high speed, high data rate and many other services. It provides speed at a rate of 144KBPS.
- **2.75G:** It is a shift to 2.5G. In this EDGE technology is used. EDGE stands For Enhanced Data Rate for GPRS evolution. Because of this it provides a speed of 374KBPS whether it provides high speed but not meet the user needs.

II. DIFFERENCE BETWEEN 3G AND 4G TECHNOLOGIES:

The difference between these two technologies can explain on some bases that are:

- On the basis of Architecture
- On the basis of Speed
- On the basis of Existence Complaint Technologies
- On the basis of Switching
- On the basis of Multiple Access Techniques

3g (Third Generation): 3g stands for third generation. It uses a technique named as UMTS. UMTS stands for Universal Mobile Telecommunication Service. UMTS employs ATM based architecture. UMTS is commonly defined as third-generation. It is targeted to be deployed in 2002. It provides data rate on demand. Third-generation provides a speed of 2MBPS.

4g (Fourth Generation): 4g stands for fourth-generation. It uses a technology named as LTE. LTE stands for Long Term Evolution. It is defined as extended versions of 3g.It provide high speed than that of 3g. It provides a speed of 14.4MBPS. It provides more services as compared to other technologies

A. DIFFERENCE ON THE BASIS OF ARCHITECTURE:

Architecture of 3g (Third Generation):

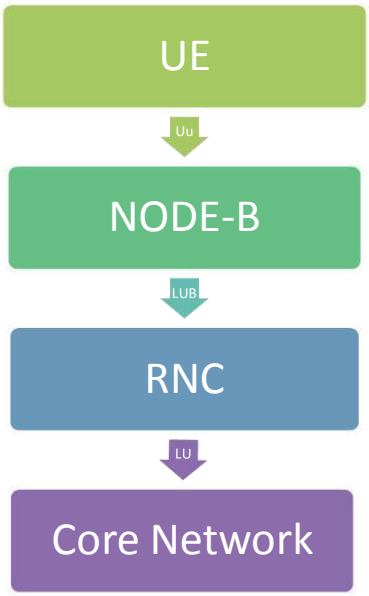

Figure 1 represents the architecture of 3g

3g architecture consists of UE, NODE-B, RNC and Core Network. The explanation of all these are as below:

UE: UE stands for User Equipment. It is similar to Mobile Station (MS) in GSM (Global system for mobile communication). It consist of Mobile Equipment, Subscriber Identity Module (SIM)

NODE-B: It is similar to BTS (Base Transceiver Station) in GSM. It serves one or more UMTS cells. The main function of NODE-B is that:

- It controls the power
- It provides modulation and demodulation
- There is transmission and reception of signal
- Channel coding

RNC: RNC is defined as radio network core. It is similar to BSC (base station controller) in GSM. The function of RNC is that:

- It allocates channel
- It provides handover control
- Segmentation
- Radio resource control

Core network: Core network is one of the major part of 3g.it is defined as that it is similar to MSC (Mobile Switching Centre). It provides control over the whole system. It is the brain of 3g.The main function of this is:

- How to handle the situation
- To which department information is to be forwarded.
- It provides control over the NODE-B and RNC.

The Architecture Of 3g Consists Of Three Interfaces:

- Uu
- LUB
- Lu

Uu: It is defined as that it connects an UE and NODE-B.the function of this interface is that it provides UMTS interface and connect NODE-B with UMTS user equipment.

LUB: It connects an RNC with NODE-B that it controls.

Lu: It is defined as that it connects an RNC with core network that is with MSC (Mobile Switching Centre).The main function of this is to exchange information between RNC and core network.

Architecture of 4g (Fourth Generation)

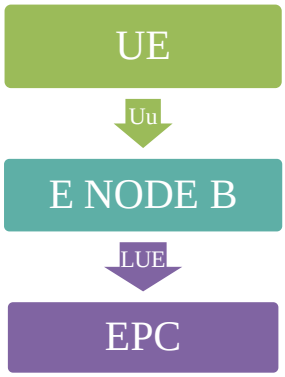

Figure 2 represents the architecture of 4g

4g architecture consist of UE, E NODE B, and EPC. The explanations of these are as below:

UE: UE stands for User Equipment. It is similar to mobile station in GSM.

E NODE B: It is similar to BSS (Base Station System).

BSS=BTS+BSC

BTS stands for Base Transceiver Station.

BSC stands for Base Station Controller

It controls the power and provides modulation and demodulation.

EPC: It stands for Evolved Packet Core. It is similar to MSC (Mobile Switching Centre) in GSM (Global System for Mobile Communication). The main functions of EPC are:

- Serving gateway
- Mobile management entity
- Packet data network gateway
- Policies and charging rules function

The Architecture Of 4g Consists Of Two Interfaces:

- Uu
- LUE

Uu: It is defined as an interface between UE and E NODE B. It connects an user equipment with E NODE B.

LUE: It is defined as an interface between E NODE B and EPC (Evolved Packet Core).It provides movement between E NODE B and EPC.

B. DIFFERENCE ON THE BASIS OF SPEED:

Speed of 3g (Third Generation): It provides high speed of 2MBPS

Speed of 4g (Fourth-generation): It provides high speed than that of 3g.It provides 14.4MBPS rate.

C. DIFFERENCE ON THE BASIS OF THE EXISTENCE OF COMPLIANT TECHNOLOGIES:

There are many technologies that are under 3g, including WCDMA (Wideband Code Division Multiple Access), HSPA (High Speed Packet Access) and among others. Although many mobile companies are quick to dub their technologies as 4g, such as LTE (Long Term Evolution), WIMAX (Worldwide Interoperability for Microwave Access) but no one of these are actually compliant to the specifications set forth by the 4g.

D. DIFFERENCE ON THE BASIS OF SWITCHING:

3g uses a mixture of packet switching and circuit switching. circuit switching is one of the oldest techniques. The disadvantage of this technique that is circuit switching is that it ties up the resource as long as the connection is there. There is wastage of bandwidth in this technique that is circuit switching. In circuit switching there is no speed or code conversion is there. It this there is fixed use of bandwidth. The one of the downside aspect of circuit switching is that dedicated transmission path is created.

4g uses only packet switching not uses circuit switching for data call or voice call. The advantage of packet switching is that resources are used when there is information to send. In this there is dynamic use of bandwidth. In this there is speed or code conversion is there. The most important advantage of this is that no dedicated path is there.

E. DIFFERENCE ON THE BASIS OF MULTIPLE ACCESS TECHNIQUES:

3g uses multiple access techniques that depends on CDMA (code division multiple access) and WCDMA (Wideband code division multiple access). But 4g wants a better technique for reducing the Interference and Inter Symbol Interference .this is done to improve the BER(bit error Rate).One of the best method is to use MC-CDMA(multi carrier code division multiple access) that satisfy the demands of 4g.

MC-CDMA is a technique that is defined as the combination of OFDM and CDMA. OFDM stands for Orthogonal Frequency Division Multiple Access. CDMA stands for Code Division Multiple Access.

One of the most important advantage of OFDM is that it tends to reduce the multipath distortion that results in reduces the channel variation.

III. CONCLUSION:

In the modern era of technology the use of technology increased day to day life. Most of the work of the person depends upon the things made with the use of technology. So it is very important to be aware of the technologies used. The main objective of the paper is to discuss the difference between the recent technologies that are 3g and 4g on the basis of some points like Architecture, Speed, Existence Complaint Technologies, Switching and Multiple Access Techniques. This study concludes that every person should aware of the technology development and the recent technologies used in this era.

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Performance Analysis of V-BLAST MIMO System under Various Modulation Schemes Using Rician Channel

Kritika Prasher, Ameeta Seehra
kritika_prasher@yahoo.in
Guru Nanak Dev Engineering College, Ludhiana

Abstract- ***MIMO wireless technologies provide high throughput, wide coverage and improved reliability but ISI is a major concern. To mitigate ISI, equalisation techniques are employed at receiver side. In this paper, we studied the BER performance of Vertical Bell Labs Layered Space Time Architecture[3] (V-BLAST) spatial Multiplexing Technique with various equalisation techniques like Minimum Mean Square Error (MMSE), Zero Forcing (ZF), Zero Forcing Successive Interference Cancellation (ZF-SIC) by using different modulation techniques such as M-PSK and M-QAM in Rician fading channel. We will consider a point to point MIMO channel with 2 transmit antennas & 2 receive antennas. We will compare different detection techniques for different modulation techniques and concluded that VBLAST ZF-SIC using BPSK gives better results. The performance of 1024 PSK is worst.***

Keywords- **MIMO, BER, SNR, PSK, QAM, ZF, MMSE, SIC, V-BLAST.**

I. INTRODUCTION

Having multiple antennas at both transmitter and receiver ends leads to new technical possibilities. Diversity and beamforming lead to an indirect increase in the capacity of wireless systems, by improving the SNR. Spatial multiplexing allows to directly improve the capacity, by transmitting multiple data streams, and the capacity increases linearly with the number of data streams.

II. MIMO CHANNEL MODEL

Consider a 2×2 MIMO channel with two transmit and two receive antennas. Consider a transmission sequence 1 2 3 ..... N_{tx}.. We have two transmit antennas, so we group the symbols into groups of two. In the first time slot, $x_1 x_2$ send from the first and second antenna[9]. In second time slot $x_3 x_4$ send from the first and second antenna and so on.

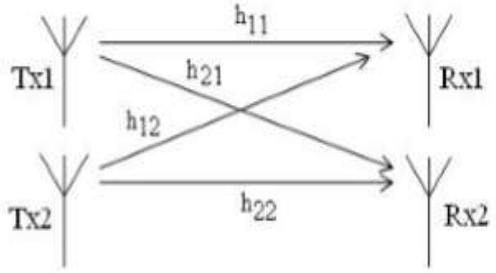

Fig.1 2 X 2 MIMO configuration

For extracting the two symbols which is interfered with each other, consider In the first time slot, the received signal on the first receiver antenna is,

$$y_1 = h_{11}x_1 + h_{12}x_2 + n_1 = [h_{11}\ h_{12}] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + n_1 \quad (1)$$

The received signal on the second receiver antenna is:

$$y_2 = h_{21}x_1 + h_{22}x_2 + n_1 = [h_{21}\ h_{22}] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + n_2 \quad (2)$$

The matrix representation is as follows:

$$\begin{bmatrix} y_1 \\ y_2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} n_1 \\ n_2 \end{bmatrix} \quad (3)$$

III. RICIAN FADING CHANNEL

The presence of a fixed (possibly line-of-sight or LOS) component in the channel will result in Ricean fading [5]. In the presence of an LOS component between the transmitter and the receiver, the MIMO channel may be modeled as the sum of a fixed component and a fading component and given by following equation:

$$H = \sqrt{\frac{k}{1+k}}\ H^{\intercal} + \sqrt{\frac{k}{1+k}} H_W \quad (4)$$

$k \geq 0$ in equation is the Ricean k-factor of the channel and is defined as ratio of the power in the LOS component of the channel to the power in the fading component.

IV. MIMO DETECTORS

A. Zero forcing

Zero forcing is a linear equalization method that does not consider the effects of noise. In fact, the noise may be enhanced in the process of eliminating the interference. A zero-forcing equalizer uses an inverse filter to compensate for the channel response function [4].

B. Minimum mean square error (MMSE)

The MMSE detector is the optimal detection that seeks to balance between cancelation of the interference and reduction of noise enhancement. We assume that the number of receive antennas is less than the number of transmit antennas.

C. Successive Interference Cancelation.

The SIC schemes also reduces the noise amplification by the nulling vector. Therefore after the first cancelation the nulling vector for the second stream need only Mr -1 dimensions. The performance can also be enhanced by optimal ordering the SIC process, in which a nulling vector has been chosen that has the smallest norm to detect the corresponding data stream, but the system becomes more complicated.

D. Maximum Likelihood (ML)

Maximum likelihood detection calculates the Euclidean distance between received signal vector and the product of all

possible transmitted signal vectors with the given channel H, and finds the one with minimum distance. The ML method achieves the optimal performance as the maximum a posterior detection when all the transmitted vectors are likely. However, its complexity increases exponentially as modulation order and/or the number of transmit antennas increases [6].

V. SIMULATION RESULTS:

In this section results are shown in terms of Bit Error Rate (BER) with respect to variation in SNR for 2X2 MIMO V-BLAST system using various modulation techniques such as M-PSK and M-QAM and compared for various equalisation algorithms under Rician channels.

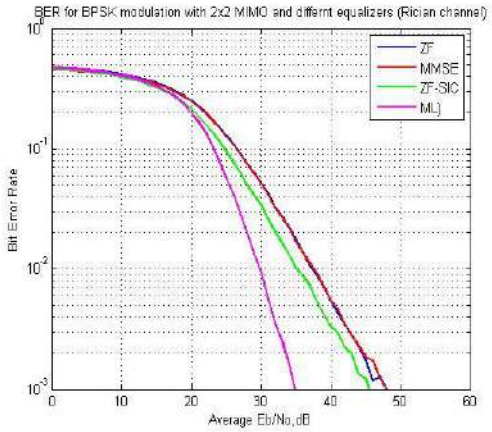

Fig2. BPSK modulation using ML, ZF-SIC, ZF, MMSE

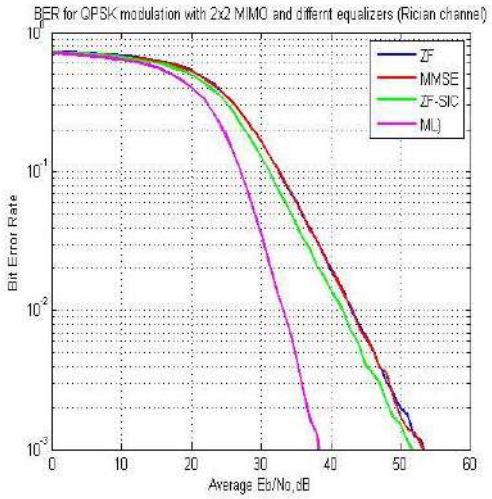

Fig.3 QPSK modulation using ML, ZF-SIC, ZF, MMSE

Modulation technique	ML	ZF-SIC	MMSE	ZF
BPSK	0.0092	0.0337	0.0510	0.0516
QPSK	0.0351	0.1268	0.1646	0.1661

Table 1. BER for BPSK and QPSK using different modulation techniques at 30dB SNR

Here it is seen that BER for ML equaliser is less than all other equalisers. SO ML equaliser is best amongst the equaliser. Also, the performance of BPSK is better as comapred to QPSK modulation.

As the order of modulation increases, the complexity of ML equaliser increases exponentially. So at modulation level of 8-PSK and above we will compare the graphs for only ZF-SIC, MMSE and ZF equaliser.

The following table shows the BER values for different modulation techniques at SNR of 50dB.

Modulation Technique	ZF-SIC	MMSE	ZF
8-PSK	0.0054	0.0072	0.0075
16-PSK	0.0208	0.0282	0.0286
32-PSK	0.0796	0.1050	0.1070
64-PSK	0.2711	0.3128	0.3133
128-PSK	0.5730	0.6011	0.6022
256-PSK	0.7785	0.7960	0.7963
512-PSK	0.8874	0.8966	0.8968
1024-PSK	0.9435	0.9479	0.9487
16-QAM	0.0539	0.0653	0.0666
64-QAM	0.0539	0.0653	0.0666
256-QAM	0.2199	0.2437	0.2439
1024-QAM	0.6147	0.6161	0.6172

Table 2. BER for different modulation techniques at 50dB SNR

Each figure shows 3 subplots corresponding to ZF-SIC, MMSE, ZF equalisation techniques for a given modulation technique in Rician channel.

Fig4. shows bit error rate vs signal to noise ratio of linear detector(LD) and non-linear detector (NLD) for 8-PSK modulation. This figure depicts that at 50dB, BER of ZF-SIC is 0.0054, for MMSE is 0.0072 and ZF is 0.007523. So, ZF-SIC achieves better BER and better performance than other 2 equalizers.

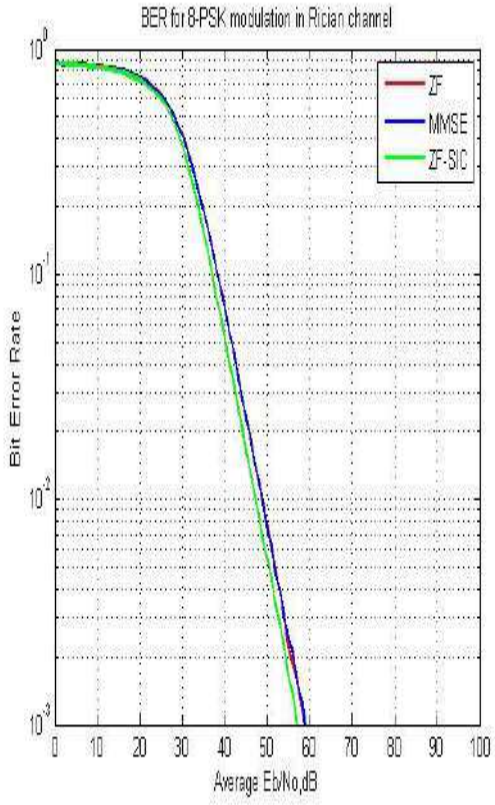

Fig4. 8-PSK modulation in Rician channel

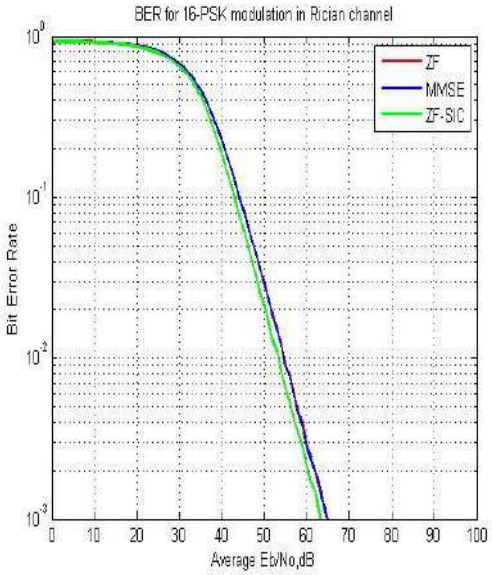

Fig5. 16-PSK modulation in Rician channel

Fig5. shows bit error rate vs signal to noise ratio of linear detector(LD) and non-linear detector (NLD) for 6-PSK modulation. This figure depicts that at 50dB, BER of ZF-SIC is 0.0208, for MMSE is 0.0282 and ZF is 0.0288.

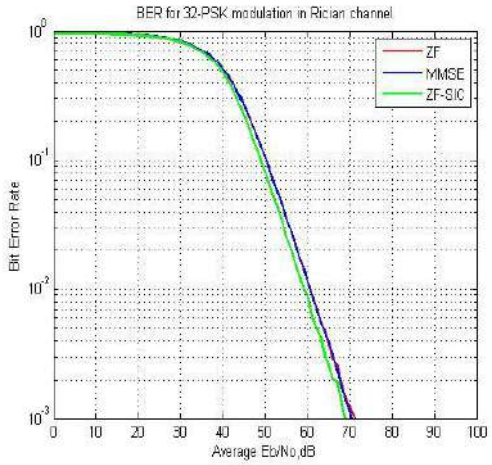

Fig6. 32-PSK modulation using in Rician channel

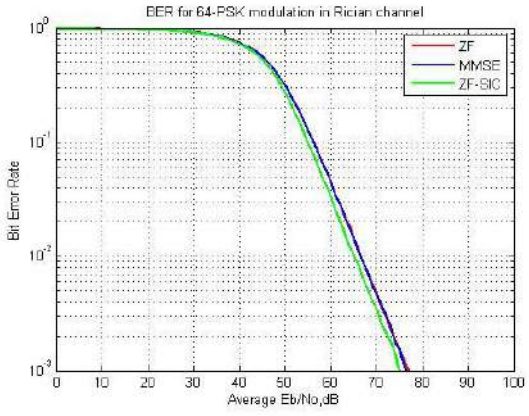

Fig7. 64-PSK modulation in Rician channel

Fig7. shows bit error rate vs signal to noise ratio of linear detector(LD) and non-linear detector (NLD) for 64-PSK modulation. This figure depicts that at 50dB, BER of ZF-SIC is 0.2711, for MMSE is 0.3128 and ZF is 0.3133. So, ZF-SIC achieves better BER and better performance than other 2 equalizers.

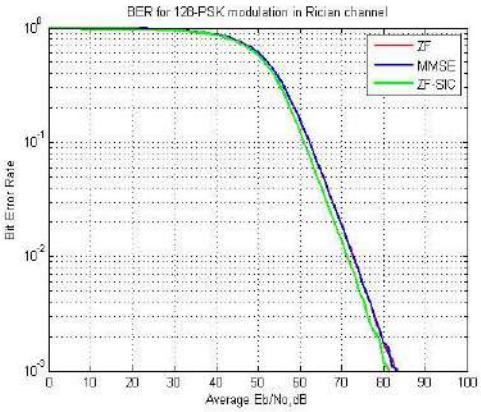

Fig8. 128-PSK modulation in Rician channel

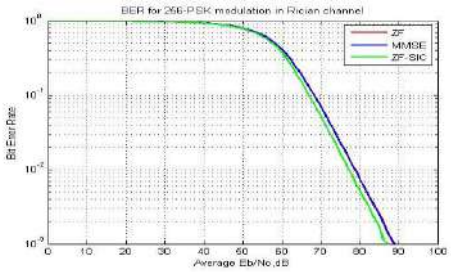

Fig9. 256-PSK modulation in Rician channel

Fig9. shows bit error rate vs signal to noise ratio of linear detector(LD) and non-linear detector (NLD) for 256-PSK modulation. This figure depicts that at 70dB, BER of ZF-SIC is 0.05125, for MMSE is 0.01226 and ZF is 0.07007. So, ZF-SIC achieves better BER and better performance than other 2 equalizers.

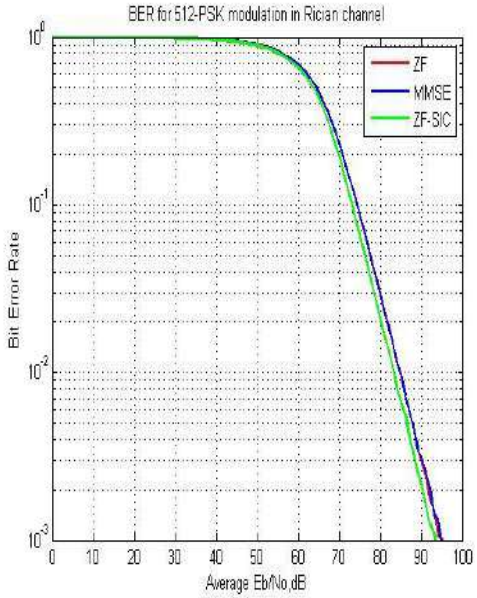

Fig10. 512-PSK modulation in Rician channel

Fig10. shows bit error rate vs signal to noise ratio of linear detector(LD) and non-linear detector (NLD) for 512-PSK

modulation. This figure depicts that at 70dB, BER of ZF-SIC is 0.1901, for MMSE is 0.2273 and ZF is 0.2286. So, ZF-SIC achieves better BER and better performance than other 2 equalizers.

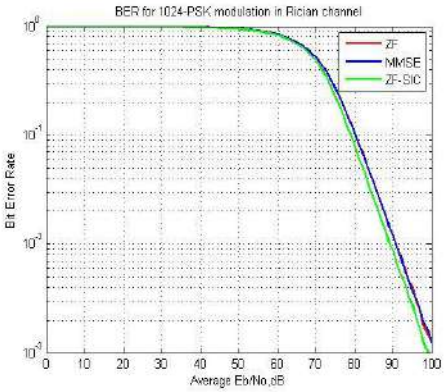

Fig11. 1024-PSK modulation in Rician channel

Fig11. Depicts for 1024-PSK modulation that at 70dB, BER of ZF-SIC is 0.4820, for MMSE is 0.5142 and ZF is 0.5149. So, ZF-SIC achieves better BER and better performance than other 2 equalizers.

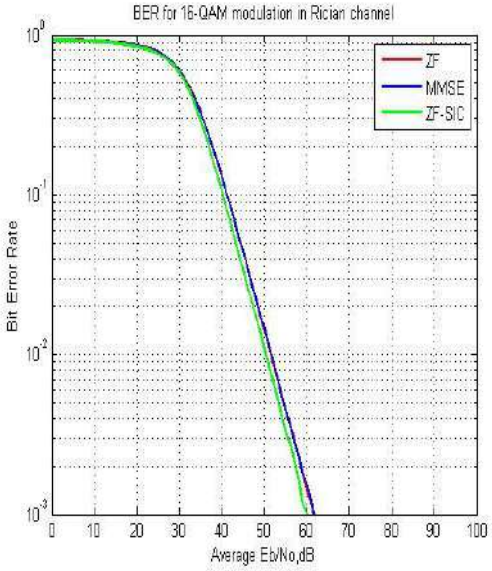

Fig12. 16-QAM modulation in Rician channel

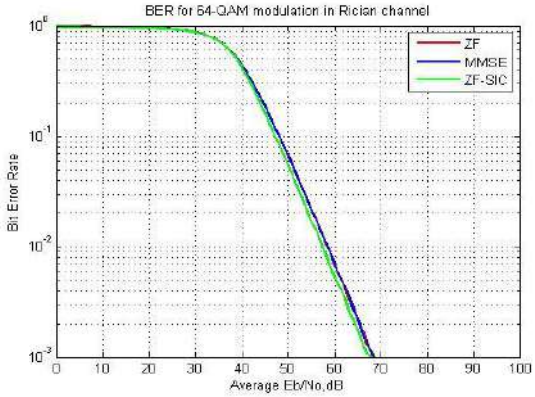

Fig13. 64-QAM modulation in Rician channel

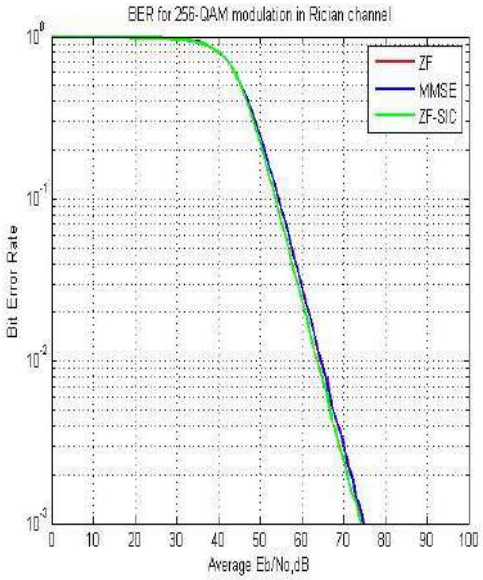

Fig14. 256-QAM modulation in Rician channel

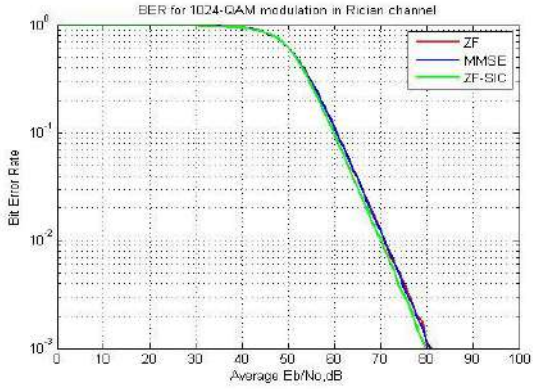

Fig15. 1024-QAM modulation in Rician channel

VI. CONCLUSION

In this papere, ISI which is due to multipath fading is effectively mitigated using various equalisation techniques. BER analysis is done using various equalisers in Rician fading MIMO channel. We concluded that linear equalizers (ZF, MMSE) perform worse than other methods while requiring a lower complexity. The ML equaliser outperforms the ZF, ZF-SIC and MMSE equaliser, however its complexity increases exponentially as the modulation order increases. Also, MIMO systems with large constellations are less efficient compared to small constellation. Finally, we concluded that MIMO system with BPSK modulation and ML equaliser over rician fading channel is optimum compared to choice of other modulation schemes and equalisers considered.

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Survey of Data Mining Tools

Sanjiv Datta
Assistant Professor
DAV College, Amritsar.
dattasanjiv@rediffmail.com

Abstract-Data mining helps in the extraction of hidden predictive information from large databases. It is a powerful new technology with great potential to help companies focus on the most important information in their data warehouses. Data mining uses number of techniques like clustering, classification, association rules, prediction, outlier detection etc. to discover and present knowledge in a form which is easily comprehensible to humans. The development and application of data mining algorithms requires the use of powerful software tools. As the number of available tools continues to grow, the choice of the most suitable tool becomes increasingly difficult. Various popular data mining tools are available today each with their own strengths and weaknesses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. Data mining tools can answer business questions that traditionally were too time consuming to solve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations. This paper attempts to support the decision-making process by presenting a range of existing state-of-the-art data mining and related tools like Weka, Rapid Miner etc.

I. INTRODUCTION

Data Mining [1][2], also popularly known as Knowledge Discovery in Databases (KDD), refers to the nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases. While data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms, data mining is actually part of the knowledge discovery process. The following figure (Figure 1) shows data mining as a step in an iterative knowledge discovery process. In its simplest form, data mining automates the detection of relevant patterns in a database, using defined approaches and algorithms to look into current and historical data that can then be analyzed to predict future trends. Because data mining tools predict future trends and behaviors by reading through databases for hidden patterns, they allow organizations

to make proactive, knowledge-driven decisions and answer questions that were previously too time-consuming to resolve.

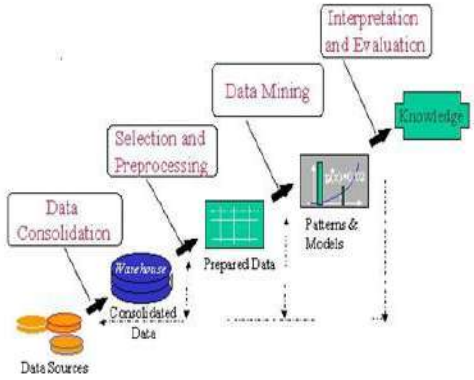

Figure 1: Data mining is the core of Knowledge discovery process.

Organizations that wish to use data mining tools can purchase mining programs designed for existing software and hardware platforms, which can be integrated into new products and systems as they are brought online, or they can build their own custom mining solution. For instance, feeding the output of a data mining exercise into another computer system, such as a neural network, is quite common and can give the mined data more value. This is because the data mining tool gathers the data, while the second program (e.g., the neural network) makes decisions based on the data collected. Different types of data mining tools are available in the marketplace, each with their own strengths and weaknesses. Internal auditors need to be aware of the different kinds of data mining tools available and recommend the purchase of a tool that matches the organization's current detective needs. This paper presents an overview of the data mining tools available today. For example- weak, Tangara, RapidMiner, Orange.

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II. CATEGORIES OF DATA MINING TOOLS

Most data mining tools can be classified into one of three categories: traditional data mining tools, dashboards, and text-mining tools. Below is a description of each.

A. *Traditional Data Mining Tools* Traditional data mining programs help companies establish data patterns and trends by using a number of complex algorithms and techniques. Some of these tools are installed on the desktop to monitor the data and highlight trends and others capture information residing outside a database. The majority are available in both Windows and UNIX versions, although some specialize in one operating system only. In addition, while some may concentrate on one database type, most will be able to handle any data using online analytical processing or a similar technology.

B. Dashboards Installed in computers to monitor information in a database, dashboards reflect data changes and updates onscreen — often in the form of a chart or table — enabling the user to see how the business is performing. Historical data also can be referenced, enabling the user to see where things have changed (e.g., increase in sales from the same period last year). This functionality makes dashboards easy to use and particularly appealing to managers who wish to have an overview of the company's performance.

C. *Text-mining Tools* The third type of data mining tool sometimes is called a text-mining tool because of its ability to mine data from different kinds of text — from Microsoft Word and Acrobat PDF documents to simple text files, for example. These tools scan content and convert the selected data into a format that is compatible with the tool's database, thus providing users with an easy and convenient way of accessing data without the need to open different applications. Scanned content can be unstructured (i.e., information is scattered almost randomly across the document, including e-mails, Internet pages, audio and video data) or structured (i.e., the data's form and purpose is known, such as content found in a database). Capturing these inputs can provide organizations with a wealth of information that can be mined to discover trends, concepts, and attitudes. When evaluating data mining strategies, companies may decide to acquire several tools for specific purposes, rather than purchasing one tool that meets all needs. Although acquiring several tools is not a mainstream approach, a company may choose to do so if, for example, it installs a dashboard to keep managers informed on business matters, a full data-mining suite to capture and build data for its marketing and sales arms, and an interrogation tool so auditors can identify fraud activity.

III. CRITERIA FOR COMPARING DATA MINING SOFTWARE: SURVEY

In the following, different criteria for comparison of data mining software are introduced. These criteria are based on user groups, data structures, data mining tasks and methods, import and export options, and license models. A detailed overview about the different tools is given later in this paper and as an Excel table in the additional material; however, some specific information about tools is discussed if a specific tool is unique to some aspects of the proposed criteria. The complete list of tools is provided toward the end of this paper.

IV. USER GROUPS

There are many different data mining tools available, which fit the needs of quite different user groups:

•*Business applications***:** This group uses data mining as a tool for solving commercially relevant business applications such as customer relationship management, fraud detection, and so on. This field ismainly covered by
a variety of commercial tools providing support for databases with large datasets, and deep integration in the company's workflow.

•*Applied research***:** A user group that applies data mining to research problems, for example, technology and life sciences. Here, users are mainly interested in tools with well proven methods, a graphical user interface (GUI), and interfaces to domain-related data formats or databases.

•*Algorithm development***:** Develops new data mining algorithms, and requires tools to both integrate its own methods and compare these with existing methods. The necessary tools should contain many concurrent algorithms.

•*Education***:** For education at universities, data mining tools should be very intuitive, with a comfortable interactive user interface, and inexpensive. In addition, they should allow the integration of in-house methods duringprogramming seminars.

V. DATA STRUCTURES

An important criterion is the dimensionality of the underlying raw data in the processed dataset. The first data mining applications were focused on handling datasets represented as two-dimensional feature tables. In this classical format, a dataset consists of a set of *N* examples (e.g., clients of an insurance company) with *s* features containing real values or usually integer-coded classes or symbols (e.g., income, age, number of contracts, and alike). This format is supported by nearly all existing tools. In some cases, the dataset can be sparse, with only a few nonzero features such as a list of *s* shopping items for *N* different customers. The computational and memory effort
can be reduced if a tool exploits this sparse structure.

Some structured datasets are characterized by the same dimensionality. As an example, sample documents in most text mining problems are represented by the frequency of words or so-called *n*-grams (a group of *n* subsequent characters in a document)[9].

The most prominent format having a higher dimensionality contains time series as elements, leading to dataset dimensions between one (i.e., only one exampleof a time series with *K* samples) and three (i.e.,*N* different examples of *s*-dimensional vector time serieswith *K* samples). Typical tasks are forecasting of future values, finding typical patterns in a time seriesor finding similar time series by clustering. Theanalysis of time series plays an import role in manydifferent applications, including prediction of stockmarkets, forecasting of energy consumption and othermarkets, and quality supervision in production, andis also supported by most data mining tools.

With a similar dimensionality, different kinds ofstructured data exist such as gene sequences (spatialstructure), spectrograms or mass spectrograms (structuredby frequencies or masses), and others. Only afew tools support these types of structured data explicitly,but some tools for time series analysis can berearranged to cope with these problems.

A more recent trend is the application of datamining methods for images and videos[10][11].The mainchallenge is the handling of extremely large rawdatasets, up to gigabytes and terabytes, caused by thehigh dimensionality of the examples. Typical applicationsare microscopic images in biology and medicine,camera-based sensors in quality control and robotics,biometrics, and security. Such datasets must be splitinto metadata—with links to image and video fileshandled in a main dataset and files—which containthe main part of the data. Until now, these problemswere normally solved using a combination of tools:the initial tool (e.g., ImageJ and ITK) would processthe images or videos, resulting in segmented imagesand extracted features describing the segments;a second tool would solve data mining problems handlingthe extracted features as a classical table or timeseries.

Another format leading to image-like dimensionsincludes graphs that can be represented asadjacency matrices, describing the connection betweendifferent nodes of a graph. Graph mininghas powerful applications[12][13]such as characterizingsocial networks and chemical structures; however,only a few such tools exist, including Pegasus andProximity.

VI. INTERACTION AND VISUALIZATION

There are three main types of interaction between a user and a data mining tool:

•pure textual interface using a programming language—difficult to handle, but easily automated;

•graphical interface with a menu structure— easy to handle, but not so easily automated;

•graphical user interface where the user selects ‘function blocks’ or algorithms from a palette of choices, defines parameters, places them in a work area, and connects them to create complete data mining streams or workflows;
a good compromise, but difficult to handle for large workflows.

Mixtures of these forms arise if macros of menu items can be recorded for workflows or if additional blocks in a workflow can be implemented using a programming language. Automation (scripting) is extremely important for routine tasks, especially with large datasets, because the workload of the user is reduced. Almost all tools provide powerful visualization techniques for the presentation of data mining results; particularly tools for business application and applied research, which are able to generate complete reports containing the most important results in a readable form for users lacking explicit data mining skills. Interactive methods can support an explorative data analysis. An example is a method called brushing that enables the user to select specific data points in a figure or subsets of data (e.g., nodes of a decision tree) and highlight these data points in other plots.

VII. DIFFERENT TOOLS

WEKA TOOL

WEKA[3], formally called Waikato Environment for Knowledge Learning, is a computer program that was developed at the University of Waikato in New Zealand for the purpose of identifying information from raw data gathered from agricultural domains. WEKA supports many different standard data mining tasks such as data preprocessing, classification, clustering, regression, visualization and feature selection. The basic premise of the application is to utilize a computer application that can be trained to perform machine learning capabilities and derive useful information in the form of trends and patterns.

WEKA is an open source application that is freely available under the GNU general public license agreement. Originally written in C the WEKA application has been completely rewritten in Java and is compatible with almost every computing platform. It is user friendly with a graphical interface that allows for quick set up and operation. WEKA operates on the predication that the user data is available as a flat file or relation, this means that each data object is described by a fixed number of attributes that usually are of a specific type, normal alpha-numeric or numeric values. The WEKA application allows novice users a tool to identify hidden information from database and file systems with simple to use options and visual interfaces.

RAPIDMINER TOOL

RapidMiner[4], formerly YALE (Yet Another Learning Environment), is an environment for providing data mining and machine learning procedures including: data loading and transformation (ETL), data preprocessing and visualization, modelling, evaluation, and deployment. The data mining processes can be made up of arbitrarily nestable operators, described in XML files and created in RapidMiner's graphical user interface (GUI). RapidMiner is written in the Java programming language. It also integrates learning schemes and attribute evaluators of the Weka machine learning environment and statistical modelling schemes of the R-Project. RapidMiner can be used for text mining, multimedia mining, feature engineering, data stream mining and tracking drifting concepts, development of ensemble methods, and distributed data mining. RapidMiner is found in the: electronics industry, energy industry, automobile industry, commerce, aviation, telecommunications, banking and insurance, production, IT industry, market research, pharmaceutical industry and other fields.

TANAGRA TOOL

TANAGRA [5] is a free DATA MINING software for academic and research purposes. It proposes several data mining methods from exploratory data analysis, statistical learning, machine learning and databases area. This project is the successor of SIPINA which implements various supervised learning algorithms, especially an interactive and visual construction of decision trees. TANAGRA is more powerful, it contains some supervised learning but also other paradigms such as clustering, factorial analysis, parametric and nonparametric statistics, association rule, feature selection and construction algorithms. TANAGRA is an "open source

project" as every researcher can access to the source code, and add his own algorithms, as far as he agrees and conforms to the software distribution license. The main purpose of Tanagra project is to give researchers and students an easy-to-use data mining software, conforming to the present norms of the software development in this domain (especially in the design of its GUI and the way to use it), and allowing to analyze either real or synthetic data. The second purpose of TANAGRA is to propose to researchers an architecture allowing them to easily add their own data mining methods, to compare their performances. TANAGRA acts more as an experimental platform in order to let them go to the essential of their work, dispensing them to deal with the unpleasant part in the programmation of this kind of tools: the data management. The third and last purpose, in direction of novice developers, consists in diffusing a possible methodology for building this kind of software. They should take advantage of free access to source code, to look how this sort of software is built, the problems to avoid, the main steps of the project, and which tools and code libraries to use for. In this way, Tanagra can be considered as a pedagogical tool for learning programming techniques.

DBMINER TOOL

DBMiner[6], a data mining system for interactive mining of multiple-level knowledge in large relational databases, has been developed based on our years-of-research. The system implements a wide spectrum of data mining functions, including generalization, characterization, discrimination, association, classification, and prediction. By incorporation of several interesting data mining techniques, including attribute-oriented induction, progressive deepening for mining multiple-level rules, and meta-rule guided knowledge mining, the system provides a user-friendly, interactive data mining environment with good performance.

DBminer performs interactive data mining at multiple concept levels on any user-specified set of data in a database using an SQL-like Data Mining Query Language, DMQL, or a graphical user interface. Users may interactively set and adjust various thresholds, control a data mining process, perform roll-up or drill-down at multiple concept levels, and generate different forms of outputs, including generalized relations, generalized feature tables, multiple forms of generalized rules, visual presentation of rules, charts, curves, etc.

WITNESS MINER TOOL

WITNESS Miner[7] is a graphical data mining tool comprising a collection of data structures and algorithms written specifically for the tasks required in knowledge discovery. Designed to be easy to use, it provides a visual method of constructing streams, containing data preparation and data mining tasks that form the knowledge discovery process. The key features of this tool are: decision trees, clustering , discretization , rule induction using modern heuristic techniques, the ability to handle missing values, host of standard data processing tools, HTML output and in the case of the decision tree, XML output options, feature subset selection. Today's organizations collect a large amount of operational data relating to all kinds of activities. If properly analyzed, this data can have a significant effect on a company's performance and profitability. WITNESS Miner provides both a useful tool and the project framework for such investigations.

WITNESS Miner offers a way of making sense of data in Manufacturing, Finance, Health, Retail and Government. It provides knowledge from raw data through, data analysis, easy data modeling, powerful rule evaluation and high quality reporting. Most importantly, it allows an exploration of data to determine fundamental relationships that affect business. The WITNESS Miner module offers easy to understand rules generated directly from the data. Rules determined are expressed in simple terms and enable simple decision rules to be implemented at many stages of key processes in order to affect service levels, costs and other major performance indicators.

ORANGE TOOL

Orange[8] is a powerful free and open source component-based data mining and machine learning software suite.It contains complete set of components for data preprocessing, feature scoring and filtering, modeling, model evaluation, and exploration techniques. It is based on C++ components, that are accessed either directly (not very common), through Python scripts (easier and better), or through GUI objects called Orange Widgets.Orange is distributed free under GPL and can be downloaded from the download page. Orange is a component-based framework, which means you can use existing components and build your own ones. You can even prototype your own components in Python, and use it in place of some standard C-based Orange component.Orange is supported on various versions of Linux,Apple's,Mac OS X and Microsoft Windows. The features of orange are: Preprocessing: feature subset selection, discretization, feature utility estimation for predictive tasks; Predictive modelling: classification trees, naive bayesian classifer, k-NN, majority classifier, support vector machines, logistic regression, rule-based classifiers (e.g., CN2); Ensemble methods, including boosting, bagging, and forest trees. Data description methods: various visulizations (in widgets), self-organizing maps, hierarchical clustering, k-means clustering, multi-dimensional scaling, and other.

VIII.CONCLUSION

Many advanced tools for data mining are availableeither as open-source or commercial software. Theycover a wide range of software products, from comfortableproblem-independent data mining suites, tobusiness-centered data warehouses with integrateddata mining capabilities, to early research prototypesfor newly developed methods. In this paper, nine differenttypes of tools are presented. They vary inmany different characteristics, such as intended usergroups, possible data structures, implemented tasksand methods, interaction styles, import and exportcapabilities, platforms and license policies are variable.Recent tools are able to handle large datasetswith single features, time series, and even unstructureddata-like texts; however, there is a lack of powerfuland generalized mining tools for multidimensionaldatasets such as images and video.

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An Insight To Position Based Routing Protocols In Vanets

Priya Sharma
M.Tech(CSE), Research Scholar
Department of Computer Science and Engg.
Amritsar College of Engineering and Technology
Amritsar,India
priyasharma.20013@gmail.com

Er. Amarpreet Singh
Associate Professor
Department of Computer Science and Engg.
Amritsar College of Engineering andTechnology
Amritsar,India
amarmandeep@yahoo.com

Abstract: Vehicular ad hoc network(VANETs) being a sub class of MANET is a challenging field of wireless communication. It is an intelligent way of using infrastructure less network augmented with Intelligent Transportation system(ITS).The issue of designing an efficient routing protocol for VANET has led to emergence of various protocols that can support its highly dynamic topology as well as frequent disconnection among vehicles. Traditional topology based routing protocols for VANET are not efficient to meet every traffic scenarios. So position based routing protocols of Vanet has been identified to be suitable for VANETs due to frequently changing network topology and highly dynamic nature of vehicular nodes. This paper consists of comparison of existing position based routing protocols based on the position prediction of neighboring and destination nodes taking into account the parameters such as packet delivery ratio, delay,buffering,recovery strategy, etc.

Keywords: V2V communication, GPSR ,CAR ,VADD ,GeoDTN+Nav

I. INTRODUCTION

In Vanets, V2V communication [11] is the pure ad-hoc communication. It is also called inter-vehicle communication that take place among vehicles where each vehicle is equipped with GPS (Global Positioning System), sensors, networking devices, digital map which has the road segment information and computing devices. Each vehicle have equal status on network and they are free to associate and communicate with any vehicle by sending messages. This type of communication is mainly used in safety applications like safety warning, traffic information, road obstacle warning, intersection collision warning etc.

Routing in VANET is a major challenge and research area. As there is no fixed infrastructure and it is a decentralized approach. The self organizing nodes dynamically communicate with each other on temporary basis. Each nodes act as a router and communicate within a network, using routing protocol to find reliable and efficient routes so that message is delivered between nodes in timely manner. One way of communication in such networks is to simply flood the entire network.[2]There are number of routing protocols proposed for VANETs. Of these protocols considering one protocol is not suitable in all the scenarios. Every protocol is distinguished from other on some basis, their characteristics and in different environment. Since VANETs change their network topology frequently without any prior information, routing in such dynamic networks is a challenging task.

II. ROUTING PROTOCOLS

A routing protocol governs the way two communication entities exchange information; it includes the procedure in establishing a route, decision in forwarding and action in maintaining the route or recovering from routing failure. There are numerous categories of protocols used in VANETs that are categorized as: Topology based routing protocol, Position based routing protocol (Geographic protocols), Broadcast routing protocol, Multicast routing protocol, Cluster based routing protocol, Zone routing protocol, etc. Among these topology-based routing protocols are not suitable in some scenarios because it uses link information that exists in the network to perform packet forwarding. The link information changes in a regular basis, topology-based routing suffers from routing route breaks and overheads of maintaining routing tables.

Many simulation results had shown that most of the topology based routing protocols suffer from highly dynamic nature of vehicular node mobility because they tend to have poor route convergence and low communication throughput. Position based routing protocols has been identified as a more suitable routing protocols for VANETs to give better performance and exhibit scalability and robustness against frequent topological changes.[3] In Position-based routing protocols route is determined based on the geographic location of neighboring nodes as the packet is forwarded. There is no need of link state exchange nor route-setup. They do not need to establish and maintain routes, thereby eliminating routing table construction and maintenance. Geographic protocols such as GPSR, GPCR, GSR,AMAR, A-STAR, CAR, MFR,VADD, GeoDTN+Nav etc. are more suitable than other routing protocols.

III. POSITION BASED ROUTING PROTOCOL

In VANET position is one of the important concern related to vehicles. Position based routing protocol uses geographic positioning information in order to select the next forwarding hops. Each vehicle wants to be aware of its own position, position of its neighboring vehicles and location of destination node as well. The position of the destination is stored in the header of the packet by the source. The position of the node's one-hop neighbors is obtained by the beacons sent periodically with random jitter (to prevent collision). Nodes that are within a node's radio range will become neighbors of the node. Geographic routing assumes each node knows its location, and the sending node knows the receiving node's location by the increasing popularity of Global Position System (GPS)unit from an onboard navigation system[1]. Although geographic routing is a promising method in VANET, it also has limitations. Due to the non uniform topology distribution, a node may not be able to find a neighbor closer to the destination than itself, a situation called
"local maximum".[9] Several routing protocols have been proposed to solve this problem and so geographic routing is classified into three categories:
i.Non-delay tolerant – GPSR ,GPCR ,GSR, CAR, AMAR, GyTAR, EBGR
ii. Delay tolerant – VADD, GeOpps
iii.Hybrid routing – GeoDTN +Nav , GPSR

IV. NON-DELAY TOLERANT PROTOCOL

The non-DTN types of geographic routing protocols do not consider intermittent connectivity and are only practical in densely populated VANETs.

A) GPSR

In Greedy Perimeter Stateless Routing a packet is forwarded by current node to an immediate neighbor which is geographically closer to the destination node. This mode of forwarding is termed as greedy mode. The packet resumes forwarding in greedy mode when it reaches a node whose distance to the destination is closer than the node at the local maximum to the destination. GPSR protocol is a complete protocol, consisting of a greedy mode and a recovery strategy called perimeter mode. Every packet sent using GPSR contains a flag, indicating in which of the modes it is:
Greedy mode or Perimeter mode.
Initially, all data packets are marked as greedy mode by their source nodes. Once the greedy routing fails, it uses recovery strategy so the packet is marked as being in perimeter mode.

But GPSR using perimeter mode is relatively incompetent in highly dense V2V networks. GPSR has low packet delivery rate and high latency. Also GPSR has limitations in the aspects of large number of hops, wrong direction, routing loops, etc. The topology of highway favors GPSR since local maximum rarely happens on a highway. Fig1 represents Greedy Forwarding mechanism where y is the neighbor of x closest to the destination D.

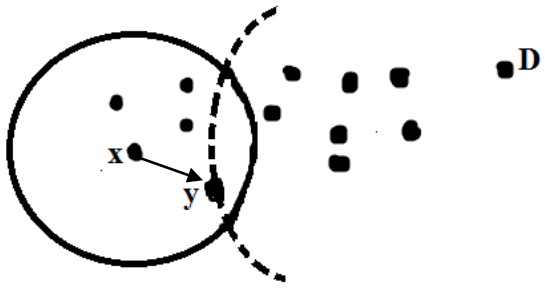

Fig.1: Greedy Forwarding mechanism

Pros

- To forward the packet a node needs to remember only one hop neighbor location.
- Forwarding packet decisions are made dynamically.

Cons

- For high mobility characteristics of node, previous information of neighbors' position is often contained in the sending nodes' neighbor table.
- Though the destination node is moving its information in the packet header of intermediate node is never updated.

B) CAR

Connectivity Aware Routing Protocols (CAR) finds a route to a destination with its unique characteristics that it maintains the cache of successful route between various source and destination pairs. It also predicts the position of destination vehicle repairs route as the position changes. Nodes using CAR protocols send periodic Hello beacons that contain their velocity vector information. On receiving Hello beacons a node will record sender in its neighbor table and calculate its own velocity vector and velocity vector of its neighbor. Beacons can also be piggybacked on forwarded data packets to reduce wastage of bandwidth and congestion. Entries expire from the neighbor table when the distance between nodes exceeds the threshold value. The CAR protocols uses guard concept to maintain the path. A guard is a geographic marker message, it is buffered

and passed from one vehicle to another to propagate the information. A guard is a temporary message that has an ID, a TTL (Time to live) counts, a radius and some state information. CAR provides two forms of guards. The Standing guard and The Traveling guard. Routing errors may occur due to communication gap between anchor points or due to guards. So CAR protocol has two recovery strategies to cope with the problem. The first strategy is Time out algorithm with active waiting cycle. The second strategy is walk around error recovery. The CAR protocol has the ability to generate virtual information in the form of guards, which is a distinct advantage over other protocols. [4]

BEACON

Beacon means transmitting short hello message periodically. It exposes presence and position of a node. An entry will be removed from neighbor table of a receiving node if it fails to receive a beacon after a certain period of time from the corresponding node. [7]

CAR uses AODV-based path discovery to find routes with limited broadcast from Preferred Group Broadcast (PGB).The destination might receive multiple path discovery packets; it chooses the path that provides better connectivity and lower delays. Data packets are forwarded in a greedy manner toward the destination through the set of anchor points using AGF(Advanced Greedy Forwarding) to account for node mobility.

Result of evaluation done using a vehicular simulator and a probabilistic shadowing propagation model that uses a statistical approach have shown CAR possesses higher packet delivery ratio (PDR) than GPSR and GPSR+AGF. The reason that CAR's PDR is higher than GPSR+AGF is that CAR guarantees to find the shortest connected path whereas GPSR+AGF may suffer from sub optimality of greedy mode in terms of finding such a path. CAR's path discovery overhead is checked by PGB.

The overhead of storing guard is not in the data packets but in the beacons. According to their finding, a node on average only broadcasts 2-3 guards during the simulation. Thus, the beacon overhead is not overwhelming.[1]

Pros

- No digital map is required.
- It has no local maximum problem.
- CAR ensures to find the shortest connected path because CAR has higher packet delivery ratio than GPSR and GPSR+AGF.

Cons

- Unnecessary nodes can be selected as an anchor.
- It cannot adjust with different sub-path when traffic environment changes.[5]

V. DELAY TOLERANT PROTOCOL

These are vehicular routing protocols designed for VANETs which are treated as a form of Delay Tolerant Network (DTN). Since nodes are highly mobile in this type of network, they suffer from frequent disconnections. To overcome this, it uses carry-and-forward strategy in which when a node can't contact with other nodes it stores the packet & forwarding is done based on some metric of nodes neighbors. If sufficient vehicles are moving between network partitions, then packets can be delivered even if the network is disconnected.[9] The notable DTN vehicular routing protocols are VADD and GeOpps.

A) VADD

Vehicle-Assisted Data Delivery (VADD) is a vehicular routing strategy aimed at improving routing in disconnected vehicular networks by using carry-and-forward strategy [8]. It is based on the use of predictable vehicle mobility. VADD require each vehicle to know its own position and also require an external static street map. Each packet has three modes: Intersection, Straight Way and Destination, where each mode is based on the location of the node carrying the packet.

Intersection mode is used when the packet has reached an intersection at which routing decision is made by vehicle to select the next forwarding path or available direction with the smallest packet delivery delay, since a path is simply a branched road from an intersection.

In Straight Way mode the current node is on a road where there are only two possible directions for the packet to travel, in the direction of the current node or in the opposite direction. Destination mode is used when the packet is close to its final destination.[4] These packet modes are based on the location of the packet carrier (i.e., the vehicle that carries the packet.) By switching between these packet modes, the packet carrier takes the best packet forwarding path. The packet forwarding delay between two adjacent intersections is the weight of the edge. Given the weight on each edge, a naive optimal forwarding path selection scheme is to compute the shortest path from source to destination by applying Dijkstra's algorithm. However, this simple solution does not work, since VADD cannot freely select the outgoing edge to forward the packet at an intersection.[10]

The expected packet delivery delay of a path can be expressed by parameters such as road density, average vehicle velocity, and the road distance. The minimum delay can be solved by a set of linear system equations.

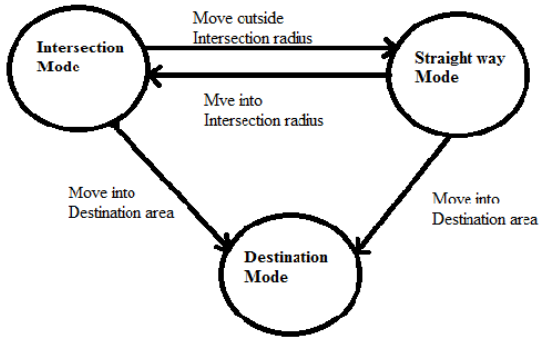

Fig.2: Three packet mode of VADD

Pros

- Comparing with GPSR (with buffer), epidemic routing and DSR, VADD performs high delivery ratio.
- It is suitable for multi-hop data delivery.

Cons

- Due to change of topology & traffic density it causes large delay.

VI. HYBRID ROUTING PROTOCOL

The hybrid position routing protocol is a mixture protocol that takes advantage of more than one protocol schemes.

A) GeoDTN+Nav

GeoDTN+Nav is a hybrid of non-DTN and DTN approach that includes the greedy mode, the perimeter mode, and the DTN mode. It switches from non-DTN mode to DTN mode by estimating the connectivity of the network based on the number of hops a packet has travelled so far, neighbor's delivery quality, and neighbor's direction with respect to the destination. [6]

TABLE 1- COMPARISON OF GEOGRAPHIC ROUTING PROTOCOLS

characteristics / protocol	Packet delivery ratio	Delay tolerant	Map required	Recovery strategy	Buffering(carry and forward)
GPSR	low	x	x	✓	x
CAR	medium	x	x	✓	✓
VADD	high	✓	✓	x	✓
GeoDTN+Nav	high	✓	✓	✓	✓

The main purpose of switching from perimeter mode to DTN mode is to virtually connect network partitions and improve the delivery ratio, while switching from DTN mode back to greedy is to improve delivery delay in connected partitions.

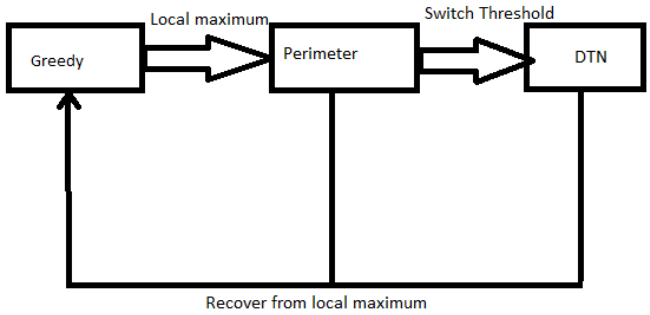

Fig.3: Switch between greedy, perimeter, and DTN mode

The delivery quality of neighbors is obtained through Virtual Navigation Interface (VNI) which abstracts information from underlying hardware (e.g., Navigation System, EDR, etc.) and provides necessary information for GeoDTN+Nav to determine its routing mode and forwarder. In addition to its hybrid approach, VNI offers users the option to protect their private data and at the same time provides best-effort routing decision. GeoDTN+Nav greatly increases the packet delivery ratio in a sparse network.[9]

Pros

- GeoDTN+Nav can switch from Non-DTN to DTN mode.
- GeoDTN+Nav can recognize partition in the network.

Cons

- The latency increases & the decreases packet delivery ratio in a situation such as sparse network where GeoDTN+Nav trys to fall-back to DTN mode again.
- The result in a partitioned network shows that DTN achieves slightly better PDR and lower latency thanGeoDTN+Nav.[7]

VI. CONCLUSION

In the above review a brief description of position based routing protocol using GPSR, CAR,VADD and GeoDTN+NAV is given.Each protocol is suitable in one scenario or another .Based on some parameters such as packet delivery ratio,delay tolerance , requirement of recovery strategy and buffering required all the four protocols are compared. There comparison states their use according to requirement.It also states that though position based routing requires position determining services using GPS and navigation system; still Position based protocols are preffered over other protocols due to its min-delay routing characteristics and scalabitlity. Moreover, it does not make use of routing tables so no overhead of maintaining table, route discovery and management is posed.

VII. FUTURE SCOPE

By studying different position routing protocol in VANET we have seen that further performance evaluation is required to verify performance of a routing protocol with other routing protocols based on various traffic scenarios. Comparison can be done among the routing protocols in the Overlay and so on.

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Performance evaluation of APTEEN and EX-APTEEN Routing Protocol of Clustering in WSN

Nikita Pathak[1]
[1] Research Scholar (Department of Computer Science and Engineering), RIMT College of Engineering & Technology, Mandi Gobindgarh, Fatehgarh Sahib, Punjab, India
pathak.nikita786@yahoo.in

Er. Rupinder Kaur Gurm [2]
[2]Assistant Professor, Department of Computer Science and Engineering, RIMT College of Engineering & Technology, Mandi Gobindgarh, Fatehgarh Sahib, Punjab, India
rupindergurm@gmail.com

Abstract* — *As we know that a Wireless Sensor Network is a self-configuring network of small sensor nodes communicating among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. It have a wide range of potential applications to industry, science, transportation, civil infrastructure, and security etc. There are many routing protocols of clustering in wsn and here we are evaluating APTEEN and EX-APTEEN. A routing protocol specifies that how routers are communicating with each other. Mobile communications and wireless networking technology has seen a thriving development in recent years. Driven by technological advancements as well as application demands various classes of communication networks have emerged such as Cellular networks, Ad hoc Networks, Sensor Networks and Mesh Networks. Cellular Networks are the infrastructure dependent networks. Ad hoc networks are defined as the category of wireless networks that utilize multi hop radio relaying since the nodes are arbitrarily and dynamically located. Ad hoc networks are infrastructure independent networks.

***Keywords*— WSNs, Routing protocols, APTEEN and EX-APTEEN**

I. INTRODUCTION

As we know that WSN have been widely used for monitoring physical or environmental properties over a large area, e.g., temperature, pressure, notion, luminosity and vibration. Naveen Sharma and Anand Nayyar [1] evaluated that there are two nodes homogeneous and heterogeneous nodes which are used in wireless sensor network and these nodes used a wireless medium to communicate with each other. To sense the environment hundred to thousands of nodes can be deployed in the sensing region. The important components of wireless sensor network are sensor nodes, clusters, cluster heads, base station, end user. There are many routing protocol of clustering in WSN like Leach, Teen etc. Routing protocol specifies that how routers communicate with each otherClusters are capable of performing multiple complex instructions by distributing workload. Clustering is energy efficient in sensor network. Firstly divide the network into clusters and then each cluster is divided into cluster head and cluster members. Then after collecting the data from cluster although the various table text styles are provided. The members, cluster head send the data to the base.

The cluster head transmit the data in two ways-intra communication and inter communication. Less power is consumed in data transmission from CH to BS if position of the base station is in the centre of the network [4]. Clustering improves system's availability to users.

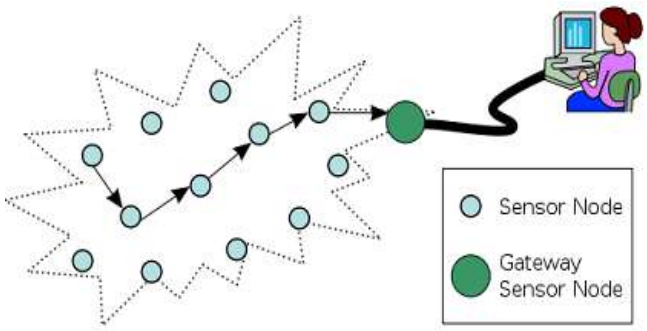

Fig 1 Typical multihop Wireless sensor network architecture

The important components of wireless sensor network are discussed below:

• **Sensor Node:** As we know that sensor node is the core component of a WSN. Sensor nodes can take on multiple roles in a network, such as simple routing; sensing; data storage; and data processing.

• **Clusters:** Clusters are the organizational unit for WSNs. To simplify tasks such as communication the dense nature of these networks requires the need for them to be broken down into clusters.

• **Cluster heads:** Cluster heads are the leader of a cluster. They are required to organize activities in the cluster. These tasks are not limited to data-aggregation and organizing the communication schedule of a cluster.

• **Base Station**: The base station is at the upper level of the hierarchical WSN. It provides the communication link between the end-user and sensor network.

• **End User:** The data in a sensor network can be used for a wide-range of applications. Therefore, a particular application may make use of the network data over the internet, using a PDA, or even a desktop computer.

Advantages of WSN:-

1. It can easily accommodate new device at any time.
2. It can be easily accessed through a centralized monitor and
3. It avoid lot of wiring.

Disadvantages of WSN:-

1. As we cannot control propagation of waves it is very easy for hackers to hack it.
2. It get distracted by various elements for e.g blue-tooth.

II. Routing Protocols

Routing protocols maintains the router in the network and become necessary in wireless sensor networks. Basically routing protocols depends on the capability of nodes. When nodes are identified, routing protocols start constructing and maintaining routes between different nodes [8].

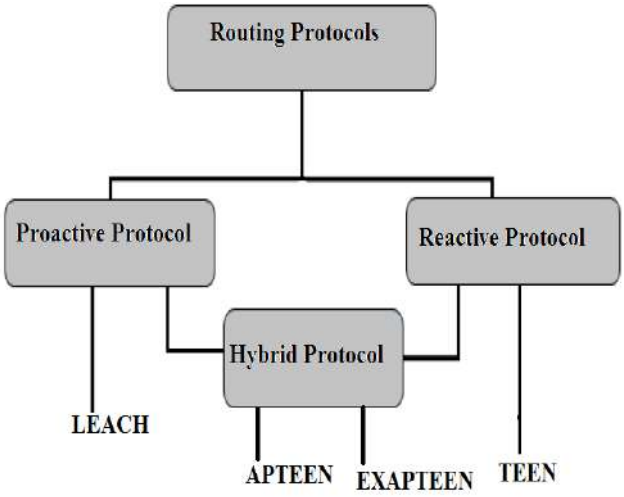

Fig 2. Classification of Routing Protocols in WSN

There are different routing protocols in WSN that are proactive, reactive and hybrid protocol.

A. Proactive routing protocol

In Proactive network route is predefined. The nodes in this network switch on their sensors and to transmit the data to the base station it first sense the environment and then send the data. Proactive networks also provide the snapshot of the sensed data at regular interval and environment. They are suitable for application that required periodic data monitoring network.

Proactive protocol include LEACH. Leach (Low Energy Adaptive clustering hierarchy) is able to increase the lifetime of the network. But this protocol assumes that to reach to the base station every node transmit with enough power, because it is not applicable to network deployed in larger regions [9]. There are many advanced protocols of leach which will overcome its advantages and disadvantages. After leach there are A-LEACH, LEACH-A, LEACH-B, LEACH-C, C-LEACH, LEACH-E, E-LEACH, LEACH-F, I-LEACH, LEACH-L etc. There are some merits and demerits of leach which are as follows:-

ADVANTAGES OF LEACH	DISADVANTAGES OF LEACH
1. In leach protocol we are able to save energy of network because single hop routing is possible from server node to CH.	1. It incurs robustness issues like failure of CH because it relies on CH rather than cluster members of cluster for communication to sink.
2. It also increases the network lifetime.	2. CH are not distributed uniformly in LEACH.
3. For the creation of clusters it does not require the information of location of sensor nodes in network.	3. It is not for network deployed in larger regions and in leach dead node are large.

Table 1:- Advantages and Disadvantages of LEACH

B. Reactive routing protocol

In reactive routing protocol there is no any predefined route but the node will immediately react if there are sudden changes in the sensed attribute beyond some predetermined threshold value. These are suitable for time critical application like temperature sensing.

Reactive routing protocol include TEEN (Threshold Sensitive Energy Efficient Sensor Network Protocol) protocol. TEEN groups sensors into clusters with each led by cluster head. TEEN protocol transmit the data by reduces number of transmission [8]. But the disadvantages of TEEN protocol is that the sensor node will not communicate if threshold value is not received.

Functioning of teen protocol:-

1. In TEEN the nodes sense their environment continuously:-
   1.1. First time a parameter from the attribute set reaches its hard threshold value, the node switches on its transmitter and sends the sensed data.
   1.2. The sensed value is stored in an internal variable in the node, called the sensed value (SV).
2. The nodes will transmit data in the current cluster period only when the following conditions are true:-
   2.1. The current value of the sensed attribute is greater than the hard threshold.
   2.2. The current value of the sensed attribute differs from SV by an amount equal to or greater than the soft threshold.

C. Hybrid routing protocol

Hybrid routing protocol includes both proactive and reactive routing protocol. It first compute all the routes and then improve the route at time of routing.

Hybrid protocol includes APTEEN protocol. APTEEN is the adaptive TEEN. APTEEN performs better than LEACH. In APTEEN protocol we will decide how to select the parameters. In this protocol once CHs are decided the CH broadcast the parameter in each cluster period. A hybrid

network can emulate a proactive or reactive network by suitably setting count time and threshold value.

III. WORKING OF APTEEN PROTOCOL

APTEEN stands for Adaptive Threshold Sensitive Energy Efficient Sensor Network. APTEEN is better than LEACH. APTEEN transmit data which is based on threshold values unlike LEACH because it transmits data at all the time. APTEEN give some facilities which TEEN does not. APTEEN analysis the past values and also it will take the snapshot view of the network. It also monitor an event for a period of time [12]. In APTEEN, in each cluster period if cluster heads are decided once the cluster heads broadcast the parameters like attribute, threshold, schedule, count time to all the nodes.

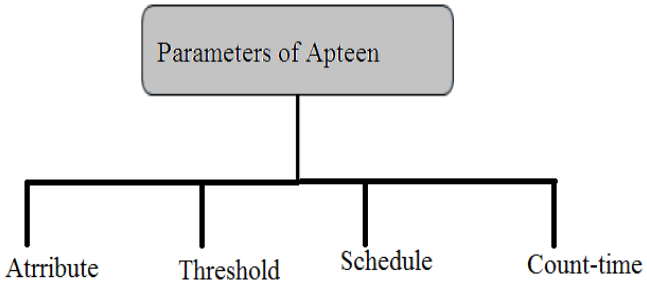

Fig 3:- Parameters of APTEEN

Basically in APTEEN protocol if a node is sending a data to the other node and during sending the data if sending node's died (its energy is lost) then also node is able to send data by using its backup, but in another routing protocols if node died then it is not able to send data to the node because its backup is not present.

The main feature of the APTEEN scheme is that it includes a combination of proactive and reactive policies both. It has the possibility of adjusting the interval timer and the threshold values so as to redress power consumption according to the type of implemented application. It include hard and soft threshold. In APTEEN, the node monitors the environment continuously, and only the nodes will transmit data that detect an attribute value above the hard threshold. The nodes will also transmit when the attribute value changes are equal to or greater than the soft threshold. It will have to retransmit lost data if a node does not send data over a period of time equal to the timer.

APTEEN uses a modified TDMA scheme to implement the hybrid network. The operation is based on the performance of TDMA, where a transmission time slot is assigned to each node in the cluster. The biggest weakness is the additional complexity to implement the features of the threshold and timer. APTEEN performance is between LEACH and TEEN in terms of energy dissipation and lifetime of the network. Apteen provide flexibility of allowing the user to set the time interval.

There are some advantages and disadvantages of Apteen which are as follows:-

ADVANTAGES OF APTEEN	DISADVANTAGES OF APTEEN
1. APTEEN consumes less energy as compared to LEACH. 2. It extend TEEN to support both reacting and periodic sensing to time critical events. 3. With the help of count-time and threshold, energy consumption can be controlled.	1. Its main drawback is the additional complexity which is required to implement the count time and threshold functions (parameters). 2. Overheads of forming clusters in multiple levels and implementing threshold based functions

Table 2:- Advantages and Disadvantages of APTEEN

IV. WORKING OF EX-APTEEN PROTOCOL

Ex-APTEEN is Extended APTEEN which is also a hybrid protocol like APTEEN which has two phases and that are cluster setup phase and data transfer phase. In cluster set up, phase cluster formation and cluster member selection is done .In the data transfer phase data is aggregated and send to the base station. Ex-APTEEN also have a backup but not only of a node but it is having a backup of whole route.

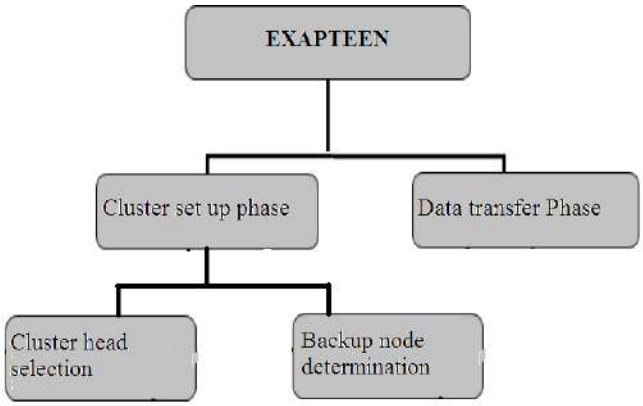

Fig. 4 :-Phases of EX-APTEEN

A. Cluster Setup Phase

It consists of 2 phases:-

1) *Cluster Head Selection:* We divided all the nodes of network into clusters and each cluster has a cluster members and cluster head nodes. Like LEACH it uses the cluster formation algorithm.

2) Backup node determination and shortest path establishment:

In Ex APTEEN algorithm we have to find the shortest path graph in which cluster head will find the shortest route to all its members. Now after finding the shortest path the members of sensor nodes by reversing the direction of each shortest

path send the data to cluster head. We have to assume the edge length be 1 so that area of sensor node will depend on sensing area. There are some nodes which are eligible for backup nodes and that are the member nodes which are inside the sensing area. When cluster member node get 1 hop message, they have to send reply after getting the message which is to be registered as backup CH. The node's send the responsibility to first node which are listed in queue of backup node list which also depends on node's energy. If node is having energy it can be CH. We will reduce the frequent clustering for saving energy so that we will select backup node. The hierarchical structure is formed by having BS as route where all the first level cluster head will be the member of second level CH.

B. Data transfer phase

In data transfer phase, we can sense the event which occur in an area, by different nodes in the close proximity. As closely placed nodes are sensing the same data the pairing is done between them. There are two nodes:-

1 One in sleep state to sense the data
2 Another in idle state to sense the data.

We will use the sufficient energy of both the nodes so that they alternate their role between themselves and also the nodes are grouped to gather.

These are the two phases in Extended APTEEN which is better than LEACH protocol.

V. SIMULATOR USED

Ns-2 is an event driven simulation tool

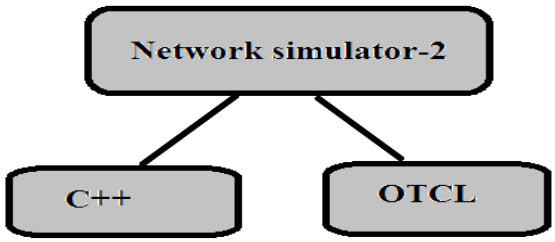

Fig. 4 :-Two key languages of NS-2

Which has two key languages and that are C++ and Otcl (It is an object oriented simulation written in C++, with an OTcl interpreter as a frontend). An event driven simulation induces events at arbitrary time. The concept of simulation is that it it move from one simulation to another and again it will execute the event until simulation terminates. C++ defines internal mechanism of simulation object where OTCL setup simulation by configuring and assembling the objects. Due to its flexibility and modular nature Ns2 gained popularity in network research.

PARAMETERS	VALUES
SIMULATOR	NS-2.35
ROUTING PROTOCOLS	APTEEN AND EXAPTEEN
METHODOLOGY	COMPARISON OF THESE PROTOCOLS

Table 3:- Parameters and values

VI. CONCLUSION

In this research paper we have discussed routing protocols of clustering in wsn. We configured merits and demerits of routing protocol. As we know that LEACH, TEEN and other routing protocols have some disadvantages and to overcome the disadvantages of these protocols we have APTEEN and EXAPTEEN. As we know that APTEEN protocols offer flexibility of allowing the user to set the time interval and the threshold values for the attribute. Than EXAPTEEN is the extended version of APTEEN which will overcome APTEEN's problem. So in future work we will compare these two protocols APTEEN and EXAPTEEN in NS-2.

VII. ACKNOWLEDGEMENT

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AODV and DYMO Routing Protocols in MANETs Based on Cuckoo Search Optimization

Jagdeep Kaur
Research Scholar
Department of CSE
RIMT-IET, Mandi Gobindgarh
Fatehgarh Sahib, PUNJAB, INDIA
jagdeep4pandher@gmail.com

Rupinder Kaur Gurm
Assistant Professor
Department of CSE
RIMT-IET, Mandi Gobindgarh
Fatehgarh Sahib, PUNJAB, INDIA
rupindergurm@gmail.com

Abstract— **A mobile ad-hoc network is a temporary wireless ad-hoc network of mobile nodes in which mobile nodes communicate with each other by using wireless links without the need of any access points and base stations. MANETs has some different features from other wireless networks like infrastructure less, no centralized control, no fixed topology. MANETs routing is always challenging task, due to dynamic topology, limited bandwidth and battery lifetime of mobile nodes. Mobile nodes are moves freely sometimes routes are fail and the performance of network decreases. So, best routing protocol is needed for route discovery between mobile nodes. Cuckoo search artificial intelligence optimization algorithm helps to find the best shortest routing path for sending data in MANETs. This paper reviews the working of AODV and DYMO routing protocols. Further we presented Cuckoo search artificial intelligence optimization algorithm.**

Keywords— **MANETs, Routing Protocols, AODV, DYMO, Cuckoo Search**

I. INTRODUCTION

MANETs is a wireless network in which mobile nodes connect with each other by using wireless links. Wireless networks are classified into two types: Infrastructure based network, Infrastructure less network. In infrastructure based wireless network nodes connect to the Internet by using access points. For example: WLAN setup in a building where all computers connect to internet by using access points. Infrastructure less or ad-hoc networks nodes connect with each other through wireless links. For example MANET, WSN (Wireless Sensor Network), WMN (Wireless Mesh Network) are all infrastructures less networks [1]. MANET is a wireless network in mobile nodes communicates with each other without fixed infrastructure such as base stations, access points, servers, cables. In MANET mobile nodes are always move and changes topology constantly. So, mobile nodes acts as a router to forward, receive packets to other mobile nodes in the network. Due to mobility of mobile nodes some problems are occurs in MANET. One main problem is availability of nodes, one time it is in range and other time it is out of range. Other problem is power and battery lifetime of each node in the MANET, nodes consumes more battery due dynamic topology of network. Common applications of MANETs are like military operations, disaster recovery, and wireless sensor network, remote geographical area where no access points or base stations for communication [2]. Figure 1 shows infrastructure less or ad-hoc network and infrastructure based wireless networks.

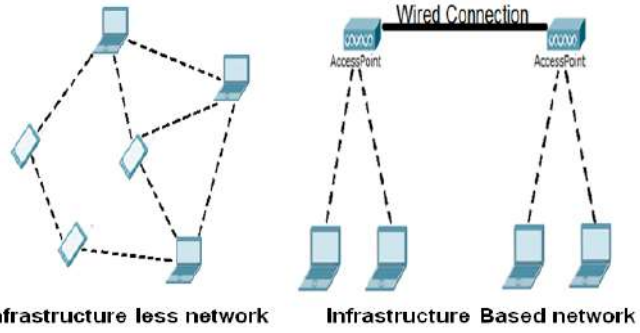

Figure 1. Wireless Networks: Infrastructure Less and Infrastructure Based Network

In this paper we focus on the AODV and DYMO routing protocols of MANETs. MANETs routing between the mobile nodes is a difficult task due to mobility of mobile nodes, no centralized control, and no fixed topology. Routing protocol is a standard that controls how mobile nodes decide which path to route packets between nodes in a MANET. The recent research in the field of MANET routing protocols increases for find best efficient route between mobile nodes. Routing

protocols can be classified into three categories: Reactive Routing protocols, Proactive routing protocols, Hybrid routing protocols [3] [4] [8]. The goal of this paper gives the review of on the working of AODV, DYMO routing protocols and Cuckoo search artificial intelligence technique.

This paper is organized as follow. In section II describes the classification of routing protocols in MANET. The section III and IV explains the working of AODV and DYMO routing protocols, section V describes the Cuckoo Search Optimization Algorithm. Finally, VI section explains the conclusion and future of the paper.

II. CLASSIFICATION OF ROUTING PROTOCOLS

Routing is the act of transferring packets from source to destination in an internetwork which is done with the help routing protocols. The routing process forwards packets on the basis of routing tables which records the route information of nodes. Each node acts as router for forwarding, receiving packets from source to destination. The routing tables are stores in the router memory, is very imported for efficient routing. The routing protocols can be classified into three categories: Reactive (On-demand) routing protocols, Proactive (Table-driven) routing protocols, Hybrid (Reactive & Proactive) routing protocols [2] [15]. Classification of MANETs routing protocols as shown in the figure 2.

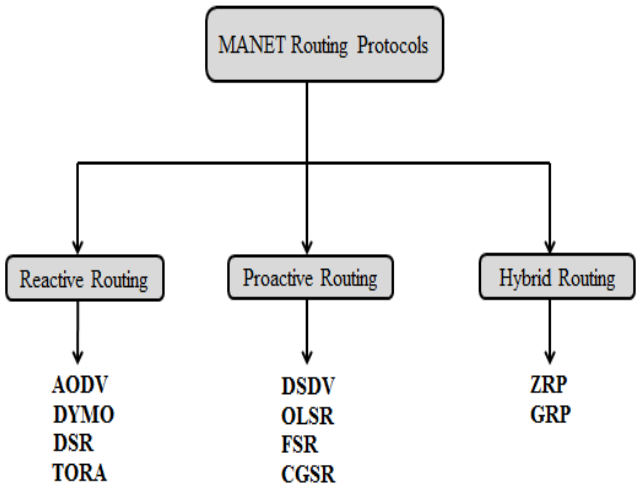

Figure 2. Classification of MANETs Routing Protocols

a. Reactive or On-demand Routing Protocols

Reactive routing protocols are also known as On-demand routing protocols because route is only discovered when it is needed. When source node wants to communicate to the destination, it starts route discovery process to find the path to the destination [3]. The main goal of reactive routing protocols is to minimize network traffic overhead. Common processes of reactive routing protocols are the following:

Route Discovery Process: Route discovery process starts when the source node wants to communicate with the destination node, first source node check its own routing table to find the route to the destination, if route not store, then it starts broadcast the route request message to the intermediate nodes. Intermediate nodes first check its routing tables, if route is find to the destination then sends reply message to the source node and if not find then rebroadcast route request message to other nodes. Finally when any node finds the route to the destination then send route reply message to the source node.

Route Maintenance Process: Route maintenance process starts when any link fail from source to destination. The error message is generated by node and multicast this message to those nodes which are concerned with the link failure. When nodes receive this message update its routing tables and delete the entry of broken link from routing table. The affected source node stop sending data and reinitiate route discovery process for that destination node by sending new route request message [4].Some examples of reactive or On-demand routing protocols are the following:

- AODV (Ad-hoc on-demand routing protocol)
- DYMO (Dynamic MANET On-demand protocol)
- DSR (Dynamic Source Routing)
- TORA (Temporary Ordered Routing Algorithm)

b. Proactive or Table-driven Routing Protocols

Proactive routing protocols are also known as table-driven protocols because each node periodically updates routing information in routing table and broadcast this updated information throughout the network. In this type of protocols source node does not need of route discovery process for find the path to the destination. Due to

high mobility, dynamic topology of ad-hoc networks, maintaining the routing information in routing tables is a challenging task. Proactive protocols require more power and bandwidth for transmission of updated routing information; the main drawback is tendency of creating loops within the network [14]. Some examples of table-driven or Proactive routing protocols are the following:

- DSDV (Destination Sequenced Distance Vector Routing Protocols)
- OLSR (Optimized Link State routing Protocol)
- FSR (Fisheye State Routing Protocol)
- CGSR (Cluster head Gateway Switch Routing Protocol)

c. Hierarchical routing protocols

Hierarchical routing protocols are the third group of routing protocols in MANET that combine the features of reactive and proactive routing protocols, this routing is also known as hybrid routing protocols. The main advantage of this routing protocol is that the proactive routing for small distance and reactive routing for long distance. Routes overlapping and longer delay are the main drawbacks of hybrid routing protocol, and nodes consumes more memory and power [12]. Some examples of hybrid routing protocols are the followings:

- ZRP (Zone Routing Protocol)
- GRP (Gathering-based Routing Protocol)

III. WORKING OF AODV ROUTING PROTOCOL

AODV means Ad-hoc On-demand Distance vector routing protocol. It is a reactive or on-demand routing protocol, there is route only constructed when it is need. It is a combination of DSR and DSDV routing protocols. It receives route discovery and route maintenance features from DSR and receives hop-by-hop routing feature from DSDV. AODV removes counting-to-infinity problem because it uses sequence number for each route request message [9].

Using destination sequence number in AODV makes the network loop free. AODV discover a loop free and shortest path from source to destination. Common control messages in AODV are the following:

- RREQ message (Route Request)
- RREP message (Route Reply)
- RERR message (Route Error)

These three control messages are used for path establishment from source to destination. The following section explains the two processes that used for path establishment in AODV routing protocol.

a. AODV Route Discovery process

In route discovery process, when source node wants to communication with destination first it checks its own routing table and if it find entry of destination address then it start communication with destination, if not find entry then it sends RREQ message throughout the network. The RREQ message contains the following fields:

Source Address	Request Identification	Source Sequence number	Destination Address	Destination Sequence number	Hop count

When source node sends a new RREQ then request ID increments each time, source address and request identification defines RREQ uniquely.

As shown in figure 3 source node A sends RREQ message to its neighbors B, C. Neighbor nodes B, C checks destination entry in its own routing tables, if they find destination address then give reply to source node A and if not find then forward the RREQ packet to other neighbor nodes till it reaches the destination.

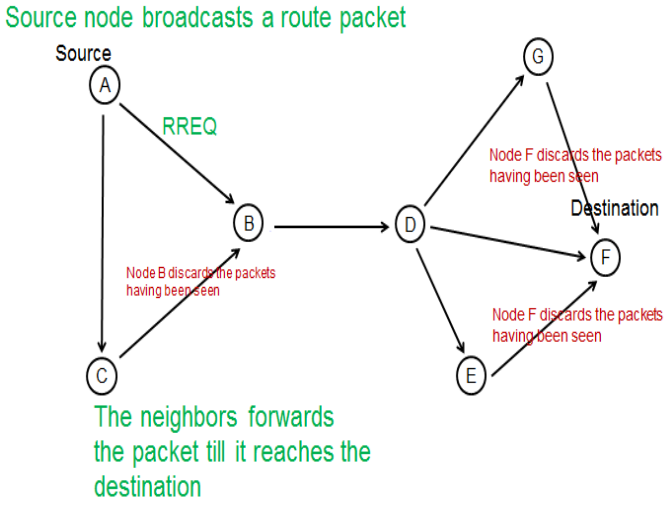

Figure 3. Route Discovery Process using RREQ message

Node B discards the RREQ message that is send by node C because it already receive same message

from node A. when destination node F receives RREQ message then it unicast the RREP message back to source node. The RREP message contains the following fields:

Source Address	Destination Address	Destination Sequence number	Hop count	Lifetime

As shown in figure 4, when destination node F receives a RREQ message then it generates RREP message and unicast this RREP message back to the requesting nodes. When RREP message reaches a source node A, then route is created to the destination node. Now source node A starts sending data packets to the destination F after creating a path. After some time if a source node receives a RREP message having greater sequence number or same sequence number with a smaller hop count, source node may update its routing table for that destination node and start communication with shortest route means less hop count route.

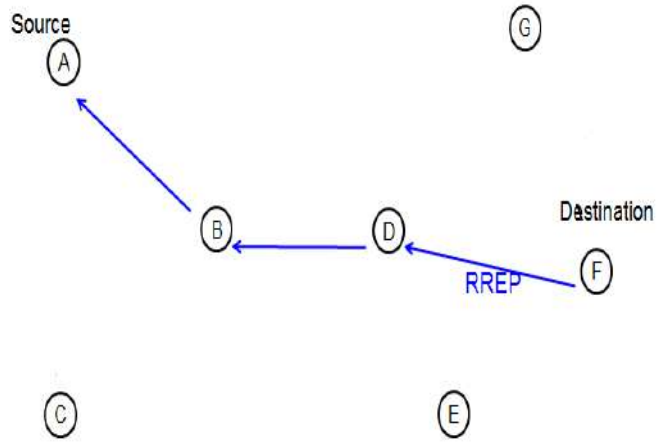

Figure 4. Route Discovery Process using RREP message

b. AODV Route Maintenance Process

After creating route from source to destination, when a node detects the link break in an active route. Then error message RERR is generated by node and multicast this message to those nodes which are concerned with route failure. Nodes update its routing tables after receiving this message and delete the entry of affected route. Now source node stop sending packets through this affected route and reinitiate new route discovery process if needed [8].

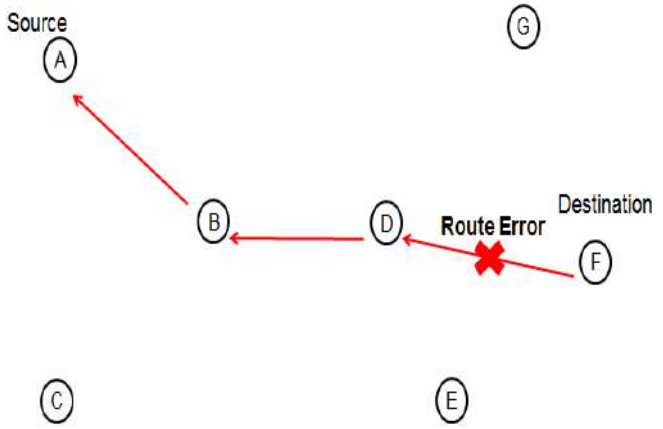

Figure 5. Route Maintenance Process using RERR message

As shown in figure 5, the link from destination node F to node D is break. Then error message is send to the source node A, remove the route to the destination from routing table and reinitiate route discovery process for new route.

IV. WORKING OF DYMO PROTOCOL

DYMO means Dynamic MANET On-demand routing protocol. It is similar to AODV protocol and also known as AODV version 2. Path accumulation is a new feature of DYMO protocol. DYMO is a reactive or on-demand routing protocol in which route is only constructed when it is needed. It does not support unnecessary HELLO messages and working is based on sequence numbers assigned to the packets. DYMO is loop free protocol because it uses sequence number. It is energy efficient and less memory consuming protocol due to path accumulation feature [4]. DYMO consists of two operations:

a. DYMO Route Discovery Process

DYMO protocol route discovery process is similar to AODV protocol except new path accumulation new feature. Figure 6 shows the route discovery process for DYMO protocol. When source node A wants to communicate with destination node F, if it has no entry to the destination node then it broadcast the RREQ message throughout the network. If any neighbour node has entry to the destination node, then it replies back to the source node and if no entry then broadcast same message to the other nodes.

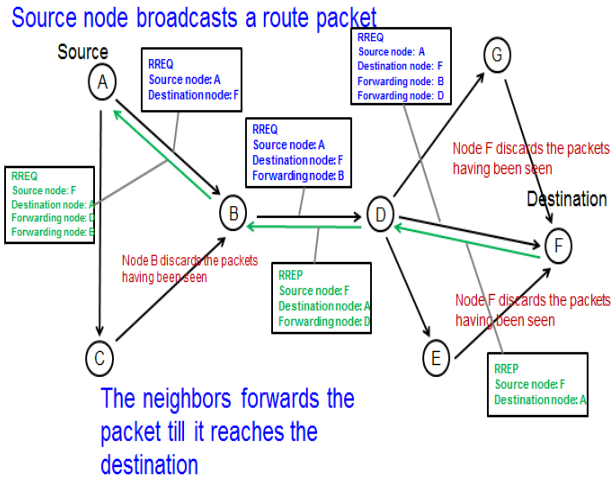

Figure 6. DYMO Route Discovery Process

When RREQ message is broadcast throughout the network, then each node will attach its address to the RREQ message. Every node that broadcast RREQ message makes a note of the backward path as shown in figure 6. Source node broadcast RREQ message to the intermediate nodes and intermediate node further forwards message till it reaches to the destination node F. When node F receives this message, then it generate RREP message. Along with backward path a similar path accumulation process is followed. This makes surly that the forward path is built and each node knows the path to the other nodes along the path. For loop free route each node maintains a unique sequence number and discards the stale packets if any. Each node updates its sequence number when send a RREQ message. RREQ message with superior sequence number is updated in the routing table [8].

Special feature of DYMO protocol is that it is energy efficient protocol. If any node is low energy then this node has an option to not participate in the route discovery process. In that case the node doses not forward any RREQ message and only see the incoming RREP message and update its routing table in future use [4].

b. DYMO Route Maintenance Process

Each node continuously monitors the active links during the routing operations and maintains the routing tables with updated information. In route maintenance process RERR message is generated by node when any link break in the established path and multicast this message to those nodes which are concerned with the link break. After receiving this message each node update its routing tables and delete the entry of broken link. Now source node stop sending packets through this route and reinitiate new route discovery process if needed [4].

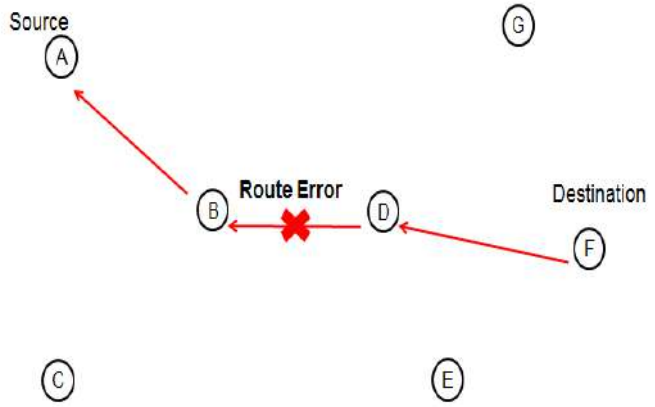

Figure 7. DYMO Route Maintenance Process

As shown in figure 7, node B received a packet from node A but route from node B to D is found broken. Then node B generates RERR message and forwards to the source node A. All the intermediate nodes update their routing tables and delete the entry of broken link. Now source node reinitiates route discovery process and find new path from source to destination.

V. COMPARISON BETWEEN AODV AND DYMO

The following table 1 shows the comparison between AODV and DYMO protocols on the basis of few parameters.

Parameters	**AODV Protocol**	**DYMO Protocol**
Path Established	By source node	By source node
Path Maintenance in	Routing Table	Routing Table
Loop Free	No	Yes
Routing Overhead	High	Less compare to DYMO
Throughput	Less compare to DYMO	High

Periodic Updating	No	No
Multiple Routes	No	No

Table 1. Comparison of AODV and DYMO Protocols

VI. CUCKOO SEARCH OPTIMIZATION ALGORITHM

Cuckoo Search (CS) is a optimization algorithm developed by Xin-She Yang and Suash-Deb in 2009. It is a different algorithm which is inspired by the obligate brood parasitism of some cuckoo species by laying their eggs in the nests of other host birds of other species. Due to breeding behaviour of Cuckoo search can be applied for various optimization problems. It is more efficient algorithm as compare to Genetic algorithm and Particle Swarm Optimization algorithm [5].

Cuckoo Search is based on three idealized rules:

1. Each cuckoo lays one egg at a time and dumps its egg in a randomly chosen nest.
2. The best nests with high quality of eggs will carry over to the next generation.
3. The number of available hosts' nests is fixed, and the egg laid by a cuckoo is discovered by the host bird with a probability Pα. The worst nests are discovered and dumped from further calculations [7].

The Pseudo code for cuckoo search Levy Flights is shown in figure 8. The quality and fitness of a solution is depends to the value of the objective function for the optimization problem [11].

```
begin
  Objective function f(x),  x = (x_1, ..., x_d)^T
  Generate initial population of
      n host nests x_i (i = 1, 2, ..., n)
  while (t <MaxGeneration) or (stop criterion)
    Get a cuckoo randomly by Lévy flights
      evaluate its quality/fitness F_i
    Choose a nest among n (say, j) randomly
    if (F_i > F_j),
        replace j by the new solution;
    end
    A fraction (p_a) of worse nests
        are abandoned and new ones are built;
    Keep the best solutions
        (or nests with quality solutions);
    Rank the solutions and find the current best
  end while
  Postprocess results and visualization
end
```

Figure 8. Pseudo code for Cuckoo Search by Levy Flights

Cuckoo Search in the case of MANET Routing Protocols:

Cuckoo Search (CS) is used in MANET for finding shortest path from source to the destination. This artificial intelligence optimization is applied to nodes in MANET. Due to Cuckoo Search intelligence source node find the best node means shortest path node that easily with consuming less time send data to the destination node. Cuckoo search algorithm avoids congestion in the route and finds shortest path. It increases the energy efficiency, life time and Quality of Service (QoS) of the network.

VII. CONCLUSION AND FUTURE WORK

In this paper, we provide the complete discussion the working of AODV and DYMO routing protocols for Mobile Ad-hoc Networks. We also provide discussion about the Cuckoo Search Optimization algorithm. It is not possible any particular routing protocol is best for all the scenarios due to MANETs features like dynamic topology, no centralized control, no fixed infrastructure. Recently the research in the field of MANETs routing protocols is rapidly growing. In future we improve the performance of AODV and DYMO protocols with the help of Cuckoo Search technique and obtain better results in terms of packet delivery fraction, Average End-to End delay, routing overhead and throughput by using Network Simulator 2 (NS2). We hope this paper will helpful for researchers who are working for AODV and DYMO protocols.

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The Different Black Hole Detection Mechanism In MANETs

Sahil Sharma, M.tech student
Department of CSE
RIMT- IET
Mandi Gobindgarh (Punjab), India
sssahil529@gmail.com

Rupinder kaur gurm, Associate professor
Department of CSE
RIMT- IET
Mandi gobindgarh (Punjab), India
rupindergurm@gmail.com

Abstract— A mobile Ad-Hoc network provide a survey of various security mechanism that has been proposed in Dynamic Source Routing(DSR) protocol against black hole attack which contain malicious nodes which replies the route request in the form of fresh route to the destination and then it drops all the receiving packets. In this paper, the proposed solution provides a secure route between the source and destination by identifying both single and cooperative black hole. The paper focus on network layer packet dropping attack like black hole/grey hole attack in DSR based manet.

Ingridient —Mobile Ad Hoc Network, Dos, Black Hole Attack.

I. INTRODUCTION

A network is a collection of nodes which follow different protocols. A wireless AD-HOC network is type pre existing network framework which has no router or access point but a collection of mobile nodes wich act as both host and router, equipped with wireless communication and networking capability to communicate with one another.
There is a problem of routing the data packet from source to destination node, so MANET goal is to provide communication to the area where limited communication organisation exist. Examples of ad-hoc network are laptops, mobiles, computers etc.diagram

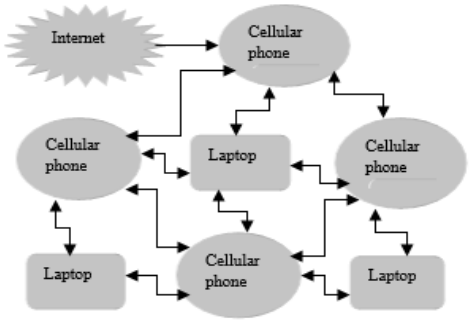

Fig 1. Mobile adhoc networks

Figure 1: A Mobile Ad-hoc Network

CHARACTERISTIC OF AD-HOC NETWORK

MOBILE AD-HOC NETWORK is a type of flexible and reliable network. It has no fix infrastructure and links and limited bandwidth which continue to have low capacity then other network which provide minimum throughput with consequences of noise and interference. It is an energy compulsion operation which relies on batteries and other source of energy. Ad-Hoc network experience security attacks due to changing network topology, decentralized monitoring and there is no certification authority. It has limited physical security and responsible for discovering other nodes dynamically, and it is a self configuring server.

II. Routing in MANET

An Ad-Hoc is a type of protocol that controls how nodes decide the path to route the packet between computing device in mobile Ad-Hoc network. It is divided into two parts.

A. Topology based
B. Position based

A. *Topology Based*: Topology based protocol is of three types.

Proactive Routing Protocol: - It is maintained by nodes to use to store packet. It is table-driven which contain routing entries. It is prone to various type of attack like message dropping, delay of service. It maintains constant up to date information between nodes. Its node experience least delay where route is immediately needed to get rid of short coming reactive protocol. Example of proactive routing protocol are DSDV (Destination sequenced distance vector), OLSR (optimized link state routing).

Reactive Routing Protocol:- it consume less bandwidth then proactive protocol. It is also called On-Demand routing protocol. It create route On-Demand to destination node initiated by source node through discovery process. It typically experience long delay communication. the main disadvantages of such type of routing, it takes high latency time in route finding and excess flooding can lead to network clogging. Example of reactive protocol are AODV(Ad-Hoc On Demand Distance Vector) DSR(Dynamic Source Routing).

Dynamic Routing Protocol: - It is an on demand routing protocol which design specially for multichip wireless Ad-Hoc network. In DSR, node uses RREQ, RREP, and RERR packet. In this, routes are discovered when source send a packet to destination for which it do not has cache route. It help in making the network topology which and rapidly changing. It is based on the concept of source routing.
It has two phases:-

1) Routing Discovery:- It is discovered by a source node which broadcast a RREQ packet to all its neighbors. It is to establish a route by flooding route request packet in network. The destination node when receive RREQ packet response to route reply packet by reversing route information stored in RREQ packet

2) Route maintence:- During this phase, break of links are handled. Link break occurs when intermediate nodes involve in packet forwarding process. Source either tries an alternate path or initiates the route discovery process again.

Hybrid Routing Protocol:- It is the combination of proactive and reactive protocol. In this the routing protocol is initially establish when some proactively prospected routes and then it serves the demand from additionally activated nodes through reactive flooding. The main disadvantage of this type of network is it depends on number of other activated nodes in the network. It is suited for a network where call-to-mobility ratio is high. Example of hybrid routing protocol are ZRP (Zone Routing Protocol) TORA(Temporally Ordered Routing Algorithm).

B. *Position Based*:- This algorithm requires information about physical positioning which eliminates the disadvantages of topology based routing. In this, the sender of a packet use location service to find the position of destination.

III. SECURITY IN MANETS

A. Security Goals In MANET

1) INTEGRITY: - In this assets can be edited by an authorized party. It ensures that message to be transferred from source to the destination nodes is never corrupted.

2) ACCESSIBILITY:- It provide an availability to authorized party when ensure survival of networks despite of delay of service attack.

3) PRIVACY:- It ensure computer based confidentiality to authorized party. we need to keep confidential information secretly.

4) AUNTHENTICATION:- It provides access to legal senders to ensure identity of node to which it is communicated.

5) NON-ACCEPTABLE:- It ensures the sender and receiver if a message, not to reject when they ever send or receive.

B. Vulnerabilities In MANET

MANET is prone to an unauthorized data organization because it does not identify uses the identity. It is more prone to risks then wired network.

1) DECENTRALIZED MANAGEMENT:- It does not have centralized monitor because it is enable to detect traffic in highly dynamic Ad-Hoc network.

2) SHARING: - It is assume that nodes are cooperative and non malicious as a sequence spiteful attacker, not able to disrupt network operation.

3) RESTRICTED POWER SUPPLY:- In Ad-hoc network, nodes need to consider limited power supply. Nodes show greedy nature when there finds limited power supply. These nodes are called selfish nodes.

4) RESOURCE REQUIREMENT:-It is a major conflict in MANET to provide secure communication in such modifying environment where there are security issues.

IV. ATTACKS IN MANET

It is a challenging issue, decentralization and cooperative medium makes MANET more vulnerable to cyber attacks. These attacks are classified into following types:-

1) Passive Attack

These attacks provide proper operation of network. There is a requirement where confidentiality can be violated through snooping. Detection of this attack are difficult.

2) Active Attack

These attacks are performed by malicious nodes which can tolerate some energy cost. It involves editing of data stream or creation of pseudo stream.

3*) External Attack*

These attack are physically stayed outside the network and create congestion in network by disrupting the entire network. External attack can become a kind of internal attack when it takes power on the internal malicious node and control it to attack the other nodes in manet. This type of attack decreases the speed of transmission of data and also makes the data packet insecure by lowering down the performance of the nodes in the network. It can be protected by using authentication and non repudiate, privacy and confidentiality methods. Diagram

4) Internal Attack

In this type of internal attack there is an internal malicious nodes which gets fit in between the routes of source and destination in the network. When the malicious nodes gets the chance then it makes itself an active data route element. When the data is going to start, at this stage it get capable of conducting attack during data transmission. Internal attack is more vulnerable to protect against this misbehaving because it is very difficult to detect them. Example of internal attack is Black hole/ Grey hole. Diagram

V. *BLACK HOLE ATTACK*

Black hole attacks have been very known and as the most important concern of security in manet. The main aim of this paper is the black hole attack based DSR routing protocol, are the most vulnerable against black hole attack because DSR having a network centric property where all the nodes have to share their routing for each other. BLACK HOLE ATTACK refers to an attack by malicious nodes as it acquire the route from source to destination by pseudo shortest hop count and maximum sequence number. It is an internal attack which has the attacker property like consume packets without any forwarding, to advertise itself as valid route to destination node as it can choose to drop of packet form the delay of service attack. In this attack, malicious nodes wait for the adjacent node to provide RREQ packet. the source node avoid RREP received from other node. This attack is called as black hole attack as it swallows all data packets. The diagram shows the black hole attack.

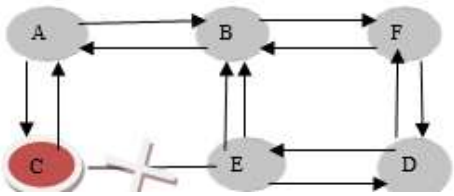

Fig. 2 Black Hole Attack

In this above example, the source A wants to communicate with the destination D. It sends RREQ (Route Request) packet to its neighbor. An attacker C, give a fake reply packet by advising a hop count for provide a shortest route to D. This leads to the existence of a fake route by the selfish node which helps in dropping the packet. Selfish nodes are also known as black hole as they spoil the data packet and never send them

A.TYPES OF BLACK HOLE ATTACK

1). Single black hole attack:- This attack is due to individual black hole node. In this, sender sends the data to recevier through malicious nodes which drop all data somewhere.

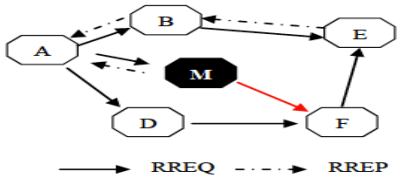

Fig. 3 Single Black Hole Attack

In this above fig. the source node A transmit RREQ packet to its neighbor nodes B and D to discover fresh route to the destination F. The black hole M quickly respond to the source node A by sending a fake RREP then the source node consider the route discovery has completed and then it reject the RREP message from other nodes. Then the attacker will drop the receive packet without sending to destination F.

2). *Collaborative black hole attack*:- This attack is due to two or more than two malicious nodes present in the network. It is very hard to detect and prevent this attack.

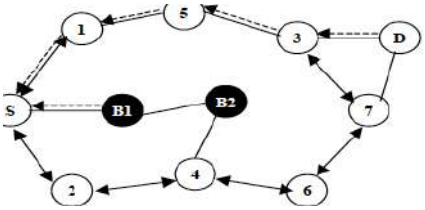

Fig. 4 Collaborative Black Hole Attack

In this above fig. the black hole node B1 is cooperating with Black hole node B2 which is its member as the next hop. The level of detecting attack is low because they work in grouped form.

VI. LITERATURE SURVEY

In this paper we will study about different black hole detection and prevention techniques.

M. Mohanapriya, Ilango Krishnamurthi proposed a routing security scheme which is considered on reputation evaluation in Ad-Hoc network as it is routed on the action of the nodes. It has a purpose of building up the participated grouping nodes for leading the data packets or to develop the activity channel of grouped nodes in the network. The authors also proposed the scheme in which the path of the intermediate nodes proffered randomly with the forwarding path as check points nodes which engages I developing community for every receive packet. An alarm packet gets up when the suspicious behavior is detected and then delivers it to the source node. They used IDS (Intrusion Detection System) for detecting Black hole/ Grey hole attack. They also approached trust based proposal which is used to improve the performance of the searching route and enhance the durability of the manet.

N. Balaji, Dr. A. Shanmuyam et al provide information about enhancement of routing security to be applied to DSR protocol of association based route selection. He proposes to apply the base route selection to fortify the existing attack through best and secure route. He provided information about the trust value which will be stored to represent the value of trusti for each node in network.

Issac Woungang et al proposed a paper in which there is a novel scheme for detecting black hole attack in manet called BDA DSR. This protocol detects and ignores the black hole problem by using fake RREQ packet to hold malicious node. Pruchee, M. Patil, Ashish T. Bhole gives the source routing and caching property of DSR which prevent the black hole attack in the network. When the black hole node and the mis-behaving node is detected, the black hole node is then go through add to route and add all remaining path for the source to reach to the particular destination. This method of normal cache reduces the time processing and packet drop ratio.

Sanjay kumar Dhuradher, Mohammad S. obaidat et at in this paper authors proposed DBA-DSR based manet scheme in which fake RREQ packet are used which identify all the malicious nodes present in the network before the actual routing starts. In this scheme acknowledgement mechanism is

also used by source and intermediate nodes, if the fake RREQ-RREP fails to identify the nodes in black hole. There are two drawback of this type of scheme used. The first one is the acknowledgement packet which are exchanged to check the intermediate node is fake are not, the overhead of routing is also increase with this scheme. The second drawback is that it takes larger time to find the path if the distance between the source and intermediate node is long.

Yogendra KumarJain, Nikesh Kumar Sharma et al in this paper, the authors provided a method which is used to find a save and secure path based on human trust analogy. In this path's trust value is used for finding a route from source to the destination to gain more secure path. Trust value is defined as equal to the minimal one of the node value in the route. In this method, nodes acquire there trust factors from experience, knowledge and advice from other nodes. Linear aggression method is used for the estimation of overall trust in a node and a minimal value is used to complete path's trust.

Po Chun TSOU, Jian- Ming Chang et al proposed a BDSR scheme to avoid black hole attack based on proactive and reactive protocol. In this paper, the author has presented an algorithm which contains two function. The first function is initiate based. In this the black hole nodes are identify by sending bait RREQ by using non existence destination address to bait the malicious node to reply ro RREP. If any node responds to that request, then is will be identified as the malicious nodes and added in the black hole list. The second function follows the normal DSR route discovery. If the packet delivery ratio is gets lower than the threshold value during its starting function, then its function calls to identify the malicious nodes and the route discovery will be successful and finally the transmission of data packets takes place.

Marti S, Giuli, T.J, Lai k. and Baker, M. et al proposed a watch dog and path rater against black hole attack which is used top of the source routing protocol such as DSR. CONFIDANT (Cooperative Of Nodes, Fairness In Dynamic Ad-HOC networks) is an updated version of watch dog and path rater in which a method is used which is similar to pretty good secure for showing various certification, trust and validitification. It is also implemented on uncast routing protocol like DSR

.VII. CONCLUSION

With developing in computing environment, the different types of services which are based on Ad-Hoc network have been increased. So, in this paper we have studied about the manet, types of routing protocols like proactive and reactive. Security and different attack in manets. Wireless Ad-Hoc network are vulnerable to various types of attack due to the physical characteristics of both the environment and the presence of nodes. In this paper authors proposed various method to mitigate or overcome from the issue of the black hole attack on the DSR based routing protocol in manet. In our study the DSR is susceptible to black hole attack and therefore it is vital to have an efficient security function in the protocol in avoiding such type of attack in the manet.

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Designing a New Class of Fault Tolerant Multistage Interconnection Network

Vikram Sharma, Asst. Professor, DAV College, Amritsar-143001, Punjab, India.
Email-vik_pnv@yahoo.com,vik.pnv@gmail.com, Mobile Number-9876074671

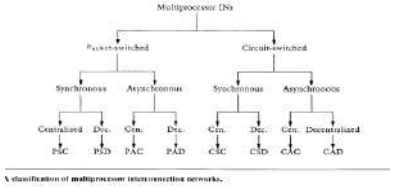
Abstract-Parallel processing is an efficient form of information processing system, which emphasizes the exploitation of concurrent events in the computing process. To achieve parallel processing it's required to develop more capable and cost-effective systems. In order to operate more efficiently a network is required to handle large amount of traffic. Multi-stage Interconnection Network plays a vital role on the performance of these multiprocessor systems. In this paper an attempt has been made to analyze the characteristics of a new class of irregular fault-tolerant multistage interconnection network named as irregular modified augmented baseline network (IMABN).IMABN can provide 'Full access' capability in presence of multiple faults . The reliability of interconnection networks and their ability to continue operating despite failures are major concerns in determining the overall system performance. In this paper reliability of the proposed IMABN have been calculated and compared in terms of the Upper and Lower bounds of mean time to failure (MTTF).Reliability and Cost study shows that IMABNs achieve a significant improvement over Modified Augmented Baseline Network (MABN).

Keywords: E-MIN; exchange operator; 4-edge Loops; edge color;permutation*;*

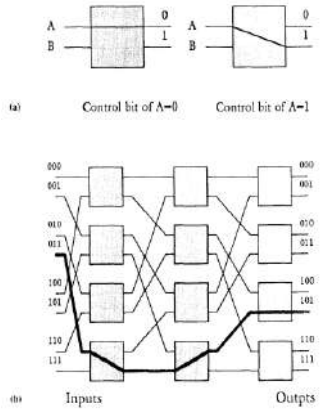
I. INTRODUCTION

This paper proposes a technique to modify a Multistage Interconnection Network (MIN) to augment it with fault tolerant capabilities. The augmented MIN is referred to as Enhanced MIN (E-MIN). The technique employed for construction of E-MIN is compared with the two known physical fault tolerance techniques, namely, extra staging and chaining. EMINs are found to be more generic than extra staged networks and less expensive than chained networks. The EMIN realizes all the permutations realizable by the original MIN. The routing strategies under faulty and fault free conditions are shown to be very simple in the case of E-MINs. With device characteristics approaching physical limits, parallel or distributed processing has been widely advocated as a promising approach for building high performance computing systems. The continued impetus research in these areas arises from two factors: (a) the technological development in the area of VLSI chips and b) the observation that significant Exploitable software parallelism is inherent in many scientific and engineering applications. To exploit this parallelism efficiently, a parallel/distributed system must be designed [5] to considerably reduce the communication overhead between the processors. The communication architecture of the system might support one application well but might prove inefficient for others. Therefore, we need to take a general approach, independent of the application, while designing the communication system or the interconnection network (IN) of a general-purpose parallel/distributed system. The IN must be efficient, reliable, and cost effective. A complete interconnection, such as a crossbar, might be cost prohibitive, but a shared-bus interconnection might be inefficient and unreliable. Thus, present research is directed to designing INS whose cost and performance lie somewhere between the two extremes. Ongoing research in the area of parallel and distributed processing suggests a number of promising INS. Because of the high cost involved[3] in hardware implementation or software simulation of these INS, performance evaluation of these networks needs to be carried out through analytical techniques so that we can make a choice between various alternatives. A mathematical model[8] makes it possible to study the efficiency of the IN in terms of various design parameters used as inputs to a model. Therefore, the intent of this article is to provide a tutorial on the subject of performance evaluation of multiprocessor interconnection networks to guide system designers in their design process.

An IN is a complex connection of switches and links that permits data communication between the processors and lent networks can have different operational characteristics giving rise to different system behaviors. These operational characteristics also necessitate different methodologies [11] to be used in IN performance evaluation. Synchronous control techniques are well understood and widely used in computer system designs. They are characterized by the existence of a central, global clock that broadcasts clock signals to all devices in a system so that the entire system operates in a lock-step fashion. Asynchronous techniques, on the other hand, operate without a global clock[14]. The communications among operational units in the system are performed by means of interlock hand shaking. As a result, they have good expandability and modularity, but are difficult to design.



A classification of multiprocessor interconnection networks.



Analyses of multistage interconnection networks:

The cost of a crossbar network is too high to be practical for building large multiprocessor systems. As an alternative to the crossbar network, multistage interconnection networks (MINs) have assumed importance in recent times. The main advantage of these networks is their cost-effectiveness. They allow a rich subset of one to one and simultaneous mappings of processors to memory modules, while reducing the hardware cost to O(N1ogN) in contrast to O(N2) for crossbar networks. An N x N MIN connects N processors to N memories. For N a power of two, it employs log,N stages of 2 x 2 switches with N/2 switches per stage[9]. Each switch has two inputs and two outputs. The connection between an input and an output is established depending on a control bit c provided by the input. When c = 0, the input is connected to the upper output, and when c = 1, it is connected to the lower output. An omega network is characterized by a perfect shuffle interconnection preceding every stage of switches [15]. The requesting processor generates a tag that is the binary representation of the destination. The connection of a switch at the ith stage is then accomplished by the ith bit of this binary tag counted from the most significant bit. The connection between input 3 and output 5 (1012) is shown by a bold line in above Figure b. This self-routing property of a MIN avoids the need for a central controller, making it very suitable for multiprocessors. Thus, the performance discussions presented in this section will concentrate solely on the decentralized control scheme. Many significant MINs, such as Banyan, generalized cube, base line, etc.,' have been proposed. However, most of these networks are similar except for the interconnection between the adjacent stages. The switch size in an MIN need not be restricted to 2 x 2. In fact, the Butterfly parallel processor connects N inputs to N.

Performance of crossbar interconnection networks:

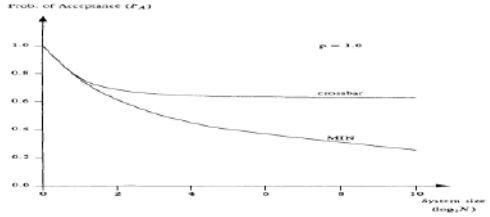
A crossbar interconnection network is an array of individually operated contact pairs in which there is one pair for each input-output combination. A crossbar network with N inputs and M outputs is referred to as an N x M crossbar. As long as there is no memory interference among a set of memory requests generated by the processors (no two or more processors request the same memory module), all connections can be established at the same time. Thus, all memory accesses can proceed simultaneously. But this capability comes at a highs witching cost, which is (O(NM)).Although the crossbar network can provide all simultaneous connections, memory bandwidth is much less than its actual capacity. This reduction is due to the memory interference caused by the random nature of the memory requests in a multiprocessor environment. Therefore, the performance analysis of a crossbar network becomes the analysis of memory interference.

II. COMPARISON AND DISCUSSIONS:

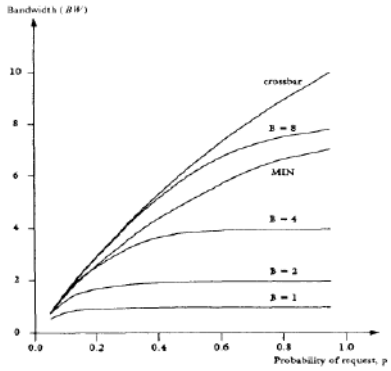
Three types of interconnection networks possess different hardware features and different system performances. Now, we will look into these differences quantitatively. In particular, we will compare the hardware cost and system performance of the three interconnection networks. The following Table lists selective hardware features of the three networks.

	Crossbar	MINs	Multiple-bus
No. switches or connections	$N*M$	$N\log N$	$B*(N+M)$
Load of buses	N	1	B
No. of wires	M	N	B
Arbiter	M 1-of-N arbiters	$N\log N$ 1-of-2 arbiters	1 B-of-M and M 1-of-N arbiters
Fault-tolerant and expansion	Fair	Poor, but fair with additional hardware	Good

As we already know, the number of switching elements used in an N x M crossbar is N x M in contrast to Nlog N of MINs. The number of connections necessary in an N x M x B multiple-bus system is proportional to R(N + M). Since each bus in the multiple bus system needs to drive N + M modules, the bus load is proportional to N + M,while the bus load of an MIN is one due to the one-to-one connection[9]. All three of these networks require certain types of arbiters to resolve the request conflicts. In a crossbar network, M N users 1-server arbiters are necessary, each of which selects one of up to N outstanding requests for a memory during a memory cycle. The MINs, on the other hand, require two 2-user I-server arbiters for each switching element for (N / 2) l o g z N switches. In a multiple-bus system, an M-users B servers arbiter is needed to assign the B buses to the outstanding requests. Once a bus is granted to a memory, only one of the processors that request the memory can proceed while the others, if any, are delayed. This choice is implemented by an N-users I-server arbiter. Thus, a multiple bus system requires M + 1 arbiters, one arbiter of the M-users B-servers type and M arbiters of the N-users I-server type. Expandability and reliability are two other very important hardware features. In this context, a multiple-bus system shows its advantages over the other two because of its re-configurability and multiple-data paths between every processor and memory. It can still operate in a degraded mode after the failure of a subset of the buses.



Next, we'll consider the performance of the three interconnection networks based on the analytical models described in the previous sections. Figure 9 shows the probability of a memory request being accepted, PA = BW/p.N, as a function of system size for synchronous circuit switched systems with p = 1 .O. Two curves, one for crossbar and one for MIN, are plotted. The difference between the two curves increases as the system size grows. The probability of acceptance in the crossbar system remains constant when the system size becomes very large. However, in the case of MIN, PA keeps decreasing as the system size increases. The performance difference between various networks is as shown



All the comparisons above apply to synchronous systems based on system cycle. We have intentionally avoided comparing synchronous systems because their performance is so dependent on the input parameters that choosing the wrong parameters might give rise to the wrong conclusions. However, the analytical techniques that can be applied to evaluate those systems are given in this article. The information provided here is useful for predicting the approximate performance of an IN structure before its design and implementation. Further references and a more detailed survey on the performance evaluation of multiprocessor INS can be found in Bhuyan[1].'It seems that enough research has already been done in evaluating INS in isolation. We strongly feel that more work is needed at the system level that includes the IN as a major component .For example evaluation of multiprocessor systems with prefetching, bulk data read or write, and solving cache coherence with INS shows promise for future research. Similarly, task (application) level modeling on multiprocessor architectures might produce some good insight into the trade-offs between computation versus communication, low versus large granularity, static versus dynamic scheduling etc. Finally, some actual measurements (traces) should be obtained on real multiprocessors and applied to the analytical models as their input parameters.

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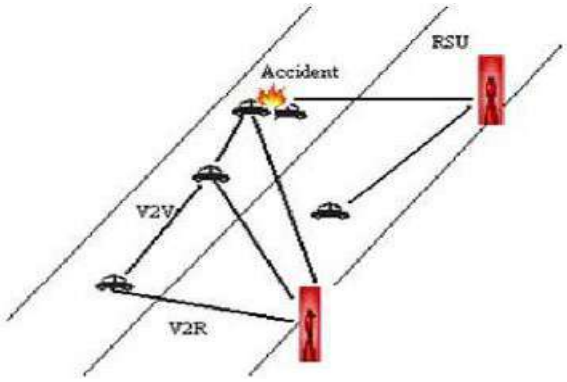
An Account of Broadcast Routing Protocols in VANETs for Urban Scenario

Manverpreet Kaur
Research Scholar, M.Tech (CSE)
Deptt. of CSE, ACET Amritsar
Amritsar, India
manverpreet05@gmail.com

Er.Amarpreet Singh
Associate Professor
Deptt. of CSE, ACET Amritsar
Amritsar, India
amarmandeep@yahoo.com

Abstract :Vehicular ad hoc network (VANETs) being a special class of MANETs attributed to Vehicular communication in a wireless environment. It is an emerging technology used in ITS (Intelligent Transportation System). Due to its highly dynamic topology as well as frequent disconnection among vehicles, various categories of protocols have designed for its efficient and reliable working. This paper discusses and compare of existing Broadcast Routing Protocols based on sharing Traffic, Road Conditions, Weather information.

***Keywords*: ITS (Intelligent Transportation System), UMB (Urban Multihop Broadcast), StreetCast, UV-CAST (Urban Vehicular Broadcast)**



I.INTRODUCTION

VANET (Vehicular Ad hoc Network) is the special arrangement of MANET (Mobile Ad hoc Network) in which mobile nodes are vehicles that communicate with each other. In this communication Vehicles are connected but they can move freely and no wired connectivity is required.

Here each vehicle has its own platform, self-organize and self-manage information in a distributed fashion. Each Vehicular Device has an ability to connect with any other device in the network.

To pave the way for communication between the source and destination each intermediate nodes forwards the message to the next node. [2] as label in fig.1. In VANET, communication can be between vehicles and road side units (V2R), vehicle and vehicle (V2V) in the short range of 100m to 300m. [3]

Vehicular Network System consists of large number of Vehicles, approximately number of Vehicles exceeding 750 million in the world today.[4]

Fig.1. VANETs Diagram [2]

II. Broadcast Routing

Broadcasting refers to the operation of disseminating a piece of information from one node to other nodes within the network either by single hop or multiple hops. Broadcasting is emerging for applications that run on wireless communication environments. In VANETs Broadcasting delivers the messages to all vehicles that are present in the network within the communication range and relay the messages to all the vehicles in the network. The challenging issues in broadcasting is dissemination of same multiple messages to a single event. In vehicular networks reducing message flooding in broadcasting is important to increase the reliability of disseminating safety messages to other vehicles. [5]

The Broadcast Routing can be classified into two types which are based upon application related to direct neighbors and application related to the entire Network-:

1. Reliable Routing (Collision avoidance)
2. Dissemination Routing (Traffic Management)

The success rate of the reliable messages delivery can be increased by three methods as

- Rebroadcasting the message
- Selective Acknowledgement
- Changing Transmission Parameters

The Dissemination is further classified into two types [6]

- Flooding
- Single relay

The applications that uses the broadcast Routing requires the safety and reliable delivery of messages. Reliability confirms to-:

Low Latency Time**-:** The Reliable Method delivers the messages from the source vehicles to all the vehicles within the entire network with low latency time.

Performance**-:** The performance of the reliable Method is measured based on the success rate of message delivery and time taken for latency in a single broadcast phase. [6]

Broadcast Routing is frequently used in VANETs for sharing traffic, road conditions, weather and emergency among Vehicles and delivering advertisement and announcement.[1]

Broadcast Routing are use flooding algorithm for send a packet to all the nodes in the network. It provides guarantee to delivery of packet at all the nodes in the network at the cost of bandwidth waste and many nodes receive duplicates. Before

discusses the Broadcast Routing Protocols it must to understand the various issues arise in Urban Scenario's.

III. Routing Issues in URBAN Scenario's

In VANETs the most challenging requirement to meet in two-dimensional urban areas than a one - dimensional area Highway scenario's. Such difficulties arise because of additional dimensions of the Urban network topology and presence of intersections. Some of the problems that differentiate the protocol design for urban area's from the design of highway setup are describe in fig.2.

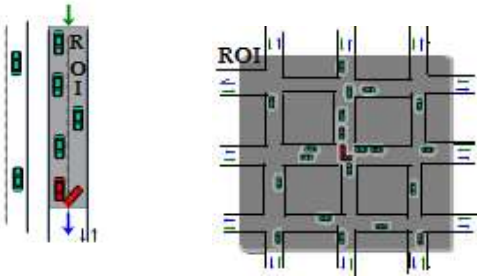


Fig.2 .Region of Interest (ROI) and direction of the messages in two scenarios: highway (left) and urban (right) scenarios. Green and blue arrows indicate the entry and exit points of the ROI, respectively.

1. Omni-directional message direction and Region Of Interest (ROI) [10]

To govern the appropriate ROI for a VANETs application one has to assume weather all the vehicles in a specific geographical location that travel in a specific direction would be interested in a broadcast message. This indicates that ROI of a particular application should be examined not only by the geographical area but also by the route journey of each individual vehicle. ROI differs according to the application [e.g.-Traffic notification, Electronic Brake Light etc.) Hence ROI and dissemination of messages may change according the application and scenario, message may be directed in several direction (North, South, East, and West)

2. Direction changes of a Vehicles at intersection point in 2-D scenarios-:

In 2-D Urban scenarios the direction changes of vehicles at intersection, it is not understandable which vehicle should be accountable for storing , carrying and forwarding (i.e. temporally relaying) the message unlike Highway scenario, where the temporal relay node is only the furthest node which is responsible forwarding the message. But this method may not be suitable for Urban Scenario. Because the farthest relay vehicle criterion is inadequate for Urban scenario as it will relay messages only to the sub region.

Hence, Urban scenario's needs a Store-Carry-Forward mechanisms with additional features.

3. Several enter and exit points to the ROI-:

In highway scenario there is only one enter and exit location in the ROI. On the other hand, the Urban scenario has number of locations where vehicles can enter and exit from. Due to multiple entries, it is no longer realistic to consider that if the message arrives at the end of area and the vehicles may not receive the message if they arrive at a later time, the vehicles that enter after the message passes through the area.

IV. Broadcasting Routing Protocol

Though they have reliability features but if implemented in uncontrolled manner that will result a following problems-: Storm Problems, Redundancy, Hidden Terminal Problem and Congestion in the network. So designing an efficient broadcast protocol for VANETs in urban areas is a big challenge. To address above stated problems three Broadcast Routing Protocols have been developed as shown in fig2. These are UMB (urban multihop broadcast Protocol), Street Cast Protocol, UV-CAST (urban vehicular broadcast protocol) that can handle and reduce broadcast redundancy, collisions and hidden problem.

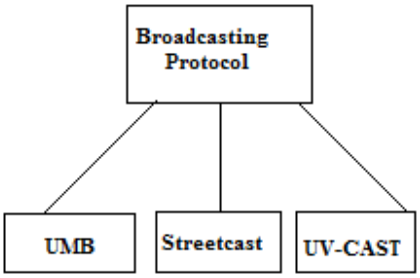


Fig.3.Broadcasting Protocol

A. UMB Protocol

UMB (Urban Multihop Broadcast) is designed to handle packet collision and interference and hidden node problems during message distribution in multihop broadcast. In this protocol, without any prior topology information sender node tries to select the furthest node in the broadcast direction for forwarding and acknowledging the packet. [7] It performs well when higher packet loads and vehicle traffic density.

UMB segmented a road in the direction of message dissemination and selected a relay node in the farthest segment by Request to Broadcast (RTB) and Clear to Broadcast (CTB) messages. [8]. It works as follows-:

The source node broadcast an RTB with its position to its neighbors. When neighbors receive the RTB message, they calculate their distance to the source vehicle and send the black burst to the source. The source vehicle accepts the black burst of each vehicle and listen the channel and only send the message when the channel is clear, the neighbor vehicles takes the responsibility to reply a CTB packet, it broadcast the data and waits for an ACK from the node which transmits the CTB packet.

Pros-:

- Overcome Packet collision and hidden node problem
- Performs successfully at higher loads and Vehicles traffic densities scenarios.

Cons-:

- Waste Bandwidth
- It doesn't work at disconnected network

B. Street Cast Protocol

Street Cast protocol consists of three components relay-node selection, MRTS (Multicast Request To Send) Handshaking and adaptive beacon control. The one hop neighbor information in the street cast protocol is used to select relay nodes. The MRTS mechanism is used to protocol Message transmission, "HELLO" beacons are used to exchange information between neighbors, adaptive beacons control

heuristic is proposed to dynamically adjust the number of beacons transmitted. [8]

Pros -:

- Avoid collisions and hidden terminal problems
- Overcome the broadcast storm problem

Cons -:

- It's not beneficial for the disconnected network

However, both UMB and Street Cast Protocols assume that network is always connected but they both have no solutions for disconnected networks. To handle this problem, a new routing protocol that eliminates the disconnected networks areas problems i.e. UV-CAST (Urban Vehicular Broadcast Protocol)

C.UV-CAST Protocol

UV-CAST (Urban Vehicular Broadcast Protocol) [10] that provides the better performance than Street Cast and UMB. The proposed protocol is completely distributed and it supports both disconnected and connected network regimes in urban scenarios with zero infrastructure support. Note that in urban areas the large number of vehicles exist in the network regimes, may operate in a disconnected network regimes, especially during the initial deployment of DSRC (Dedicated Short Range Communication) during which only a small fraction of vehicles on the road will be new and DSRC equipped. Thus even during peak hours of traffic, the network of DSRC equipped vehicles in an urban environment might be operating in the disconnected network regime as the disconnected network problem will persist until the DSRC penetration rate reaches a certain threshold. [10]

So, the UV-CAST protocol is able to deliver a specific message to all intended vehicles in the timely manner, giving the drivers an opportunity to revise their route and performs.

UV-CAST should possess the following features -:

1. Multiple vehicles should be responsible for the Store-Carry-forward task [10]

In Urban area's omnidirectional directions and the ROI, so each vehicle should be responsible for Store-Carry-Forward task. In some situation this mechanism might be crucial, especially the initial deployment of DSRC where small fraction of vehicles will be DSRC equipped.

2. SCF Mechanism assigned vehicles should forward the message more than once [10]

As described earlier, Urban area's has multiple entry and exit locations. So, the SRF Mechanism allows to each vehicles should continue to carry and Forward messages even though they have already relayed their messages for pave the whole region. But, sometimes such modifications may cause a lot of rebroadcast.

To overcome this problem, one of the solution is to use message acknowledgement in periodic Hello message. Each Hello message contains the ID's of message. By which vehicles can decide whether message needs to rebroadcast or not.

V. Conclusion

In VANETs many Broadcasting Protocols have been developed. This paper discussed different Broadcast Routing in VANETs each having its own Pros and Cons. Although all broadcasting protocols are suitable for v2v communication but each have one or the other limitations. To say which is the best among different Broadcast Routing Protocol is hard as each suits in different traffic conditions and environment. To answer the above question further performance evaluation is required to verify the performance of these Broadcast Routing Protocol.

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Bee Colony Optimization and its Applications A Review

Bhawna Dhawan
M.Tech Scholar,
PTU Regional Centre
Dept of Computer Science & Engineering,
Amritsar College of Engineering and Technology (Manawala)
Email Id- Bhawnadhawan52@gmail.com

Sandeep Kad
Head of Department (IT),
Department of Information Technology
Amritsar College of Engineering and Technology (Manawala)
Email Id- sandeepkad@acetamritsar.org

Anjali Arora
B.tech Research Scholar
Email id-Anjali.arora.65@gmail.com

Abstract-This paper presents a Bee Colony optimization technique with its components. This process is a swarm-based process inspired by the food foraging behavior of honey bees. This paper will explain you the Bee Colony optimization technique, its applications and its benefits. Compared with different optimization techniques and considering the quality of the solution obtained .Bee Colony optimization algorithm which is inspired by the foraging behavior of honey bee swarm, is a biological-inspired optimization. It shows more benefits as compared to genetic algorithm (GA), particle swarm optimization (PSO) and ant colony optimization (ACO).Bee Colony Optimization(BCO) method or technique, that explores collective intelligence applied by the honey bees during nectar collecting process, is one of them[1].The Bee Colony optimization(BCO) meta-heuristics belongs to the class of nature-inspired algorithms. The algorithms based on various biological and natural processes. We are particularly interested in bee's behavior based on the biological needs of individuals to stay together [1-4]

Keywords: nature of bees, process, algorithm, application

I. INTRODUCTION

Optimization is the technique or an operation of a system to make it as good as possible in some defined sense. Optimization problems frequently encountered in a multitudinous applications are at the heart of engineering design [6,7] , economics [8] , statistical,physics[9],information theory and computer science etc [10-12].However it is very widely believed the for many actual optimization problems, searching optimal solutions is very extreme hardness, costly and sometimes completely beyond the computational capacity[5].So, there are various optimization techniques or algorithms to solve these kind of problems such as ant colony optimization ,bee colony optimization ,swarm optimization .These algorithms have been adopted by researchers so far and are well suited to solve various complex computational problems such as pattern recognition ,filter modeling etc. Bee Colony has been proposed by Lucic and Teodorovic [1-4] and up to now it is successfully applied to various real-life optimization problems. The BCO is a stochastic, random-search technique that belongs to the class of population-based algorithm. This technique uses an analogy between the way in which bees in nature search for food, and the way in which optimization algorithms search for an optimum of (given)combinatorial optimization problems[1-4].BCO has been proposed for the first time in[1-4] for solving the travelling salesman problem and was evolving through later application. The BCO has also been applied to :the vehicle routing problem[13],the routing and wavelength assignment in all optical net-works[14],the ride-matching problem[15],the traffic sensors locations problem on highways[16],and the static scheduling of independent tasks on homogeneous multiprocessor systems[17].

II. DESCRIPTION OF THE BEHAVIOR OF BEES IN NATURE

The basic idea of designing BCO is to compose the multi-agent system (colony of artificial bees) that will search for good solutions of a variety of combinatorial optimization problems. The artificial bees explore the principles used by honey bees for the period of nectar collection process [18]. Social insect colonies can be considered as dynamical system gathering information from environment and adjusting its behavior in accordance to it. While gathering information and adjustment processes, individual insects don't perform all the tasks because of their specialization. Generally, all social insect colonies behave according to their own division labours related to their morphology. Bee system consists of two essential components:-

- Food sources: - the value of food source depends on different parameters such as its proximity to the nest, richness of energy and ease of extracting this energy.
- Foragers:-

a) Unemployed foragers: - If a bee doesn't have knowledge about the food sources in the search field, bee initializes its search as an unemployed forager. There are two types of unemployed foragers:-

i) Scout bee: If the bee starts searching spontaneously without any knowledge it will be a scout bee. The percentage of a scout bee varies from 5% - 30% according to the information in to the nest.

ii) Recruit bee: If unemployed forgers attends to a waggle dance done by some other bee the bee will start searching by using the knowledge from waggle dance.

b) Employed foragers: When the recruit bee finds and exploit the food source, it will raise to an employed

forager who memorized the location of the food source. After the employed foraging, bee loads a portion of nectar from the food source; it returns to the hive and unloads the nectar to the food area in the hive. There are three possible options related to residual amount of nectar for the foraging bees.

i) If the nectar amount decreased to a low level or exhausted, foraging bee abandons the food sources and become an unemployed bee.

ii)If there are still sufficient amount of nectar in the food source, it can continue to forage without sharing the food source information with the nest mates.

iii) Or it can go to the dance area to perform waggle dance for informing the nest mates about the same food source. The probability values for these options highly related to the quality of the food source.

c) Experienced foragers: These types of foragers use their historical memories for the location and quality of food source.

i) It can be an inspector which controls the recent status of food source already discovered.

ii) It can be a reactivated forager by using the information from waggle dance. It tries to explore the same food source discovered by it if there are some bees confirmed the quality of same food source (RF).

iii) It can be scout bee to search new patches if the whole food source is exhausted (ES).

iv) It can be a recruit bee which is searching a new food source declared in dancing area by another employed bee.[19]

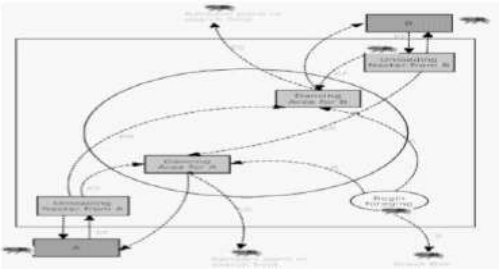

Fig1:-Typical Behavior of honey bee foraging

❖ Waggle dance: waggle dance provides the communication among bees which contain the following information:

a) The direction of flower patches (angle between the sun and the patch).

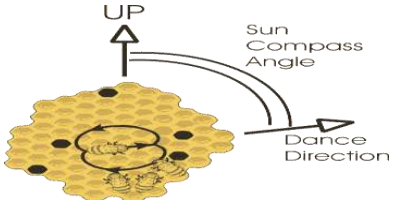

Fig2: Angle between the sun and the patch

b) The distance from the hive (duration of the dance).

c) The quality rating (fitness, frequency of the dance).

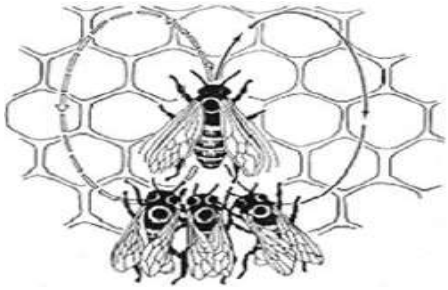

Fig3:-Waggle Dance

❖ Hive: A structure for housing a swarm of honey bees or a place swarming with busy occupants or a section of registry.

❖ Dance area: Dance area is an area set aside for dancing of the bees. In this area, bees do waggle dance that provides communication among various bees.

III. BEE COLONY OPTIMIZATION PROCESS:

In a bee colony optimization, some tasks are performed by specialized individuals. These specialized bees try to maximize the nectar store in the hive using efficient division of labour and self organization. The emergent intelligent behavior in foraging bees can be summarized as follows:

❖ At the initial phase of the foraging process, the bees start to explore the environment randomly in order to find a food source.

❖ After finding a food source, the bees become an employer forager and start to exploit the discovered source. The employed bee returns to the hive, with the nectar and unloads the nectar. After unloading the nectar. Bee can go back to its discovered source sites directly or bee can share information about its source site by performing a dance on the dance area. If its source is exhausted, bee becomes a scout and starts to randomly search for a new source.

❖Recruit bees waiting in the hive watch the dances advertising the profitable sources and choose a source site depending on the frequency of a dance proportional to the quality of the source.[20]

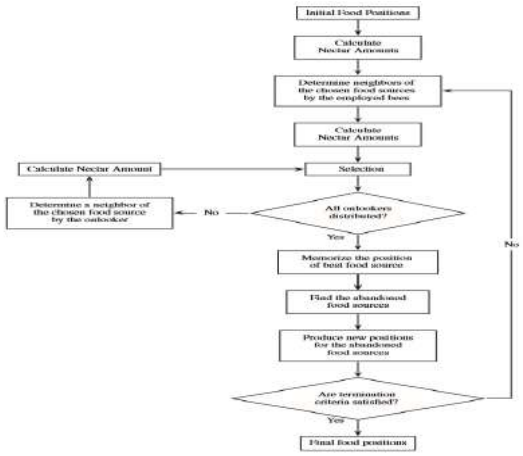

Fig4:-Flow chart of bee colony optimization

IV. BEES COLONY ALGORITHM

The Bees Algorithm is an optimization algorithm inspired by the natural foraging behavior of honey bees to find the optimal solution [21]. The algorithm requires a number of parameters to be set, namely: number of scout bees (n), number of sites selected out of n visited sites (m), number of best sites out of m selected sites (e), number of bees recruited for best e sites, number of bees recruited for the other (m-e) selected sites, initial size of patches which includes site and its neighborhood and stopping criterion.
Step1. Initialize population with random solutions.
Step 2. Evaluate fitness of the population.
Step 3. While (stopping criterion not met) //Forming new population.
Step 4. Select sites for neighborhood search.
Step 5. Recruit bees for selected sites (more bees for best e sites) and
Evaluate fit nesses.
Step 6. Select the fittest bee from each patch.
Step 7. Assign remaining bees to search randomly and evaluate their fitnesses.
Step 8. End While.

In first step, the bees algorithm starts with the scout bees (n) being placed randomly in the search space. In step 2, the fit nesses of the sites visited by the scout bees are evaluated. In step 4, bees that have the highest fit nesses are chosen as "selected bees" and sites visited by them are chosen for neighborhood search. Then, in steps 5 and 6, the algorithm conducts searches in the neighborhood of the selected sites, assigning more bees to search near to the best e sites. The bees can be chosen directly according to the fit nesses associated with the sites they are visiting. Alternatively, the fitness values are used to determine the probability of the bees being selected. Searches in the neighborhood of the best e sites which represent more promising solutions are made more detailed by recruiting more bees to follow them than the other selected bees. Together with scouting, this differential recruitment is a key operation of the Bees Algorithm. However, in step 6, for each patch only the bee with the highest fitness will be selected to form the next bee population. In nature, there is no such a restriction. This restriction is introduced here to reduce the number of points to be explored. In step 7, the remaining bees in the population are assigned randomly around the search space scouting for new potential solutions. These steps are repeated until a stopping criterion is met. At the end of each iteration, the colony will have two parts to its new population – those that were the fittest representatives from a patch and those that have been sent out randomly [21-22].

V. APPLICATIONS:

❖ Manet Routing Protocol: - A Bee-inspired routing protocol for Mobile Adhoc network has been presented in many research work [24]. This algorithm is designed to provide routing solutions inspired by the foraging principles of bees. The algorithm developed here is a reactive source routing algorithm which consumes less energy as compared to conventional mobile adhoc routing algorithms. Bee-Adhoc algorithm is use to route the mobile adhoc network. The Bee-Adhoc algorithm was identified as an algorithm with major savings in energy of consumption packets. It was also recognized to be a simpler and easier algorithm to execute [23].

❖Job Scheduling: - In research work [25] BCO is proposed for job shop scheduling problem. Job shop scheduling is a very essential procedure for the manufacturing business as it improves machine utilization as well as reduces cycle-time. It is a hard problem. In research work the authors have proposed BCO algorithm through mapping the food foraging behavior of honey bees to locate solution. [23].

❖ Travelling Salesman Problem: - TSP is probably the most widely studied combinatorial optimization and it is a benchmark problem which is solved by almost all the latest researching algorithm. The proposed BCO algorithm with local search for TSP in [26]construct algorithmically based on collective intelligence of bee's food searching activities. This show effectiveness over other approaches with the help of the set of benchmark problem[23].

❖Solving Sudoku Puzzles:-A Sudoku is a logical 2D array in row, column, and diagonal without being repeated. In this paper [27] a BCO algorithm has been developed to solve Sudoku puzzles which are NP-hard problems .The algorithm mimic the method by which bees forage food. The obtained results is used to solve Sudoku puzzles more efficiently and successfully [23].

VI. WHY SHOULD WE CHOOSE BEE COLONY OPTIMIZATION?

❖ Tailored:-The Bee Colony optimization algorithm is simple and easy to use. It made according to the specifications of the users.

❖ Co-operation:- In BCO, honey bees co-operate with each other to find the food sources. Co-operation enables bees to be more efficient and to achieve goals they could not achieve individually.

❖ Information Exchange: - BCO has the ability to exchange the information. Honey bees exchange the information through waggle dance.

❖ Recruiting Process:- BCO algorithm includes the recruiting process. Recruited foragers may waggle dance as well, increasing the recruitment for highly rewarding flower patches.

❖ Autonomy:-BCO algorithm also includes the concept of autonomy. It is used to solve the multi-objective functions.

❖Communication:-Bees communicate through the waggle dance which contains the following information:The

direction of flower patches,the distance from the hive, the quality rating..

VII. CONCLUSION

The Bee Colony Optimization is the youngest Swarm Intelligent technique. It is a meta-heuristic motivated technique by foraging behavior of honey bees. It represents general algorithm that can be applied to various optimization problems in management as well as engineering. This general algorithm should be always tailored and it is based on the concept of co-operation. Co-operation enables bees to work more efficiently and to achieve goals they could not achieve individually. The BCO also have the capability of information exchange through waggle dance and it also supports the recruiting process among bees to intensify the search in the promising regions of the solution space.

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Özbakır2 and Pınar Tapkan21University2Erciyes of Gaziantep, Department of Industrial EngineeringUniversity, Department of Industrial Engineering Turkey

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Role of component based reusability in varying software engineering Environment

O. K. Harsh and Col. (Retd.)Gurmukh Singh
Amritsar College of Engineering & Technology, Amritsar, India
Emails: oharsh@gmail.com and col_gurmukh@yahoo.com

Abstract*— Role of reusability has been discussed in details in the component based software engineering environment. Application of reusability on the Cloud computing, Object oriented system and UML have been analysed. It has been observed that not only cost and efforts could be saved while quality of the system will also be favourably affected as a result of reuse. Analysis of three dimensional model based on component based reuse has also been discussed. It has been concluded that component based reuse is a great deal in the software engineering which if could be exploited appropriately may become a great help to software engineering problems.

1. INTRODUCTION

1.1 WHAT IS A "REUSABLE SOFTWARE COMPONENT?"

A reusable software component can be fit in into a diversity of programs without alteration. Such reusable software components are intended to concern the advantage of reusable ingredients from other trade to the field of software building. Other business may have extensive revenue from reusable components [1].

Example of Reusable electronic components can be realized as a part of circuit boards. Another example is a characteristic piece in our car which can be substituted by a component through other diverse rival producer. Purpose is that that typical interfaces permit for exchangeable as well as reusable components [2]. However, such description of reuse does not convene our objective since it is not apprehension with present reusable software components included into client programs.

A typical straightforward case of a reusable software element is Reusable software components be able to be simple akin to well-known push buttons, text fields list boxes, scrollbars etc. Software reuse is the employment of engineering facts or artifacts from available software components to construct a novel arrangement [1]. Burning examples are a lot of effort creations that can be reused, for example well known source code, designs, specifications, architectures and documentation.

1.2 ADVANTAGES OF SOFTWARE REUSE

One of chief obstacles to comprehend software reusability in numerous institutes is the incapacity to situate and recover already existing software components. Sometimes frequently there is a great corpse of software accessible for utilization on a novel purpose; however the complexity in situating the software or even being conscious that it is available results in the comparable components being re-discovered more than once. To resolve this dilemma an essential primary job is the aptitude to categorize and catalogue compilations such software components and supply the suggestion for developers to rapidly investigate a compilation to recognize contestants for possible reuse [5].

Software reuse is a significant part of software engineering investigation that assures noteworthy enhancement in software yield and quality [4]. One can say that Software reuse is the utilization of already available software or software knowledge to build innovative software [6]. Successful software reuse needs that the consumers of the organization have right to use to suitable components. The condition is that consumer should be able to use such components precisely and rapidly, and be capable to alter such components if require. Thus one can submit that component is a distinct element of software that has a well known recognizable interface and be able to be employed in combination with other components to form bigger pieces [3]. Reuse treats with the capability to unite disconnected autonomous software components to shape a bigger entity of software. To integrate such type of reusable components into our systems, programmers have to be clever to discover and appreciate them. Thus one can appreciate that the majority recovery techniques need typical type of categorization of the components.

We have various causes why such designed and making reusable software components possibly enhances together software quality as well as programmer efficiency. Since the price of designing and making a component recoverable over many uses, it is economically practicable to entrust the time, energy of thinker, and money will be properly utilized in the beginning.

Since the technology has been developing, the techniques and instruments required for the software reuse is turn out to be extra applicable for the exploitation of innovative coordination to bear scientific research, therefore, applying software reuse methods can make more useful for the acceptance of novel type of scientific exploration. Now we are surer that Software reuse techniques, methods and related tools be able to add to the assessment of systems being build up to sustain scientific research.

In addition to this applying software reuse when implementing innovative technological advances also has the likely possibility to develop new technique and practices for making software reuse. If a designer of a reusable piece be acquainted with that it could be employed in the future applications then the designer will probably catch the situation gravely and design in a qualitative way that part. The most important part is that programmer efficiency will enhance it since it is generally easier to reuse a healthy-designed software component as compare to design without prior knowledge of reusing it. Though time is needed to judge the usefulness of a known reusable part to a novel software artefact, but such time is very less as compared to time required for a novel element [1].

II. OBSTRUCTIONS TO SOFTWARE REUSE

Example of non-technical obstacle is the financial setting. If a Software corporation trades a really bugs free and reusable component to a client, that client may no longer require the repair of the software.

If we want to make reusable software cost-effectively then the cost of the reusable components should diminish and the rewards should be provided to the manufacturers of such reusable components without abolishing the financial bazaar for the components [5].

The non technical obstruction is a managerial obstacle. The details of all listing of existing components should be given to the possible clients by the producers. Client must be capable to professionally look for these listings and easily make a decision that whether a picky reusable component is suitable for a particular purpose.

III. APPLICATIONS OF SOFTWARE REUSE METHODS APPLICABLE TO VARIOUS PROCESSES

3.1 CLOUD COMPUTING:

Fresh progress in the advancement in technology that justify technical investigation comprise cloud computing, which present potential for research personal to apply scientific data and related services to apply to high cost processes. Cloud computing is a key paradigm of a skill which could be benefited from software reuse.

Once we create systematic steps for developing a system and its applications and related services for possible reuse then it could potentially be provided to other cloud providers which enhance the capability to serve customer community. We need to consider the interoperability of the job if different cloud suppliers employ different principles or conventions. Generating a reference structural plan for cloud jobs to reuse procedure and clarifications can be adapted and adopted to promote mutual provision of services as well as allocation amid consumers. Once we prepare a particular plan for reuse then it would enable us to support the enhanced need without wasting time and resources.

3.2 OBJECT ORIENTED SYSTEMS:

Since the enhancement of intricacy and magnitude of projects, expansion prices have enhanced multiple. Therefore, well-organized reuse of present expertise has turn out to be extremely significant. Object-oriented model allows simple reuse of components. An object-oriented structure is described as a range of classes that symbolize a conceptual design for resolution to relatives of concerned problems [9].

Because of software reuse, object-oriented programming has been becoming more acceptable. Development of novel system from scratch is costly and moreover maintaining such system is still more costly. A study reveals that 60 to 85 percent of the entire cost of software is due to maintenance [8]. Obviously another method to reuse a program is to develop it more so by maintaining applies a particular case of software reuse. Thus whether to reuse or maintain both are not easy tasks.

Definition of class provides modularity and information hiding which could be exploited later-on various ways either by adapting or adopting. If we go for late binding of procedure call then it will need less information about the objects because only object should have appropriate protocol. A polymorphism related method is simpler to reuse as compare to that which is not polymorphic because of broad varieties of arguments while a class inheritance allows us to reuse as a customized shape by creating a subclass out of it. Property like modularity allows us to realize the modification in the program. Number of procedures is less due to the application of Polymorphism which ultimately reduces the size of the program.

In the object-oriented program, we know that the new classes are only different from old one which helps us to create the new program means only the difference between old and new class should be known. Thus once we create a class its subclass always keeps the identity and carries the history with itself which facilitated greatly in the concept of reuse. Thus it is always advisable that designers of system should plan accordingly to reuse aged component and strongly try to locate novel reusable that or related component. This also implies that one should be read to adopt and adapt the aged or old component in his or her new project. This also implies that not only instruments and techniques are reusable while approach is also responsible for the reusability.

Such approach assures that object-oriented software design offers a sparkling design and improves the capability to insert fresh

characteristics in the expectations either by the way of adapting or adopting. Following three solutions of high-quality blueprints are required:

A. *Maintainability*, which is the simplicity with which a software system or component can be altered to adapt to varying setting, enhance the performance, accurate errors, or supplementary characteristics. This demonstrates that healthy-designed projects need less-infrastructure for maintenance and alternations.

B. *Reusability*, which is the quantity to which a software unit can be employed in added computing program. Reusability of software components assists to make sure that quicker development of software applications is possible either by adapting, adopting or modification certain requirements to some extent.

C. *Robustness*, which is the constancy of software applications in severe circumstances (e.g., mistaken consumer contributions). Robust applications have fewer can decrease repairs prices.

3.3 UNIFYING MODELLING LANGUAGE (UML):

If we want to reuse effectively then numerous conditions should be met by every element as well as by the complete organization. The system should have an acceptable abstraction to create the multifaceted functionalities obvious to the consumer, it should be handy and should be capable to survive and assist separately beyond the present structure. Well-organized component reuse also requires the complete organization to be freely attached so that the reliance of every element with each other is as least. In order to satisfy above criteria, a modelling method is needed. Fortunately Unifying Modelling Language (UML) can offer this required concept and a whole homogeneous description of the structure. Every UML illustration is designed to allow developers and customers observe a software arrangement from a diverse viewpoint and changing level of notion. Diagrams which a UML can generally comprise are Use Case Diagrams, Class Diagrams, Interaction Diagrams, Activity Diagrams and physical Diagrams.

It is possible to model the key reuse scenarios with the help of by three generalization connections sustained by Use Case Diagrams [10] for example <extend>, <include> and <inheritance>. An extend use case is an interchange way of the base use case while an include dependency is a generalization connections representing the inclusion of the behaviour illustrated by another use case. Similarly inheritance case is inherited from other use cases and their replacement is also possible. Such described generalization methods permits reuse inside the project as well as by other outside projects.

IV. A THREE DIMENSIONAL MODEL AND COMPONENT BASED SOFTWARE REUSE:

Harsh [11-14] have carried out research work involving software as well as knowledge components in three dimensional environment. His work demonstrates that reusability should be treated as the third dimension in order to describe the reusable components. He also described that time is also an important factor in the knowledge environment because knowledge increases as the time so the reusability should also be modified. The work of Harsh [14] using the software complexity and functionality along with the software reusability as a third dimension can be generalized to incorporate the all the three problems mentioned above. Because component based technology is evolving which is severely affecting the complexity and functionality proportionally.

Whether is cloud computing, object oriented systems or UML, all of them could be effectively dealt easily with the component based technology. Once the component are described in terms of their complexity and functionality, they can be appropriately group to form the reusable components,

V. CONCLUSION

Present work on component based reusability is not only saves the cost and efforts while also enhances the quality of the systems due to repetitive reuse of the components. Microsoft and IBM have already using such features in their novel applications while the new emerging technologies should get boosted with the incorporation of the component based software reuse. A rigorous experimental set-up is required to facilitate all the three phenomena discussed above. On the other hand a three dimensional model based on software reusability, complexity and functionality can be used extensively to resolve the dilemma faced by cloud computing, object oriented systems as well as by Unifying Modelling language.

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Comparative Study of Data Mining Tools and Analysis with Employee Dataset

Amanpreet Kaur Toor
Research Scholar (M.Tech, C.S.E)
PTU Regional Centre, ACET,ASR
er.amantoor@gmail.com

Amarpreet Singh
Associate Professor
ACET, Amritsar
amarmandeep@yahoo.com

Girish Kumar
Assistant Professor
ACET, Amritsar
girishvansh@gmail.com

Abstract- ***Nowadays, a large amount of data and information are accessible to everyone. Data can be stored in many different types of databases and information repositories rather than storing the information on the Internet. So this large database requires some powerful methodologies for better interpretation and understanding of this information that exceeds the human's capability for conception and making judgment in a better way. In order to expose the most excellent tools for dealing with the clustering task that helps in decision making, this paper has conducted a comparative study between a some of the freely available data mining tools available for knowledge discovery process. Simulated results have shown that the performance of the tools for the clustering task is affected by the kind of dataset used and by the way the clustering algorithms were implemented within the toolkits. For the applicability issue, the WEKA toolkit has achieved the highest applicability followed by Tanagra. Finally, WEKA toolkit has achieved the highest improvement in clustering task.***

Keywords- **Clustering, data mining tools, data set, Weka, Tanagra.**

I. INTRODUCTION

Today's databases and data repositories contain a large amount of data, so it is unfeasible to manually analyze that data for decision-making. Therefore, we require assistance of data mining tools and methods to analysis capacity [1]. Such kind of necessity has produced an urgent requirement for data mining tools that can assist us in transforming those gigantic amounts of data into valuable information and knowledge.

Data mining is the process of discovering attractive knowledge from large amounts of data stored in different databases, data warehouses. The data mining task involves an incorporation of techniques from several disciplines such as database and data warehousing technology, high-performance computing, statistics, machine learning data visualization, information retrieval, image and
signal processing, and data analysis. Data mining has many fields such as marketing, business, science and economics, games engineering and bioinformatics. Data Mining is used for numerous applications one of them is Data Clustering.

Clustering is the process of organizing data objects into a set of dissimilar classes called Clusters. Clustering is an unsupervised technique of Classification. In unsupervised technique the correct answers are not known in advance. Classification is a technique that assigns data objects to a set of classes. Formally, we have a set of dimensional points and a distance function that gives the distance between two points and we are required to compute cluster centers, such that the points falling in the same cluster are similar and points that are in different cluster are dissimilar. Most of the initial clustering techniques were developed by various communities, where the goal of the communities was to cluster a small number of data instances. However, within the data mining community, the focus has been on clustering large datasets. Developing clustering algorithms to effectively cluster swiftly growing datasets has been discovered as an important challenge [13].

Now a days, several data mining and knowledge discovery tools are existing for everyone and different usage such as the Waikato Environment for Knowledge Analysis (WEKA) [3] [4], Tanagra etc. These tools and software offer a set of methods and algorithms that useful in better use of data and information available for users. It also includes various methods and algorithms for cluster analysis, clustering, nearest neighbour, data visualization, Decision trees, Text mining, etc.

This research has conducted a comparison study between two data mining tools available depending on their ability for clustering data precisely and correctly.

The remaining paper is organized as follows: Section 2 summaries related works on data mining, mining tools and data clustering. Section 3 gives a general description on the methodology followed and provides a general description of the tools and software under test. Section 4 reports our simulated results of comparison on different tools. Finally, we close this paper with a summary and an outlook for some future work.

II. RELATED WORKS

Hen and Lee [1] have compared and analysed the performance of five known data mining tools namely, IBM intelligent miner, SPSS Clementine, SAS enterprise miner, Oracle data miner, and Microsoft business intelligence development studio. 38 metrics were used to compare the performance of the selected tools. Test data was mined by various data mining methods ranging from different types of algorithms that are supported by the five tools, these includes classification algorithms, regression algorithms ,segmentation algorithms,

association algorithms, and sequential analysis algorithms. Results have provided a review of these tools and have proposed a data mining middleware adopting the strengths of these tools.

King and Elder [7] have conducted an evaluation of fourteen data mining tools ranging in price from $75 to $25,000. The evaluation process was performed by three kinds of user groups: (1) four undergraduates; who are inexperienced users in data mining, (2) a relatively experienced graduate student, and (3) a professional data mining consultant. Tests were performed using four data sets. To test tools flexibility and capability, their output types have varied: two binary classifications (one with missing data), a multi-class set, and a noiseless estimation set. A random two-thirds of the cases in each have served as training data; the remaining one-third was test data. Authors have developed a list of 20 criteria, plus a standardized procedure, for evaluating data mining tools. The tools ran under Microsoft Windows 95, NT, or Macintosh 7.5 operating systems, and have employed Decision Trees, Rule Induction, Neural Networks, or Polynomial Networks to solve two binary classification problems, a multi-class classification problem, and a noiseless estimation problem. Results have provided a technical report that details the evaluation procedure and the scoring of all component criteria. Authors also showed that the choice of a tool depends on a weighted score of several categories such as software budget and user experience. Finally, authors have showed that the tools' price is related to quality.

Carrier and Povel [8] have described a general schema for the characterization of data mining software tools. Authors have described a template for the characterization of DM software along a number of complementary dimensions, together with a dynamic database of 41 of the most popular data mining tools. The business-oriented proposal for the characterization of data mining tools is defined depending on the business goal, model type, process-dependent features, user interface features, system requirements and vendor information. Using these characteristics, authors had characterized 41 popular DM tools. Finally; authors have concluded that with the help of a standard schema and a corresponding database, users are able to select a data mining software package, with respect to its ability, to meet high-level business objectives.

Collier et al. [9] have presented a framework for evaluating data mining tools and described a methodology for applying this framework. This methodology is based on firsthand experiences in data mining using commercial data sets from a variety of industries. Experience has suggested four categories of criteria for evaluating data mining tools: performance, functionality, usability, and support of ancillary activities. Authors have demonstrated that the assessment methodology takes advantage of decision matrix concepts to objectify an inherently subjective process. Furthermore, using a standard spreadsheet application, the proposed framework by [9] is easily automatable, and thus easy to be rendered and feasible to employ. Authors have showed that there is no single best tool for all data mining applications. Furthermore, there are a several data mining software tools that share the market leadership.

Abbott et al. [10] have compared five of the most highly acclaimed data mining tools on a fraud detection application. Authors have employed a two stage selection phase preceded by an in-depth evaluation. For the first stage, more than 40 data mining tools/vendors were rated depending on six qualities. The top 10 tools continued to the second stage of the selection phase and these tools were further rated on several additional characteristics. After selecting the 10 software packages, authors have used expert evaluators and re-rated each tool's characteristics, and the top five tools were selected for extensive hands-on evaluation. The selected tools and software were Clementine, Darwin, Enterprise Miner, Intelligent Miner, and PRW. The tools and software properties evaluated included the areas of client-server compliance, automation capabilities, breadth of algorithms implemented, ease of use, and overall accuracy on fraud-detection test data. Results have showed that the evaluated five products by authors would all display excellent properties; however, each may be best suited for a different environment. Authors have concluded that Intelligent Miner has the advantage of being the current market leader. Darwin is best when network bandwidth is at a premium. Finally, PRW is a strong choice when it's not obvious what algorithm will be most appropriate, or when analysts are more familiar with spreadsheets than UNIX.

III. THE COMPARATIVESTUDY

The methodology of the research consists of collecting a set of free data mining tools to be tested and selecting a particular clustering algorithm to test the tools' performance which is available in both tools. Fig. 1 shows the overall methodology used for satisfying the objective of this research.

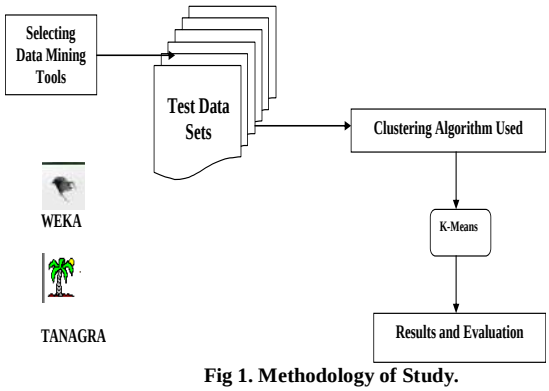

Fig 1. Methodology of Study.

A. Tools Description

This methodology consists of selecting some available open source data mining tools to be tested. Many Websites provide some open source data mining tools. Followed by our previous researches we have chosen two most popular data mining tools such as the Waikato Environment for Knowledge Analysis

(WEKA) and Tanagra. The description of these data mining tools along with the pros and cons are discussed below:-

WEKA toolkit [12] is a most popularly used toolkit for machine learning and data mining tasks. It was initially developed at the University of Waikato in New Zealand. It contains a huge group of state-of-the-art machine learning and data mining algorithms written in Java. WEKA toolkit contains tools for clustering, regression, classification, association rules, visualization, and data pre-processing. WEKA toolkit is very popular with industrial and academic researchers, and is also very popular when used for teaching purposes. Some Pros and Cons of WEKA tool are given below:-

Pros

1. Contains a lot of algorithms.
2. Free (most other Data Mining tools are very expensive)
3. Open source, so adapting it to your own needs is possible.
4. Constantly under development (not only by the original designers).

Cons

1. Lack of possibilities to interface with other software.
2. Performance is often sacrificed in favour of portability, design transparency, etc.
3. Memory limitation, because the data has to be loaded into main memory completely.

Tanagra tool is free data mining software that is used for academic and research purposes. It provides many data mining methods for data analysis, machine learning and statistical learning. The first use of the Tanagra project is to give researchers and students easy-to-use data mining software. The second purpose of TANAGRA is to provide researchers an architecture that allows them to easily add their own data mining methods, to compare their performances. The last purpose of tool is that trainee developers should take benefit of the free access to source code, to look how this kind of software was built actually. In this method, Tanagra can be considered as a pedagogical tool for learning programming techniques as well [13]. Some Pros and Cons of Tanagra Tool is given below:-

Pros

1. Tanagra is simple to use and easy to implement.
2. Some clustering algorithm are present in this tool are not present in other tools of data mining like Weka and Orange.
3. Tanagra tool provides proper documentation.

Cons

1. The algorithms can't be called from your own code.
2. Predefined fixed input parameter.
3. Does not provide the better visualization of clusters.
4. Tanagra cannot directly read other formats except xls, txt and arff.

B. Dataset Description

A dataset is a collection of data items that have different features. In the process of clustering, these data items are grouped into clusters. In this research we have used Employee Data set. This data set has been downloaded from the internet. The detailed description of data set is given in Table 1.

Total Attributes	**10**
Instances	**10430**
Missing Values	**None**
Data Set Type	**Multivariate**

Table 1.Employee Data set

IV. EXPERIMENTS AND EVALUATIONS

To evaluate the selected tools using the given datasets, some experiments were conducted. This section presents the results obtained after running the two data mining tools using the selected data sets described in Table 1.

We have used K-Means Clustering Algorithm to show the results. The main reason of selecting algorithm is that it is most popular and widely used fastest clustering algorithm and K-Means algorithm is present in both tools. After implementation of K-Means in Tanagra and WEKA tool results are given in Table 2. K-Means algorithm requires Number of clusters and data set as the only input. The simulated results shows that K-Means algorithm requires 6 iterations in Weka tool and 7 iterations in Tanagra tool and Sum of the Squared Error is 0.6780 in Tanagra tool and 0.1102 in Weka tool. As a result we can say that Weka tool is best among them.

K-Means Algorithm	**Tanagra**	**WEKA**
No of Clusters	5	5
No of Iterations	10	9
Sum of Squared Error	0.5645	0.4138

Table 2. Comparative analysis of Tanagra and Weka tool.

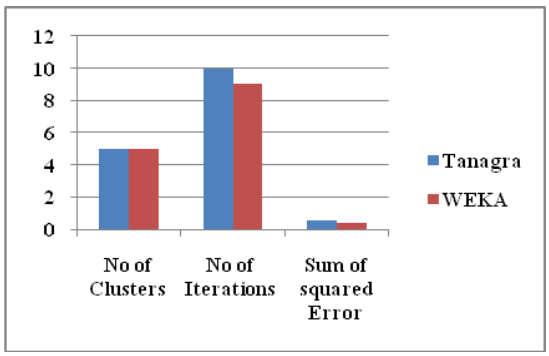

Fig 2. Performance Improvements.

A. Interfaces to Tanagra Tool

To Create a new data mining diagram user can follow the following steps in Tanagra tool:-

1. Choose *File/New...* in the main menu of TANAGRA.
2. Enter the name of the associated file in which you will save your work.
3. Validate by clicking the OK button to start loading.

In next step user can specify the Define Status to avoid repetition of steps. Then user can select the appropriate clustering algorithm. Fig 3 shows the K-Means algorithm implementation results such as clusters in Tanagra Tool.

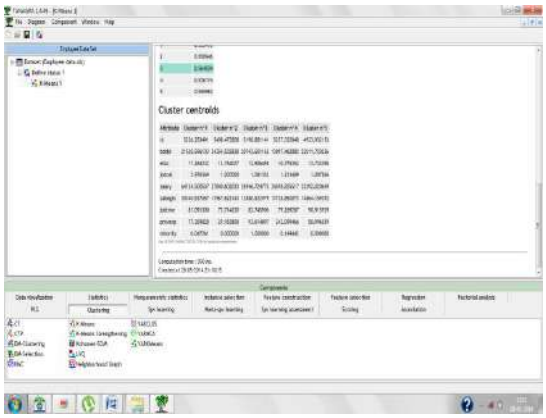

Fig 3. Tanagra Explorer for result visualization

In Tanagra Tool for visualization of clusters we have used the scatterplot with label option. Scatterplot is very useful for visualization of the relationship between two variables. It plots values pair of descriptors on a horizontal and vertical axis. Each point can be labelled with the example ID, the X and Y values or the values of a discrete attributes.

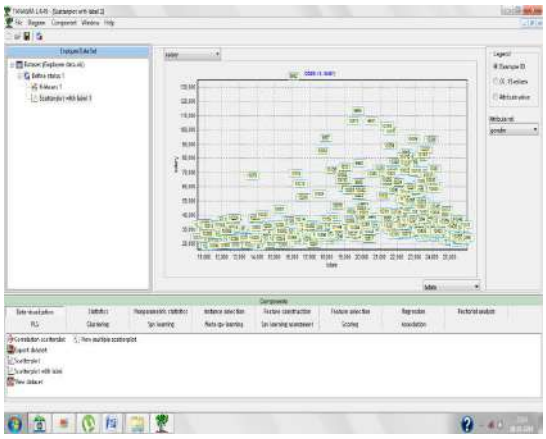

Fig 4. K-Means clustering algorithm showing scatter plot with label.

B. Interfaces to Weka

There are four interfaces to WEKA which can be started from the main GUI Chooser window, as shown in Fig 5 that are Simple CLI, Experimenter, Knowledge Flow and Explorer. To start clustering task we select the Explorer tab from Weka GUI.

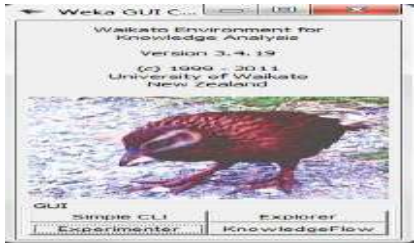

Fig 5.WEKA GUI Chooser

When user click on the Explorer Tab from GUI chooser, the Weka Tool opens a new window as shown in Fig 6 to load data set into Weka in .arff and .csv format only.

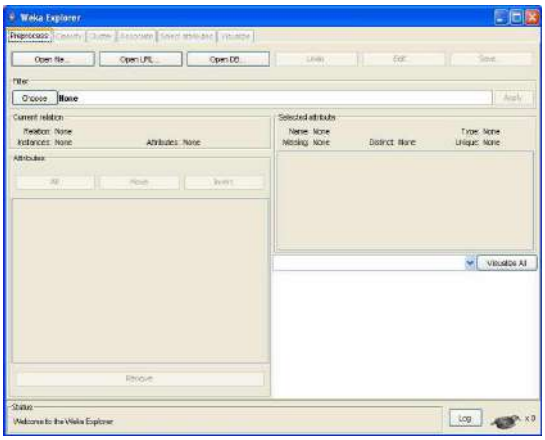

Fig 6. Load data into Weka – ARFF format or CVS format (click on "Open file…")

The preprocess tab that is also called "Filters". When data is being import in Weka tool it shows the class attributes along with their Histogram individually or all in new window to show the statistics of the currently selected tab. Histogram shows that how many times an given instance in the data set has a particular value**.**

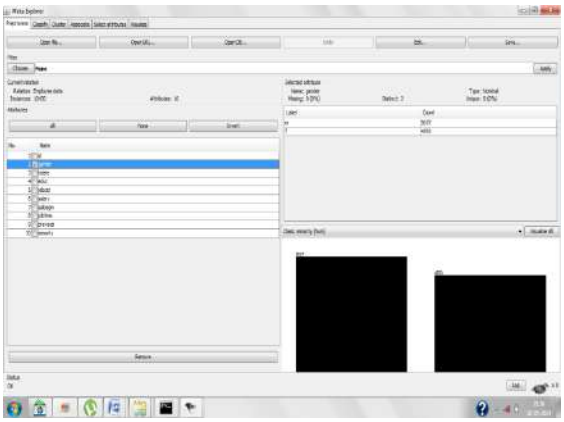

Fig 7. Weka Knowledge Explorer

Weka Tool contains clusters for finding group among a set of instances as shown in Fig 8.

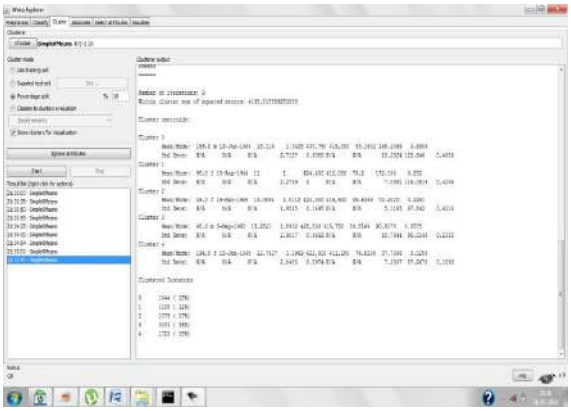

Fig 8. Display Clusters.

Clicking the visualize tab bring up the visualize panel. It shows the matrix of scatter plot. By clicking on the cross open up an instance information window as shown in Fig 9, which lists the value of all attributes for the selected instance.

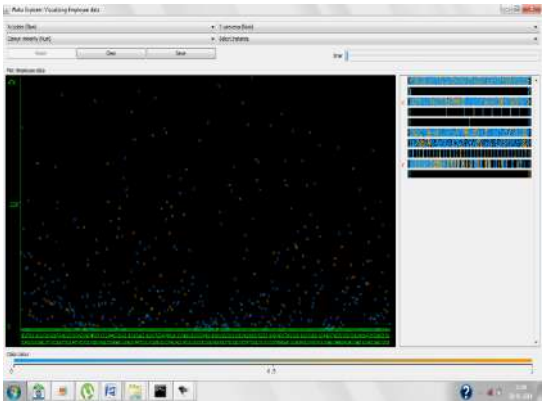

Fig 9. Visualization of scatter plot (Clusters)

V. CONCLUSION AND FUTURE WORK

This research work has conducted a comparison between two data mining toolkits for clustering purposes, Employee data sets was used to judge these two toolkits tested using one famous K-Means clustering algorithm.

We concluded that the WEKA tool is the best tool in terms of the ability to run the selected clustering algorithm. The algorithms can either be applied directly to a dataset (using GUI) or called from your own Java code (using Weka Java library) in Weka Toolkit.

As a future work, the selected data mining tools can be used for other machine learning tasks; such as classification, using test data sets intended for such tasks and for other algorithms of clustering.

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A Review on Identification and Prevention of Blackhole Attack in Secure Mobile Ad Hoc Networks

Jasmeen Kaur
M.Tech Scholar,
Department of Computer Science and Engineering,
Amritsar College of Engineering And
Technology (Manawala)
Email Id- jais2432134@gmail.com

Dr.Tanupreet Singh
Professor and Head of Department,
Department Of Electronics and
Communication Engineering,
Amritsar College of Engineering And
Technology (Manawala)
Email Id- tanupreet.singh@gmail.com

***Abstract*— Blackhole attack is one of the challenges in security attacks that occur in the network layer. The specification of Blackhole Attack in AODV with the Internal Black hole attack and External Black Hole Attack is discussed. The two possible proposed solutions to find the black hole attack node are mentioned. The first solution is to find more than one path to a destination. The second solution is to exploit the packet sequence number included in any packet header. The next proposed solution of Blackhole attack in AODV which is the enhancement of the basic AODV routing protocol i.e. Secure AODV, which will be capable to avoid Blackhole. Later discussing the other attack which is known as Jellyfish attack and it is the type of the Denial of Service attack. The main motive of this paper is to identify the black hole attack in MANETs with the help of AODV routing protocol and its proposed solutions. And also doing the comparison study of Blackhole with the Jellyfish attack.**

***Index Terms*— MANETs, AODV, Attack, DSR, DSDV, RREQ, RREP.**

I. INTRODUCTION

MANETs- Mobile Ad Hoc network is the 'Self-organizing network having the capabilities of real time network and locating any user on that network, it can also altering the network path due to congestion'.
It is a collection of wireless mobile connections or nodes that can communicate with each other without the centralized controller authority. Due to the characteristics of MANETs for instance wireless connection and dynamic network and distributed network Mobile Ad Hoc Network is exposed to many security attacks like Wormhole attack, Black hole attack, Gray hole attack, Flooding etc. Though, wireless networks are fully distributed and have the ability to work without the help of any permanent infrastructure or access points. [1]

A. Types of Ad Hoc Network

- Mobile Ad Hoc Network (MANET).
- Vehicular Ad Hoc Network (VANET).
- Internet based Mobile Ad Hoc Network (iMANET).

B. What is attack?

In Mobile Ad Hoc Network an attack is any try to damage, expose, alter, disable, sneak or gain unauthorized access to make unauthorized use of an resource. [2]

Types of Attacks in MANETs:

1) Passive attacks
2) Active attack

Passive Attacks: In Passive attack, the intruder listen to network in order to get data, what is going on in the network channel? It listens to the network in Order to know and understand how the nodes are interacting with each other, how they are placed in the network. Before the intruder launch an attack against the network, the intruder has enough data about the network that it can easily steal and introduce attack in the network. [5, 6]

Active Attacks: In active attack the intruder unsettle the performance of the network, sneak significant information and attempt to harm the data during the exchange in the network [5, 6].

Active attacks can be of two types. It can be internal or an external attack.

C. Security Issues in MANETs

The various security issues in MANETs are [12].

- Lack of secure boundaries.
- Risks from compromised nodes inside the network.
- Lack of centralized management facility.
- Restricted Power Supply.
- Scalability.

D. Security Solutions to Mobile Ad Hoc Network

The various security goals to evaluate if mobile ad hoc network is secure or not are as follows [1].

- Availability: Availability means the resources gain access to authorized parties at assumed times. Availability applies to both data and to services also. It makes sure that the durability of network service in spite of Denial of Service attack.

- Confidentiality: This makes sure that computer related resources are gain access only by authorized parties. Securing of information which is swapping through a MANET. It should be secured in opposition to any disclosure attack like Eavesdropping- unauthorized access to messages.
- Integrity: It means that the resources can be adjusted only be authorized parties or only in authorized way. Integrity makes sure that a message being transmitted is never corrupted.
- Authentication: Authentication is basically to sure that members in communication are authenticated and not impersonators. The assets of network should be gain access by the authenticated nodes.
- Authorization: It goal assigns different access rights to different types of users.
- Resilience to attacks: It needs to support network functionalities when a part of nodes is compromised or terminated.
- Freshness: It makes sure that the intruder node does not resend the foregoing captured packets.

E. Types of Security Attacks in MANETs:

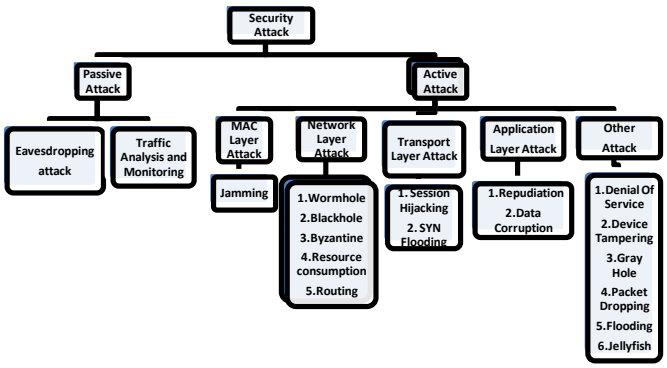

Fig-1 Types of Security Attacks in MANETs

II. BLACK HOLE ATTACK

Black hole attack is the one of the security attacks that is occur in the network layer. In this attack mischievous node uses the routing protocol to promote or to shows itself as having the shortest path to the destination node to which node it wants to interrupt. In Flooding based protocol, if the response from the mischievous node arrives at the requesting node before the reply from the real node or source node then, a fake path has been created. When the information is actually start transmitting it grasps all the packets that were originally meant for the destination node. This mischievous node then can be deciding whether to drop the packet to perform the Denial of Service attack or to use its location on the path as the Man-in-the-middle attack. [3, 4]

A. *How Black Hole Problem Occur?*

This is the way how mischievous node locates in the data path varies. Fig-2 shows how black hole problem occur, here node "A" wish to send data packets to node "D" and initialized the path discovery process. So if node "C" is a mischievous node then it will request that it has effective route to the desired destination as soon as it receives RREQ packets. It will then send the reply to node "A" before any other node. In this way node "A" will believe that this is the effective route and thus effective route discovery is complete. Node "A" will not pay attention to all other replies and will start sending data packets to node "C". In this way all the data packet will be destroy or absorbed by mischievous node. [5]

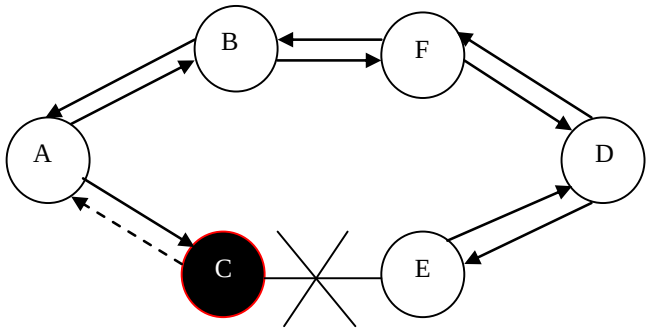

Fig-2 Blackhole Problem

B. *Black Hole Attack in AODV*

Since AODV has no security mechanism, mischievous node can perform various kinds of attacks. A Mischievous node M can carry out various attacks against AODV [7].

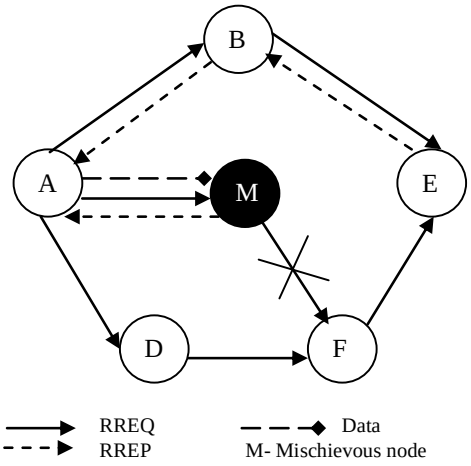

Fig-2.1 Black Hole Attack in AODV [7]

Two types of black hole attack can be discussed in AODV in order to differentiate the kind of black hole attack.

Internal Black hole attack

This kind of black hole attack has an internal mischievous node which fits in between the paths of given source and destination. As soon as it gets the opportunity this mischievous node make itself a fresh data path medium. At this level it is now able of controlling attack with the start of data transmission. This is an internal attack because node itself is appropriate or locates to the data path. Internal attack is more risky to protect against because of difficulty in detecting the internal mischievous node. [5]

External Black hole attack

External attacks are actually locates outside the network and refuse access to network traffic or creating congestion in network or by distracting the whole network. External attack can become a type of internal attack when it grab or take control of internal mischievous node and control it to attack other nodes in MANETs. [5]

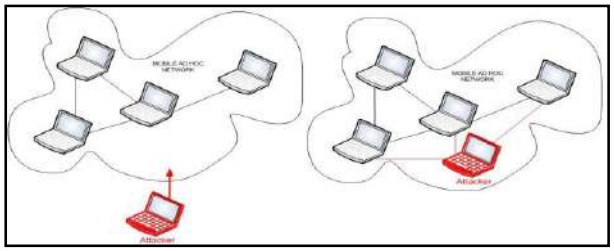

Fig-2.2 External and Internal attack in Mobile Ad Hoc Network [5]

External black hole attack can be explained in further points:

1. Mischievous node identifies the active path and notice the destination address.

2. Mischievous node sends a route reply packet (RREP) containing the destination address field spoofed to an unknown destination address. Hop count value is set to smallest values and the sequence number is set to the highest value.

3. Mischievous node sends Request Reply (RREP) to the closest available node which belongs to the active path. This can also be send directly to the data source node if path is available.

4. The RREP received by the closest available node to the mischievous node will pass on via the established inverse path to the data of source node.

5. The latest information received in the route reply will permit the source node to update its routing table.

6. Latest path selected by source node for choosing data.

7. The mischievous node will now drop all the data to which it belongs in the route. [5]

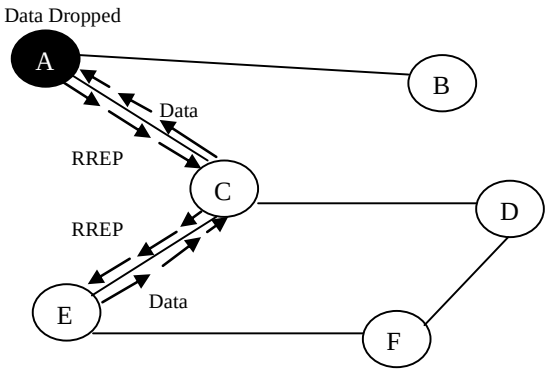

Fig-2.3 Black Hole Attack Specification [5]

In AODV black hole attack the mischievous node "A" first detect the active i.e. the fresh route in between the sender "E" and destination node "D". The Mischievous node "A" then send the RREP which contains the spoofed destination address including small hop count and large sequence number than normal to node "C". This node "C" forwards this RREP to the sender node "E". Now this route is used by the sender to send the data and in this way data will arrive at the mischievous node. These data will then be dropped or discarded. In this way sender and destination node will be in no position any more to communicate in state of black hole attack. [5]

III. How Black Hole Node Attack Affects MANETs

Black hole attack is one of the challenges in MANETs. "Black Hole attack is also known as the Packet Drop Attack".

To know about How Black Hole node affects MANETs, we will use the reactive routing protocol i.e. AODV. The AODV is the On Demand Distance vector routing protocol which is used to find the path between source nodes to destination node when desired. It uses Request Message such as Route Request (RREQ) and Route Reply (RREP) for establishing a path from source to the destination.

In AODV during the path finding phase when a node get a Route Request (RREQ) message if respond to the source node with the route reply (RREP) message in which it contain the information and sequence number to the destination on the basis of route reply message then network decide which one will be the best path for sending the data to the target node i.e. the destination node. [4]

Black Hole node i.e. the Mischievous node send a fake Route Reply (RREP) packet to a source node that starts the path discover mechanism in order to show itself to be a destination node. By matching the destination sequence number comprised in RREP packets when a source node received multiple RREP, it decides the greatest one as the most fresh routing information and selects the path comprised in that RREP packet. In case the sequence numbers are equal it selects the path with minimum hop count. If the intruder spoofed the identity to be the destination node and sends RREP with destination sequence number greater than the real destination node to the source node, the data traffic will arise towards the intruder. In this way, source and destination nodes became incapable to communicate with one another. [4]

IV. Proposed Solutions for Black Hole

Researchers find two proposed possible solutions to find black hole node attack in MANETs.

A. First Solution

The first solution is to find more than one path to the destination for instance there should be redundant paths and at least three unique paths to the destination node. In this the sender needs to check the validity of the node that starts the RREP packet by using the network redundancy. Then the source node transmits a beep packet to the destination node using these three unique paths. We should allocate unique packet identifier and the sequence number, so any node who receives the first packet will not fall down the second packet if it exists in both paths. The receiver and the mischievous node in addition to any middle node possibly will have the path to the destination node will reply to this beep request message.

The source will verify those acknowledgements and access them in order to find out which one is harmful and possibly will have the mischievous node. [4]

B. Second Solution

In the second solution exploit the packet sequence number which is contained in a packet header. The node in this condition require two additional tables; the first table contains the sequence number of the latest packet sent to each node in the network and The Second table for the sequence number accepted from each sender. Throughout the Route Reply (RREP) phase, the middle or the destination node must contain the sequence number of the latest packet accepted from the source that initializes the Route Request. When the source accept the RREP it will take out the latest sequence number and then match it with the value solved in this first table. If it matches the broadcasting will take place. If not matched, then this replied node will be transmitting to alert the network about this node. [4]

V. SOLUTION TO BLACKHOLE ATTACK WITH SAODV

Researchers have proposed the two solutions i.e. the first solution is to find more than one path to the destination and the second solution is to exploit the packet sequence number which is contained in a packet header [4]. In spite of this, in these solutions the next node also acts as a mischievous node and they cannot detect it. So we approach to another solution i.e. the Secure on Demand Distance Vector Routing Protocol (S-AODV) which is the enhanced version of the AODV routing protocol. The S-AODV will be capable to detect or avoid black holes. To decrease the black hole attack problem this solution projected to wait and verify the response from all the adjoining nodes to discover a secure path.

In accordance to this secured path solution the requesting node instead of sending the packet the datagram packet to the answering node at once, it has to wait as other answers with next node information from the other adjoining nodes. After accepting the first request it sets timer in the 'Timer Expired Table', for gathering the other requests from unique nodes. It will save the 'sequence number', and the time at which the packet reaches in a 'Collect Route Reply Table' (CRRT). The time for which each node will wait is proportionate to its distance from the source. It computes the 'timeout' value based on reaching time of the first path request. After the timeout value, it first verifies in CRRT whether there is any duplicated next node. If any duplicated next node is available in the response routes it suppose the routes are accurate or the risk of the mischievous route is reduced. Then it selects any one of the routes with the duplicated node to broadcast the datagram packets. If there is no duplication then select the unplanned path from CRRT. Here again the risk of mischievous path chosen is degrade [7].

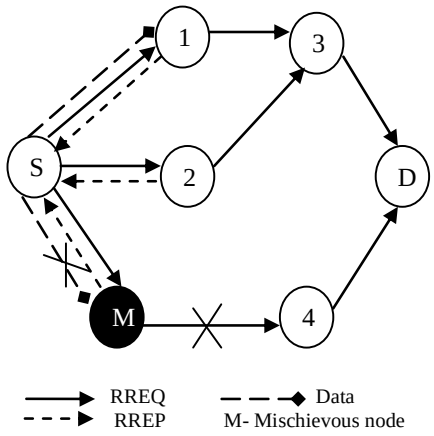

Fig- 3 Secure Solution to Black hole problem [7]

VI. JELLYFISH ATTACK IN MANETS

Jellyfish attack is a kind of Denial of Service attack (DOS) attack in which intruder or mischievous node try to maximize the packet End to End Delay and Delay jitter [8]. These two factors degrade the performance of the network. "The end to end delay means the time taken for a packet to be transmitting across a network from source to destination and Delay Jitter means Packet delay variation."

Before employing attack jellyfish intruder first increase access to the routing class in mobile ad hoc network. This can be feasible by operating Rushing Attack. According to change in number of senders, receivers and attack position state will get change in jellyfish attack. As intruder grasp forwarding packet, and start breaking or delaying data packets for specified amount of time before forwarding them routinely [8].

Jelly fish attacks are directed in opposition to closed-loop flows. In jellyfish attack, intruder node fully follows the procedure. So, it is a passive attack and challenging act to identify the attack. The main aim of jellyfish node is to moderate the application level throughput, which can be achieved by falling some of packets [8].

As shown in Figure-4 below, there is a Jellyfish node, and a node S starts to interact with node D after a route via the Jellyfish node is recognized. Then the Denial of service attacks introduced by node Jellyfish will begin packet loss and delay the interaction between nodes S and D ultimately in time.

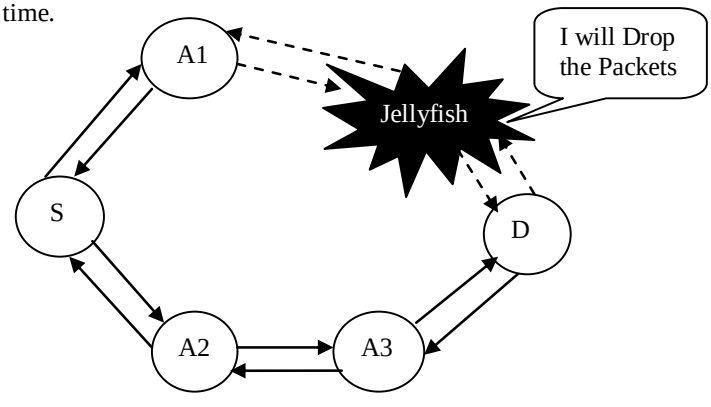

Fig-4 Jellyfish Attack

A. Jellyfish attack is further classified into three sub categories [8, 9]

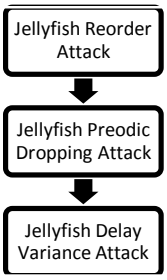

Fig-5 Types of Jellyfish attack

Jellyfish Reorder Attack

Jelly Fish Reorder attack is possible due to well known weakness of TCP. Jelly fish intruder uses this weakness to record packets. This is possible because of various factors such as path changes or the use of multipath routing [8, 12].

Jellyfish Periodic Dropping Attack

Periodic dropping is possible because of mockingly selecting period by the intruder node. This kind of periodic dropping is possible at transmitting nodes. Assume that congestion failures force a node to drop a% of packets. Now consider that the node drops a% of packets from time to time, then TCPs throughput may be lessen to near zero even for little values of a [8,12].

Jellyfish Delay Variance Attack

In this type of attack, the intruder node arbitrarily postponed the packets without changing the sequence of the packets. In this a jellyfish intruder first needs to have access to the routing paths. If successful, it then delays all data packets it receives for a random period of time ranging from zero to 10 seconds before forwarding them [8,12].

VII. COMPARISON BETWEEN BLACK HOLE ATTACK AND JELLYFISH ATTACK

Blackhole Attack and Jellyfish attack both are the challenges in security attacks. Here discussing the difference between both attacks.

Table-1 Comparison of Blackhole attack and jellyfish attack

BLACKHOLE ATTACK	JELLYFISH ATTACK
1. Blackhole attack is one of the security risks.	**1.** Jellyfish attack is a type of selective Blackhole attack.
2. In this problem the traffic is transmit to mischievous node which drops all the packets or this node is the fake node and not exists in the network.	2. Jellyfish attack is a kind of Denial of Service attack (DOS) attack in which mischievous node try to maximize the packet End to End Delay and Delay jitter.
3. The Blackhole attack applicable to locations in the network where the arriving traffic is silently discarded or dropped. [10]	**3.** In jellyfish attack the intruder grasp forwarding packet, and start dropping or delaying data packets for specified amount of time before forwarding them routinely. [10]
4. Blackhole attacks are directed in opposition to Open-loop flows.	4. Jelly fish attacks are Directed in opposition to closed-loop flows. [10]
5. Blackhole attack can drop the Packet delivery ratio (PDR) from 99% to as low as 14%. [10]	5. Jellyfish attack affect the packet end-to-end delay and the delay jitter but not the Packet Delivery ratio (PDR) or the throughput. [10]
6. The main aim of the Blackhole attack is to discover the safe route from the source node to the destination node.	**6.** The main aim of the Jellyfish nodes is to decrease the throughput of all the flows by either reordering the packets or dropping a small fraction of packets.[10]
7. In Blackhole attack, an intruder first implements rushing attacks to have access to the routing mesh, and then later drops all data packets it receives.[10]	7. A jellyfish attacker first implements the rushing attack to have access to the routing mesh. If successful, it then delays all data packets it receives for a arbitrarily period of time ranging from zero to 10sec before forwarding them.[10]
8. In case of Blackhole attack, the mesh centre is the powerful attacking position, if the number of intruders is smaller as compared to the number of senders. Else, the most risky or harmful attack positions are those nearest to the sender. [10]	8. In Jellyfish attack, the change in the number of senders, receivers and attack position will get change in the jellyfish attack. [10]

VIII. CONCLUSION

Mobile Ad Hoc Network is capable to implement the Network whereas the old organizational structure environment cannot possibly be implemented. Here specifying the various security attacks. With the importance of MANETs, there are still many challenges left in order to overcome. Security in MANETs is one of the important characteristic for its implementation.

In this work the Blackhole attack is analyzed with the reactive routing protocol and tries to find out the solution for this Blackhole problem.

Here also analyze how the Blackhole attack occurs and how it affects the mobile ad hoc network and also discussing some points about the Jellyfish attack as the comparison study of the Blackhole attack.

IX. FUTURE WORK

MANETs are widely used network due to their adaptable behavior for instance; they are easy to adapt any environment. These networks are employed to both external and internal attacks as it is a self organizing and decentralized network. A lot of research work is still needed in this area. We try to discover and analyze the impact of Blackhole attack in MANETs using AODV and compare the Blackhole attack with Jellyfish attack.

There is need to survey the Blackhole attack in other MANET Routing protocols such as DSR, TORA, and GRP. Whereas other types of attacks such as wormhole attack and Sybil attack are needed to be studied in comparison with Blackhole attack.

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A Review on Cross Layer Design and Signaling Methods in Mobile Ad Hoc Networks

Ramandeep Kaur
M.Tech Scholar,
Dept of Computer Science & Engineering,
Amritsar College of Engineering and Technology (Manawala)
Email Id- Ramandeephundal1990@gmail.com

Dr. Tanupreet Singh
Professor and Head of Department,
Dept of Electronics & Communication Engineering,
Amritsar College of Engineering and Technology (Manawala)
Email Id- tanupreet.singh@gmail.com

***Abstract*— Cross layer design is proposed to overcome the limitations of OSI (Open system Interconnection) and TCP/IP (Transmission control protocol/Internet protocol).OSI offered the standardization of network using layered architecture. This Layered architecture in which no communication and no interaction among the layers due to the strict boundaries between layers. Cross layers are designed to overcome such limitations and functionalities associated to the original layers are maintained.**

Cross layer design allow coordination, interaction by disappearing the boundaries. Cross layer signaling architectures provides the solutions through which information exchange between two or more layers is possible. In this paper various cross layer signaling methods are discussed.

***Index Terms*—Layered Design, Cross Layered Design, Mobile Ad Hoc Network, OSI, TCP/IP, Cross Layer Signaling.**

I. INTRODUCTION

MANETs: Mobile Ad hoc network (MANET) is a group of wireless nodes that form a network without support of any kind of infrastructure. Following are features of MANET:

- Movement of host is frequent
- Topology change is frequent
- No cellular infrastructure.
- Multi-hop wireless links.
- Data must be routed via intermediate nodes

A mobile ad hoc network consists of a collection of wireless mobile nodes that are capable of communicating with each other without the use of a network infrastructure or any centralized administration. MANET is an emerging research area with practical applications. It is based on peer to peer network, where nodes can join and leave network and share or distribute information to each other like human Communication model [1].

A layered architecture, like the seven-layer OSI model, divides the overall operation of the network into layers and defines a hierarchy of services to be provided by the individual layers [17].

II. INTRODUCTION TO CROSS LAYERS

A strictly layered network architecture decline direct communication between nonadjacent layers and communication between adjacent layers is limited to procedure calls and responses.

Alternatively, protocols can be designed by violating the reference architecture, For example, by permitting direct communication between protocols at nonadjacent layers or sharing variables between layers [2]. Such violation of a layered architecture is the cross-layer optimization approach, which rises to protocol design by exploiting the dependence between protocol layers to obtain a better system performance. In cross layer technique, instead of considering a layer as a completely independent functional entity, information can be shared among layers in both senses: upper to lower layers and lower to upper layers. This information exchange can be used to optimize the overall performance of the system.

ISO (International Organization for Standardization) introduced the OSI (Open System Interconnection) standard in 1984. OSI model has seven layers with different functionality of every layer.

TCP/IP (Transmission Control Protocol/Internet protocol) Model separated networking function into four layers. The layered design has following characteristics:

- Every layer performs particular function
- Every layer depend on previous lower layer to perform more primitive function
- Every layer supply services to the higher layer
- Modify one layer does not need modification in other layers

III. REVIEW OF LAYERED AND CROSS DESIGN

A. Layered Design

The OSI and TCP/IP model follow the layered design as all the layers are arranged in order. Each layer has a different level of abstraction. Each layer performs its function properly.

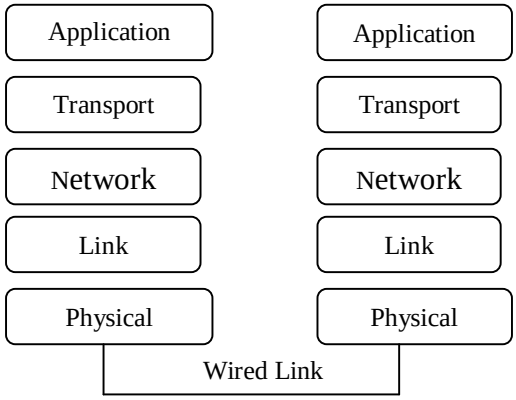

Fig1 The layered design model [3].

A. *Cross layer Design:*

Cross layer enables the interaction of a layer with other layer in the protocol stack. A layer can interact with the layer which is previous one and the next layer. Wireless links oppose wired links in a variety of ways. Wireless links are lossy and their bandwidth, latency varies. At the physical layer if transmission rate varies, the set of nodes or links which are connected they also vary. This results in possible interaction between non-adjacent layers. Due to this change network layer discovered different routes [3]. Fig. 2 shows few of the ways that information may require to cross between layers, but in fact decision making processes at any layer may require information from any other layer or even a set of other layers. As further shown in Fig. 2, information might also be needed from other layers on other nodes, while the current architecture only allows communication between peer layers.

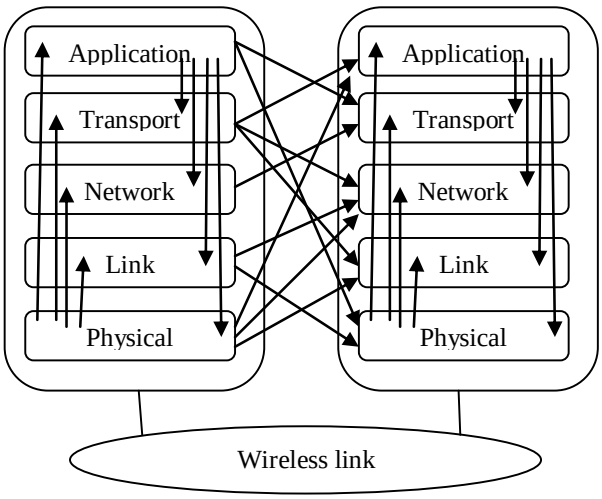

Fig-2 Cross Layered Design Model [3]

Thus, in general, cross layered designs and implementations can need almost arbitrary violation of the basic layer structure. The goal is to develop an architecture that can accommodate this without destroying the current layered architecture with its advantages of modularity and robustness. The basic idea of cross layered design is to

-maintain the functionalities associated to the original layers

- allow coordination, and interaction of protocols between layers.

IV. CROSS-LAYER SIGNALLING METHODS

A number of ways present for exchanging information between two or more layers. Following are four ways which we are reviewing in this paper [4, 5, 6, 7] :

A. *Interlayer signaling pipe:*

Architecture consists of a signaling pipe which is linked with the layer. Signaling pipe is of two types: top- to- bottom and bottom- to- top.ISP Allows propagation of signaling messages along with packet data flow inside protocol stack.

Two methods available for encapsulation of signaling information-Packet header and packet structure.

Packet header does the functions as:

-follow packet processing path

-Packet header can be accessed by any subsequent layer Drawbacks in packet header is the limitation of signaling to the direction of packet flow and processing overheads.

Packet structure: Packet structure contains the signaling information. Packet structure includes packet related information which is allocated when packet is generated by protocol stack. Information such as protocol headers and application data having internal protocol stack information as network interface id, socket descriptor, configuration parameters.

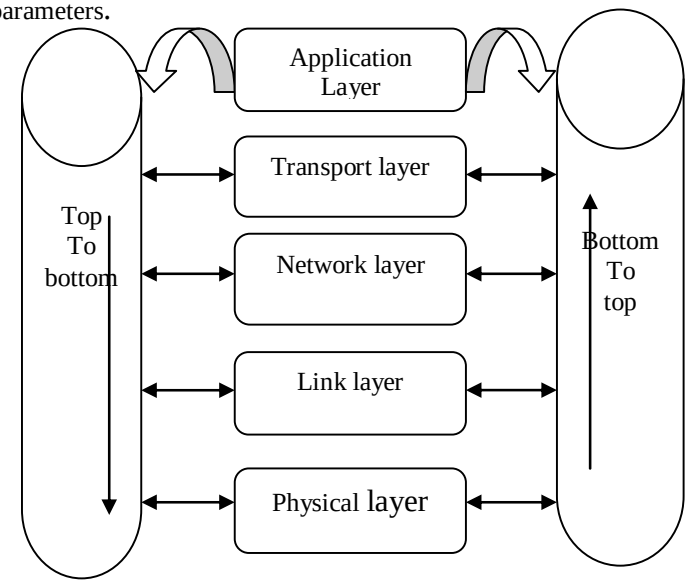

Fig-3 Inter Layer Signaling Pipe [10]

B. *Direct Interlayer communication*

This method introduces signaling layout called CLASS (Cross-Layer Signaling Shortcuts). It allows non neighboring layers of protocol stack to exchange messages without processing at each adjacent layer and this leads to fast signaling information delivery to destination. Advantages of this method are -it allows direct communication

-This method provides standardized way of signaling. One of protocol which follows direct Interlayer communication method is ICMP (Internet Control Message Protocol)[8,9].

ICMP is widely deployed signaling protocol in IP based networks. ICMP messages can be generated at any layer of

protocol stack. Comparison of two methods as first method in which pipe is used whereas in second method involve punch holes in the protocol stack [10].

Second method propagates information across layers by using ICMP messages. Direct interlayer communication is more flexible and mature as it is implemented on Linux operating system with APIs (Application Program Interfaces) developed. As shown in Fig4 there are direct links between layers such as transport layer and link layer without turning to middle layer, network layer. For example, the Layer-3 entity RRM (Radio Resource Management) directly accesses Physical Layer in GSM [15]. A dedicated API between Network Layer and Application Layer was defined in a software simulator, GloMoSim [16].

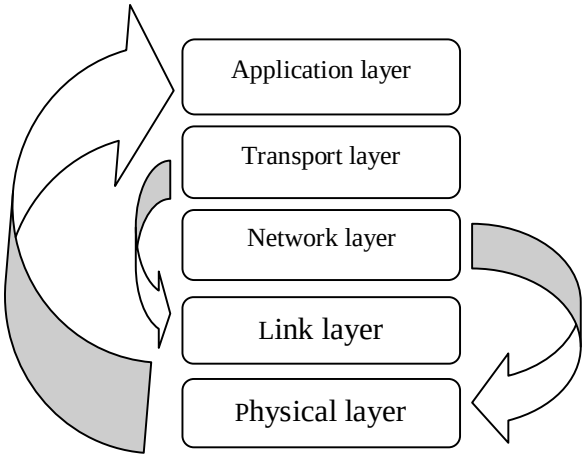

Fig-4 Direct Inter Layer Communication [10]

C. Central Cross-layer Plane:

A Shared database is present that can be accessed by all layers. There is information exchange between layers which is stored in the database called central cross-layer plane and it provides the values of their internal parameters to other layers. This architecture is shown in fig 5.

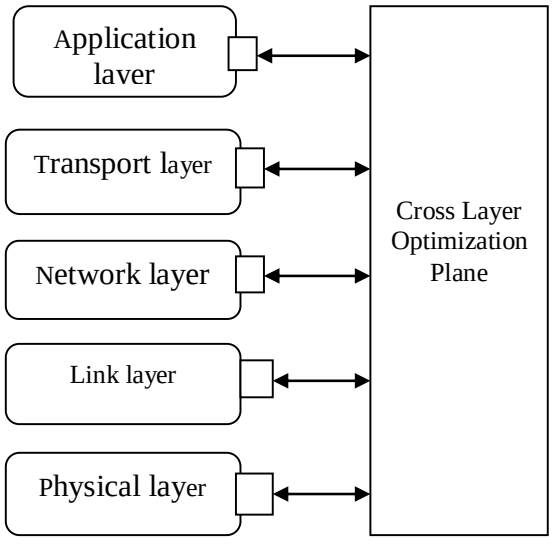

Fig-5 Central Cross Layer Optimization Plane [10]

D. Network wide cross-layer signaling:

This refers to network wide propagation of cross layer signaling information. All above methods define cross layer signaling between different layers of single node of protocol stack but network wide cross layering deals with information obtained at different protocol layers of distributed network node.

As shown in fig. there are two different networks which are connected by a router and communication between both the networks takes place.

Among all the methods discussed, packet header and ICMP messages are good candidates. Cross layer signaling encapsulates data into optional fields of the packet header and it does not cause additional overheads. Explicit Congestion Notification is the example of Cross-network cross-layering presented in [12]. It realizes in-band signaling approach by marking in-transit TCP data packet with congestion notification bit. However, due to the limitation of signaling propagation to the packet paths this notification need to propagate to the receiver first, which echoes it back in the TCP ACK packet outgoing to the sender node. This unnecessary signaling loop can be avoided with explicit ICMP packets signaling. However, it needs traffic generation capabilities form network routers and it consume bandwidth resources.

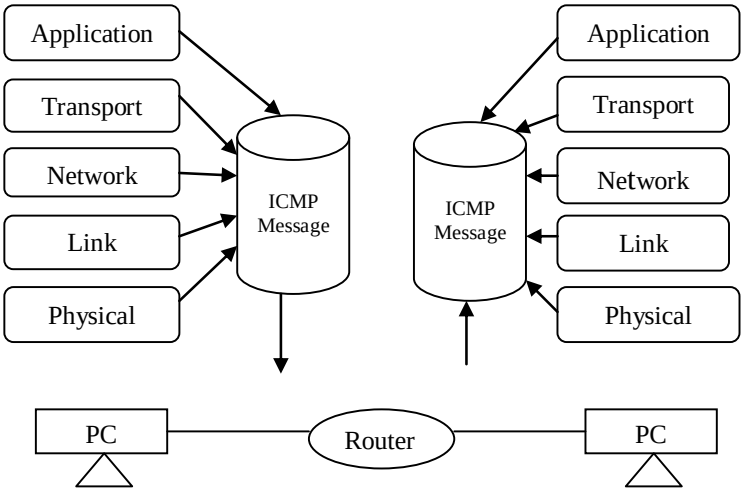

Fig-6 Network Wide Cross Layer Architecture [10]

An example of adaptation of Central Cross-Layer Plane-like architecture to the cross-network cross-layer signaling is presented in [13]. This recommends the use of a network service which collects parameters related the wireless channel located at the link and physical layers, and then provides them to adaptive mobile applications.

A unique combination of local and network-wide cross-layer signaling approaches called Cross-Talk is presented in [14]. Crosstalk architecture consists of two cross-layer optimization planes. One is responsible for organization of cross-layer information exchange between protocol layers of the local protocol stack and their coordination. Second plane is responsible for network wide coordination: it aggregates

cross-layer information provided by the local plane and serves as an interface for cross-layer signaling over the network.

V. COMPARISON OF DIFFERENT METHODS OF SIGNALING

A comparison of different cross layer signaling methods through the comparison of their characteristics [10,11]. Some of characteristics as shown below:

Scope: Scope defines the operation boundaries of cross layer. Methods having single protocol stack are more flexible as they can use internal stack such as packet structures which avoids processing overhead. Three methods have single protocol stack so their scope is local while network wide method has both local/network scope.

Require standardization: Standardization parameter specifies whether standardization is required for the cross layer signaling method. Packet header and ICMP messages require standardization.

Propagation Latency: This parameter describes the delay linked with the message delivery. Delay refers to delay of communication links and time messages spend in router buffers. Propagation latency is high for network-wide method and lowest for ICMP Messages.

Complexity: This parameter requires different level of OS modification and internal/external interface design.

Processing overhead: It is the measure of processing power needed for message creation, encapsulation, extraction, and analysis. Medium processing effort required for interlayer signaling pipe, higher for ICMP messages creation.

Flexibility: This parameter can be useful for signaling between two arbitrary layers and for different tasks. Flexibility is highest for direct interlayer communication method.

Communication overhead: This parameter for local signaling corresponds to amount of operations required to deliver message from one layer to another. Interlayer signaling method requires highest communication overheads due to subsequent processing at protocol layers.

Direction of signaling: Directions which do not depend on regular traffic flow signaling are path independent, this is the synchronous way while packet path dependent provides asynchronous reaction.

Propagation direction: Messages can be propagated in top-to- bottom and bottom- to- top signaling. For some complex tasks, Bi-directional propagation is required.

The comparison table 1 represent comparison between cross layer signaling methods [10,11]. This comparison does not lead to a particular solution but it can serve as implementation basis for future cross-layer optimization solutions. Direct interlayer communication uses ICMP messages in which desired information is abstracted and use of CLASS approach made this method appropriate. In CLASS, there is direct signaling between non neighboring layers in both directions and it has lowest propagation latency with high efficiency and flexibility. Interlayer signaling pipe uses packet structure provides relevant performance. In Network wide method packet header used for transmission of periodic, delay tolerant and information related with particular packet. ICMP headers can be used if immediate feedback is needed; size of message along with overheads is small.

Another methods used for cross layer signaling are network service and local profiles. In network service, Wireless Channel Information (WCI) is a specific access network service. In this method channel and link states from physical layer and link layer are collaborated, abstracted and arranged by distributed WCI servers. Applications which are interested can access to the WCI for their required parameters from the lowest layers. Drawback of this method is signaling overhead and delay. In Local profile method, local profiles are used to store periodically updating information. Cross layer information is abstracted from every necessary layer and stored in separate profiles. The desired information can be fetched by interested layers. This method stores the information in local hard disk whereas network service method stores information in a network server [11].

CLASS eliminates most of drawbacks of other method. The drawbacks are layer-by-layer communication involve the intermediate layer also which causes propagation latency and more overheads. Signaling in upward and downward is not flexible. CLASS breaks the layer ordering constraint and provides communication between the layers.

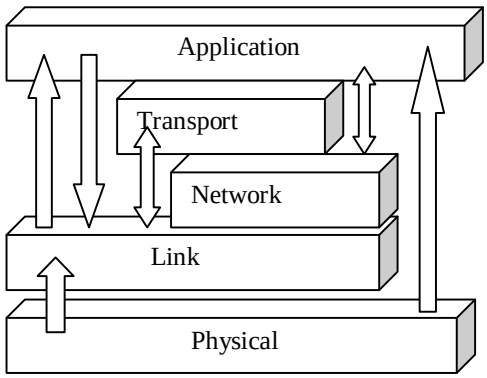

Fig-7 CLASS model [11]

In CLASS model diagram, there is direct communication between Application layer and link layer without disturbing the middle layers such as transport layer and network layer, also communication between application and network layer.
The applications of CLASS are broad because multi-layer management could be applied to the management of QOS, power, radio resource, mobility and more areas in IP-based next generation wireless systems [11].

VI. TABLE-1 COMPARISON OF CROSS LAYERS SIGNALING METHODS

Criterion	**Interlayer Signaling pipe**		**Direct Interlayer communication**		**Central Cross layer plane**	**Network-wide cross-layer signaling**	
	Packet Header	**Packet structure**	**ICMP Messages**	**Callback functions**		**Packet header**	**ICMP messages**
Scope	Local	Local	Local	Local	Local	Local / network	Local / network
Require Standardization	Yes	No	Yes	No	No	Yes	Yes
Propagation latency	Medium	Medium	Lowest	low	Low	High	High
Complexity	Low	Low	High	Medium	Medium	Low	High
Processing overhead	Medium	Medium	High	Low	Low	Medium	High
Flexibility	Low	Low	Highest	Medium	High	Low	Low
Communication overhead	More	More	Medium	Less	Less	Less	More
Direction of signaling	Path Dependent		Path independent		Path independent	Path Dependent	Path Independent
Propagation direction	Bi-directional		Bi-directional		Bi-directional	Single direction	

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VII. CONCLUSION

Cross–layer signaling is a key concept to achieve cross-layer design. Cross-layer design overcomes the drawback of layered model. The layered design models are not efficiently cope up with dynamic changing environment in the wireless networks with increased Quality of service (QOS) requirements. Cross layer provides way of coordination and interaction between layers. Cross layer signaling provides various ways of communication between layers. Four methods discussed and compared. Method provides a good way for communication between protocol stack at single node and a method called network wide provides communication between different protocol stack at different nodes in network. Cross- layer design maintains the functionalities associated with layers and the performance is improved.

VIII. FUTURE SCOPE

Further research is under way to simulate CLASS in a software simulator. Example of simulator is GloMoSim and It can be implemented on Linux. In future, protocol for communication between layers can be proposed and study of mathematical model for threshold value to improve and optimize QOS.

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A Review on Evaluating the Performance of Routing Protocols in Mobile Ad hoc Networks

Navneet Kaur
M.Tech Scholar
Department of Computer Science and Engineering
Amritsar College of Engineering& Technology, Amritsar
navneetsethi2102@gmail.com

Dr.Tanupreet Singh
Professor and Head of Department
Department of Electronics and Communication Engineering
Amritsar College of Engineering and Technology, Amritsar
tanupreet.singh@gmail.com

Abstract*— This is a review paper on how to evaluate the performance of routing protocols in MANETs. There are some parameters and performance metrics under which performance can be evaluated. These parameters and metrics include network size, connectivity, mobility, link capacity and message delivery ratio, end to end delay, hop count, control overhead respectively. We emphasize end to end delay. End to end delay has significant impact on the performance of routing protocols and in guaranteeing QoS. End to end delay is influenced by link stability and no. of mobile nodes. This paper shows that delay is inversely proportional to performance of routing protocols.

***Keywords*—Mobile adhoc network; end-to-end delay; routing protocols**

I. INTRODUCTION

The mobile ad hoc network is infrastructure-less network of mobile nodes connected without wires that can communicate with one another via radio waves [3, 4, 8]. The mobile nodes that are in radio range of each other can directly interact, whereas others aid the need of intermediate nodes to route their packets [2, 3, 4]. As mobile adhoc networks are infrastructure-less, they can work at any place without the help of any existing infrastructure and these networks are fully distributed. This property makes the network highly flexible and robust [3].

Characteristics of MANETs are [2]:

- Communication through wireless network.
- Nodes can play the roles of both hosts and routers.
- There is no centralized controller and infrastructure.
- Dynamic Network topology.
- Frequent routing updates.
- Intrinsic mutual trust.

Some of the Applications of MANETs are given below [2, 10]:

- Applications in military.
- Homeland security.
- Industrial monitoring.
- Disaster relief operations.
- Defence development.
- Mine site operations.
- Urgent business meetings

Advantages of MANETs [2]:

- They provide access to services and information regardless of geographic position.
- These networks can be setup at any place and at any point of time.

Disadvantages of MANETs [2]:

- Resources are limited.
- Limited physical security.
- Intrinsic mutual trust vulnerable to attacks.
- It is hard to detect the malicious nodes because of volatile network topology.
- Authorization facilities are very less.
- Security protocols for wired networks cannot work for wireless networks (adhoc networks).

Fig1. Example of mobile adhoc network [5]

Routing protocols in MANETs vary depending on the type of network. Typically, routing protocols for adhoc networks can be classified into three major categories: Proactive (table driven), Reactive (on demand driven), Hybrid routing protocols [3].

In order to evaluate the performance of routing protocols we will consider End-to-End delay.

End-to-End delay is defined as time taken by one packet to be transmitted across a network from source to destination [9].

$d_{end\text{-}end} = N [d_{trans} + d_{prop} + d_{proc}]$

where

$d_{end\text{-}end}$ = end-to-end delay.

N = Number of links (number of routers + 1)

d_{trans} = Transmission delay (amount of time required to push all of the packet's bits on wire or transmission channel).
Formula of transmission delay is:

DT = N/R

where
DT→ Transmission delay
N→ No. of bits
R→ Rate of transmission [11]
d_{prop}= Propagational delay (time taken by one packet to travel from source to destination). And
Propagational delay = d/s
Where
d→ distance
s→ speed [11]
d_{proc} = Processing delay (time taken by routers to process packet headers)

In MANETs many applications require stable end to end connections to guarantee QoS. Link stability and number of mobile nodes has a great impact on end to end delay [1]. By increasing or decreasing the link stability or number of mobile nodes in connected/disconnected network, delay will increase or decrease accordingly discussed in section 5 and if delay will decrease performance of any routing protocol will increase.

II. ROUTING PROTOCOLS FOR MANET

Routing protocols in adhoc networks vary depending on the type of network [2, 3]. Typically, routing protocols for adhoc networks can be classified into three types based on the routing information updated mechanism as shown in fig2. They are Proactive (table driven), Reactive (on demand driven) and hybrid routing protocols.

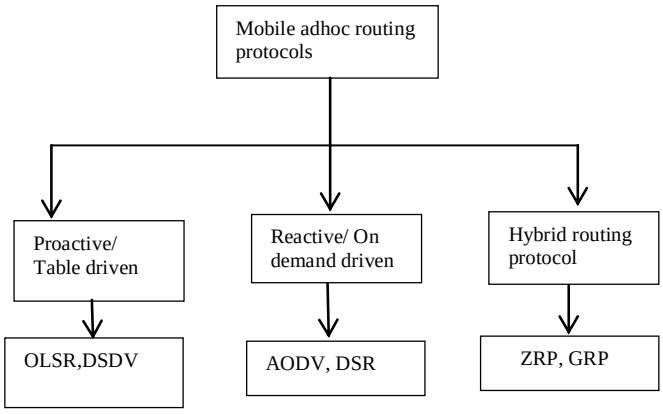

Fig2. Categorization of routing protocols of MANET

A. *Proactive Routing Protocols:*

In Proactive Routing Protocols, routes are maintained to all destinations by sending periodical control messages. There is unnecessary wastage of bandwidth for sending control messages. These protocols are not suitable for larger networks, as there is need to maintain route information at every node's routing table. This results in more overhead leads to consumption of ore bandwidth [3].
For example: Destination Sequenced Distance-Vector routing protocol (DSDV), Optimized Link State Routing (OLSR).
Advantages:

- A route is selected immediately without any delay.

Disadvantages:

- It produces network congestion.
- It consumes more bandwidth.
- It produces more routing traffic [14].

OLSR: OLSR stands for Optimized Link State Routing Protocol. It is proactive/ table driven routing protocol. It inherits the stability of link state algorithm. Due to its proactive nature, it has the ability of having the routes immediately available when needed. It uses the pure link state protocol in an optimized manner in mobile ad hoc networks. In pure link state protocol, all the links with neighbor nodes are declared and are flooded in the whole network. OLSR first of all decreases the size of control packets: instead of all links, it declares only a subset of links with its neighbors who are its multipoint relay selectors.
Secondly, it reduces flooding of this control traffic by using the selected nodes, called multipoint relays, to spread its messages in the network. Only the multipoint relays of a node are able to retransmit its broadcast messages. This technique significantly minimizes the number of retransmissions in a flooding or broadcast procedure [15]. Thus, optimization is based on a technique called *multipoint relaying.*

The idea behind multipoint relaying is to minimize the flooding of broadcast messages in the network by reducing duplicate retransmissions in the same region. Each node in the network selects some of the nodes in its neighborhood, which retransmits its packets. This set of selected nodes in the neighborhood is called Multipoint Relays (MPRs) of that node [15].

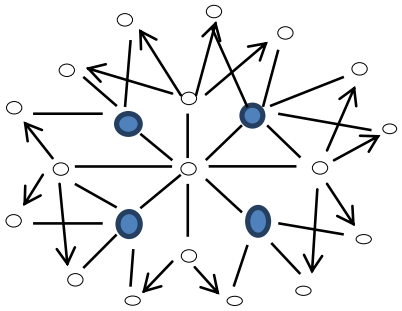

Fig3. Multipoint Relays

● → Retransmitting nodes or multipoint relays

OLSR protocol depends on the selection of multipoint relays and calculates its routes to all known destinations through these nodes that is MPR nodes are selected as intermediate nodes in the path [15].
OLSR defines 3 basic types of control messages:

- **HELLO:** HELLO messages are sent to all neighbours. These messages will be used for neighbour sensing and MPR calculation [16].
- **TC:** Topology Control messages are link state signalling done by OLSR [16].
- **MID:** Multiple Interface Declaration messages are transmitted by those nodes that are running OLSR on more than one interface. These messages list all IP addresses used by a node [16].

B. Reactive Routing Protocols:

Reactive routing protocols are based on some sort of query-reply message [6].In reactive routing protocols, routes are found between source and destination on demand i.e the main idea behind these routing protocols is to find a route between source and destination when that route is needed or requested[6,3]. Hence, it reduces the routing overhead. There is no need to look for and maintain the routes on which there is no route request. Finding the routes on demand avoids the cost of maintaining routes that are not being used and also controls the traffic of the network as it does not send excessive control messages [6]. Reactive routing protocols behave well in the resource-limited environment. However, source node should wait until route to destination is found. These protocols are best suitable when traffic is light and network is static [3].
For example: Ad hoc On-demand Distance Vector (AODV), Dynamic Source Routing Protocol (DSR).
Advantages:

- Reactive protocols are more energy-efficient.
- Consumes lower bandwidth.
- Route maintenance is effective.

Disadvantages:

1. These protocols have higher delays, when comes to route discovery [14].

AODV: AODV stands for Ad hoc On Demand Distance Vector routing protocol. AODV is capable of both unicast and multicast routing. It can find routes on demand i.e. it builds routes between nodes only when desired by source nodes for transmitted data packets. Routes are maintained till the communication is completed by the node. Sequence numbers can be used in AODV routing protocol to maintain the freshness of routes. Advantages of AODV include loop free operation and scalability to a large number of terminals [2].
AODV has two phases:

i. Route Discovery.
ii. Route Maintenance.

C. Hybrid Routing Protocols:

Both proactive and reactive routing protocols have pros and cons. Hybrid Routing Protocols take the advantage of both proactive and reactive routing protocols to balance the delay and control overhead. The problem of all hybrid routing protocols is the complexity of organising the network according to network parameters. Disadvantage of such protocols is that nodes that have high level topological information maintains more routing information, which leads to more memory and power consumption [3].
For example: Gathering Based Routing Protocol (GRP), Zone Routing Protocol (ZRP).

GRP: It stands for Gathering Based Routing Protocol. It collects the network information during route discovery which will be used later by the source node. First of all, source node broadcasts a destination query (DQ) packet which is forwarded towards the destination. When DQ reaches the destination node, a network information gathering (NIG) packet is transmitted by the destination. The NIG packet is then propagated over the entire and collects information. sequence number is assigned to each NIG packet. Nodes that receive an NIG packet with a new sequence number attach network information to this packet and forward it along effective outgoing links (EOLs). EOLsare those links in which the NIG packets are not received. Once the NIG packet reaches the source node, the optimal path is calculated by the source node based on the collected network information. Data packets are then transmitted through this calculated route [17].

III. COMPARISON OF ROUTING PROTOCOLS

Parameter	Proactive	Reactive	Hybrid
Network organization	Flat/ Hierarchical	Flat	Flat, Hierarchical
Route Latency	Always available	Available when needed or requested	Both
Communication overhead	High	low	medium
Storage Requirements	Higher	Dependent on no. of routes maintained	Depends on size of each zone or cluster
Route Availability	Always available	computed as per requirement	Depends on location of destination
Periodic Route updates	Required always	Not required	Used inside each zone or cluster
Delay	Low	High	Low for local destinations and high for inter zone
Scalability	up to 100 nodes or >100	>100	>1000
Control Traffic	High	Low	Lower than other two types
Routing Information	Keep stored in table	Does not store	Depends on requirement

Table1: Comparison of routing protocols [7]

IV. PARAMETERS AND PERFORMANCE METRICS FOR EVALUATION OF ROUTING PROTOCOLS

There are some network environment parameters and performance metrics available to evaluate the routing protocols. The essential network parameters include network size, connectivity, mobility and link capacity and it considers all the things that are occurring in network environment. And performance metrics include message delivery ratio, control overhead, hop count and end to end delay.

A. *Network Environment Parameters*

The performance of routing protocols is influenced by network environment parameters [2]. The essential network environment parameters include:

- **network size**: described as number of nodes [2];
- **connectivity**: the average degree of a node, and is described as number of neighbours [2];
- **mobility**: it includes network topology, relative position and speed of the nodes [2];
- **link capacity**: it includes bandwidth, bit error rate etc [2].

B. *Performance Metrics of Routing Protocols*

Metrics are used to evaluate the performance of routing protocols. The major four metrics used for evaluation are:

- **Message delivery ratio**: it is the ratio of total number of messages received at their intended destination to the total number of generated messages [2].
- **Control overhead**: this can be measured in terms of number of control packets or it can be defined as the ratio of the number of control bytes to the total number of bytes transmitted by the network [2].
- **Hop count**: it is defined as average number of hops that successful messages travelled to reach their final destination [2]. And it is also known as path optimization [2].
- **End-to-end delay**: it is the average delay time of all successfully delivered packets [2].

As we can see, in order to evaluate the performance of routing protocols there are many parameters and performance metrics available. However, in this paper there is consideration of end to end delay. This paper shows that how delay impacts on the performance of routing protocols and how the end to end delay itself is influenced by two parameters.

V. RELATED WORK

1) Narinder, et.al (2013), "Analyze the impact of Mobility on Performance of Routing Protocols in MANET using OPNET Modeller", International Journal of Advanced Research in Computer Science and Software Engineering, Vol.3 pp.768-772, 2013, [4] performance of 3 protocols have been discussed under Random waypoint and vector mobility model by undertaking three parameters: delay, throughput and network load.
2) Yang Tan, et.al (2010), "A Study of End-to-end Delay in MANET", Proc. Int. Conference on Pervasive Computing, Signal Processing and Applications, 2010, [1] how link stability and number of mobile nodes impact on end-to-end delay in MANET have been discussed. As delay is one of the important performance metrics with the help of performance of routing protocols can be evaluated and this paper discusses that how delay is influenced by 2 parameters (link stability and number of mobile nodes).

VI. IMPACT OF DELAY ON PERFORMANCE OF ROUTING PROTOCOLS

Delay indicates that how much time a packet takes to travel from source to the application layer of destination. End to end delay is influenced by link stability and number of mobile nodes [1]. The metric of link stability is Average Link Duration (LD) [1] and is proved to be very good, unified stability metric for the multihop link stability of many types of mobility models. Link duration is the lifespan of node-to-node link from the time receiver enters the communication region of the transmitter to the time the receiver leaves the communication region [1]. Random waypoint model (RWP) and paper [1] both focus on how link stability and number of mobile nodes leads to the change of end to end delay.

RWP model is elementary synthetic model often used in adhoc network simulation. It is a model which describes the movement pattern of independent nodes [11, 12].

Briefly, in the RWP model:
Mobility domain is convex area.
Each node moves along a zigzag line from one waypoint P_m to the next P_{m+1} with velocity v=1.
The waypoints are uniformly distributed over the given convex area.
At the start of each leg a random velocity is drawn from the velocity distribution.
(in the basic case the velocity is constant 1)
Optionally, the nodes may have so-called "thinking times" when they reach each waypoint before continuing on the next leg, where durations are independent and identically distributed random variables [11, 12].

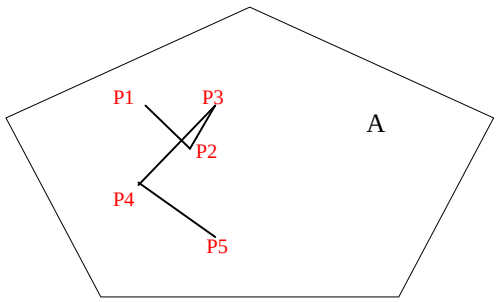

Fig4. RWP model

P_m —— P_{m+1} → one leg
In RWP model, it has been shown that the delay increases by increasing LD or increasing the number of mobile nodes when the networks are disconnected and delay decreases by decreasing the LD or decreasing the number of mobile nodes when the networks are connected [1]. But work done by Yang Tan and Xiongda Li found the results opposite to RWP model. They found that end to end delay increases by decreasing LD or increasing the number of mobile nodes when networks are connected and delay decreases by increasing LD or decreasing

the number of mobile nodes when networks are disconnected [1].

We need to observe that in both cases delay is increasing while increasing the number of mobile nodes and it does not matter whether network is connected or disconnected. Now, consider the work done by Narinder et al., in order to evaluate the performance of routing protocols, they consider the 3 protocols: OLSR (proactive), AODV (reactive), GRP (hybrid). And they found that:

- OLSR performs better as compared to AODV and GRP in terms of end to end delay. There is less delay in OLSR regardless of network size. As OLSR is a proactive protocol, has a faster processing at intermediate nodes. When a packet reaches at a node, it can immediately be forwarded or dropped because this protocol proactively holds routes to all destinations in its table, regardless of topology changes [4].

- In reactive protocols as AODV in this case, if there is no route to destination, packets to that destination are stored in a buffer while a route discovery is conducted. Because route maintenance is inefficient in reactive routing protocols, delay is largest for these protocols [4].

- GRP, being a hybrid protocol, typically shows those values of network load that lie in between the reactive and proactive protocols because of its initial on-demand nature [4].

Therefore, protocols with less delay will perform better as compared to protocols with high delay. Hence, delay has significant impact on the performance of routing protocols.

VII.CONCLUSION

This paper shows that in order to evaluate the performance of routing protocols there are various parameters and performance metrics available. Out of which we consider only end to end delay metric. Here we considered three protocols: OLSR, AODV and GRP. Each routing protocol has unique features; each protocol has their pros and cons and is well suited for certain situations. According to results given in paper [4] OLSR is better as compared to other protocols in terms of end to end delay. Now, performance of all those protocols will be better in which packets will take less time to travel from source to destination as compared to other protocols i.e. protocols with less delay will be better.Moreover, delay is influenced by 2 parameters: link stability and number of mobile nodes. According to RWP model and work done by Yang Tan, Xiongda Li shows that delay is increasing when no. of mobile nodes are increasing whether network is connected or disconnected. So, the protocols in which no. of mobile nodes are increasing will have higher delay as compared to protocols in which number of mobile nodes are stable or decreasing. Future scope is to find a solution of how to decrease the delay while increasing the no. of mobile nodes in a particular protocol.

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Performance analysis of inter-satellite optical wireless communication (IsOWC) system

Navjot Kaur
M.Tech Scholar
Dept. of Electronics & Communication
Amritsar College of Engg. & Tech.
Amritsar, Punjab, India
ndhanjal2@gmail.com

Gaurav Soni
Associate Professor
Dept. of Electronics & Communication
Amritsar College of Engg. & Tech
Amritsar, Punjab, India
gaurav.ece@acetedu.in

***Abstract*— Optical communications systems have evolved from lengthy fibers to powerful wireless systems. This has hence resulted in the use of optical wireless communication system in space communications. As the number of satellites orbiting earth increase year by year, a network between the satellites provides a method for them to communicate with each other. This is important for satellites to send information to one another and also to relay the information from one satellite to another satellite and then to the ground stations. In this paper, we have designed a model of IsOWC system using OPTI-SYSTEM simulator to establish an inter-satellite link (ISL) between two satellites estranged by a distance of 500 km and 1000km at data rate 1 Gbps.**

Keywords— Inter-satellite optical wireless communication (IsOWC), Inter-satellite link (ISL), Optical wireless communication (OWC).

I.INTRODUCTION

Inter satellite optical wireless communications (IsOWC) systems provide a high bandwidth, small size, light weight, low power and low cost alternative to present microwave satellite systems [1]. The inter satellite optical communications systems will be deployed in space in the near future. The present satellite communications system uses microwave technology for space-to-ground and geosynchronous satellite to low earth orbiting vehicles. In the future system, the satellite to ground links would remain in the microwave regime but satellite-to-satellite communication will be governed by optical wireless links. The technology uses laser light of infrared wavelengths to transmit optical signals between two points via free space. This requires devices similar to those used for the transmission through fiber-optic cable, except that the signal is transmitted through free space and not via optical cable capable of transmitting data, voice or video. IsOWC can be used to connect one satellite to another, whether the satellite is in the same orbit or in different orbits and the data can be sent at speed of light without much delay and with minimum attenuation since the space is considered to be vacuum. The advantages of using optical link over radio frequency (RF) links is the ability to send high speed data to a distance of thousands of kilometers using small size payload

By reducing the size of the payload, the mass and the Cost of the satellite will also be decreased. Another reason of using OWC is due to wavelength. RF wavelength is much longer compared to lasers hence; the beam width that can be achieved using lasers is narrower than that of the RF system [3]. Due to this reason, OWC link results in lower loss compared to RF but it requires a highly accurate tracking system to make sure that the connecting satellites are aligned and have line of sight. However, the transmission of such transmissions is affected in different ways by the environment processes such as absorption, scattering and shimmering. All three conditions attenuate the transmitted energy, affecting reli ability and the bit error levels. Satellites revolve around earth at their own orbit and there are three commonly used orbits for satellites. Satellite orbits with orbital height of approximately 1000 km or less are known as Low Earth Orbit (LEO). LEOs tend to be in general circular in shape. LEO satellites take from 2 to 4 h to rotate around earth. This orbit is commonly used for multi-satellite constellations where several satellites are launched up to space to perform a single mission. Satellite orbits with orbital heights of typically in the range of 5000 km to about 25,000 km are known as Medium Earth Orbit (MEO)/Intermediate Circular Orbit (ICO). MEO and ICO are often used synonymously, but MEO classification is not restricted to circular orbits. In Geosynchronous Earth Orbit (GEO) the satellite is in equatorial circular orbit with an altitude of 35,786 km and orbital period of 24 h. Three satellites in GEO placed 120° apart over equator cover most of the world for communications purposes [4]. In an inter-satellite microwave photonic link, the amplified RF signals received from ground station directly modulated to the OC and then processed in optical domain such as amplified, transmitted, and received by another satellite. There are no processes of base-band data demodulation, modulation or analogue to digital and digital to analogue conversions which severely increase the system complexity when the data throughput is huge. At present there are 6124 satellites orbiting earth and this number increases year by year [5]. At the same time the optical wireless communication (OWC) technology has grown and advanced throughout the year. Laser communication is now able to send information at data rates up to several Gbps and at distance of thousands of

kilometers apart. This has open up the idea to adapt optical wireless communication technology into space.

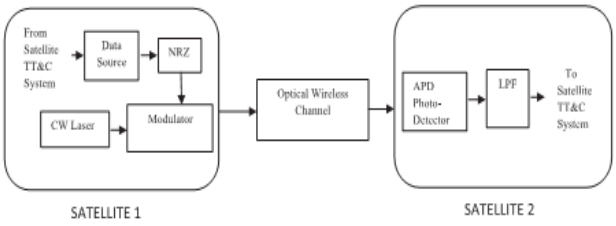

Fig.1. Design of Inter satellite optical wireless communications systems [4]

Optic communication where the difference relies in the propagation medium. The free space between two connecting satellites is considered as OWC channel which is the propagating medium for the transmitted light. The OWC channel is modeled between an optical transmitter and optical receiver with 15 cm optical antenna at each end. The transmitter and receiver gains are 0 dB. The transmitter and receiver antennae are also assumed to be ideal where the optical efficiency is equal to 1 and there are no pointing errors. Additional losses from scintillation and mispointing are also assumed to be zero. The OWC channel is considered to be outer space where it is assumed to be a vacuum and free from atmospheric attenuation factors. The aperture Diameter of transmitting- and receiving-antenna is taken as 18 cm and 17cm. The IsOWC transmitter receives data from the satellite's Telemetry, Tracking and Communication (TT&C) system of the satellite works along with its Counterparts located in the satellite control earth station. The telemetry system collects data from sensors on board the satellite and sends these data technology; hence inter-satellite optical wireless communication is developed. In this work, we have presented the simulation investigation of Inter-satellite optical wireless communication systems at transmission rate of 1 Gbps over a space distance of 500 km and 1000 km.

II. MODEL DESCRIPTION

The IsOWC system consists of three main communication parts which are transmitter, propagation channel and receiver which shown in Fig. 1 where the transmitter is in the first satellite and the receiver is in the second satellite. Optical wireless communications uses light at near-infrared frequency to communicate. The IsOWC system is not much different from free space optics and fiber.
via telemetry link to the satellite control center which monitors the health of the satellite. Tracking and ranging system located in the earth station provides the information related to the range and location of the satellite in its orbit. The command system is used for switching on/off of different subsystems in the satellite based on the telemetry and tracking data. Light source is the most important component in optical signal since communication is done by transmitting light. Light-emitting diode and laser diode are two types of optical light source commonly used in optical communication. The output light emitted by the laser diode is monochromatic, coherent and has high radiance which makes it suitable for long distance free space transmission [6]. The light generated by the laser can travel much further than the light emitted by LED. Hence, a CW laser diode of line width of 5 MHz is used in IsOWC system. The electrical signal from TT&C system and optical signal from the laser is modulated by an optical modulator before it is transmitted out to space. The output light pulses from the optical modulator are transmitted in the transmission medium to the receiving satellite. Different from free space optics that is subjected to many losses due to weather and atmospheric attenuation, the optical wireless communications channel is considered as vacuum and free from atmospheric losses. At an ideal case, the only cause of signal attenuation is the distance of the transmission. Optical antenna or optical lenses can be used at the transmitter and the receiver. Therefore, the free space loss is taken as 0 dB/ km of optical wireless channel various in our model. The optical antenna allows wider light beam divergence and detection. An optical antenna is actually a lens or a telescope that is placed before and after the transmission medium to increase the signal divergence as shown in Fig. 2. The receiving end of the IsOWC system consists of an Avalanche photodiode and a low pass filter. Amplification in APD photo detector or avalanche phenomenon occurs when charged electrons are introduced in such high electric field area and collide with neutral semiconductor atoms, thus generating other carriers. This process is then repeated to effectively amplify the limited number of carriers [7].

Fig 2. Optical antenna [7]

III. RESULTS AND DISCUSSION

An inter-satellite optical wireless system is designed with the help of OPTI-SYSTEM simulator consisting of two satellites with a space difference of 500 km and 1000 km exchanging externally modulated optical data at 1 Gbps through free-space medium at operating wavelength of 980 nm and 1550 nm. There is a comparison between two distances i.e. 500 km and 1000 km at 980 nm and 1550 nm. Table 1 shows the performance analysis of link at wavelength of 980nm and 1550nm

Table 1. Performance analysis of the optimized link at wavelength of 980nm and 1550nm.

S.No	Range	Wavelength	Q Factor	BER
1.	500	980	33.1791	$6.56238 e^{-242}$
2.	500	1550	20.6077	$7.49719 e^{-095}$
3.	1000	980	16.0621	$1.56042 e^{-058}$

4.	1000	1550	9.7334	7.82062 e^{-023}

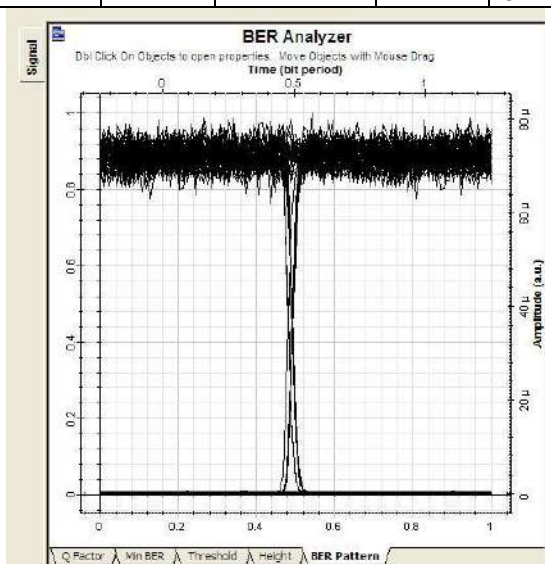

Fig 3. Eye diagram of OWC inter-satellite system 500 km apart with transmitting power of 10 dBm at operating wavelength of 980 nm.

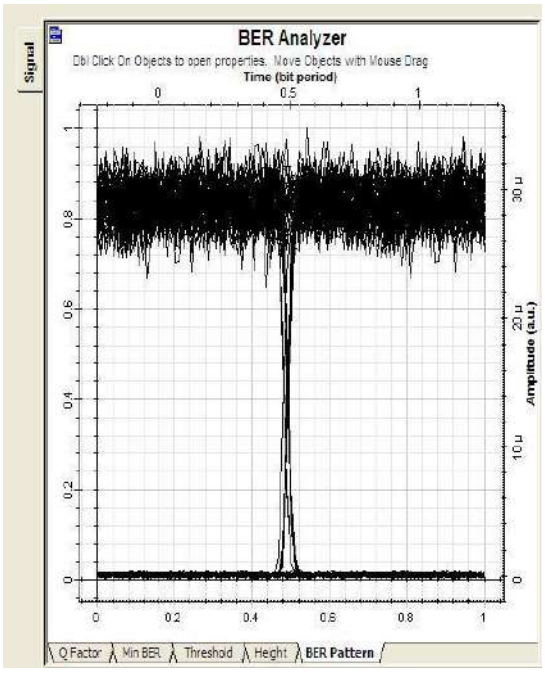

Fig 4. Eye diagram of OWC inter-satellite system 500 km apart with transmitting power of 10 dBm at operating wavelength of 1550 nm.

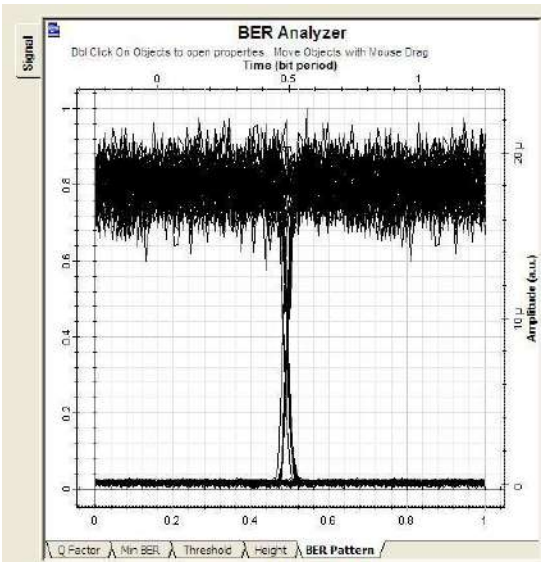

Fig 5. Eye diagram of OWC inter-satellite system 1000 km apart with transmitting power of 10 dBm at operating wavelength of 980 nm.

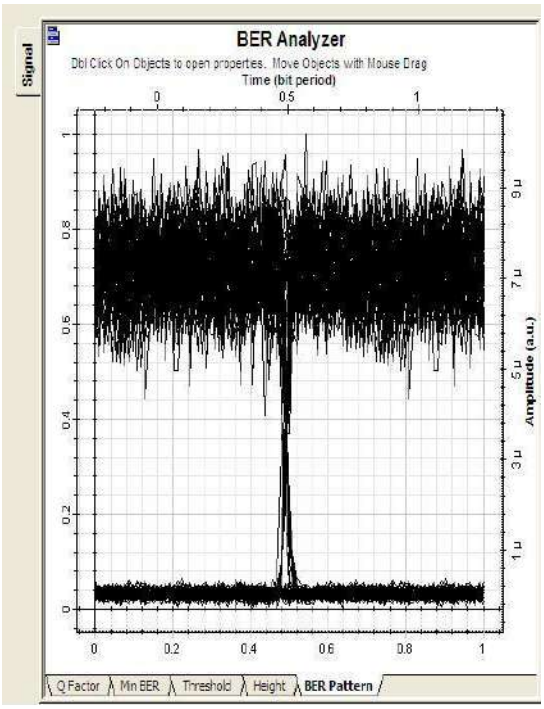

Fig 6. Eye diagram of OWC inter-satellite system 1000 km apart with transmitting power of 10 dBm at operating wavelength of 1550 nm.

IV.CONCLUSION

In this work, we have designed an inter-satellite OWC system to establish an inter-satellite link (ISL) of 500 km length and 1000 km length between two satellites at data rate of 1 Gbps. For the comparison we have used two wavelengths i.e. 980 nm and 1550nm. It is concluded from our simulated OWC system that the ISL link that have wavelength of 980 nm and range 500 km have better results than that of another wavelength. Because there is minimum BER in wavelength 980 nm than 1550 nm.

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An Analysis of Collation of Desktop and Mobile web

Manish kumar
Assitant Professor
DAV College, Amritsar
marora80@gmail.com

Girish Kumar
Assistant Professor
Amritsar College of Engineering & Technology
girishvansh@gmail.com

***Abstract*: As one of the most important innovation of the last century is the worldwide web. It is just because it provides the human being a different comfort and easiness in so many areas that affect our daily life. The path worldwide web covered so far as desktop web is itself a full fledge story from seeds to nuts which is heading toward new streets namely mobile web. So a mobile web is not a different concern of the worldwide web. The assimilation of the two facets is collectively a single shell named One-Web which is the ultimate vision of the future wave of today. Here in this paper I am presenting you the analysis of worldwide webs by all its landmark touches under vasodilation.**

***Keywords*: Breadcrumbs, contextual and global navigation, progress indicators, personalized search**

I.INTRODUCTION

The well known worldwide web has grown so much that it has become now a fundamentally presumed store of all problem solutions in almost all areas of the daily life. These days it could be sensed at any moment whenever you are not sure about any thing and in a role of assist stylist or stylist. So your first thought is to just check it out form the worldwide web which apparently arise availableness of desktop computer till the last century but now with the wide spread of mobile industry we can access the worldwide web from our pocket mobile. Now days the desktop web technology is growing and getting more matured as compared to the mobile web which is quite new and spreading its roots day by day. Both of these technologies having so much similarities in their implementation but they are Quite different from each other. Here in this paper we are providing the analysis of each of them and then put in front the ultimate vision of the future that is named as one web.

Design principle and best practices:

Web site design principles and best practices are becoming well known these days. Many believe the basic principles and guidelines that are applicable in the design of Web sites should still apply when designing for mobile platforms. After all, Web design has evolved from basic, text-based HTML pages into today's Web standards. So, we might expect that mobile sites that follow the same guidelines could easily reach the same level of success with users that desktop Web sites have achieved. However, the design of mobile sites is still in its infancy A (Jakob Nielsen's 2009) study on mobile usability pointed out, users' success rates when using mobile devices to access mobile sites averaged only 64%, which is quite low in comparison to the 80% average success rate for users who access Web sites on a computer. The form-factor difference seems to have a dramatic impact on the success rates of users' interactions, and therefore, should impact how we design mobile sites as well. New principles and best practices will inevitably arise as mobile site design continues to evolve. As a first step toward achieving this evolution, I've looked at how some successful mobile sites already differ from desktop Web sites.

II. Factors and basic differences between the desktop web and mobile web:

I.

I. Bars, Tabs, and Hypertext

Hypertext is the signature component of the Internet and the Web. However, we see much less hypertext on mobile pages. It's not that pages are no longer linked, but that links instead appear in the form of bars, tabs, and buttons. The reason for this is the optimization of mobile design for users' operation of mobile devices with their fingers. Hypertext is ideal when users click links using a mouse on a computer, but tapping links using your fingers on a touch screen mobile device is not easy. Users can too easily activate a link they did not intend to tap and accidentally land on an undesired page. This can lead to a bad user experience. Fitts's law tells us that the time required to acquire a target area is a function of the distance to and the size of the target. Bigger objects such as bars, tabs, or buttons allow users to tap with more precision. It is essential to make the actionable objects on mobile sites big and easily noticeable.

Figure 1: displaying bar, tabs and hypertext in mobile web

II. Text and Graphics

On Web pages, we can use graphics for many different purposes such as promoting, marketing, or navigating. However, designers often remove promotional or marketing graphics from the designs of mobile sites. There are several reasons for this transition from many to few graphics. One reason is that some mobile devices do not support the software we traditionally use for desktop Web site design. Other reasons include the small screen sizes of mobile devices and the limited available screen real estate in which to display content, as well as the slow download speeds on mobile devices.

III. Contextual and Global Navigation

Desktop Web sites typically use various forms of navigation. Some of them are global and remain consistent across a site, while others are contextual and change depending on where users are on a site. However, while global navigation is common on mobile sites, contextual navigation is not. The main reason for the reduction of global and contextual navigation on mobile sites is the limited screen on mobile devices. However, a lack of global and contextual navigation may cause users to find themselves in the middle of nowhere, not knowing where they are. Therefore, it's essential to reduce hierarchy when organizing the content on mobile sites, so users don't have to dig too deeply to get things done. They should be able to achieve what they want to accomplish before becoming lost.

IV. Content Prioritization

In comparison to the design of Web sites for desktop computers (typically, for a 1024 x 768 screen resolution) the biggest challenge in designing a Web site for a smart phone with a (320 x 480 & etc) screen resolution is how to cope with this dramatic difference in screen size without sacrificing the user experience. While desktop Web sites often contain a wide range of content, mobile sites usually include only the most crucial functions, features and content that users are most likely to need when viewing a site using a mobile device. Which may dictates a lot from a content-development stand point, or a site's architecture and screen layouts.

V. Vertical Instead of Horizontal Navigation

Horizontal navigation, like that on the is a widely accepted means of structuring and presenting content on desktop Web sites. Users scan a navigation bar from left to right, then click a link to go to a different section of a site. When a navigation bar is at the top of a page, users can typically more easily focus on page content rather than their being visually attracted to the navigation bar on the side. However, vertical navigation has replaced horizontal navigation on many of the mobile sites.

VI. Footers

There are two types of footers that are in common use on desktop Web sites. One type of footer provides links to content that users might expect to see on a site's home page, but has a lower priority than the primary content on the home page **Site-map**. Another type of footer provides quick links to content users typically need to view most often. These quick links are often grouped in lists in footer, so users have access to them across a site. Mobile sites employ footers that provide access to content users often look for on a home page, keeping its links to a minimum.

VII. Breadcrumbs

On desktop Web sites, breadcrumbs are an effective way of reassuring users they are on the right page and allow them to backtrack on their navigational. They make sense for large, hierarchical Web sites with lots of different content at multiple levels in a hierarchy. However, breadcrumbs rarely appear on mobiles sites, and there is usually no necessity for them. Limited space is one reason breadcrumbs are uncommon on mobile sites. But the main factor is that the design of mobile sites prevents users from having to go too deep into a hierarchy to find what they are looking for.

VIII. Progress Indicator

On desktop Web sites, when users must progress through multiple steps to complete a process such as filling out a long registration form, there is often a progress indicator at the top of the page to guide users through the process. Such progress indicators do not appear on mobile sites. Again, limited space is the main reason.

Use alternative approaches to make users aware of their progress without a progress indicator. For example, instead of using buttons with implicit actions such as **Next** or **Continue**, use buttons with explicit labels that inform users exactly what the next step is. Users still receive information about where they are in a process and what to expect at the next step.

IX. Integration with Phone Functions

Smart phones are communications devices, so making phone calls is their most basic function. While mobile platforms place many limitations on design and content, they also open up new opportunities that traditional Web sites cannot provide. For example, there is better

integration with phone functions such as direct calling and text messaging, which lets mobile sites facilitate ordering products by phone or send promotional text messages.

X. Localized & Personalized Search

Another area of opportunity that is unique to mobile sites is the use of geo-location services or support. While this technology has been available for some time, only in the last five years has it gained traction in the consumer market-place. Now, it is commonplace for mobile applications and Web sites to take advantage of this functionality by integrating it into value-adding services such as mobile search.

Many mobile devices can automatically detect where users are and give them local search results. This capability offers powerful opportunities for businesses to promote their products or services based on a person's proximity to their place of business and their immediate intent.

Conclusion:

So as we have realized that there are many particular concentric points and features which let the mobile web as with a separate concern from the desktop web. But both of the technologies are just two branches of the same root i.e. World Wide Web. So fundamentally there should be only version saved for a particular web. No separate mobile version to be maintained for the mobile user and for this a complete content, resource and platform adaptation of web by different mobile devices has to be achieved on the real time with user access to web. This idea is not new but still is in infancy and bit labor intensive. With respect to contents particularly This can be achieved by the adapting any of techniques listed below

- Client side Content Adaptation
- Sever side Adaptation
- Responsive Design
- Mobile first Responsive Design
- Hybrid Adaptation.

With the adaptation of any of above techniques we can minimize the fundamental differences to a greater extent and can achieve complete awaited goal of one web which serve the society with universal availability of all web contents any time anywhere on any device which is the most awaited goal for web today.

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A Review on Wormhole Attack In Mobile Ad Hoc Networks

Shekharan Deep Bindra
M.Tech Scholar,
Department of Computer Science and Engineering,
Amritsar College of Engineering & Technology (Manawala)
Email Id- bindra.shekharan5@gmail.com

Dr. Tanupreet Singh
Professor and Head of Department,
Department of Electronics and Communication Engineering,
Amritsar College of Engineering & Technology (Manawala)
Email Id- tanupreet.singh@gmail.com

Abstract— Mobile Ad-hoc network is a self-supporting and independent network formed with wireless links without a central controller, and which frequently changes its topology. In this paper, the performance of MANET under wormhole attack is analyzed, And also studying about the multiple routing protocols which are used in mobile ad-hoc networks. The wormhole attack is one of the security attacks in mobile ad hoc network which occurs in the network layer. Here, in this review paper the whole work is how to prevent the Wormhole attack.

Keywords*— Wormhole attack, routing protocols, DSDV, OLSR, *SEAD, DSR, Aridane, AODV

I. INTRODUCTION TO MANETs

A mobile Ad hoc network is consist of two or more nodes which communicate with each other without having central coordinator to handle their function [4][5]. Nodes like computer , laptops , PDAs and wireless devices which have limited transmission range for the straightway transmission, these wireless transmission have very useful for environmental control to military systems. The working of network and reliability is arranged by attacks on ad hoc network routing protocols. In MANETs, Nodes faces some problems such as wormhole attack. In this attack two nodes collude with each other using weird link or directional antenna , to give an impression that they are only one away . A large number of routing protocols are introduce for MANETS to create and reconstruct the network.

MANETS faces some challenges which are as follow:-

- *Security* – The main aim of security is to give explanation for mobile ad hoc network is provide a background covering availability, integrity, reliable and authentication to ensure the services to the mobile user.
- *Multicast Routing* – The design of muticast routing protocol for a constantly changing mobile ad hoc network environment
- *Power consumption* – If the nodes in MANET network runs on batteries and are deployed in hostile terrains, they have stringent power requirements.
- *Quality of Service* – provides constant Quality of service for the different multimedia services for changing environment.

II. INTRODUCTION TO WORMHOLE ATTACK

Wormhole is defined as an attack on mobile ad hoc network routing protocols in which enemy construct a subway between two nodes in the network and are directly connected through the nodes [6]. A wormhole attack is harmful attack on MANET routing where two points called enemies connected with the subway link called wormhole link.
Suppose from figure 1, Node A sends RREQ To Node B and node X and Y are intruder nodes having band channel between X and Y. Node X tunnels the RREQ to Y which is near to B. The two RREQ for B that is A-X-Y-B and A-C-D-E-F-B. The first way is faster than the second way and chosen by node B. In wormhole attack, enemy underpass packets to another area of the network bypassing simple and normal paths.

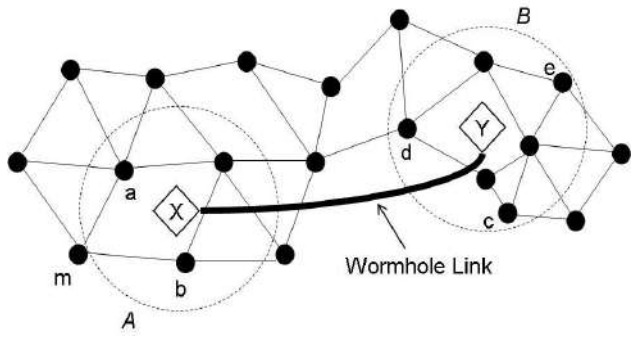

Fig-1 Wormhole attack in MANETs

In [1] A wormhole attack are classified as:

A. In – band wormhole attack:

That needs a convert overely over the existing wireless medium .

- Self- sufficient wormhole attack, here the attack is limited to the colluding nodes
- Extended wormhole attack ,in this the attack

B. *Out – of – band wormhole attack:*

which require a hardware channel to connect two nodes.

These tricky nodes attack its closest nodes and attract the traffic received by its neighbor node.

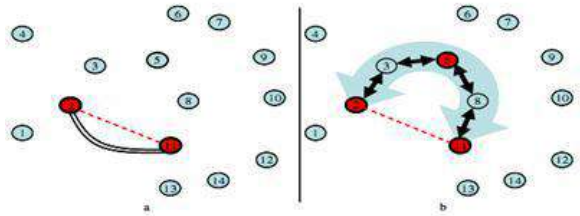

Figure 2. (a) Out-of-band wormhole, (b) in-band wormhole

III. ROUTING PROTOCOLS

In MANET many routing protocols are available. Multiple Ad-hoc network routing protocols are developed in order to find better routes between source and destination. To make data transmission possible between two or more nodes, multiple hops are needed due to limited transmission range of the node. The routing protocols are categorized into two types: Table-Driven (proactive) and Demand – Driven (reactive) [7].

A. *Table – Driven (proactive):*

It includes DSDV, OLSR, And SEAD routing protocols.These protocols are described as follow:

1. DSDV (Destination Sequenced Distance Vector):

It is a proactive routing protocol, in which all the destination routes and the next hop to each target(destination) and sequence number is generated by the target node are maintained in a table[7],[8]. In this each node behaves as a router. This table is updated by periodic exchange of messages between the neighboring routers.

2. OLSR (Optimized Link State Routing):

OLSR is proactive routing protocol. In this Topology information is exchanged periodically. Hello messages are broadcast to discover single hop neighbors. To divide signaling traffic, flooding mechanism is used where every node forwards a flooded message not forwarded by it earlier. The Topology messages which contains information about the link states which are sent to all other nodes. Each node computes the shortest path using some links (symmetric links) to form topology graph. It is open to wormhole attack [9][10].

3. SEAD(Secure ad hoc Distance vector):

The SEAD protocol is based on one way hash chains rather than asymmetric cryptography and then prevents the network from the attacks and Dos attacks. Some of the nodes having capacity to authenticate the elements of other chain. In this the receiver must also authenticate the sender[3]. Thus , the attacker which never compromises a nodes and cannot send routing message, as it cannot provide authentication code to its neighbors[11].

B. *Demand – Driven (Reactive):*

It include DSR, AODV, Aridane. These protocols are described as follow:

1. DSR (Dynamic Source Routing):

DSR is a reactive routing protocol which discovers the address routes only when it has packets to send to that destination. It needs source route maintenance, since, during the use of the route, it is required to monitor the operation of the route and to inform the sender of any errors [3]. It is harmful to wormhole attack and may also result in denial of service attack at the destination[9]. This protocol requires forwarding of only the first RREQ received by it and will discard all other RREQ packets for the same route. The RREQ packet contains the information regarding the intermediate nodes and the hop count. The route discovered is then utilized to send data packets.

2. Aridane(A Secure On – Demand Routing Protocol for Ad-hoc Networks):

The Ariadane protocol is based on DSR and it depends upon symmetric cryptography. Ariadane guarantees that the destination node authenticates the source and the source can authenticate each middle node in the route. Each middle node can remove or add nodes in the list of nodes of the path requested. It uses the key administration protocol called TESLA which depends on the clock synchronization to authenticate routing messages. It uses per-hop hashing mechanism [3]. The authentication at each node not only depends on the contents of the RREQ packets but also the authentication code of the last or previous node. The verification of origin of each data field in the RREP message can be done by the source node.

3. AODV (Ad-hoc On-demand Distance Vector):

It is a pure on-demand routing protocol. For the purpose of sending messages to destination, it broadcasts RREQ messages to its immediate neighbors. These neighbors are again rebroadcast them to their neighbors. This process continues unless the RREQ message reaches the destination. Upon receiving the first RREQ message from the source node, it sends a RREP to the source node[7],[12]. All the intermediate nodes also set up forward route entries in their table. Upon detecting error in any link to a node, the neighboring nodes forward route error message to all its neighbors using the link. These again initiate a route discovery process to replace the broken link. The AODV routing protocol is vulnerable to wormhole attack[9]. Since the colluding nodes involved in wormhole attack uses a high

speed channel to send messages, it is possible that the RREQ packet through them reaches the destination faster compared to usual path. By this protocol, the destination discards all the later RREQ packets received, even though they are from authenticated node.

IV. PREVENTIONS OF WORMHOLE ATTACK

Choi al et[2] suppose that the nodes will examine the behavior of its neighbors. Each node will send RREQ messages to destination. If RREP message cannot be receive by the source in a given time, it detects the wormhole and adds the route to its wormhole list. In this the source node sets the Wormhole Prevention Timer (WPT) after sending RREQ packet and wait until it overhears its neighbor's retransmission.

Mahajan et al.[1] gives some proposals to detect wormhole attacks like:

1. The abrupt decrease in the path lengths can be used as a possible symptom of the wormhole attack.
2. With the available advertised path information, if the end-to-end path delay for a path cannot be explained by the sum of hop delays of the hops present on its advertised path, existence of wormhole can be suspected.
3. Some of the paths may not follow the false link, yet they may use some nodes involved in the wormhole attack. This will lead to an increase in hop delay due to wormhole traffic and subsequently an increase in end-to-end delay on the path. An abrupt increase in the end-to-end delay and the hop queuing delay values that cannot be explained by the traffic supposedly flowing through these nodes can lead us to suspect the presence of wormhole.

V. WORMHOLE ATTACK DETECTION AND AVOIDANCE

Detection of wormhole has been an active area of research for last few years. The major task is to find out the presence of wormhole in the network.

In [13], detection of wormhole nodes is done on the basis of the Hello control messages. As a metric of compliance with the OLSR specifications, the author has used the percentage of HELLO Message Timing Intervals (HMTIs) that lie within a range bounded by the amount of jitter. A range $R = [T - \delta, T + \delta]$ has been defined. If an HMTI is in this range R, it is considered to be valid; otherwise it is out-of-protocol. A secondary check is done whenever the Hello Message Timing Interval packet behavior is suspicious. On the other hand, a poorly performing node would have associated with it a relatively large number of retry packets, which would not be the case with an attacking node. This way, the problem of false positive alarms is negotiated.

In [14], a new protocol called Multi-path Hop-count Analysis (MHA) is introduced based on hop-count analysis to avoid wormhole attack. It is assumed that too low or too high hop-count is not healthy for the network. The novelty of the hop-count analysis in detecting wormholes is however questionable. Similar works have also been reported earlier. As an example, Djenouri et al. [15] may be considered.

In [16], wormholes are detected by considering the fact that wormhole attacks consists of relatively longer packet latency than the normal wireless propagation latency on a single hop. Since the route through wormhole seems to be shorter, many other multi-hop routes are also channeled to the wormhole leading to longer queuing delays in wormhole. The links with delays are considered to be suspicious links, since the delay may also occur due to congestion and intra-nodal processing. The OLSR protocol has been followed as the basis for routing. The approach [16] aims to detect the suspicious link and verify them in a two step process described below.

In the first step, Hello packets are sent to all the nodes within its transmission range. When the receiver receives a Hello (request), it records the sender's address and the time delay Δ left until it is scheduled to send its next Hello message. For piggybacked reply, the node attaches the recorded address of the sender and their respective values of Δ. When a node receives a Hello (reply), it checks whether it contains information related to any of its outstanding requests. If no such information is present, then it treats it as any other control packet. Otherwise, the node checks the arrival time of Hello (reply) to see whether it arrived within its scheduled timeout interval taking into consideration the delay Δ that occurred at the receivers end. If it is within its timeout then the link between itself and node is considered to be safe, otherwise suspicious and communication to that node is suspended by the sender nodes until the verification procedure is over.

In the second step, the sender will send a probing packet to all the suspected nodes detected in the previous step.

If a proper acknowledgement is received from some node X within its scheduled timeout then node X is again considered to be safe. Otherwise the presence of wormhole is proved. Further the end-to-end authentication is also considered by using symmetric key cryptography.

In reference [17], both the hop count and delay per hop indication (DelPHI) are monitored for wormhole detection. The fundamental assumption in [17] is once again that the delay a packet experiences under normal circumstances for propagating one hop will become very high under wormhole attack as the actual path between the nodes is longer than the advertised path. Like [16], the proposed methodology in [17] for wormhole detection is also a two-step process.

In the first phase the route path information are collected from a set of disjoint paths from sender to receiver. Each sender will include a timestamp on a special DREQ packet and sign it before sending it to the receiver. Each node upon receiving the packet for first time will include its node ID and increase the hop count by 1 and discards the packet next time onwards. The DREP packets will be sent by the receiver for each disjoint path received by it. This procedure is carried out for three times and the shortest delay as well as hop count information will be selected for wormhole detection. In the second phase, the round trip time (RTT) is taken by calculating the time difference between the packet it had sent to its neighbor and the reply received by it.

Table 1: Detection methods of wormhole attack.

METHOD	MOBLITY	SYNCHRONIATION	QOS
Geographic Leash Technique	Bound to maximum transmission distance	Low synchronization	Delay up to leash factor
Temporal Leash Technique	Bound to maximum transmission distance	Medium synchronization	Delay up to leash factor
DELPHI	No need	No need	Delay
SECTOR	No need to Time synchronization	No need	No delay
WAP	Maximum transfer distance is calculated	Only source node is synchronised	Deley per hop
SaW	Delay Factor	Not required	Not required
DaW	Not considered	Not considered	Deley parameter
LITEWROP	Static Network only		
HMTI	Short Range Wormhole can be detected	No need	Jitter

VI. CONCLUSION

In the paper MANETS is insecure and dangerous to many attacks so that it require efficient, good and reliable protocol that can be deployed and use daynamic routing. Therefore, the application of MANET that uses proactive routing protocol is more trusted compared to the reactive one when more than one attacker exists in the network. Also Wormhole attacks in MANET significantaly degrade network perforamance and it is a risk to network security.

VII. FUTURE WORK

Here we survey that the approaches which exist in MANETS will help us in future to design a new approach for detecting the wormhole attack in mobile ad- hoc network. Several solutions are very useful for network which has been described. In a wormhole attack, the intruders may behave in a myriad of ways. They may forward all traffic generated by the valid station, they may drop a certain percentage of the station's traffic, or send the packets out of order. They may choose to randomly drop only data packets while forwarding all routing information.

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User Interface Models for the Cloud

Sophia
Amritsar College of Engineering and Technology
Sophia_gill2001@yahoo.com

Simranjeet Kaur
Global Institute of Management and Emerging Technology
Simrangill_84@yahoo.co.in

Abstract- ***Neither the desktop metaphor nor the web are completely suitable for the coming age of cloud-based applications. The desktop was developed in an era focused on local resources, and consequently its gestures, semantics, and security model reflect heavy reliance on hierarchy and physical locations. Cloud-based web applications delivered through the browser suffer from non-unified, hetereogenous interfaces across providers, potentially inviting user confusion. This paper proposes a new user interface model that accounts for cloud applications, incorporating representations of people and new gestures for sharing, while minimizing the prominence of location. The model's key feature is a lightweight mechanism to group objects for resource organization, sharing, and access control, towards the goal of providing simple semantics for a wide range of tasks, while also achieving security through greater usability.***

Keywords
Cloud, Desktop, Groups, Model

I.INTRODUCTION

This paper proposes an exploration of new user-interface metaphors for end-users that better combine desktop computing with cloud-based services. The current desktop metaphor, developed in an era before networked systems were prevalent, is an inadequate basis for incorporating such remote services. The desktop's gestures, artifacts (e.g., folders and devices), and security model (e.g., designated folders for Public documents) heavily reflect the local file system model and its associated operations. As such, resource organization is grounded firmly in hierarchy (e.g., directory trees) and physical locations—which contrasts sharply with cloud-based application models. Conventional desktop environments, however, are ceding function to cloud-based services delivered through the web browser, suggesting that all applications may ultimately run within an evolved web browser, thus marginalizing the role of the local desktop model. Google's recent Chrome OS [1], with its notable absence of a desktop, suggests such a future. But there are several concerns with a web-only application environment. First, the web imposes a page (or document) metaphor—forcing applications to conform to that metaphor or else prompting developers to work harder to program around it. Second, a web-only environment may invite a fragmented, inconsistent user experience across sites. One important role of traditional operating systems is establishing a consistent user interface paradigm. Due to the heterogeneity of the web, there is no entity that provides and enforces a consistent interface or security model (e.g., user privacy and sharing settings). For congruence with the coming age of cloud computing, new interface metaphors should directly represent people, promote simple gestures for sharing and specifying access control, while abstracting away physical location of resources from the user model. Proposal This paper proposes a user interaction model for a "social desktop", one that addresses both access control and organization of users' documents and resources. A key feature is a lightweight, user-created grouping construct, which provides a convenient mechanism to express context among a set of related resources while also implicitly specifying access control. Groups are similar to file folders, but with a few important distinctions. First, groups are not limited to holding representations of files, but also representations of other objects, such as people, applications, and hardware resources.

As such, they also serve as a natural security sandbox for the contents within. Second, groups do not enforce strict hierarchy, allowing a particular object to exist in multiple groups. Finally, the system automatically maintains and visualizes relationships with other groups containing related objects, relaxing the need for users to know exact locations to organize and retrieve their resources. Groups are considered lightweight because they are cheap (computationally and cognitively) to create, find, and modify. Our hypothesis is that the properties described above—lightweight contexts, unenforced hierarchy, social metaphors—not only facilitate the organization and retrieval of resources, but also enable greater adherence to the implicit security [17] principle, whereby the intended security policy is inferred directly from the user's main task.

II. WALK THROUGH

Let's introduce Mary, an end-user persona representative of a large class of users in what she wants to accomplish using her home desktop: e.g., chat with her family, share photos, and occasionally buy goods online for her grandchildren. In a few years, she will buy a new computer that might come prebundled with remote computing utility services (e.g., storage, email and phone accounts). Let's consider a new model for Mary's future user interface. Imagine that Mary has just returned from a family summer vacation, with a camera full of pictures. Her ultimate goal is to sort through the pictures, create an album from a select few, and share the album with her friends and family, by perhaps posting it on a photo-sharing site (e.g., Flickr). While creating the album, she might want to perform modest editing on some photos but may require some help. First, Mary connects her camera to her computer, and image thumbnails appear automatically in a new group. The group

has a default name, e.g., Images Taken with HP Camera, 6/14/10–6/19/10, but she decides to rename it to Lake Tahoe Trip 2010. Mary isn't concerned about where these images are physically stored, nor does she worry about moving the group to a "known" location (e.g., My Pictures). She takes for granted two things: a) that even once the group disappears from view, she will be able to easily find it again, and b) should her computer crash and need replacement, her photos remain safe (e.g., because her data is automatically transferred to the cloud shortly after connecting the camera). Mary wants to select the best images of the entire set, so she creates a new group, which she doesn't bother to name yet, if ever, though we'll refer to it as the shortlist group. As she examines each image, she decides whether to drag it to the shortlist. If she does, the thumbnail appears in the shortlist but continues to exist in the original group (Figure 1). Mary understands that both thumbnails refer to the same picture. If she wanted to, Mary could select the thumbnail in either group, and the system could show her visual hints of all other groups where she might find that image. Once Mary is satisfied with her selection of potential photos, she closes the group containing all her photos and begins to closely review the shortlist. She realizes that some of the photos could use some cropping and brightness adjustment, but she isn't quite sure how to proceed. Mary decides to ask her favourite granddaughter, who frequently provides Mary with technical support. Mary might just type in her granddaughter's granddaughter's name, but Mary would rather just browse for her granddaughter's avatar. She first opens her family group, which contains a jumble of avatars representing various family members. Mary doesn't immediately see her granddaughter, but she does see her granddaughter's mother, so she selects the mother, which visually hints at other groups to which the mother belongs. Mary follows one of the hints, opens the group containing her granddaughter's nuclear family,
and sees her granddaughter's face (Figure 2).

Mary could click on her granddaughter to see visual hints for groups that might contain others related to her granddaughter, as well as groups that contain documents Mary currently shares with her granddaughter.

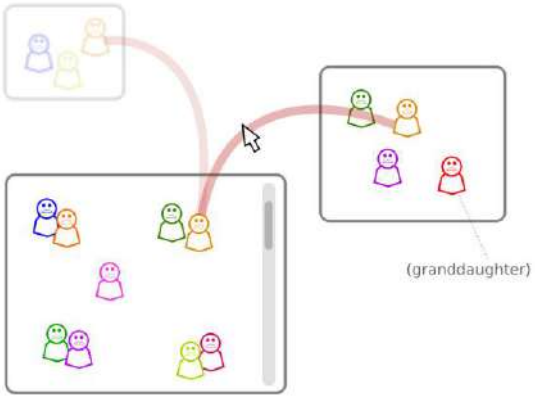

Figure 1: Users browse objects by relationships, maintained by the system. Mary might find her granddaughter by, e.g., selecting the granddaughter's mother. The system produces visual hints to guide Mary to groups that contain the mother, one of which leads to Mary's granddaughter. A visual indicator suggests that Mary's granddaughter is available, so old-fashioned Mary decides to call. She drags a telephone icon, representing a service, onto her granddaughter (or vice versa). Mary asks how she might edit her photos, to which her granddaughter recommends a popular free service, PhotoChop. Mary knows of a directory to find services, but her granddaughter sends her an instant message, containing an icon of PhotoChop (which Mary might drag to a place of her choosing, such as a favorites dock). Photo- Chop might be a web application with an advanced interface, a downloadable program, or some hybrid.. Mary creates a new group, which we will refer to as touchup, and from the shortlist, throws in photos that need editing. She drags the touch-up group onto PhotoChop, knowing that PhotoChop can only access photos in touch-up, reminded by a visual link between the touch-up group and the window containing PhotoChop . Eventually, she gets stuck while attempting to change the brightness of a photo and finds that she's made quite a mess. She locates her granddaughter's avatar and drags it into the touch-up group to share the group (and photos) collaboratively with her granddaughter. Mary explains the problem, prompting her granddaughter to assist. Mary feels secure that should she not approve, she hasn't lost any of her original work because the system automatically maintains revisions. Mary is pleased with all of her touch-ups, and closes the window and associated touch-up group. Before Mary posts the photos, she would like feedback from her family. She finds family members (or groups of them) and drags them
into the shortlist to share her photos.
Days later, Mary decides to post her shortlist on a public photo-sharing service. Mary has lost track of her shortlist group, but she can find it again by a) either selectingher HP camera or any of her family members with access to the shortlist, and b) subsequently following group relation hints—or searching at any point along the way. She orders her photos accordingly, might add captions, and drags the group onto the photo-sharing service. A window appears, containing a service-specific web page, with various forms already pre-filled for Mary to confirm and submit. Mary might add more photos at a later date to the group, which couldautomatically trigger their publication.

III. RELATED WORK

The above scenarios illustrate many uses of lightweight groups to support end-user cloud computing, by combining both resource organization and access control while deemphasizing the role of physical locations. The groups model is inspired by several previous projects in resource sharing, organization, and access control, as summarized

below. Sharing and Access There have been many recent studies on access controls in the context of file sharing. Representative work includes Shen et al.'s proposal [15] to extend current access control models to support new rights (e.g., beyond simple read/write) relevant to synchronous collaborative environments (e.g., rights to change content on a shared display). Cao et al. [6] propose a new approach, called intentional
access management (IAM), which generates an enforceable policy based on user intention and refined through an interactive process modeled on wizards. Whalenetal.'s survey [19] suggest that users do change file access permissions over time to adjust for changing (social) contexts, while Smetters et al.'s work [16], which examines sharing access controls over a much longer evaluation period, suggests
the opposite: that users don't change policies after initially set, but policies tend to be quite complex. Smetters et al.'s study indicates that a file's context (rather than content) determines its sharing policy and suggests that location is often used as a proxy for context. Voida et al. [18] examine sharing in practice and note that current approaches for sharing are highly domain specific—and hence mechanisms for specifying access vary substantially. While many of these and similar studies focus on the traditional access control list model, Voida et al. propose a visual sharing palette, in which users share files by dragging desktop files to icons representing peers. The approach is similar in spirit to the model explored here, though our model extends the general idea to a wider variety of contexts (e.g., sharing hardware resources and file organization). Organization: Non-hierarchy and Search There is evidence that non-hierarchy is an idea (still) worth further investigation. The Lifestreams project [8] proposes on-demand folders, or views, that are automatically created for the user to encapsulate a set of files, typically through search queries. Similarly, semantic file systems (SFS) [9] create virtual directories to group files by meta-data attributes. Marsdenet al. [12] argue against the usability of hierarchical file systems, proposing instead file-system models with transactional, database semantics. The Presto project [7] explores "place-less" document spaces, enabling users to create groups to hold related documents. Rekimoto [13] proposes using time as a metaphor, for the purposes of organization. ContactMap [20] proposes representing peers as first class objects and argues that a flat (visual) namespace for organizing them is sufficient. To address finding files and documents, Bergman et al. [5] demonstrated that users tend to prefer folder navigation over desktop search. The model proposed in this paper borrows concepts from many of those projects but differs by exploring: a) on demand, user-created contexts that may persist for grouping objects, rather than serving as temporary views, b) links to other contexts, created automatically, rather than solely manually, based on common files, attributes, or shared status with other peers, and c) a hybrid approach for finding files, based on navigational browsing bolstered with search. The first concept, user-created contexts, explores the hypothesis that when users need to group common files, the ability to create persistent groups in a lightweight manner is more natural than to a) assume a flat namespace, and consequently b) require users to construct search queries using meta-data attributes to find files. The second concept, that of automatic linking, explores the hypothesis that while users need to group files, they may not need to manually organize those groups. If users feel confident that they can easily find their files and groups, they may yield control of organization to the system. The hybrid approach for finding files explores
whet
her users can effectively search while navigating, without losing context. A further question is whether the search ranking algorithm can leverage group links and distance to better order results based on the current user context. Desktop Access Control Several existing projects explore usable access controls on the desktop, beyond traditional mechanisms of requiring users to manually specify security policy per resource. Chameleon [11] proposes a model that partitions the desktop into one of several security sandboxes that map to user task types (e.g., "personal", "work", "communications") to limit the effects of malware. Other projects propose similar ideas, such as formal models for role-based access controls (e.g., [14]), compartmentalized or restricted execution environments (e.g., [10]), approaches that combine information flow control with compartmentalization (e.g., [4]), and fully compartmentalized machine metaphors (e.g., [3]), also exemplified in virtualization. Virtual machines may be too heavyweight, and compartmentalized models may be too inflexible to support easy sharing across task types. Static or predetermined role based sandboxes may confuse users when the mapping between tasks and the appropriate sandbox is unclear or not one-to-one. Instead, this paper proposes exploring whether lightweight contexts should also serve as a user model for specifying access. Doing so would leverage the same mechanism for both organizing and specifying sharing policy between peers and resources. Users would then need not divert from their main task to specify a sharing policy, as the system has a reasonable chance of inferring it. Finally, if easily created, user-defined contexts are more fluid than static roles, and likely more natural for complex policies that reflect human relationships and workflows. Other Work Ackerman [2] articulates a social-technological gap between what people expect in systems that support social interaction and what is technically feasible. The gap comes from the fact that people naturally operate on
nuanced, fluid, and implicit social contexts and roles, while supporting systems tend to be rigid and find ambiguity challenging to manage. Lightweight groups may address some of these issues. Groups are flexible and tolerate ambiguity, as they are fairly generic mechanism and do not impose social semantics—deferring to the user to assign

meaning to groups he or she creates. Also, groups are easy to create, encouraging users to create as many as necessary for the particular purpose, context, or role at hand.

IV. CONCLUSION

Lightweight groups are one approach to support end-user cloud computing, by combining both resource organization and access control. They represent an example of the broader thrust of this work: that the unifying model for next generation computing systems should promote representations of people, simple gestures for sharing, and an understandable security model, while de-emphasizing the importance of physical locations.

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How to Secure Our Transactions Over Internet

Vishal Gupta
Assistant Professor
DAV College, Amritsar
vishal.gupta8524@gmail.com

Vinod Kumar
Assistant Professor
DAV College, Amritsar
malik.vinod2004@gmail.com

Girish Kumar
Assistant Professor
ACET, ASR
girishvansh@gmail.com

Abstract-In this document we talk about the main topic relating to the security feature about the online transaction over the internet. In this paper we also try to know different security steps, which need to be taken up at a clear scale. Security of Internet transaction is very important. It is not only the installed software, type of hardware used and the protection used by service providers (shops, banks, shopping malls, online stores etc.) that influences the level of security. The behavior of users (the parties of transactions, account holders) plays an importance role too. The overall level of security is influenced by many complementing actions. Our main purpose is to view all the main ways by which we can safely browse over internet with online transactions.

I .INTRODUCTION

Electronic or e-commerce transaction means payment made through credit card for any purchase of products bought over the internet. A person familiar with this process would also be having knowledge of Internet Merchant Account. Any company doing business over internet must have an Internet Merchant Account and these days many reputed companies are offering software required for operation and maintenance of such Internet Merchant accounts. For the purpose of maintaining an Internet Merchant Account, Companies doing online business, must open a checking account with any bank, anywhere in the United States because some local banks do not offer this facility. These days, market is flooded with many such companies who are offering their services for opening such accounts with the banks and are charging nominal fees for the same. Internet Merchant Account is useful not only for companies but also for individuals also who are engaged in web-based businesses. Due to popularity of online business, banks have now gone one step ahead by offering entire package i.e. right from the opening of internet merchant account to receiving online payments and then crediting the same to company's official account. There are three layers that exist between a customer and an organization.
These three layers are known as Payment Gateway Internet Merchant Account Website

The job of Payment Gateway is to screen the credit card, its validity, the product ordered, the billing details such as Price of the product, quantity and any discount offered etc. which is subsequently transferred to the Merchant Bank Account along with the payment received from credit card through electronic format. For smooth electronic transaction, the website engaged in web-based business should be integrated with the Payment Gateway as well as the Merchant Bank Account.

Transaction Fees- In addition to the discount rate charged on each transaction. All such transactions come with a fixed nominal fee to the tune of $0.20 to $0.30/transaction.

Gateway Fees- Payment Gateway which is must to have for online process may also carry monthly charges to the tune of $15 to $30 per month.

The Internet Merchant Accounts too comes at a price. Normally, there are three different price ranges for upfront application fee, ongoing fixed rate, discount rate, fixed transaction fee, termination fee and miscellaneous fee which depends on the quantum of the business an organization or the website can get. For a low volume generating business the prescribed fee might be less. Whereas, there will be a scope for scaling up the business and changing the range of the account. One must go through all the offers being given by different banks before choosing a particular bank, as the banks are also known to bend, as per requirement of their customer. Even the banks offering such services, have now started advertising on internet for the convenience of individuals as well as organizations engaged in e-commerce.

II. WAYS TO SECURE YOUR TRANSACTIONS

- *Stored-value cards*

Cards that you can buy with specified loaded dollar amounts. A stored-value card refers to monetary value on a

card not in an externally recorded account and differs from prepaid cards where money is on deposit with the issuer similar to a debit card. One major difference between stored value cards and prepaid debit cards is that prepaid debit cards are usually issued in the name of individual account holders, while stored value cards are usually anonymous.

- Smart cards

Cards that can act as credit cards and debit cards are stored value cards. A smart card, chip card, or integrated circuit card (ICC), is any pocket-sized card with embedded integrated circuits.

There are two broad categories of ICCs. Memory cards contain only non-volatile memory storage components, and perhaps dedicated security logic. Microprocessor cards contain volatile memory and microprocessor components. The card is made of plastic, generally polyvinyl chloride. Smart cards may also provide strong security authentication for single sign-on within large organizations

- *Digital cash*

Electronic money (also known as e-currency, e-money, electronic cash, electronic currency, digital money, digital cash or digital currency) refers to money or scrip which is only exchanged electronically. Typically, this involves the use of computer networks, the internet and digital stored value systems. Electronic Funds Transfer (EFT) and direct deposit are all examples of electronic money.

III. ONLINE PAYMENT SERVICES LIKE PAYPAL

PayPal is an online payment service that allows individuals and businesses to transfer funds electronically. You can use it to pay for online auctions, purchase goods and services, or to make donations. You can even use it to send cash to someone. A basic PayPal account is free. You can send funds to anyone with an e-mail address, whether or not they have a PayPal account. They'll get a message from PayPal about the funds, and then they just have to sign up for their own account. Funds transferred via PayPal reside in a PayPal account until the holder of the funds retrieves them or spends them. If the user has entered and verified their bank account information, then the funds can be transferred directly into their account.

- *Use the latest Internet browser*

The program that you use to surf the Internet is called a browser. This software has built-in encryption capabilities that scramble the information you send to a server. Using the most recent browser ensures that the data is protected using the latest encryption technology. This technology also uses a Secure Sockets Layer (SSL), which is an Internet security protocol used by Internet browsers and Web servers to transmit sensitive information. The server receiving the data uses special "keys" to decode it. You can make sure you are on an SSL by checking the URL - the http at the beginning of the address should have changed to https. Also, you should notice a small lock icon in the status bar at the bottom of your browser window

Look for digital certificates Look for digital certificates that authenticate the entity you are dealing with. Independent services like VeriSign will

authenticate the identity of the Web site you are visiting. Web sites that use this service (usually those that sell items or services online) will have the VeriSign logo. By clicking on the logo, you can be assured that the site is legitimate, rather than a clone of the legitimate company set up to collect your personal and financial information

Today each and every legal bank and online shopping websites, all are veriSigned secured by these types of securities, which can safe our secret records to hack.

- *SSL Certificates*

VeriSign provides Secure Sockets Layer (SSL) Certificates and more in a single solution. The first Certificate Authority to provide SSL in 1995, VeriSign remains the leading provider of the most trusted solution for online security and helps assure customers that they are safe from search to browse to buy and sign-in. When customers see the VeriSign Trust™ Seal, they know they can trust the link, trust the site, and trust the transaction.

- *Read the privacy policy*

The information you enter on the Web site should be kept confidential. Make sure you read the company's privacy policy to ensure that your personal information won't be sold to others. Services like Trust-E review a company's privacy policy (for a fee) and then allow the company to post the Trust-E logo if its privacy policy follows certain industry standards for consumer protection.

- *Only use one credit card*

Try to use only one credit card for all transactions, by this you has an idea that how much amount you have splendid for all of your online purchases.

- *Never give out passwords or user ID information online unless you know who you are dealing with?*

Don't give it out to your Internet service provider if you get an e-mail requesting it. This is a relatively recent scam used to access your account and get your credit card number, along with whatever other personal information is there.

- *Keep records of all of your Internet transactions*

Watch your credit card statement for the charges and make sure they're accurate. Match your details with your transactions and with your monthly bank reports for your security. By this our transactions records are matched with our monthly billing reports.

- *Credit Card Fraud*

Have you ever eaten at a restaurant, paid with a credit card, and forgotten to get your copy of the credit card receipt? Did you know that many of these receipts have your credit card number printed right there for anyone to see (and use)? And, if you've signed them, your signature is also right there for someone to carefully copy. This can lead to the most simple form of identity theft. With this bit of information, some unscrupulous person can be well on his way to making purchases either by phone or on the Internet using your credit card number. You won't know about it until you get your statement (a good reason why you should always study the charges on your credit card statements!). All they have to have, in most cases, is your mailing address, which can be looked up in a phone book or easily found on the Internet.

IV.CONCLUSION

We have introduced the formal methods to online transaction security. We start from traditional ways, and move to the new and useful methods we check and deal with the online threats in the new online purchase applications and new website for security. Key points
We have provided all the basic information which deals with the secure transactions, to implement safely.
We have provided the best ways to protect you and secure you from daily transaction threats, which may lead to harm on very little information basis. The concepts regarding the formal analysis and verifications of security were described.

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10Introduction to E-Commerce
Author Diane Cabell

A Review on Quality of Service (QOS) in Multicast Routing Protocols in Mobile Ad hoc Networks

Er. Navjot Kaur
M.Tech Scholar
Department of CSE
Amritsar College of Engineering and Technology
Email Id: kaur.navjot30590@gmail.com

Dr. Tanupreet Singh
Professor and Head of Department
Dept of ECE
Amritsar College of Engineering and Technology
Email Id: tanupreet.singh@gmail.com

Abstract*—Multicast communication is one of the demanding and challenging area to support Mobile ad hoc networks. Mobile Ad hoc Networks is a wireless network that supports communication through the interconnected nodes. These interconnected nodes are used in tree based routing protocol and mesh based routing protocol. In Tree based routing protocol there is only one feasible path provided from the source to the destination where as in mesh based routing protocol there are several available paths. Some of the important applications areas for MANETS are real time systems and multimedia systems such as home applications i.e., in laptops, in multi-user game. Our review paper is based on quality of service in multicast routing. In order to provide better quality of service we have reviewed the work of two protocols i.e QMMRP and MQBM in MANETS.

***Keywords*— Mobile ad hoc networks, multicast routing protocol, quality of service**

I. INTRODUCTION

Mobile ad hoc networks is an essential way in which the user can access information from anywhere and at anyplace and at any time in the present and future networks.[10] They are the collection of mobile nodes In MANETS nodes participate actively to transmit data or information to another nodes through the wireless channel. This can be a standard Wi-Fi connection, or any other medium, that may be cellular or satellite transmission. MANETS have many of the advantages such as independently developed, easy, fault tolerance, economical installation [2]. However it faces some problem and challenge while including the routing in networks.

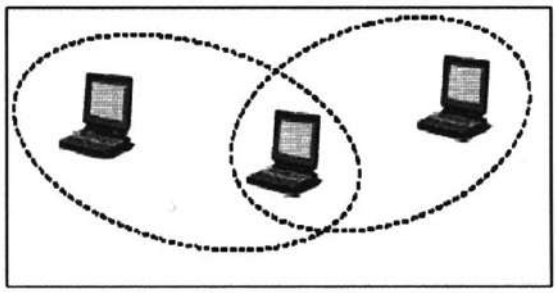

Figure1. Architecture of ad hoc network [10]

Quality of service is an open area in Manet's .It becomes more challengeable to provide a better quality of service by using the multicast routing protocol. In Multicast routing there is only one source and a group of destination nodes. And it becomes challengeable to send the packet to the reliable nodes from the source to the destination. Usually finding the paths from sender to final receiver is not sufficient; however providing paths with certain quality of service is very required especially, for multimedia and real time applications [2].

For this purpose two of the QOS protocols are used i.e. QMMRP and MQBM. MQBM is inspired by the bee's communication when they search for the food and QMMRP is based on the entropy of nodes that provide a stable path between the sender and the receiver. MQBM is a tree base protocol and QMMRP is used for both the tree based and mesh based protocol. Our review is based on how these two protocols provide better quality of service by increasing efficiency and performance in MANETS.

In the rest of the paper we have discussed about the mesh based protocol in section II. The tree based protocol in section III. The next covers QMMRP in section IV and MQBM in section V. At last section VI contains the conclusion and future scope.

II. MESH BASED ROUTING PROTOCOL

Multicast routing has received large amount of attraction and attention since the recent years. Routing process in MANETS is generally carried out through the intermediate nodes. In the Mesh based multicast routing protocol multiple packets are delivered between the source and the destination even if the wireless links break. The wireless links breaks due the redundant data or mobility in the networks. Mesh based routing protocol provides multiple paths between the sender and the receiver. The presence of multiple paths adds to the robustness of the mesh-based protocols at the cost of multicast efficiency [3]. Another advantage is the reliability for the multicast networks.

When a node needs to send the multicast packet it began to establish the multicast network that contains the forwarding nodes. These nodes are forwarded to the destination. One of the major drawback of the mesh based routing protocol is the high congestion that is caused by the scattering of same copies of the same packet through the mesh. It also causes increase in delay and the problem of limited bandwidth for multicast communication[2].Some of the examples of mesh based protocols are On Demand Multicast Routing Protocol (ODMRP) [5], Neighbor Supporting Adhoc Multicast Routing Protocol (NSMP) [6], and Dynamic Core-Based Multicast Protocol (DCMP) [7].

III. TREE BASED ROUTING PROTOCOL

Tree based routing protocol provides single feasible path between the source and the destination. Tree-based multicasting is a well-defined concept used for several multicast protocols to achieve better multicast efficiency. In tree-based protocol, there is only one path between the source-receiver pair. The main drawback of this is that they are not robust enough to operate in highly mobile environments [3]. Another advantage of it is the performance of the network resources. It provides better network resources. Usually the tree based routing protocol contains the least number of intermediate nodes. There are basically two categories of the tree based routing protocol i.e., source based routing protocol and the group shared based routing protocol. They are discussed as follow [2]:

In the source based routing protocol, each source generates the separate multicast tree. Each multicast tree contains the shortest path for the destination. So from this we can say that there are number of trees available for the number of sources. The number of trees increases for the sender-receiver pair as the number of sources increases. This increase of resources shows the scalability. Source based routing is less scalable since the bulkiness of the resources generates overhead. Overhead is considered as its disadvantage [2]. Some example of this category are as follow: Associatively-Based Multicast Routing Protocol (ABAM) and Multicast Routing Protocol based on Zone Routing (MZR) [8].

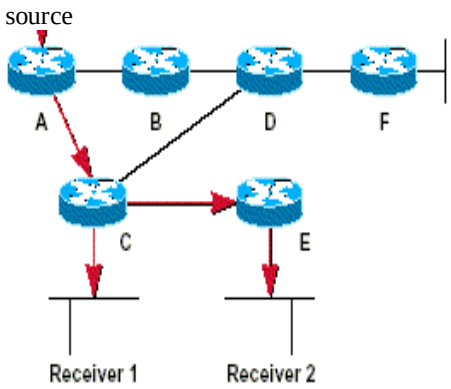

Figure2: Source based routing [4]

In the group shared based routing protocol, a single tree is maintained for each group of the multicast network that is shared by the source nodes. Shared-group based tree multicast protocols are much scalable as compared to source-tree-based multicast protocol. By scalability, we mean the ability of the protocol to work well without any degradation in performance when the number of sources increases in multicast network .In shared-multicast tree-based protocol, the increase in bandwidth is not as high as that of source-tree-based protocols because, even when the number of sources for multicast network increases, the number of trees remains the same. It reduces the overhead as it is allows formation of multiple source tree that was the major drawback of source based routing tree . From this we can say that information is transmitted in a unicast way to the first node and then it is transmitted to the group members in the multicast fashion. Most of the applications depends upon Group based routing protocol such as video conferencing, interactive television, temporary offices.[11] One of the major disadvantage of it is that it does not guarantee that the found path is optimal or not. Since the state information is maintained per group, the additional memory is required. Ad hoc Multicast Routing (AM-Route), Ad hoc Multicast Routing protocol utilizing Increasing id-numbers (AMRIS) and Multicast Ad hoc On-demand Distance Vector Protocol (MAODV) [9].

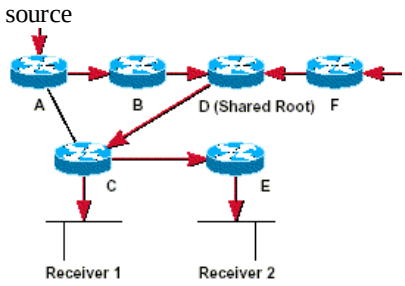

Figure 3: shared group based routing [4]

IV. QMMRP (QUALITY BASED MULTICAST ROUTING PROTOCOL IN MANETS)

QMMRP is the quality of service based protocol that provides better quality for multicast communication. It is used to handle much higher loads than that of the other protocols such as ODMRP (On demand Multicast routing protocol). Entropy of nodes is considered as its major parameter to provide a stable path for the transmission of information in the multicast network. It is advantageous as it provides better efficiency and increases the performance [1]. As QMMRP depends upon entropy of nodes and these nodes present in both the mesh based (in the form of several paths) and tree based protocol (from sender to the receiver).It also reduces the packet loss rate that is generally because of the low bandwidth. Therefore by reducing the packet loss rate it increases the quality of service of information transmitted between the network nodes. However it also helps in reducing the delay time that arises due to the network load. As it selects a stable link to transmit data along the network i.e., it reduces end to end delay [1]. The work of Zheng Sihai has experimentally shown this by comparing the result of QMMRP with the ODMMRP.

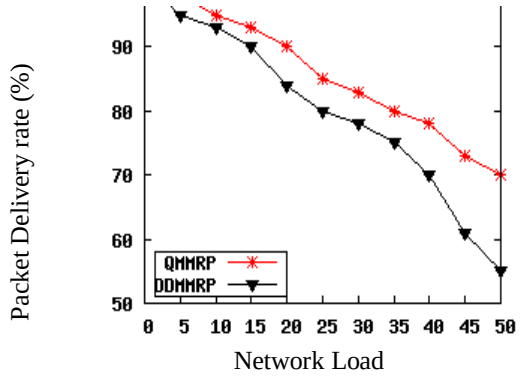

Figure4: Packet delivery rate and network load[1]

The given figure shows that the packet delivery rate of both the protocols decreases with the increase in velocity. Whereas the packet delivery rate of QMMRP is always higher than that of the ODMMRP [1]

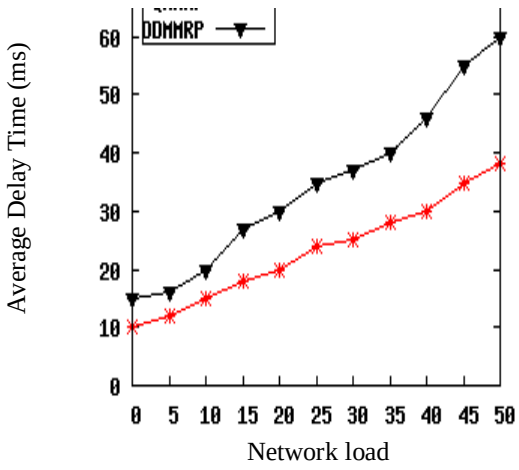

Figure5: Average delay and network load

The given figure shows that delay time increases with increase in the network load. From the figure it is clear that the average delay time taken by QMMRP is quite less than that of the ODMMRP.[1]

V. MQBM (AN AUTONOMIC QUALITY OF SERVICE MULTICAST ROUTING PROTOCOL FOR MOBILE AD HOC NETWORKS)

Another Quality of service based protocol is the MQBM. This protocol is inspired by that of the bees communication. Bees communication was discovered by the Australian scientist Karl Von frinch (1886-1982) [2]. He said that bees usually communicate in order to search for their food. This communication is based on the bees dance in order to locate their food. Bees perform scout dance when the food is very close and they perform waggle dance when it is in the range of 100m. After that the bees locate where the food actually is. Bees communication is shown as follow: [2]

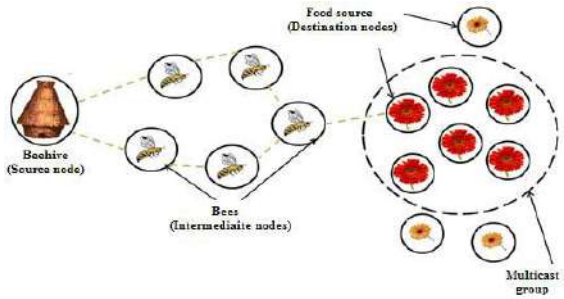

Figure4: Bees communicate for food [2]

Here beehive is considered as the source and food is considered as the destination. Bees swarm protocol is usually used as unicast protocol but here our concern is on the multicast routing. In which beehive is the source and destination nods are the multicast group members. These destination nodes are the food sources of the bees that are the flowers. The intermediate nodes lies between the area of source and destination is in the form of working flies [2].

MQBM quality based protocol is quality of service based protocol. It is on demand, adaptive and tree based protocol. MQBM is used to find route between the source and the head of the multicast group. Each group is allowed to transmit if it satisfy end to end delay and average bandwidth similar to that of the QMMRP . It also improves the efficiency and performance of the network. It is a bio inspired protocol which is inspired by the bees communication when the bees transmit signal to locate or search for their food. It also broadcast its message to its neighbors i.e. from one source to all it's destination [2].

In MANETS, MQBM serve as the quality of service based protocol. It is a reactive protocol inspired by behavior of bees. This protocol has two phases: the first step involves find the group members using the unicast or the multicast routing and then forward the packets to another nodes of the group members by the head of the group.[2]

Some similar feature of MQBM and QMMRP is that it reduces end to end delay, latency that may have arise due to load or limited bandwidth. It is used to increase the efficiency and performance of the multicast systems. Moreover the system become more reliable for transmitting the information.[2] Therefore both are used to provide multicast routing.

VI . CONCLUSION AND FUTURE SCOPE

QMMRP and MQBM are the quality based protocol for multicast network i.e. in tree and mesh. Here QMMRP entropy of nodes as its major parameter to provide better communication in multicast network. And MQBM is a tree based protocol, adaptive and reactive protocol with two phases where the first aim is to find the group members and the second aim is to distribute the packets among other members. Both the quality of service based protocols i.e., QMMRP AND MQBM can be used to include more QOS support and can be used to for study the speed of the mobile nodes and to evaluate more and more overhead. . This will provide a better

qos in multicast routing. Hence will increase the efficiency and performance of multicast network

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Sustainable Computing
A step leading to a Green Environment

Vinod Kumar
Assistant Professor
DAV College, Amritsar
malik.vinod2004@gmail.com

Milandeep Arora
Assistant Professor
DAV College, Amritsar
milandeep9@gmail.com

Girish Kumar
Assistant Professor
ACET, Amritsar
girishvansh@gmail.com

Abstract.-Green computing or green IT, refers to environmentally sustainable computing or IT. Green computing, also called green technology, is the environmentally responsible use of computers and related resources. Such practices include the implementation of energy-efficient central processing units (CPUs), servers and peripherals as well as reduced resource consumption and proper disposal of electronic waste (e-waste). This paper discusses why is green computing important It also talks about the best practices that can be followed to create a green computing environment. It discusses by modifying the work habits of computer professionals and computer users, the adverse impact on the global environment can very well be minimized. This paper also provides a case study of Infosys organization to demonstrate the paper savings done in this organization by providing the statistics.

Keywords: Green Computing, energy crisis, global environment, e-waste.

I. INTRODUCTION

Green computing is the study and practice of using computing resources efficiently. The goals are similar to green chemistry; that is reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste. Taking into consideration the popular use of information technology industry, it has to lead a revolution of sorts by turning green in a manner no industry has ever done before. It is worth emphasizing that this “green technology” should not be just about sound bytes to impress activists but concrete action and organizational policy. Opportunities lie in green technology like never before in history and organizations are seeing it as a way to create new profit centers while trying to help the environmental cause.

Green computing benefits the environment to a great extent. We have lot of green computing techniques which helps in reducing ***Carbon dioxide emissions*** such as Power-down the CPU and all peripherals during extended periods of inactivity. Try to do computer-related tasks during contiguous, intensive blocks of time, leaving hardware off at other times. Power-up and power-down energy-intensive peripherals such as laser printers according to need. Use liquid-crystal-display (LCD) monitors rather than cathode-ray-tube (CRT) monitors. Use notebook computers rather than desktop computers whenever possible. Use the power-management features to turn off hard drives and displays after several minutes of inactivity. Minimize the use of paper and properly recycle waste paper. Dispose of e-waste according to federal, state and local regulations. Employ alternative energy sources for computing workstations, servers, networks and data centers.

II. WHY GREEN COMPUTING?

In a world where business is transacted 24/7 across every possible channel available, companies need to collect, store, track and analyze enormous volumes of data everything from click. But this all comes with a cost to both businesses and the environment. Data warehouses and the sprawling data centers that house them use up a huge amount of power, both to run legions of servers and to cool them. In this Respect the main concern is, How much, a whopping 61 billion kilowatt-hours of electricity, at an estimated cost of $4.5B annually. The IT industry has begun to address energy consumption in the data center through a variety of approaches including the use of more efficient cooling systems, virtualization, blade servers and storage area networks (SANs). But a fundamental challenge remains. As data volumes explode, additional, appliance-centric data warehousing approaches can only continue to throw more hardware at the problem. This can quickly negate any green gains seen through better cooling or more tightly packed servers. To minimize their hardware footprint, organizations also need to shrink their "data footprint" by addressing how much server space and resources their information analysis requires in the first place. A combination of new database technologies expressly designed for analysis of massive quantities of data and affordable, resource-efficient, open-source software can help organizations save money and become greener. Organizations can do so in the following three key areas: ***reduced data footprint***, ***reduced deployment resources*** and ***reduced ongoing management & maintenance***.

III. CURRENT ISSUES AND BEST PRACTICES TO SOLVE THE ISSUES

Techniques used for manufacturing computers and packaging computers cause pollution. Pollution is caused by the disposal of computers and its related components. Toxic chemicals like lead, mercury and chromium are used in computer manufacturing. These toxic wastes might cause destruction by entering into the food chain.

Parts taken from outdated systems can be recycled by private

or municipal recycling centers or with the help of certain retail outlets. Harmful materials like lead, chromium and mercury can be kept further energy and emissions by replacing the equipments that otherwise would have to be manufactured newly. Before recycling the equipment, users should take care that they physically destroy the hard drives or store them somewhere safe. Authorized hardware recycling companies are available to whom we can give our computers for recycling and a non-disclosure agreement is signed by them.

PCs consume power in active and inactive states. Serious effort must be taken to minimize the power consumption. Today's desktop computers have the capability of automatically transitioning to a hibernate state or sleep mode when inactive. But 90 percent of the computers have this function disabled. Make it a point to switch ON the Power management features in your computer. Enable stand by / sleep mode in your computer.

Power management features should be used to turn OFF hard drives when not required. Peripherals which consume more energy should be powered ON / OFF according to the need. There are programs available using which voltages supplied to the CPU can be adjusted by users manually. This reduces the amount of heat produces and also the electricity consumed. This process is called "Undervolting".

A tree is said to absorb between 3 to 15 pounds of CO_2 every year. When a single computer is switched ON for 24 hours a day, it is said to dump 1,500 pounds of CO_2 into the atmosphere. Thus 500 trees per year are required to offset the emissions of one computer that was kept ON all the time. Hence the best practice is, computer users must use energy efficient CPUs, peripherals and servers. Multicore chip efficiency can very well be used to build new high end servers. Switch off the monitors/ Power down the CPUs when they are idle. Switch off the computer in the night. Don't regret to switch off your computer when it is unused. A computer can handle 40,000 on/off cycles which is significantly more in number compared to the number of cycles that will be initiated during the computers 5 to 7 years life time.

Smaller hard disk drives consume less power per gigabyte than physically larger drives. Data gets stored in flash memory or DRAM for solid-state drives unlike the hard disk drives. There might be reduction in power consumption for out of landfills by recycling computing equipments. Recycling also saves low capacity flash based devices, since solid state devices do not have moving parts.

Better to switch off the monitors, when not in use, rather than using the screen savers. Screen savers save energy only if the backlight in laptops is turned off. Use dark background for monitor screen. Bright displays consume more power.

Try to prolong equipments lifetime. Look for product longevity, including upgradability and modularity. Computer systems that had been used for many years and outlived their max age can be donated to non-profit organizations and charities or recycled.

Light level in the room where computers are used, must be reduced.

Using LCD monitors are better than using CRT monitors. LCD monitors, in ON mode, uses on average 50 to 70% less energy compared to CRT (Cathode Ray Tube) monitors. A Cold-cathode fluorescent bulb is used in LCD monitors to provide light for the display. Amount of electricity used can be reduced when we use light-emitting diodes (LEDs) for display instead of fluorescent bulbs. Smaller monitors consume less energy compared to the big ones. (Example. 14 inch monitor consumes less energy compared to a 17 inch monitor). Average energy consumption of a 17 inches CRT monitor is 70 watts which is very high compared to the energy consumption of a 17 inches LCD monitor which is around 35 watts.

Laptop uses less energy compared to the desktop computers. Compared to desktop computers, it is better to use Notebook computers. Approximately 280 watts of power is consumed by our traditional desktop computers as compared to 30 watts of power consumed by certain thin clients in the same time frame which yields an energy saving of 90% nearly. A concept of users working with a terminal connected to a central server can be setup. All computing is done in the server, but the end user experiences the operating system on the terminal. When combining these with thin clients, there will be a reduction in energy consumption and costs since it uses up to 1/8 the amount of energy of a normal computer.

Network connections are lost when computers are put in sleep mode /low-power/sleep. Nowadays computers are designed to sleep without losing the network connection and without losing any data. CPUs with Wake on LAN (WOL) technology can receive data packets even though they are left in sleep mode throughout the night.

Surge protector with a master control outlet is available into which computers could be plugged. This automatically senses whether the computer is in use or not. If the computer is unused, it cuts power to the computer and its peripherals.

Bio-plastics are form of plastics obtained from renewable biomass sources like vegetable oil, corn starch etc. We can replace petroleum filled plastics with bio-plastics. Bio-plastics computer cases are built nowadays which keeps the computers cool protecting from electronics melting them.

RoHS (Restriction of Hazardous Substances Directive) is a standard that emphasizes on banning the use of hazardous substances in computer manufacturing. Many new electronics in the market are meeting this standard. Try to buy equipments meeting these type of standards which uses less toxic materials and more recycled components

Go for "Cloud Computing". Cloud computing typically replaces hardware with virtual servers. Organizations are benefitted because of this since their needs to have energy consuming servers are reduced by relocating them on the internet. In Cloud computing system, tasks are assigned through a combination of connections, service and software over a network. These connections collectively are known as 'the cloud'. Organizations have the benefit of using an enormous infrastructure without the need to implement and manage them directly. Multiple data centers can be accessed across the globe. Cloud computing helps us in reducing the number of hardware components to be used by replacing them with cloud computing systems. This setup lowers energy costs for running hardware and cooling required for the equipments. Thus the amount of CO2 emissions is reduced. Thus one need to have only one small and inexpensive computer, monitor and processor. Hard drives, Cd / DVD drives are not required.

Using an internet connection, the user having this small computer gets connected to a central super computer which will help in hosting all the required programs and files. Due to this storage and security issues are minimized and lifespan of your computers also increases. This setup has multiple servers. Incase of one server going down, the users can connect to another server and get their job done in few minutes.

Paper usage can be minimized and waste paper should be recycled properly. Recycled-content paper can be used for printing. Take printouts only when really necessary. E-mail communications can be used as an alternative. Double-sided printing functions must be used. Documents and other emails can be reviewed online rather than printing them out. We are going to see some statistical data from Infosys scenario shortly in this paper.

Ink jet printers are slower than laser printers but ink jet printers consume 80 - 90 % less energy compared to the laser printers. A conventional laser printer might use 100 watts or more while printing and much less while idling in "sleep mode". An ink jet printer uses 12 watts while printing and around 5 watts while idling. Non-petroleum-based inks that are made from renewable resources can be bought. They require fewer hazardous solvents and produce cleaner, brighter colors. Put the printers on a network and share them whenever possible

A multi-function device (MFD) which is all-in-one device can be used. Combination of all the required items line printer, scanner, fax machine, etc is what an MFD is all about. This machine will use less than 50% of the energy of a separate scanner + printer + fax machine + copier. Organizations using separate pieces of equipment can replace their separate equipments with this multi-function device.

Telecommuting and video conferencing for conducting meetings / trainings are advantageous. It helps in decreasing the amount of greenhouse gas emissions related to travel. It also increases profit margins for the organization as a result of low overhead costs for lighting, office space, heat, etc.

Example 1: By using such tools one can find out the energy consumed by the laptop.

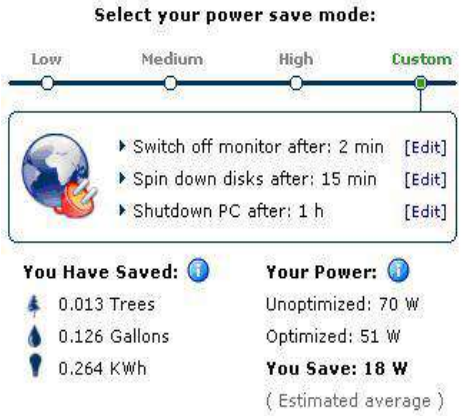
It shows the Laptops configuration and the power required for the monitor, hard drives, CPU, etc

Power management settings in the laptop which, when adjusted, can be more beneficial. The tool shows various power management options. The tool which is used for collecting statistics has 4 categories – Low, Medium, High and Custom.

If the category is set to 'High', it will have more optimal usage of power and hence more optimal saving of energy costs for the Laptop. One can also perform 'Custom' setting. One of such custom setting is shown below wherein the values are set as shown in below figure.

Once set, it can show the settings as follows

With this setting on august 18, 2010, one laptop is left unused at around 2.25 PM. As per the power settings, it got switched off automatically at 2.27 PM. When started the laptop after 15 minutes, around 2.40 PM, the power usage was shown as follows:

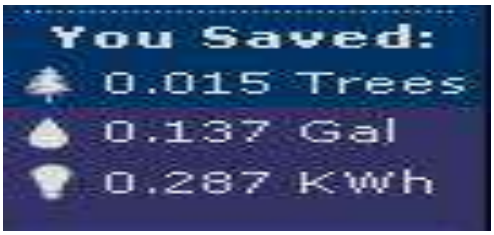


Thus, the savings is displayed on screen which can motivate computer user towards "go green" concept. As depicted in the above snapshot, the water saving was 0.004 gallons (0.126 – 0.122) and power saving was 0.010 kwh (0.264 – 0.254).Like this, every person should proactively put lots of effort to reduce the power usage.

Example 2: When you switch off your computer, energy consumption is reduced and heat stress and wear on the computer is lowered

Using the Schedule, the energy can be saved such as on **Aug 18, 11.52 PM (Laptop switched off at this time)**

Aug 19, 5.36 AM



(Laptop switched on at this time

The above statistics shows that, when monitor is switched off in the night for around 5 and ½ hours, 0.204 kwh saving is achieved. Please take care that you do not keep your laptops/computers 'ON' unnecessarily in the night. Switching OFF your monitors/computers or laptops in the night will yield a major role in the annual energy savings Example 3 : Infosys has the world's largest education center in Mysore DC, called as Global Education Center (1 and 2). We have collected the details of trainee strength only in Mysore DC for last 5 months. Here, by considering on an average 50 slide per session and at least 15 session days in a month per batch, 750 paged course materials which has the hard copies of the slides only should be given to every trainee. Considering the total trainee strength and on an average 170 paged course material, how many pages would have to be used in printing the course material for every trainee is calculated and shown in the below table. Along with that it also shows if double side printing, as suggested by green computing, is followed how many pages would be required. But since Infosys shares the soft copies of these materials with the trainees, the organization was able to save the totals pages that would have been required for the course material printing.
The same is represented in the form of graph.

IV. CONCLUSIONS

Creating a green computing environment not only helps the environment but it is highly beneficial for the organization in reducing the energy costs. Creating a green environment is a win-win situation for the organization by minimizing the energy costs as well as the environment since the carbon emission is minimized. Computer professionals can very easily adopt the work habits suggested in the best practices part. By modifying the work habits of computer professionals and computer users, the adverse impact on the global environment can very well be minimized.

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A Survey of Mitigating Techniques for Wormhole Attack in Wireless Sensor Networks

ANU SHARMA
DEPARTMENT OF COMPUTER SCIENCE
GURU NANAK DEV UNIVERSITY,
REGIONAL CAMPUS, JALANDHAR
Anusharma91@ymail.com

AANCHAL SHARMA
DEPARTMENT OF COMPUTER SCIENCE
GURU NANAK DEV UNIVERSITY,
REGIONAL CAMPUS, JALANDHAR
Aanchalsharma14@gmail.com

Abstract-The wireless sensor network is the collection of sensor nodes which collect information from the environment that can be the building, industrial, battle field or elsewhere. Due to the wireless nature of the sensor nodes they are prone to various attacks like wormhole attack, gray hole, packet flooding, sinkhole attack, black hole attack, sync attack, Sybil attack. Wormhole attack is a severe threat against wireless ad hoc and sensor networks. It can be launched without compromising any legitimate node or cryptographic mechanisms, and often serves as a foundation for many serious attacks. In this paper, attempt to understand the impact and inevitable symptom of wormholes is made and surveys the various wormhole detection and prevention methods in wireless sensor networks which have been discussed or implemented so far.

Index Terms—Wormhole attack, Wireless sensor networks

I. INTRODUCTION

Wireless Sensor Network [1] is a self-configuring network made up of small sensor nodes of size 35mm approx. consisting of radio ,sensors, battery and a minimal amount of on board computing .These communicate among themselves using radio signals, and deployed in quantity to sense, monitor and understand the physical world. The nodes self-organize their networks, rather than having a pre-programmed network topology. Because of the limited electrical power available, nodes are built with power conservation in mind, and generally spend large amount. The wireless sensor nodes are called motes. Motes that have computational capabilities, sensing capabilities and communication capabilities. The major challenge in the field of wireless sensor technology is the energy consumption along with good bandwidth. This issue requires innovative design techniques to use the available bandwidth and energy efficiency.[10].Wormhole attack is a special kind of outside attack, which can result in severe damage to the functions and structure of WSNs, especially to the routing scheme .In the wormhole attack, an attacker tunnels messages received in one part of the network over a low latency link and replays them in a different part. The simplest instance of this attack is a single node situated between two other nodes forwarding messages between the

two of them. However, wormhole attacks more commonly involve two distant malicious nodes colluding to understate their distance from each other by relaying packets along an out-of-bound channel available only to the attacker. An wormhole. An attacker could convince nodes who would normally be multiple hops from a base station that they are only one or two hops away via the wormhole. This can create a sinkhole: since the attacker on the other side of the wormhole can artificially provide a high-quality route to the base station, potentially all traffic in the surrounding area will be drawn through if alternate routes are significantly less attractive. This will most likely always be the case when the endpoint of the wormhole is relatively far from a base station[2].It is dangerous attack as it is independent of MAC layer protocols and is immune to the cryptographic techniques. It is hard to detect because communication medium between the two bad nodes are unknown.

- Control and verify hop count. This limits the self-organizing criteria of an ad-hoc network.
- Use protocol that is not based on hop count. In geographic routing, a route is based on coordinates of intermediate nodes. But if adversary nodes can mimic its location, this doesn't work.

The wormhole attack will also affect connectivity-based localization algorithms and protocols based on localization, like geographic routing, will find many inconsistencies resulting in further network disruption. Wormhole attack is a great as it could be performed even at the starting phase during the sensors initializes to identify its neighboring information [3]. This Wormhole attacks are very difficult to stop since routing information given by a sensor node is very difficult to check. The wormhole attack is possible even when the attacker has not compromised with any hosts nodes and even if all communication provides confidentiality and are authenticated also. [4]

. This paper is organized as following. Next section covers the wormhole manifestation techniques which is categorized into wormhole attack modes and classification of wormholes .This section is followed by the the list of research work done in detection and prevention of wormhole attack in wireless sensor networks. Next section summarises various mitigation techniques and represent the gap areas in tabulated form. This section is followed by the various open issues in the field of wormhole attack mitigation measues and lays the foundation for the future scope.

II. WORMHOLE ATTACK MANIFESTATION

Under wormhole attack manifestation,wormhole attack modes and classification of wormhole attack is discussed

A.Wormhole attack modes

Wormhole attacks are classified based on their implementation technique or attack modes. [5]

Wormhole using Out-of-Band Channel

In this mode, the wormhole attack is launched by having high-quality, single-hop, out-of-band link between the malicious nodes. This tunnel can be achieved by using a direct wired link or a long-range directional wireless link. This mode of attack is more difficult to launch than the packet encapsulation method since it needs specialized hardware capability.

Wormhole using Packet Encapsulation

In encapsulation-based wormhole attacks, several nodes exist between two malicious nodes and the data packets are encapsulated between the malicious nodes. Since encapsulated data packets are sent between the malicious nodes, the actual hop count does not increase during the traversal. Hence, routing protocols that use hop count for path selection are particularly susceptible to encapsulation-based wormhole attacks.

Wormhole using High Power Transmission

In this type of wormhole attack, only one malicious node with high-power transmission capability exists in the network and this node can communicate with other normal nodes from a long distance. When a malicious node receives an RREQ, it broadcasts the request at a high-power level. Any node that hears the high-power broadcast rebroadcasts the RREQ towards the destination. By this method, the malicious node increases its chance to be in the routes established between the source and the destination even without the participation of another malicious node.[17]

Wormhole using Packet Relay

Packet-relay-based wormhole attacks can be launched by one or more malicious nodes. In this attack type, a malicious node relays data packets of two distant sensor nodes to convince them that they are neighbors. This kind of attack is also called "replay-based attack" in the literature. Cooperation by a greater number of malicious nodes serves to expand the neighbor list of a victim node to several hops.

Wormhole using Protocol Deviation

The malicious node creates wormhole by forwarding packets without backing off unlike a legitimate node and thus, increases the possibility of wormhole path getting selected.[3] The purpose is to let the request packet it forwards arrive first at the destination.[18]

B. Wormhole Attack Classification

The classification of such an attack facilitates the design of prevention and detection methods. According to whether the attackers are visible on the route, we classify the wormholes into three types: closed, half open, and open .There are three types of wormhole attack.

*Open Wormhole attack***:** In this type of wormhole, the attackers include themselves in the RREQ packet header following the route discovery procedure. Other nodes are aware that the malicious nodes lie on the path but they would think that the malicious nodes are direct neighbors.

Closed Wormhole Attack **:** The attackers do not modify the content of the packet, even the packet in a route discovery packet. Instead, they simply tunnel the packet form one side of wormhole to another side and it rebroadcasts the packet.

*Half open wormhole attack***:** One side of wormhole doe not modify the packet and only another side modifies the packet, following the route discovery procedure.[18]

III. RELATED WORK

In recent years, security in wireless sensor networks is more and more important [6], so a lot of studies are solving the security issues. Wormhole attack is a famous external attack in wireless sensor networks [7]. There are several methods to work against wormhole attack in wireless sensor networks. Most researchers studied wormhole attack on ad-hoc networks, not sensor networks. Some use centralized schemes and others may require additional hardware. Most approaches are not suitable for distributed sensor network environments. Therefore, a novel decentralized solution is needed to solve the wormhole problem in sensor networks.[14] We explore current approaches and classify these studies.

TIAN Bin and LI Qi[8] proposed used neighbor discovery and k-means cluster to determine the true neighbors and the fake neighbors. And the experiment showed our method can achieve satisfying result.It provides method to detect wormhole attack called time-based cluster wormhole detection protocol. Fan-rui kong,

Chun-wen LI[9] proposed that WAPN is a distributed approach based on the observation that a sensor node affected by a wormhole usually suffers a sharp increase in its neighboring- node-number due to the attacking tunnel, which can lead two nodes located more than one hop away into believing that they are immediate neighbors.

Kuldeep Kaur, Vinod Kumar & Upinderpal Singh[10] the proposed solution node authentication using the digital signature. In this algorithm the authentication is provided at each sensor node in the packet header which is forward from source to destination. Only the authenticate nodes can communicate in wireless sensor network. Using this authentication procedure we can detect the malicious nodes which causes the wormhole attack.

Zaw Tun and Aung Htein Maw[3] This proposed mechanism consists of three phases. The first phase is to construct neighbor list for each node and the second phase is to find the route between sources to destination node. After that it finds the location of wormhole link to make any necessary action.

Dezun Dong, Mo Li, Yunhao Liu[11] proposed design goal that rely solely on network connectivity information to detect and locate the wormholes. they focussed their study on a fundamental view on the multihop wireless network topologies, aiming at catching the topological impact introduced by the wormhole.

Yurong Xu , Guanling Chen, James Ford, Fillia Makedon [12] proposed wormhole geographic distributed detection (WGDD) algorithm uses a hop counting technique as a probe procedure. After running the probe procedure, each network node collects the set of hop counts of its neighbor nodes that are within one/k hops from it. (The hop count is the minimum number of node-to-node transmissions to reach the node from a bootstrap node.) Next,the node runs Dijkstra's (or an equivalent) algorithm to obtain the shortest path for each pair of nodes, and reconstructs a local map using multidimensional scaling (MDS). Finally, a diameter feature is used to detect wormholes by identifying distortions in local maps]

Dezun Dong,Mo Li[13] proposed wormhole detection algorithm that was motivated by an observation that a legitimate multihop wireless network deployed on the surface of a geometric terrain while the wormholes in the network inevitably change the network connectivity topology, resulting in some forbidden structures that is called wormhole circles. This method locates the wormhole by identifying wormhole circle.

Gu-hsin lai, chen-sen ouyang and chia-mei chen [14] In this paper, authors assumed that the topology of the sensor network is static, that the links between sensors are bidirectional, and that secure communication between two sensors exists in the network. Each sensor is equipped with its group location before deployment and the deployment distribution of the sensors in one group follows Gaussian distribution. All the group locations are pre-determined and standard deviation is assumed to be able to be estimated in advance.

P. Hemalatha[15] In this paper, the wormhole attack made by the malicious attacker in sensor networks has been implemented and also the number of Guard nodes required has been decided and implemented. Functions of the guard nodes like local inter-node collaborative data fusion and decision fusion to detect, isolate and prevent any further attacks is to be implemented. Simulations have been performed under different scenarios and from the results of simulation .Theyhave observed that our scheme is capable of improving the security in resource constrained wireless sensor networks.

KashyapmPatel , and Mrs.T.Manoranjitham [16] proposed paper that is about implementation and detection of wormhole attack in wireless sensor network. Advantage of Wormhole attack is to hack any useful data packet and perform changes on those data packet. So based on simulation results shows that wormhole attack is detected based on packet reception ratio, packet dropped ratio, and throughput. In this paper author has number of packets decrease exponentially. so wireless sensor network can be secure using the results and wormhole attack can be prevented.

Nishant Sharma1, Upinderpal Singh [17] proposed technique that detects wormhole attack based on location information of nodes and uses Euclidean distance formula which gets the shortest distance between two nodes will improve packet forwarding and make the transmission of packets between nodes more secure and reliable. During route discovery procedure in AODV, routing table is generated at each node which describes the path with less hop counts. This is used by malicious node to attack the sender node and disrupt packet forwarding. For two nodes, with node A with coordinates (x1, y1) and node B with coordinates (x2, y2), the Euclidean distance is given by$((x1 - x2)^2 + (y1 - y2)^2)^{1/2}$. This helps in locating wormhole attack nodes by providing exact location of neighbour nodes with their x-position and y-position and the distance between them when the whole area of sensor nodes follows a grid type pattern. Thus when location information and shortest distance between them is available to the communicating node between them, it does not packets to the malicious nodes and save the packets from being accessed by the malicious attacker.

Buch, Dhara,Jinwala, Devesh[19] proposed approach that is based on the analysis of the two-hop neighbors forwarding Route Reply packet. To check the validity of the sender, a unique key between the individual sensor node and the base station is required to be generated by suitable scheme.

Khan, Z.A., Islam, M.H. [20] , In this paper authors focused on wormhole attack and proposed distributed network discovery approach to mitigate its effect. According to the simulation this approach can mitigate almost 100% of wormhole attack overload in the environment where 54% of nodes are affected with the wormhole.

IV. SUMMARY OF MITIGATION TECHNIQUES

Based on the literature survey that has been discussed in the above section, the summary of the mitigation techniques has been tabulated. In this table major gap areas for the same has been filtered.

PROTOCOL\ ALGORITHM	***DESCRIPTION***	***REMARKS***
Detecting wormhole attacks In wireless sensor networks. Yurong xu, guanling chen (2008)	Wormhole geographic distributed detection algorithm uses hop count and dijkastra algorithm to detect wormhole attack.	As the accuracy of detecting wormhole attacks is increased, but the likelihood of false alarms is increased. Does not require hardware.
WormCircle: Connectivity-based Wormhole Detection in	Wormholes in the network inevitably change the network connectivity topology, resulting in some forbidden structures that is	The major challengeso f this design lie in how to

PROTOCOL\ ALGORITHM	*DESCRIPTION*	*REMARKS*
Wireless Ad Hoc and Sensor Networks By Dezun Dong,Mo LI 2009	called wormhole circles. This method locates the wormhole by identifying wormhole circles.	explore the Local impacts caused by wormhole to characterize wormholes.
WAPN: a distributed wormhole attack detection approach for wireless sensor networks By Fan-rui KONG, Chun-wen LI, ,2009.	WAPN, based on the observation that a sensor node affected by a wormhole usually suffers a sharp increase in its neighboring-node-number due to the attacking tunnel, which can lead two nodes located more than one hop away into believing that they are immediate neighbors.	Strong cryptography and encryption algorithm is required so that data in the packet is not distorted. Its performance improves as node redundancy increases WAPN is scalable. WAPN becomes more accurate as the scale of the netwok increases.
Topological Detection on Wormholes in Wireless Ad Hoc and Sensor Networks By Dezun Dong, *Member,* MoLi.,2011.	Classify wormholes into categories based on impact on topology and captures fundamental topology deviations and thus locates the wormholes.	It only works well where node densities are fair. It does not work on non-continuous geometric surface.
A ranging based scheme for detecting the wormhole attack in wireless sensor networks" by Tian Bin, Li Qi, Yang Yi-Xian, Li	Time-based cluster wormhole detection protocol is used.	Does not work well if the topology of the sensor networks is dynamic. Applicable to layered architecture

PROTOCOL\ ALGORITHM	*DESCRIPTION*	*REMARKS*
Dong, Xin Yang,2012.		of network.
Detection of Wormhole Attack in Wireless Sensor Networks By Kuldeep Kaur, Vinod Kumar & Upinderpal Singh	In this algorithm the authentication is provided at each sensor node in the packet header which is forward from source to destination. Only the authenticate nodes can communicate in wsn.	Need for authenticating each node using digital signature
A Group-Based Deployment for Wormhole Prevention In Sensor Networks By Gu-hsin lai, chen-sen ouyang and chia-mei chen(2011)	In this group based deployment technique ,authors assumed that the topology of the sensor network is static, that the links between sensors are bidirectional, and that secure communication between two sensors exists in the network. Each sensor is equipped with its group location before deployment and the deployment distribution of the sensors in one group follows Gaussian distribution. All the group locations are pre-determined and standard deviation is assumed to be able to be estimated in advance	The lower the standard deviation is, the better the connectivity of proposed approach. The connectivity is also acceptable (97.819%), even when the standard deviation is high. Hardware support is not required. Minimises the damage caused by the wormhole and aims at preventing wormhole attack.
P.Hemalatha, " Detecting and Preventing Wormhole Attacks In Wireless Sensor Networks(2013)	In this paper, the wormhole attack made by the malicious attacker in sensor networks has been implemented and also the number of Guard nodes required has been decided and implemented. Functions of the guard nodes like local inter-node	It detects ,isolate and prevent the attacks. It is capable of improving the security in resource constrained

PROTOCOL\ ALGORITHM	*DESCRIPTION*	*REMARKS*
	collaborative data fusion and decision fusion to detect, isolate and prevent any further attacks is to be implemented.	wireless sensor networks.
Detection of Wormhole Attack In Wireless Sensor Network By KashyapmPatel , and Mrs.T.Manoranjitham (2013)	Wormhole attack is detected based on packet reception ratio, packet dropped ratio, and throughput. Here number of packets are decreasing exponentially. so wireless sensor network can be secure using these results and wormhole attack can be prevent	Provides Higher Level Security in wireless sensor attacks.
Various Approaches to Detect Wormhole Attack in Wireless Sensor Networks By Nishant Sharma1, Upinderpal Singh (2014)	Various wormhole detection mechanisms and various methods suggested to detect and prevent wormhole attack and mitigate its effects has been discussed and proposed a new method.	Prevents the relay of packet to malicious nodes and protects it from attacker.

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V. OPEN ISSUES AND FUTURE SCOPE

Considerable efforts have been done to overcome wormhole attack as discussed in previous section but still there is a lot of scope for further improvement leading to development of more efficient algorithm for wormhole detection and prevention has been discussed below.

- Resource constraints: Usually,the Intrusion detection system are installed on powerful computers like mainframes on which they can operate efficiently. However, in WSN this is not possible because of the resource constrained sensors in terms of computation, memory and power consumption. Since WSN is composed of numerous number of tiny and cheap sensors and these sensors has very limited power, limited storage capacity, limited memory, limited power processing capability and limited signal bandwidth, it makes it very difficult to design an effective intrusion detection system.
- Dynamic topology change: The continuous change in topology because of the movement of the sensor in some WSN applications makes it difficult for the detection system to cope up with this dynamic change.
- Hardware Cost: Some approaches employ specialized hardware devices, such as GPS, directional antennas or special radio transceiver modules , which introduce significant amounts of extra hardware costs for the systems.Other types of approaches are based on ideal assumptions, such as global tight clock synchronization , special guard nodes, attack-free environments , or unit disk communication models. These requirements and assumptions largely restrict their applicability in networks composed.
- Security: Some threats can be countered by encryption ,cryptography and authentication. But still security of wireless sensor network remains an intensive studied field.

VI. CONCLUSION

The wormhole attacks detection methods are made to detect and prevent this attack mainly depends on the accurate determination of the neighboring information. Most of the detection methods considers neighbor case of the node in order to detect and prevent wormhole attack. The counter measures for the wormhole attack can be implemented at different layers. For example, directional antennas are used at the media access layer to defend against wormhole attacks, and packet leashes are used at a network layer. Since current wormhole detection methods are imperfect, a sensor node will have a lot of false neighbors under large scale wormhole attacks. Having many false neighbors often causes trouble for many protocols. Some more efforts are required to make the accurate neighbor discovery protocols in the detection and isolation of wormhole attacks

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A survey on the Caching Techniques in Asp.Net Technology

Balram Singh Yadav
Assistant Professor
DAV College, Amritsar
balram4056@gmail.com

Abstract- ***Web programming is a fast changing field where new technologies and software offer better ways to design and develop powerful web solutions. A recent addition to web development technology is the .NET frame work from Microsoft. Microsoft's .NET technology is a programming architecture for designing and implementing web based applications and services. Under the .NET framework, ASP.NET is the environment for running web applications developed using one of the many .NET programming languages. The way an ASP.NET web application is developed and run is very different from the traditional ASP. In this paper, a we have study the how the caching technique done in .net technology. In asp.net we have various type of caching which applied on web site. Website are the online web based application which run over the internet. A .NET application is a set of assemblies developed or reused by programmers, and tested together for correctness and performance. Caching apply on the website make it fast as compare to other website without cache.***

Keyword : Caching, Proxy caching, Web server Caching, Data caching, Partial Caching

I. INTRODUCTION

When you developed a site for a large number of users. Larger number of client means larger number of requests to your web server and heavy load on the network causing performance issue. Also when web page request a database access. Opening a database connection and retrieving data is slow operation. The best way to improve the performance of your data access code is not to access the database at all. By taking advantage of caching, you can cache your database records in memory. Retrieving data from a database is slow. Retrieving data from the cache, on the other hand, is lightning fast. In this paper, I talk about different caching mechanisms supported by ASP.NET Framework, which provides us an overwhelming number of caching options. I try to clarify all these caching options. Performance is the key requirement of any application. Caching is the important technique to helps in the performance of application. Caching is the process of storing frequently used data on the server to fulfill subsequent requests. Reusing pages from memory is much faster than re-creating pages every time they are requesting. Caching increases your application's performance, scalability and availability. Caching has been viewed as an effective way to scale up Web sites and is generally used in all distributed information systems to reduce network traffic and improve response time for end users. Particularly, caching is important in the World Wide Web since the number of users on the web is increasing exponentially. Nowadays, users prefer to use customized and dynamic content. In contrast to static html pages, dynamic content is generated by web servers as answers to users' requests. The rate, at which page generation occurs, depends on the resource load placed upon the server by scripts running (such as ASP.NET, JSP, and PHP). These scripts require values of various parameters (e.g. article identifier) as well as necessary data from various sources (e.g. database servers) in order to create a html page, which may be returned to the user as an answer to their request. Although the dynamic content was very rare ten years ago, it has become the standard for web servers, especially in ecommerce area. In ASP.NET, caching is implemented as an HttpModule that listens to all HttpRequests that come through the ASP.NET worker process.In this paper we discuss various caching techniques including the new SQL Invalidation caching capabilities and Post-cache substitution feature. We will throw some light on custom cache dependencies.

II. DIFFERENT CACHING LOCATIONS

Caching in a web application can be done either on the client side (client browser), in between the client and the server (proxy and reverse proxy caching), or on the server side (data caching/page output caching). So we can classify caching locations like this[1]:

- Client Caching
- Proxy Caching
- Reverse Proxy Caching
- Web Server Caching

CLIENT CACHING

In Client Caching, the client browser performs caching by storing cached data on the local disk as a temporary file or in the browser internal memory. This provides quick access of some information which reduces the network load and the server load also. This information can't be shared by other clients so it is client specific

Fig. 1 Client caching

PROXY CACHING

The main disadvantage of client caching is data that is stored on the client browser is client specific. Proxy caching uses a dedicated server that stores caching information in between the client and the web server in a shared location so that all clients can use the same shared data. The proxy server[2] (e.g., Microsoft Proxy Server) fulfills all the requests for the web page without sending out the request to the actual web server over the internet, resulting in faster access.

Fig. 2 Proxy caching

Proxy caches are often located near network gateways to reduce bandwidth usage. Some times multiple proxy cache servers are used for larger number of clients. This is called a cache array.

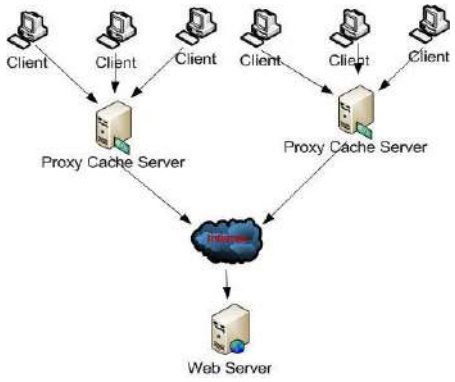


Fig. 3 Cache array

REVERSE PROXY CACHING

Some proxy cache servers can be placed in front of the web server to reduce the number of requests that they receive. This allows the proxy server to respond to frequently received requests and only pass other requests to the web server. This is called a reverse proxy.

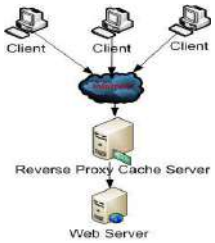


Fig. 4 Reverse proxy caching

WEB SERVER CACHING

In web server caching, cached data is stored inside the web server. Data caching and page caching uses the web sever caching mechanism.

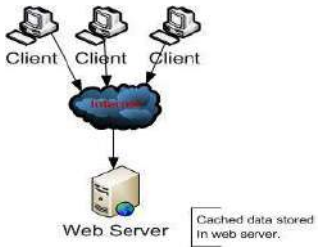


Fig. 5 Web server caching

ADVANTAGES

- Reduce hosting server round-trips
- Reduce database server round-trips
- Reduce network traffic
- Avoid time-consumption for regenerating reusable content
- Improve performance

III. METHODS OF CACHING

caching is generally used to catch frequently accessed data. When u used catching at that time u have to depend upon certain variables like parameter, time etc. But one demerit of using catching is if your using dynamic page at that time u will unable to get the updated value. We can deal with caching in several ways. Different caching methods are given below[3]:

- Output Caching
- Partial Page Caching
- Data Caching

OUTPUT CACHING

Output Caching is a way to keep the dynamically generated page content in the server's memory to fulfill future requests. You apply output caching by inserting an OutputCache page directive at the top of an .aspx page as shown below.

<%@ OutputCache Duration="60" VaryByParam= "None" %>

The Duration attribute defines the number of seconds a page is stored in memory.

Attributes of Output Caching

The VaryByParam attribute determines which versions of the page output are actually cached. You can generate different responses based on whether an HTTP-POST or HTTP-GET response is required. You can also cache different responses

based on different attributes like VaryByHeader, VaryByCustom, VaryByControl.

The VaryByParam attribute can specify which QueryString parameters cause a new version of the page to be cached.

<%@ OutputCache Duration="60" VaryByParam = "EmpidID;CategoryID" %>

If you want to cache a new version of the page based on any combination of parameters, you can use VaryByParam ="*", as shown below

<%@ OutputCache Duration="60" VaryByParam = "*" %>

- VaryByControl

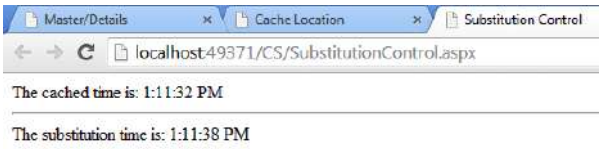
VaryByControl can be easy way to get good performance from complex user controls that render a lot of HTML that doesn't change often. For example, imagine a User Control that renders a Combo Box showing the names of all the countries in the world. Certainly, the names of countries don't change that often. So you can set cache based on this user Control where duration attribute can be set to say one fortnight.

<%@ OutputCache Duration="1296000" VaryByControl="drpdownCountries" %>

PARTIAL PAGE CACHING

Partial Page Caching to cache particular regions of a page. Partial Page Caching makes sense when a page contains both dynamic and static content. For example, you might want to cache a set of database records displayed in a page but not cache a random list of news items displayed in the same page. In this section, you learn about two methods for enabling Partial Page Caching. You can use post-cache substitution to cache an entire page except for a particular region. You can use User Controls to cache particular regions in a page, but not the entire page.

Using Post-Cache Substitution: In some cases, you might want to cache an entire page except for one small area. For example, you might want to display the current username dynamically at the top of a page but cache the remainder of a page. In these cases, you can take advantage of a feature of ASP.NET Framework called post-cache substitution. Post-cache substitution is used internally by the Ad-Rotator control. Even when you use Page Output Caching to cache a page that contains an Ad-Rotator control, the content rendered by the Ad-Rotator control is not cached. You can use post-cache substitution either declaratively or programmatically. If you want to use post-cache substitution declaratively, you can use the ASP.NET Substitution control. For example, the page uses the Substitution control to display the current time on a page that has been output cached.



DATA CACHING

Output Caching is done almost declaratively. But you can perform data caching programmatically. You can use cache object to start caching specific data items for later use on a particular page[4]. The cache object enables you to store everything from simple name/value pairs to more complex objects like datasets and entire aspx pages. You can use the cache object in the following fashion:

Cache["dataset"] = mydataset;

After an item is in cache, you can retrieve it later as shown below:

DataSet ds = new DataSet();
ds = (DataSet)Cache["dataset"];

Using cache object is an outstanding way to cache your pages. Above fragment shows simple use of the Cache object.

Cache Dependencies
ASP.NET 2.0 now ships with the time-based, file-based and now SQL-based CacheDependency support. The real power of cache object comes with its capability to invalidate itself. Using the cache object, you can store and also invalidate items in the cache based on several different dependencies

- File based dependencies
- Key based dependencies
- Time based dependencies
- SQL based dependencies

When inserting items into the cache object, you set the dependencies with the Insert method as shown below.
CachenInsert("Conn",ConnectionStringsSection,new System.Web.Caching.CacheDependency(Server.MapPath("config.xml"))) ;
By using a dependency when the item being referenced changes, you remove the cache for that item from memory.
Another important feature in ASP.NET 2.0 is that you can create your own custom dependencies which are inherited from Cache Dependency class. When you create your own cache dependencies, you have the option to add procedures to invalidate cache upon arrival of MSMQ message or create a Oracle database specific Cache dependency.
Finally, ASP.NET 2.0 has re-factored and unsealed Cache Dependency class which allows creating custom cache dependencies. Another outstanding feature of ASP.NET 2.0 is SQL Server cache invalidation which enables you to invalidate items stored in cache when underlying changes occur to the data in the tables being covered. Post Cache Substitution fills in an important gap in ASP. Net's

technology, enabling you to have both the best highly dynamic content and a high-performance web site with caching.

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A Review of Issues in Self Organizing Networks

Avneet Kaur
Department of Computer Science
Guru Nanak Dev University,
Regional Campus, Jalandhar,
Jalandhar, India.
avneet.kaur.arora1990@gmail.com

***Abstract*—This paper presents the basic architecture of Self Organizing Networks(SON), some of the design issues related to SON architectures. A comparison has been made between the previous reference works done by some authors so that a better idea of the distinct features in each paper, could be made easier.**

***Index Terms*— self-organizing networks, ad hoc networks, self-configuration, self-optimization.**

I. INTRODUCTION

A self-organizing Network (SON) is an automation technology designed to make the planning, configuration, management, optimization and healing of mobile radio access networks simpler and faster.

Organizations: SON functionality and behavior has been defined and specified in generally accepted mobile industry recommendations produced by organizations such as 3GPP (3rd Generation Partnership Project) and the NGMN (Next Generation Mobile Networks). In simple words: A self-organized network is a kind of wireless network that can be deployed instantly and provide easy network communication without the support of pre-established network infrastructures, such as base stations. This network architecture brings promise of much better mobility and communication capacity. A self organizing network is an ad hoc network architecture that can be rapidly deployed without relying on a pre-existing fixed network infrastructure with minimal or no human administration. They are also know as reconfigurable Wireless Networks (RWN). Newly added base stations should be self-configured in line with a "plug-and-play" paradigm, while all operational base stations will regularly self-optimize parameters and algorithmic behavior in response to observed network performance and radio conditions. Furthermore, self-healing mechanisms can be triggered to temporarily compensate for a detected equipment outage, while awaiting a more permanent solution. This paper is organized as follows: The second section contains the background description of Self-Organizing Networks, the third section consist of the prior related work done by different researchers, the fourth section contains the challenges associated with the Self Organizing Networks , fifth section consist of the open issues and future scope of this paper and the sixth section contains the conclusion.

II. BACKGROUND DESCRIPTION OF SELF-ORGANIZING NETWORKS

SON Architectural Types: Self-organizing networks are commonly divided into three major architectural types.

Distributed SON In this type of SON (D-SON), functions are distributed among the network elements at the edge of the network, typically the ENodeB elements. This implies a certain degree of localization of functionality, and is normally supplied by the network equipment vendor manufacturing the radio cell.

Centralized SON In centralized SON (C-SON), function are more typically concentrated closer to higher-order network nodes or the network OSS, to allow a broader overview of more edge elements and coordination of e.g. load across a wide geographic area. Due to the need to inter-work with cells supplied by different equipment vendors, C-SON systems are more typically supplied by 3rd parties like Celcite or Cisco.

Hybrid SON Hybrid SON is a mix of centralized and distributed SON, combining elements of each in a hybrid solution.

Son sub-functions: Self-organizing network functionalities are commonly divided into three major sub-functional groups, each containing a wide range of decomposed use cases.

Self-configuration functions: Self-configuration strives towards the "plug-and-play" paradigm in the way that new base stations shall automatically be configured and integrated into the network. When a new base station is introduced into the network and powered on, it gets immediately recognized and registered by the network. The neighboring base stations then automatically adjust their technical parameters (such as emission power, antenna tilt, etc.) in order to provide the required coverage and capacity, and, in the same time, avoid the interference.

Self-optimization functions: Every base station contains hundreds of configuration parameters that control various aspects of the cell site. Each of these can be altered to change network behavior, based on observations of both the base station itself, and measurements at the mobile station or handset. One of the first SON features establishes neighbor relations automatically (ANR), while others optimize random access parameters or mobility robustness in terms of handover oscillations. A very illustrative use case is the automatic switch-off of a percent of base stations during the night hours. The neighboring base station would then re-configure their parameters in order to keep the entire area covered by signal. In case of a sudden growth in connectivity demand for any reason, the "sleeping" base stations "wake up" almost instantaneously. This mechanism leads to significant energy savings for operators.

Self-healing functions: When some nodes in the network become inoperative, self-healing mechanisms aim at reducing the impacts from the failure, for example by adjusting parameters and algorithms in adjacent cells so that other nodes can support the users that were supported by the failing node. his function of SON permits to spot such a failing base stations immediately in order to take further measures, and ensure no or insignificant degradation of service for the users.

Functional overview

Three classes of key functions figure prominently in SON.

Self-configuration comprises all tasks necessary to automate the deployment and commissioning of networks and the configuration of parameters. Network elements operate autonomously, running setup routines, authenticating and connecting to the OSS, as well as linking up and swapping parameters with need-to-know neighbors.

Self-optimization serves to improve or recoup network quality by tuning network parameters on the fly. Key tasks involve brokering handovers and balancing loads among neighboring cells. Contributing to a greener network environment, SON offers advanced energy-saving features.

Self-healing encompasses a set of key functions designed to cope with major service outages, including detection, root cause analysis, and outage mitigation mechanisms. Auto-restart and other automatic alarm features afford the network operator even more quick-response options.

Self-planning combines configuration and optimization capabilities to dynamically re-compute parts of the network, the aim being to improve parameters affecting service quality

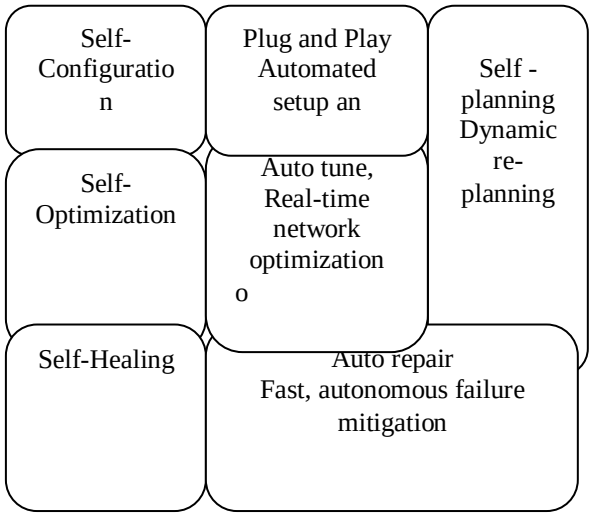

Figure: SON functions

Challenges associated with a self organizing network: Major challenges encountered while the designing of a Self-Organizing Network, are explained. These include:

i.) Configuration: Most of today's networks are relatively static. They involve a large management cost to be setup and maintained. Today to setup connection to the Internet, we need to have an IP address assigned by a network administrator and some manual entries in the DNS server.

ii.) Discovery: Discovery is a very important aspect of making an ad hoc network self organizing. Discovery deals with two issues:

a.) The discovery of the node itself within the network.

b.) The discovery of the services available to the node once it has placed itself in the network.

The simplest way a node can discover itself is by using a Global Positioning System (GPS). The GPS can provide the node with its location and then it can start looking for nodes in its zone.

iii.) Routing: Routing is one of fundamental operations of a network. Thus there are a lot of routing protocols proposed to work with ad hoc networks. Link state and distance vector are two common approaches to solve the routing problem. In the link state each router has a good picture of the network topology and thus does not prove to be a good approach for self organizing networks.

Broadly speaking routing protocols are classified into two :

a.) Proactive: These types of protocols constantly evaluate the routes within the network so that when a packet needs to be forwarded the route id already known. E.g. Open Shortest Path First (OSPF), Wireless Routing Protocol (WRP), Destination-Sequenced Distance-Vector (DSDV).

b.)Reactive: This type of protocols determines the route on demand. E.g. Temporally-Ordered Routing Algorithm (TORA), Ad hoc On Demand Distance Vector (AODV) and Dynamic Source Routing (DSR).

iv.) Cooperation Incentive

Self organizing network are highly cooperative, since each node of the network acts as an autonomous network elements and provides all the services themselves. Since providing service to the network does not provide any direct advantage to the users of such a node, they may just consume services and not provide any. So mechanisms are required to encourage end-users to let their node act as a relay, and keep their terminal turned on and not tamper with them. Further such a mechanism should also discourage end-users from overloading the network, in particular limit the number of long distance communications.

v.).Security

Security issues like legitimacy of the users, confidentiality and integrity of information in self organizing networks are similar to that of conventional networks. But this type of network has more complex issues as listed below:

- The medium used is wireless, thus it becomes easier to eavesdrop.
- These networks do not have a centralized monitoring or management point.
- The network configuration changes dynamically owing to the dynamic nature of the network.
- Mobile devices have a limited processing capacity and battery life, so any kind of solution has to take these factors into account.
- Mobile devices can be captured unlike fixed

a.) To secure a self organizing network, we consider the following attributes: availability, confidentiality, integrity, authentication, and non-repudiation.

b.) To ensure that the message delivered has not been modified a technique called diversity coding can be used. The basic idea is to transmit redundant information through additional routes for error detection and correction without message retransmission. Thus even if one route is compromised, the other routes can be used to get the correct information across.

c.) To authenticate a user proposes a technique called threshold cryptography which takes advantage of the link redundancy of these types of network. It discusses the how distribution of trust can make Certification Authorities more robust and resistant to attack.

III. RELATED WORK

Katayoun Sohrabi, Jay Gao, Vishal Ailawadhi, Greg Pottie, 1990 [1] Wireless sensor networks will enable low-cost connections between the physical world and telecommunications networks, with applications including security, industrial automation, remote exploration, and medical monitoring. After briefly discussing the underlying technology, a protocol suite for self-organization of sensor networks, in which the number and topology of the sensor nodes are prior unknown, and no timing has been made available, is described. The scalable protocol very quickly establishes a TDMA and frequency assignment schedule, and then proceeds to establish energy-efficient routing. Simulation results will be demonstrated.

Y Chun - 2000 [2] A self-organized network is a kind of wireless network that can be deployed instantly and provide easy network communication without the support of pre-established network infrastructures, such as base stations. This network architecture brings promise of much better mobility and communication capacity. Various routing protocols have been presented. This paper gives a detailed study of whether each of them works and whether there is a superior one that can function successfully under all kinds of situations. We conclude that there is no superior protocol for all situations and look at the main issues to be considered when designing routing protocols for a self-organized network.

Yasir Drabu , 2001[3] Since the inception of communication, self-organizing wireless networks has been an intellectual fantasy of communication researchers. Self organizing networks are based on sophisticated protocols that allow diverse computing devices to establish a

communication system without human intervention. This survey investigates these networks and tries to present the various issues and challenges they pose. Further the contributions made towards solving these problems are also outlined.

Sujuan Feng, Eiko Seidel, Nomor Research GmbH, Munich, 2008 [4] As every mobile network, LTE (Long Term Evolution) system also needs to be managed. There is a trend to simplify the management by auto-configuration and auto-optimization. However, the complexity of LTE system also place new demands on the Operations and Maintenances of the network. Self-Organizing Networks (SON) is seen as one of the promising area for an operator to save operational expenditures. SON is therefore currently discussed in 3GPP standardisation. This paper provides some background on SON principles, introduces different architectures that are considered and describes some exemplary procedures..Need of SON in 3GPP Long Term Evolution system:

1. The number and structure of network parameters have become large and complex.
2. The rapidly expanding number of Base Stations needs to be configured and managed with the least possible human interaction.
3. Increasing capacity of the network

Francis Heylighen , 2008 [5] One of the most recent applications of the complexity perspective is the analysis of complex networks, such as the World-Wide Web, and the non-linear processes that generate them. This has led to the identification of common statistical features of such networks: small-world, clustering and scale-free link distributions. These notions promise a wealth of applications in the analysis of information networks, potentially helping us with the organization, management, retrieval and discovery of relevant knowledge within masses of ill-structured and continuously changing data.

Telenor, 2012 [6] Self-Organizing Networks (SON) is a collection of functions for automatic configuration, optimization, diagnosing and healing of cellular networks. It is considered to be a necessity in future mobile networks and operations due to the increased cost pressure. The main drivers are essentially to reduce

1. CAPEX (Cost Affective Expenditure)
2. OPEX (Operational Expenditure)

which would otherwise increase dramatically due to increased number of network parameters and rapidly increasing numbers of base stations in the network Mobile networks are getting more complex to configure, optimize and maintain. Many SON functions will give cost savings and performance .

Florian Kreitmair , 2013 [7] This paper describes and reviews the mechanics of self configuration in Long Term Evolution (LTE) mobile networks.In particular the process of auto connectivity and auto commissioning in detail, with an extra look at the security setup, is done. Furthermore, the dynamic radio configuration of parameters that depend on neighboring cells, has been described. Finally, the possibilities and current status of adoption in practice, is surveyed.

Bilal Zafar, Soheyl Gherekhloo, Aidin Asgharzadeh, Mehdi Tavakoli Garrosi , 2010 [8] A software SONIR (Self-Organizing Network with Intelligent Relaying), in MATLAB, was developed, which implemented an end-to-end multi-hop, capable of dealing with mobility of nodes. Different methods for clustering, mobility management, routing were implemented. These methods work on different OSI layers. The main goal is to be able to visualize such a system as a whole in order to see the end-to-end performance..

IV. ISSUES AND CHALLENGES IN SON

On the basis of research done above, some issues and challenges in the designing of Self Organized Networks have been presented in a tabular format.

Research Paper	Main Features	Remarks
Self Organizing Wireless Sensor Network	1. Bandwidth utilization 2. energy utilization 3. network scalability 4. formation of ad hoc sub-networks.	Drawbacks 1. Minimum energy required for network formation could not be decided. 2. Extent to which algorithms can deal with more extensive mobility in nodes and targets.

Research Paper	Main features	Remarks
Self-Organizing Networks (SON) in 3GPP	This paper provides some background on SON principles, introduces different architectures that are	Need of SON in 3GPP Long Term Evolution system:

LTE, 2008	considered and describes some exemplary procedures.	1. The rapidly expanding number of Base Stations needs to be configured and managed with the least possible human interaction.
Benefits of Self-Organizing Networks (SON) for Mobile Operators, Telenor, Research and Future Studies, 2012	The main drivers are essentially to reduce 1. CAPEX (Cost Affective Expenditure) 2. OPEX (Operational Expenditure)	Mobile networks are getting more complex to configure, optimize and maintain. Many SON functions will give cost savings and performance .
Self-Organizing Network with Intelligent Relaying (SONIR)	A software SONIR (Self-Organizing Network with Intelligent Relaying), in MATLAB, was developed, which implemented an end-to-end multi-hop, capable of dealing with mobility of nodes.	The main goal is to be able to visualize such a system as a whole in order to see the end-to-end performance as well as solve the possible issues that arise with it.
Self-Organizing Networks (SON) in 3GPP: Release 11 – The Benefits of SON in Long Term Evolution	Networks	SON use cases that play an important role in the operation of multi-vendor Heterogeneous Networks comprising of macro and metro cells.

V. OPEN ISSUES AND FUTURE SCOPE

The major issues in the previous papers have been discussed but some issues in the field of Self Organizing Networks, are still open , which need to be solved. The key design issues are the available bandwidth (which is large, compared to the per hop data rate) and available energy (which is small). There are lot of technical issues involved in the designing of an ad hoc network and then making it self organizing. Configuration, discovery, routing, MAC layer adaptation, security are some of the key issues. Further , power and processing capabilities are scarce resources in mobile device, thus making protocols design even more complex. The potential benefits like ease of use, robustness and overall efficiency of such networks need further research till they can be commercially realizable.

VI. CONCLUSION

The design of self organizing networks, involves the resolution of lot of complex issues. In this survey, some of these issues ranging from configuration to security, have been discussed. Some of the possible approaches that can be adopted to resolve them, have also been outlined. Major issues explored are: Cutting the cost of operation and improving network quality.This paper is prepared with the hope that it will be useful for the future researches in the field of wireless networks.

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FAILURE OF SOFTWARE REUSE

Arif Nazir
Assistant Professor
DAV College, Amritsar

Abstract-Software reuse offers the promise of reducing product costs and increasing system reliability by making it possible to share code. However, software reuse in practice has proved much harder. This paper examines three cases of software reuse to understand why reuse remains elusive. The findings show that reuse encounters three coordination problems: the work required to traverse boundaries, the effects of organizational and environmental changes, and the coordination required to align and assemble multiple Pieces of software.

I. INTRODUCTION

Although computing power and network bandwidth have increased dramatically in recent years, the design and implementation of networked applications remains expensive and error-prone. Much of the cost and effort stems from the continual re-discovery and re-invention of core patterns and framework components throughout the software industry. Like many other promising techniques in the history of software, however, systematic reuse of software has not universally delivered significant improvements in quality and productivity. There have certainly been successes, *e.g.*, sophisticated frameworks of reusable components are now available in OO languages running on many OS platforms. In general, however, these frameworks have focused on a relatively small number of domains, such as graphical user-interfaces or C++ container libraries like STL. Moreover, component reuse is often limited in practice to third-party libraries and tools, rather than being an integral part of an organization's software development processes.

II. FAILURE OF SOFTWARE REUSE

In theory, organizations recognize the value of systematic reuse and reward internal reuse efforts. In practice, many factors conspire to make systematic software reuse hard, particularly in companies with a large installed base of legacy software and developers. In my experience, non-technical impediments to successful reuse commonly include the following:

- *Organizational impediments* -- *e.g.*, developing, deploying, and supporting systematically reusable software assets requires a deep understanding of application developer needs and business requirements. As the number of developers and projects employing reusable assets increases, it becomes hard to structure an organization to provide effective feedback loops between these constituencies.
- *Economic impediments* -- *e.g.*, supporting corporate-wide reusable assets requires an economic investment, particularly if reuse groups operate as cost-centers. Many organizations find it hard to institute appropriate taxation or charge-back schemes to fund their reuse groups.
- *Administrative impediments* -- *e.g.*, it's hard to catalog, archive, and retrieve reusable assests across multiple business units within large organizations. Although it's common to scavenge small classes or functions opportunistically from existing programs, developers often find it hard to locate suitable reusable assets outside of their immediate workgroups.
- *Political impediments* -- *e.g.*, groups that develop reusable middleware platforms are often viewed with suspicion by application developers, who resent the fact that they may no longer be empowered to make key architectural decisions. Likewise, internecine rivalries among business units may stifle reuse of assests developed by other internal product groups, which are perceived as a threat to job security or corporate influence.
- *Psychological impediments* -- *e.g.*, application developers may also perceive ``top down'' reuse efforts as an indication that management lacks confidence in their technical abilities. In addition, the ``not invented here'' syndrome is ubiquitous in many organizations, particularly among highly talented programmers.

III.STRIVE TO CREATE THE PREREQUISITES FOR SUCCESSFUL SYSTEMATIC REUSE

In my experience, systematic software reuse is most effective when the following prerequisites are met:

1. *The market is competitive* -- In a competitive business environment, such as financial services or wireless networking, time-to-market is crucial. It's therefore essential to leverage existing software to reduce development effort and cycle time. When a market is not competitive, however, organizations tend to reinvent, rather than reuse, software.
2. *The application domain is complex* -- Components that are relatively easy to develop, such as generic

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linked lists, stacks, or queues, are often rewritten from scratch rather than reused. In contrast, developers working in highly complex domains, such as distributed, real-time systems are often willing to reuse components.

3. *The corporate culture and development process are supportive* -- Not only is it hard to develop high-quality reusable components and frameworks, it's even harder to reap the benefits of reuse immediately. Significant investment must be expended up-front to produce efficient, flexible, and well-documented reusable software assets before they can be leveraged in subsequent generations of a product line. Therefore, organizations must support an appropriate software development process that allows systematic reuse to flourish.

   Ideally, an organization's software process should reward developers who invest the time and effort to build, document, and reuse robust and efficient components. For instance, a reward system could be built into project budgets, with incentives based on the number of software components reused by individuals or groups. I still find companies, however, whose processes measure programmer productivity solely in terms of the number of lines of source code *written from scratch*, which penalizes developers who attempt to reuse existing software.

4. *Attractive ``reuse magnets'' exist* -- To attract systematic reuse, it crucial to develop and support ``reuse magnets,"[1] *i.e.*, well-documented framework and component repositories. These repositories must be well-maintained so that application developers will have confidence in their quality and assurance that any defects they encounter will be fixed promptly. Likewise, framework and component repositories must be well-supported so that developers can gain experience through hands-on training and mentoring programs.

   In my experience, development processes are an effective process for creating attractive reuse magnets. Open-source processes have yielded many widely used software tools and frameworks, such as Linux[2]

   As a general rule, software *development* does not scale up as the number of developers increases. The main problems stem from the increased human communication and coordination costs associated with large projects. A team of 10 good developers can therefore typically produce much better quality software systems with much less effort and expense than a team of 1,000 developers.

   In contrast, however, software *debugging* does scale up as the number of developers helping to debug the software increases. The main reason for this, of course, is that all other things being equal, having more people test the code will identify its ``error-legs" much more quickly than having just a few people testing code. A team of 1000 testers will therefore typically find many more bugs than a team of 10 testers.

   Moreover, open-source development efforts tend to have short feedback loops between the point when a bug is discovered and the bug is fixed. This increases the incentive for the user community to help with the debugging process since they are ``rewarded" by rapid feedback and fixes once bugs are identified. In addition, because the source code is available for inspection, developers in the user community can often help fix any bugs they find, which further amortizes the overall debugging effort and improves software quality rapidly.

5. *Strong leadership and empowerment of skilled architects and developers* -- The ability of companies and projects to succeed with reuse is highly correlated with the quality and quantity of experienced developers and effective leaders. Conversely, reuse projects that lack a critical mass of developers with the necessarily technical and leadership skills rarely succeed, regardless of the level of managerial and organizational support.

   In general, the level of experience required to succeed with systematic reuse depends largely on whether programmers are trying to develop reusable components or to use them. I've found that *developing* reusable frameworks and components for complex domains, such as telecom or avionics, requires highly experienced and skilled architects and developers. These individuals must be trained and empowered to create, document, and support horizontal middleware platforms that reduce the effort required to develop vertical applications.

   In general, the more complex the domain, the greater the skills and leadership required to develop effective reusable middleware that can encapsulate complex communication protocols and mechanisms for concurrency, locking, persistence, fault tolerance, connection management, event demuxing, and service configuration. When middleware architects and developers are successful, they create component abstractions that hide these error-prone and tedious mechanisms and protocols. Application developers therefore needn't be as experienced with complex systems-level technologies since they can program to these higher-level component abstractions.

   I've also observed, however, that horizontal middleware platform efforts generally fail when application developers are (1) too inexperienced, (2) the domain is sufficiently challenging, and (3) the

middleware team lacks sufficient training, resources, time, or empowerment to create a stable platform. It's therefore important that developers at all levels improve their technical skills and learn how to apply good software principles, patterns, and practices.

Unfortunately, many organizations lack the five prerequisites described above. As a result, these organizations often fall victim to the ``not-invented-here'' syndrome and redevelop many software components from scratch. However, deregulation, global competition, and the general dearth of experienced application and middleware developers is making it increasingly hard to succeed by building complex networked applications from the ground up.

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Text to Speech Generation System for People with Cognitive Disabilities

Simmi Luthra
Assistant Professor
Department of Information Technology
Amritsar College of Engineering and Technology,
Amritsar (Punjab)-INDIA
Simmi_36@yahoo.com

Navneet Bawa
Associate Professor
Department of Computer Science
Amritsar College of Engineering and Technology,
Amritsar (Punjab)-INDIA
Bawa.navneet@gmail.com

Neha
Assistant Professor
Department of Information Technology
Amritsar College of Engineering and Technology,
Amritsar (Punjab)-INDIA
nehachadha@acetamritsar.org

Abstract: **Text To Speech synthesis (TTS) is an application to convert the text written in a language into speech. This paper discusses the development of a concatenated speech generation system for the Punjabi text written in Gurmukhi script based on Phoneme as basic unit. The research work was carried out with the aim that the developed system must be able to produce synthetic speech, corresponding to two qualities of Speech Synthesis: intelligibility and naturalness. In order to get the naturalness in the synthetic speech, Concatenative speech synthesis techniques have been used, with Punjabi Phonemes as a basic unit. In this work, phonemes have been selected as the speech unit for the development of the Punjabi speech database. After analyzing of Phonemes, a carefully selection of unbiased Punjabi Corpus was made, having nearly, 2, 33,009 unique and more than four million total words. The two types of Phonemes (V and CV) gave rise to 380 phonemes with non nasalized vowels and 380 phonemes with nasalized vowels, resulting total 722 phonemes. The system is based on a Punjabi speech database that contains the starting and ending positions of phoneme-sounds labeled carefully in a wave file of recorded words. The input text is first processed then these phonemes are searched in the database for corresponding phoneme-sound positions in recorded wave file. The main objective for developing a Speech generation system for Punjabi language is to help the persons with cognitive disabilities like dyslexia, visual comprehension and other learning disabilities.**

Keywords: *Speech database, Punjabi Phoneme, Phoneme sounds***.**

I. INTRODUCTION

In today's life every person wants that the computer systems should behave like humans and proved to be user friendly. In recent years, the use of computers in speech synthesis and speech recognition has become an important area of study among speech and computer scientists. The primary motivations are to provide users with a friendly vocal interface with the computer and to allow people with certain handicaps (such as blindness) to use the computer.

Even many of the great researchers have dreamed of involving the machines in every face of human life. With the growth in the power of computing machines, their applications in modern daily life are also rising. Speech and spoken words have always played a big role in the individual and collective lives of the people. Speech represents the spoken form of a language and is also one of the important means of communication

A) Text to Speech System

The main function of text-to-speech (TTS) system is to convert an arbitrary text to a spoken Waveform. This task generally consists of two steps, *i.e.*, text processing and speech generation [5]. Text processing is the conversion of the given text into a sequence of synthesis units, whereas speech generation is generation of an acoustic wave form corresponding to each of these units in the sequence. A general view of the system is depicted in the Fig.1

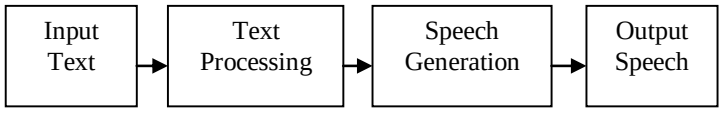

Figure 1. Text to speech system

II. PUNJABI PHONEMES

Punjabi is a language spoken by inhabitants of the historical Punjab region (north western India and eastern Pakistan).Punjabi phonemes can be classified as: segmental phonemes and supra-segmental phonemes. Punjabi language, like other Indian languages includes segmental phonemes, but not supra-segmental phonemes in its alphabet.

Segmental phonemes in Punjabi include twenty vowels and thirty eight consonants. Out of twenty vowels ten (ਇ,ਈ,ਏ,ਐ,ਅ,ਆ,ਔ,ਉ,ਊ,ਓ) are non-nasalized and ten (ਇਂ,ਈਂ,ਏਂ,ਐਂ,ਅਂ,ਆਂ,ਔਂ,ਉਂ,ਊਂ,ਓਂ) are nasalized. And out of thirty eight consonants in Punjabi language five (ਵ, ਙ, ਞ, ਨ, ਮ) are nasalized and the remaining consonants are non-nasalized. Punjabi vowels can be classified based on: opening of mouth, position of tongue tip and rounding of the tongue, whereas Punjabi consonants can be classified based upon: place of co-articulation and manner of articulation.

Supra-segmental phonemes include stress, nasality, juncture, tone and intonation [1]. In case of mono syllablic
words, stress is given on the whole word during the utterance of the sentence, whereas in case of poly-syllabic words, stress is given on long, middle syllables of the word, during utterance of word in a sentence [2]. In Punjabi stress is represented by / ◌ੱ /, called *'addak'*.

Presence of *'addak'* in words changes word meaning and so is phonemic. Stress is multi-dimensional supra-segmental phoneme in Punjabi. In Punjabi nasality is distinctive and its presence changes the meaning of the word. Unlike nasalized consonants, nasalized vowels are not segmental. The nasality depends upon vowels and so is supra segmental.

In Gurmukhi nasality is represented by / ◌ੰ / (called *'tippi')* and / ◌ਂ / (called *'bindi')*. Juncture marks the breaks in the speech continuum.

Juncture, as in other languages, is important in Punjabi, and it changes the meaning of the sentence. Among all Indo-Aryan languages, only Punjabi is a tonal language [2], in which presence of tone on one or more syllables of the word changes its accent and may change its meaning also.

III. GENERATION OF PUNJABI SPEECH SYSTEM

There are some steps that have been followed for the generation of Punjabi speech system:

A) Pre-processing

In this Pre-processing, the user can enter the text. The text can have some abbreviations, numeric values and special symbols etc .which must be processed before passing the text for the TTS conversion. There may be the abbreviations in the input text, which are first searched and then replaced with expanded form, so that written abbreviations be spoken in full word form. Also the numeric values are first analyzed and then expanded to the form required for speaking out that numeric value. The entered text is then segmented into words.

B) Segment Words into Phoneme

As Phoneme is the basic unit of concatenation, so it is necessary to segment the words of text into phonemes. The word is segmented into Phonemes, upon concatenation the word will be spoken as per Phonemic sounds.

C) Searching

These components deals to find the values of phonemes in the recorded sound file, from the database. First the Punjabi text is segmented into words, and then the words are segmented into phonemes which are stored in a linear array. Then it is passed to the database for search. Initially the search is made according to the position (Starting, end) of the phoneme in the word. . If search is successful for that particular position of Phoneme, starting and end positions of Phoneme sound in recorded sound file are returned from database. If there is no entry for that particular position of Phoneme in the database, then this will be skipped as invalid phoneme as typing error (Mistake).

D) Database Development

The following steps have been followed to develop Punjabi speech database:-

a)Selection of Phoneme

For the development of Punjabi system, Phoneme was selected as the basic units of concatenation. Phoneme is a unit of speech made up of vowels and consonants. A phoneme can be defined as a minimum sound unit of a language by which the meaning may be differentiated. The reason for selecting phoneme basic speech units is that, being relatively smaller than words and syllables, these preserve within co-articulation effects. So, phoneme give lesser number of total speech units than words and syllables .Hence it provides lesser storage space.

b)Punjabi Corpus used

The role of corpus for the study of different aspects of a language is very important.: For the analysis of phonemes, a carefully selection of unbiased Punjabi Corpus was made, having nearly, 2, 33,009 unique and more than four million total words The two types of Phonemes (V and CV) gave rise to 380 phonemes with non nasalized vowels and 380 phonemes with nasalized vowels, resulting total 722 phonemes.

c) Analysis of Punjabi phonemes

In order to select minimum require phonemes for the system, the total phoneme set of Punjabi language was analyzed over the carefully selected Punjabi corpus. There are total two types of phonemes in Punjabi (V and C where V and C represent vowel and consonant respectively).

The Phonemes (V and CV) gave rise to 380 phonemes with non nasalized vowels and 380 phonemes with nasalized vowels, resulting total 722 phonemes.

d) Word Recording

The finally selected words were recorded by the native female speaker of Punjabi. The speech quality depends upon the quality of the recorded sound and hence, sound quality of extracted speech units from this recorded sound. So, a professional female speaker of Punjabi is selected for recording. The recording has been done in the studio with the following characteristics, set for recording:

Sampling Rate: 44,100Hz, Bit Depth: 16 bit, Channels: Mono

e) Labeling of Phoneme sound

The next phase was to label the Phoneme sound in the recorded sound file. Labeling or extracting the phoneme sounds in the recorded sound file is one of the most important and time consuming tasks that needs to be done very carefully, because the naturalness of the synthetic speech produced by TTS system depends upon how exactly phoneme boundaries have been marked. For this purpose we have used sound editing software - *Sonic Foundry Sound Forge 5.0B and* the phoneme sounds have been labeled manually one by one, after carefully listening and analyzing the word sounds. The phoneme boundaries have been marked by noting down the starting and end position of each phoneme in thee recorded sound file.

f) Punjabi Speech Database

The speech database is an important part of a Punjabi system based upon the concatenation technique. For the development of this Punjabi speech generation system database has been implemented. The database that is designed for this system includes three fields: Phoneme, Starting Sample position and end Sample position

IV. Functioning of Punjabi Speech Generation System

The working of Punjabi Speech Generation System is shown in the below flowchart i.e. Fig 2

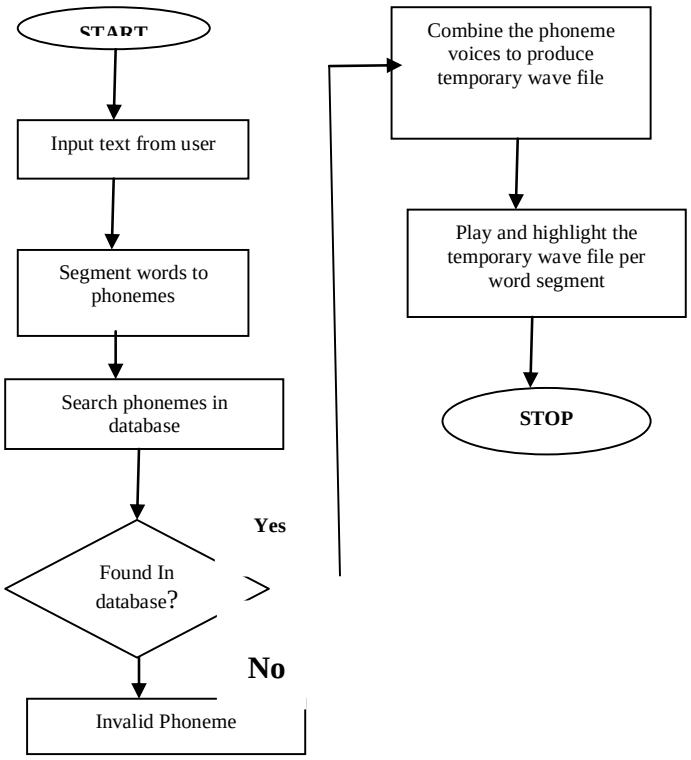

Figure 2. Flowchart of Speech Generation system

V. APPLICATION OF SYSTEM FOR COGNITIVE DISABLE PERSON

The main objective for developing a Speech generation system for Punjabi language is to help the persons with cognitive disabilities like dyslexia, visual comprehension and other learning disabilities. The concept of cognitive disabilities is extremely broad, and not always well-defined. When someone has a cognitive disability, this means that her or his brain works differently. That person may struggle with things like learning, thinking, and reasoning, problem solving, understanding information, making decisions or remembering. In other words, a person with a cognitive disability has greater difficulty with one or more types of mental tasks than the average person. There are too many types of cognitive disabilities.

This Punjabi speech generation system will be used as an add-on tool embedded with web browsers that will enable the browser to read aloud a website in Punjabi language. With more and more electronic data becoming available online, software's with this system as add-on tool will be helpful for information dissemination, as the user who cannot read Punjabi but can understand it will then be able to get the information contained in a document/webpage by listening to it. This type of assistive technology can be particularly helpful to individuals with cognitive disabilities, visually impaired persons and old people who find it difficult to read from the computer screen. There are at least two ways to classify cognitive disabilities: by functional disability or by clinical disability

A) Clinical Diagnosis of Cognitive Disability:

Clinical diagnoses may be useful from a medical perspective for treatment. Clinical diagnosis of cognitive disability can include Down syndrome, Traumatic Brain Injury (TBI), Autism, or Dementia. Clinical diagnosis may also include less severe cognitive conditions such as Dyslexia (difficulty reading), Attention Deficit Disorder, Dyscalculia (difficulty with math), and other learning disabilities.

- Dyslexia

Dyslexia is the most common form of language-based learning disability. Approximately fifteen to twenty percent of the population has some form of language-based learning disability. Dyslexia is primarily a reading disability, and there is evidence suggesting that Dyslexia is a condition that is inherited. Dyslexia is a condition that is found in both females and males from all ethnic backgrounds. The person may have trouble with different forms of language, reading, and difficulty with spelling and writing as well.

- Attention Deficit Hyperactivity Disorder (ADHD)

ADHD is a medical condition affecting a person's ability to focus, sit still, and pay attention. They may have difficulty in focusing on tasks or subjects, or act impulsively; they may also get into trouble. ADHD begins in childhood, but may not be diagnosed until the person reaches adolescence or even adulthood. Persons with ADHD may have difficulty with finishing assignments from school or tasks from home, jumping from one activity to another. They may lose things; forget things like homework or something they were supposed to do. They may have difficulty with following instructions, or following through with tasks they have been assigned. The person may make careless mistakes, or have difficulty paying attention to details. Persons with ADHD may have trouble organizing activities, or tasks, and may interrupt other people. They may fidget, feel restless, or talk excessively.

B) Functional Diagnosis of Cognitive Disability:

Sometimes it is more useful to avoid the medical perspective of cognitive disability and view them from a functional perspective instead. A Functional disability perspective ignores the medical and behavioral causes of cognitive disability and focuses on the abilities and challenges the person with a cognitive disability faces. Functional cognitive disabilities may involve difficulties or deficits involving problem-solving, attention, memory, math comprehension, visual comprehension, reading, linguistic, and verbal comprehension.

VI. CONCLUSION

The current work has been aimed at developing a Speech Generation System for Punjabi language. an helping tool for cognitive disable persons. This system as add-on tool will be helpful for information dissemination, as the user who cannot read Punjabi but can understand it will then be able to get the information contained in a document/webpage by listening to it.

There are some more important features that have been taken care of:

- Selection of the basic unit
- Selection of corpus
- Labeling of the of speech unit
- The quality of the speech unit database.

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Various Techniques for the Detection of Micro calcification clusters using Mammograms

Amanpreet Kaur
M.Tech (CSE),
CTITR, Maqsudan
Jalandhar (Punjab), India

Ramandeep Kaur
M.Tech (CSE),
CTITR, Maqsudan
Jalandhar (Punjab), India

Abstract- ***Since micro calcification clusters are primary indicators of malignant types of breast cancer, its detection is important to prevent and treat the disease. This paper presents various techniques that have been used till now for detection of micro calcification clusters in mammograms. These techniques include the use of Gaussian filters, Fuzzy logic, Wavelet analysis, neural networks. These techniques rely on a combination of criteria used by experts, including the shape, brightness contrast and uniform density of tumor areas. Based on any one of these techniques, mammography exists as the most powerful technique for detection of breast cancer and that too at an early stage in order to increase the rate of survival.***

I. Introduction

Today, breast cancer is one of the main causes of death in women. Since the survival rate is directly proportional to the stage at which it is detected, so diagnosis at an early stage is very important to reduce the mortality rate. In this disease, cells in breast tissues become abnormal as they divide without any particular order or without any control. These abnormal cells then form tumor in the form of calcifications. These calcifications are small areas in which calcium clusters are formed in the breast. Calcifications are very common but harmless in most of the cases and can't be felt normally. There are two types of calcifications:

(a). Micro calcifications : Micro calcifications are tiny deposits of calcium in breast tissues and are not normally due to cancer but if seen in one area in form of cluster then it may be a sign of early breast cancer.

(b) Macro calcifications: These are coarse calcium deposits in breast. They appear as large white dots in mammogram. These are a result of breast ageing, are harmless and hence do not need any treatment.

A report of World Health Organization (WHO) shows that around two million women are diagnosed with breast cancer every year throughout the world.

Mammogram is the most effective technique used nowadays to detect the breast cancers. Mammography is a diagnostic technique that uses low energy X-Rays (usually around 30 KVp) to examine the human breast in order to detect the breast calcifications. During breast screening, a radiographer uses a special X-Ray machine called a Mammogram that creates an image of the breast by passing X-rays through the breast tissue at very low dose. Various ways in which X-rays pass through different types of tissues allows radiologists to see if there is any abnormal tissue in the breast, to take pictures of a woman's breasts. This method of screening can detect small changes in breast tissue before they can be seen or felt. As a result mammography saves lives due to earlier detection and treatment of breast cancer.

History

The first attempts to use radiography for the diagnosis of breast abnormalities were made in the late 1920's, but mammography, as we understand it nowadays, using dedicated X-Ray units, was developed in the 60s. The use of mammograms started in 1913 with the observations of a German surgeon who laid the foundation for mammography. From 1940 to around 1970 followed the development of the technique by radiologists and the last quarter of the 20th century was dominated by the arrival of breast cancer screening, the use of ultrasound and Magnetic Resonance Imaging (MRI) and nowadays the transition to digital mammography systems. It took the surgery community more than half a century to accept mammography but radiological industry played an important role in the development of mammography.

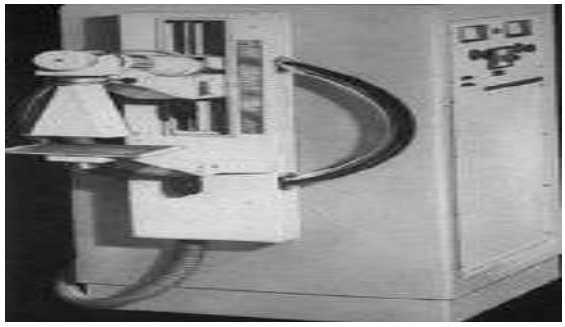

FIG1. First Mammography Machine

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II. Techniques used in Mammography

A. Wavelet Analysis

One of the approaches for detecting micro calcifications in digital mammograms employs the wavelet-based sub band image decomposition. Micro calcifications or tiny calcium clusters usually appear as clusters of pixels with relatively high intensity as compared to their neighboring pixels. Such image features can be observed by a detection system that employs a suitable image transform method which can observe the signal characteristics in the original and the transform domain. Since the micro calcifications are the high frequency components of an image spectrum, their detection can be accomplished or acquired by breaking down the mammogram image into several distinct frequency sub bands. According to this approach, we conceal the low-frequency sub band and highlight the high-frequency sub band. Finally, the mammogram is reconstructed from the highlighted sub band of high frequencies. So, as a deduction, wavelet-based sub band image decomposition can be used as a tool for detecting micro calcifications in digital mammograms.

Another approach is to use a two-stage method based on wavelet transforms for detecting and segmenting the calcifications. As the calcifications appear as fine grains in mammograms and it is difficult to detect these individual grains because of variations in their size and shape and also because the background mammogram texture is typically inhomogeneous. The first stage is based on an undecimated wavelet transform which do not employ any down sampling so that the four octave sub bands, low-low (LL), low-high (LH), high-low (HL), and high-high (HH) remain at full size. Calcifications are detected in HH and combination of LH+HL sub bands. These two sub bands have finer scale resolution. In fact, the filters which convert the input image into HH and LH+HL are analogous to pre-whitening matched filters for detecting Gaussian objects (idealized micro calcifications) in two common forms of background noise. The second stage is devised to overcome the drawbacks of simplistic Gaussian assumptions and provide an authentic and correct segmentation of calcification marks. Pixel sites in HH and LH+HL sub bands are then detected and weighted before evaluating the inverse wavelet transform. This results in highlighted individual micro calcifications in the output mammogram image.

B. Neural Network

Another approach for the detection of micro calcification in digital mammogram is artificial neural networks that have been employed for the differentiation of real "true" clusters from the normal parenchymal patterns and from false positive clusters. The differentiation occurred in both spatial and frequency domains. In the image spectrum the micro calcification corresponds to the high frequency components, the detection of micro calcification is achieved by decomposing the mammogram into the different frequency sub bands. Suppressing the sub bands of lower frequency and the sub bands containing the high frequency are use to rebuild the final mammogram. These results are used as the input of the neural networks for the classification. The neural networks contain the following layers.

- One input layer
- Two hidden layers
- One output layer

The input layer has 30 neurons, two hidden layers have 45 and 20 neurons and the output layer has only one neuron. ROC (receiver operating characteristics) analysis is used to measure the quantitative performance of neural networks. In the clinical situations, a large database is needed for the reliable performance. The hybrid neural network classifier performs the three step procedure for the identification of micro calcification in digital mammogram. Three steps are

1. Pre-processing and segmentation.
2. Regions of interest (ROI) specification.
3. Feature extraction and classification.

Two subsystems, rule based and a neural network are used to perform the elimination of false positive clusters. In the first step the features related either to individual micro calcification or to a group is computed automatically. The reduction in number of features is achieved through principal component analysis (PCA). The micro calcification cluster detection steps include contrast enhanced procedure and background correction procedure through which features are extracted using Hybrid neural network classifier and hence micro calcification clusters are detected.

C. Fuzzy Logic

In this study, a novel approach to micro calcification detection based on fuzzy logic technique is presented. Detection of micro calcifications using fuzzy logic makes use of an algorithm that considers the degree of association in terms of distance, brightness and variance and then selects an output value that represents those pixels having a strong possibility of being a micro calcification. A number of feature extraction techniques have been analyzed and fact have been found that a combination of three features (such as standard deviation and entropy, number of pixels) is the best combination to distinguish a benign micro calcification pattern from one that is malignant.

Contrast enhancement is another technique that makes use of fuzzy logic in mammograms to enhance the mammographic features. According to this approach, mammogram is first normalized in order to conceal the effects of varying illuminations. Then the normalized mammogram images are fuzzified based on the maximum fuzzy entropy principle. The local contrast is measured and enhanced on account of both the local and global information so the fine details of mammograms can be enhanced and the noise can be suppressed. The major advantage of the proposed method is its ability to detect micro calcifications even in very dense breast mammograms.

D. Gaussian Filters

The Difference of Gaussian Filters has been directed by Dangler et al. and Ochoa for the detection of micro calcification in mammogram. A Gaussian Filter is obtained from a Gaussian distribution and it acts like smoothening filter and eradicate high frequency noise from the image when it is applied to an image. A DoG (Difference of Gaussian Filter) is

made from two simple Gaussian filters each must have different variance. The optimized difference of two Gaussian filters is used for enhancing those regions containing bright points.

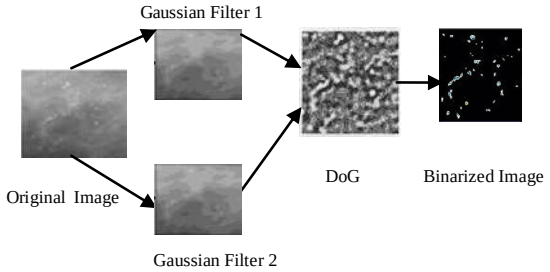
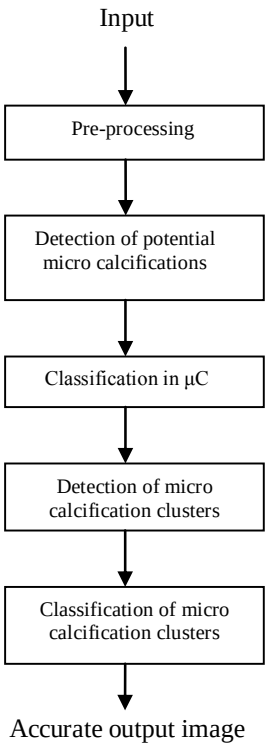


Fig 2. Conversion of original image into binary image using Gaussian filters

In order to maximize the amount of detected probable individual micro calcification in mammogram there is a developed procedure that applies sequences of DoS. The developed procedure has five stages. These stages are:



The general procedure receives a digital mammogram (I) as input and passes it through five stages. The output of one stage becomes the input of the next stage. The first stage is named as pre-processing whose aim is to eliminate the interfering irrelevant elements from the image also referred to as background noise in order to focus only on the relevant region in the image of breast that contain the calcification clusters. The second stage is named as detection of potential micro calcifications (signals) whose objective is to expose the mass centers of the hidden micro calcifications in the image signals. The third step involves classification of signals into real micro calcifications which identifies if an obtained signal corresponds to an individual micro calcification or not. This stage extracts a set of features from image signals based on their contrast and shape. Different criterion are used to identify what features should be used for classification purpose that finally result into a subset of features that reduce the error of the classificatory. Then a back-propagation technique of neural network is used to obtain those signals that correspond to the real micro calcifications. After unmasking of individual micro calcification, they are grouped in clusters. The next stage called detection of micro calcification clusters determines those clusters that occupy regions where quantity of micro calcifications per cm square is higher. From each cluster, a cluster feature set is extracted. The last stage i.e. classification of micro calcification clusters into Benign and Malignant. Benign and Malignant are two stages that classify each of the clusters that appear in mammogram.

III. Advantages of Mammographic Screening

Mammography is the most powerful breast cancer detection tool. Possible tool to detect cancer earlier is mammography, In order to increases the chances of survival. For the detection of breast cancer in women with radio graphically dense breasts Film mammography has limited sensitivity. Digital mammography avoids some of these limitations.

IV. Risks and Limitations of Mammography

Having a mammogram involves X-Rays but if dose of rays used exceeds certain limit then radiations may cause certain harm to skin like pain, anxiety, biopsies etc. Mammograms don't let us detect every instance of breast cancer. Sometimes false alarms cause False Positive Results that may cause unnecessary worry. Occasionally mammography detects cancers that would never have been diagnosed if the women hadn't been screened –cancers that would never have had any effect on her health. This phenomenon is called Over Diagnosis. Women genetically predisposed to breast cancer often develop the disease at a young age when dense breast tissue reduces the sensitivity of X-Ray mammography. In such cases, Contrast Enhanced Magnetic Resonance Imaging (CE-MRI) helps to detect the breast cancer.

V. Conclusion

The main conclusion of this review and scope for further work are presented in this section. This paper reviews various techniques that can be used to detect micro calcification clusters using mammogram which includes analysis of calcifications using wavelet technology, use of neural networks, fuzzy logic and Gaussian filters. This review is based on deterministic properties like frequency of the components only so the main suggestion for future scope is that properties like fractional Brownian motion can be employed for the classification and detection. The combination of various such techniques is also possible. Research may also be done to study shape of abnormalities present in the mammograms.

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An Integrated Technique of Hybrid Median filtering and Morphology based Edge detection

Uvika, SakshiMahajan, NavneetBawa
Department of Information Technology,
ACET, Amritsar (Pb.) India
uvikataneja01@gmail.com
Department of Information Technology,
ACET, Amritsar (Pb.) India
sakshimtech@gmail.com
Department of Computer Science, ACET,
Amritsar (Pb.) India
bawa.navneet@gmail.com

Abstract- Various image filtering techniques and edge detection methods are available in digital image processing. These techniques can be used to perform various operations on the images. The proposed method helps in removing noise in an image during image acquisition and preserves edges also which may be further used for detecting edges to produce better segmentation results.

Keywords-edge detection, edge preservation, hybrid median filter, median filter, morphology, salt and pepper noise.

I. INTRODUCTION

In image processing, noise reduction and restoration of image is expected to improve the qualitative inspection of an image and the performance criteria of quantitative image analysis techniques. Digital image is inclined to a variety of noise which affects the quality of image. The main purpose of de-noising the image is to restore the detail of original image as much as possible. The criteria of the noise removal problem depend on the noise type by which the image is corrupting. In the field of reducing the image noise several types of linear and non linear filtering techniques have been proposed. Different approaches for reduction of noise and image enhancement [1] have been considered, each of which has their own limitation and advantages.

Image de-noising is a vital image processing task i. e. as a process itself as well as a component in other processes. There are many ways to de-noise an image or a set of data and methods exists. The important property of a good image denoising model is that it should completely remove noise as far as possible as well as preserve edges. Traditionally, there are two types of models i. e. linear model and non-liner model. Generally, linear models are used. The benefits of linear noise removing models is the speed and the limitations of the linear models is, the models are not able to preserve edges of the images in an efficient manner i. e. the edges, which are recognized as discontinuities in the image, are smeared out. On the other hand, Non-linear models [2] can handle edges in a much better way than linear models.

Segmentation refers to a process of partitioning an image into groups of pixels which are homogeneous with respect to some criterion. The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. Segmentation subdivides an image into its constituent parts or objects. The level to which this subdivision is carried depends on the problem being viewed. Sometime we need to segment the object from the background to read the image correctly and identify the content of the image for this reason [15] segmentation techniques are divided into two basic categories: edge-based and region-based.

1) Edge detection is an essential pre-processing step in image segmentation. In this technique, one approach is to partition an image based on abrupt changes in gray level image.Edge detection detects outlines of an object and boundaries between objects and the background in the image. Edge is a boundary between two homogeneous regions. Edge detection refers to the process of identifying and locating sharp discontinuities in an image. [15]

2) Region-based segmentation schemes are based on pixel-intensity values. Each of the pixels in a region is similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly different with respect to the same characteristic(s). [16]

In the proposed algorithm initial results has been obtained by using filtering method. For that hybrid median filter method has been proposed which helps in removing noise in an image which may occur during image acquisition and it also helps in preserving edges and then Morphology based edge detection method is applied for detecting and defining the boundaries of the objects. Morphology refers to the study of forms, structures and algebraic arithmetic operators. For this various morphological operations has been used to maintain good edge information in images and the edges we obtained have no broken lines on entire image and the final edge detection result is one closed boundary per actual region in the image.

II. LITERATURE SURVEY

S. Esakkirajan et al. (2011) [1] described a new algorithm Modified Decision Based Unsymmetric Trimmed Median Filter (MDBUTMF) which gives better performance in comparison with existing noise removal algorithms in terms of PSNR and IEF. The performance of the algorithm has been tested at different noise densities on both gray-scale and color images. Even at high noise density levels the MDBUTMF gives better results in comparison with other existing algorithms. Both visual and quantitative results are demonstrated. The algorithm is effective for salt and pepper noise removal in images at high noise densities.

Priyanka Kamboj et al. (2013) [2] described that Enhancement of a noisy image is necessary task in digital image processing. Filters are used best for removing noise from the images. Various types of noise models and filters techniques have been described. Filters techniques are divided into two parts linear and non-linear techniques. After studying linear and non-linear filter each of have limitations and advantages.

Shanmugavadivu et al. (2012) [3] proposed a filter which is more effective in restoring the images corrupted with fixed value impulse noise. As the proposed filter is computationally simple, the restoration rate is faster. This filter finds application in eliminating noise from various scanning images, used in the study of surface morphology, because these images are invariably degraded by fixed value impulse noise.

Shanmugavadivu P et al. (2011) [4] defined a newly devised noise filter namely, Adaptive Two-Stage Median Filter (ATSM) to denoise the images corrupted by fixed-value impulse noise. The performance of the proposed filter is proved to be better in terms of Peak Signal-to-Noise Ratio and human visual perception. This filter is effectual in denoising the highly corrupted image.

K. S. Srinivasan et al. (2007) [5] discussed a new decision-based algorithm for restoration of images that are highly corrupted by impulse noise. The new algorithm shows significantly better image quality than a Standard Median Filter and various nonlinear filters. The proposed method, unlike other nonlinear filters, removes only corrupted pixel by the median value or by its neighboring pixel value.

V. Jayaraj et al. (2010) [6] described the new method which introduces the concept of substitution of noisy pixels by linear prediction prior to estimation. A novel simplified linear predictor is developed for this purpose. The objective of the scheme and algorithm is the removal of high-density salt and pepper noise in images.

K. Aiswarya et al. (2010) [7] described a new algorithm to remove high-density salt and pepper noise using modified sheer sorting method. The new algorithm has lower computation time when compared to other standard algorithms. Results of the algorithm are compared with various existing algorithms and it is proved that the new method has better visual appearance and quantitative measures at higher noise densities.

GnanamballIlango et al. (2011) [8] introduced various hybrid filtering techniques for removal of Gaussian noise from medical images. The performance of Gaussian noise removing hybrid filtering techniques is measured using quantitative performance measures such as RMSE and PSNR. The experimental results indicate that the Hybrid Max Filter performs significantly better than many other existing techniques and it gives the best results after successive iterations. The method is simple and easy to implement.

Shihu Zhu (2011) [9] proposed the new method of edge detection based on multi-structure elements morphology and image fusion. Edges are detected using four different orientations SE (structure element) where direction angles of all the structure elements are 0°, 45°, 90°, 135°and final edge result is got by image fusion using entropy weighted method. The proposed method not only can effectively eliminate the image noise, but also effectively maintain good edge information.

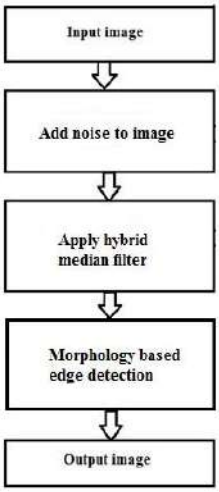
C.NagaRaju (2011) [10] proposed an edge detection algorithm based on multi- structure elementsmorphology. The eight different edge detection results are obtained byusing morphology gradient algorithm and final edge results are obtainedby using synthetic weighted method. The proposed algorithm resultsare compared with the conventional mathematical morphological edgedetection and differential edge detection operators such as Watershed method, Sobel operator and Canny operator and obtained the betteredges over traditional methods.

Sabina Priyadarshini (2010) [11] proposed a new technique of edge detection that employs simple additions and divisions and finds out fine edges. It makes use of a threshold that is computed automatically during the edge detection process and it's simple to compute the threshold value. It is based upon simple arithmetic and logic operations, consisting of three procedures: image binarization, image contraction and image subtraction. The proposed method is a computationally simpler and performs better than Sobel's method and requires much lesser computation than Sobel's method.

III. PROPOSED ALGORITHM

1) Add salt and pepper noise to the image.
2) Check for each pixel whether it is corrupted or not.
3) Remove all the corrupted pixels and collect the remaining ones and find median of them using hybrid median filter.
4) In this filter we can apply median filter of different shapes and sizes. So Hybrid median filter is median of got medians values which will not only remove salt and pepper noise but also preserves edges after filtering.
5) After preserving the edges then convert the image into a Gray scale image.
6) Detect the edges of image using Morphology based Edge detection method.

IV. FLOWCHART FOR PROPOSED ALGORITHM



V. CONCLUSION AND FUTURE WORK

Image restoration is the process of eliminating or reducing noise from a degraded image with an objective to recover, the original image. Noise is a quality degradation factor that is measured as unwanted/unrelated information present in the image. Several nonlinear filters have been proposed for the restoration of images contaminated by salt and pepper. In the most of the existing work effort are made to remove impulse noise (salt and pepper noise).This paper describes efficient method for removing salt and pepper noise in corrupted images after filtering and it also preserves edges. This paper also presents efficient image segmentation technique. The proposed method solved the problem of broken edges of objects in the images and final edge detection result is one closed boundary per actual region in the image.

In near future we will propose a new integrated method which will suppresses the impulse noise with higher degree of edge preservation and edge detection to produce segmentation results and this work can be further enhanced to extract objects from different types of images.

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An Efficient Routing Algorithm in Survivable Optical Network

Satnam Singh[#1], Shaminder Singh[*2], Jasmeen Gill[*3]

[1#]CSE,[2#]CSE ,[3#]CSE, [1#]PTU,[2#]PTU ,[3#]PTU
[1#]GGI,Khanna, India
[2]Ph.D. Scholar PTU, India,[3*]Ph.D. Scholar PTU, India*
[1]s.ghuman55@gmail.com
[2]er_shaminder@yahoo.co.in
[3]er.jasmeengill@gmail.com

Abstract*— Survivability of a network refers to a network's capability to provide continuous service in the presence of failures. In a wavelength division multiplexing (WDM) network, as a single channel may be carrying tens of gigabits of data per second, a single failure would cause a huge amount of service disruption to a large number of users. This paper introduces of an efficient technique for designing survivable routing schemes for optical networks while keeping the number of light paths as low as possible. The results shown in this paper prove that the blocking probability of the proposed algorithm increased with the increase in the offered load per unit link and also compared the two conventional algorithm first fit routing algorithm and best-fit routing algorithm. The comparison clears proposed algorithm is effective routing algorithm and it can be used for the networks with larger load.

Keywords*— Wavelength division multiplexing (WDM) network, Survivable Optical networks, routing algorithms, Dijkstra algorithm, rerouting.

I. INTRODUCTION

A routing algorithm establishes the path that follows to reach their destination. The performance of a network is extremely influenced by specific properties of the routing algorithms. Between these properties, three are of greater significance, deadlock, live lock freedom and adaptivity. Adaptivity is the talent of a routing algorithm to route packets through specific paths in the presence of contention or defective components. Survivability is the network's capability to provide continuous service in the presence of failures. The restoration schemes differs in their best guess about the functionality of cross-connects, traffic demand, performance metric, and network control. The routing algorithm for the optical networks has been used for dynamic provisioning of light path.[9]

The survey suggests that several algorithms have been proposed for routing and for joint working and spare capacity planning in optical networks. These techniques have better performance on WDM optical network and are suitable for network cost. Most of the work had been done in the field of fixed and alternative routing. Some of the gaps exist in the case of various concepts like rerouting and dynamic routing on the basis of various parameters like traffic, number of channels, blocking probability and optimization of routes with or without wavelength conversion. Regarding the Robustness and performance of routing algorithms for survivable optical network has not been properly covered or evaluated. The motive of this study is to develop adaptive and accurate routing algorithms and a better expression in between source to destination routing by calculating the blocking probabilities with respect to load and number of channels and paths or links.

Firstly, the paper goes through their abstract and introduction about the work that has been done.Then the introduction has been covered .Then study survivability of the WDM optical network and different routing schemes. In the next chapter the routing schemes are taken into consideration. After that Design of the routing algorithm has been covered for providing lightpaths dynamically. Implementation of the routing algorithm on to the given logical network topology for better performance as compared to existing algorithms. The next chapter covers the experimental results on some randomly generated optical network topology on the basis of different parameters like load, number of channels and links, and blocking probability. Finally we have concluded our paper with some remarks and directions for future works.

II. SURVIVABILITY OF WDM OPTICAL NETWORKS

Survivability of a network refers to a network's capability to provide continuous service in the presence of failures. Survivability paradigms are classified based on their re-routing methodology as path/link based, execution mechanisms as centralized/distributed, by their computation timing as pre computed/real time, and their capacity sharing as dedicated/shared. There are two basic ways of fault recovery to ensure optical network survivability. A categorization of fault management scheme for WDM optical network is depicted in the figure 1. below [7][11]:

A. Protection scheme

Protection-based techniques are based on the provisioning of backup paths to recover from a failure. During the period of establishing light paths, network resources are kept reserved, such that, when a failure occurs, data can be rerouted around the affected links/light paths. In a traditional path protection scheme ,if a logical edge is established from node i to node j ,then two light paths are actually setup . There are two commonly used protection schemes:

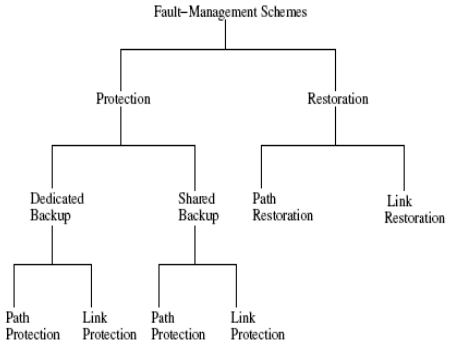

Figure 1. A categorization of fault management schemes [7]

- Shared path protection: In case of shared path protection, spare capacity is shared among different protection paths. Shared path protection is quite difficult to implement. It is more capacity efficient.
- Dedicated path protection: In dedicated path protection, the spare capacity is dedicated to individual protection paths. Dedicated path protection is easy to implement but is less capacity efficient [7].

B. Dynamic restoration scheme

Restoration-based techniques, on the other hand, dynamically search for the spare capacity in the network to establish new light paths in order to restore the affected services after a network failure is detected.There is no allocation of resources for back up paths at design time. Such techniques are more efficient in terms of resource utilization. However, restoration takes longer time than protection to restore services (since back up paths are not known in advance) and there is no guarantee that all the affected light paths can be restored. In summary, either protection and restoration schemes require the setting up or the creation of new light paths, when a fault is detected [12][15].

III. ANALYSIS OF ROUTING SCHEMES

There are a number of wavelength routing techniques used in the optical network. In this research three routing schemes are considered, namely, fixed routing, alternate routing and exhaust routing.

In fixed routing, only one route is provided for a node pair. Usually this route is selected to be the shortest route. When a connection request connects for a node pair the route fixed for that node pair is found for the availability of a free wavelength. In alternate routing, two or more routes are provided for a node pair. These routes are found one by one in a predetermined order. Usually, the predetermined order of these routes is ordered in non-decreasing order according to their length. In exhaust routing, all possible routes are found for a node pair. The state of the network is represented as a graph and a shortest-path-finding algorithm is used on the graph. While the exhaust routing has the best performance as compared to the other two routing techniques, but it is computationally more complex. Similarly, the fixed routing method is simpler than alternate routing method but it has a poorer performance than the other [4][15][16][13].

In fixed routing, fixed alternate routing and some methods for wavelength assignment schemes have been planned with the objective of minimizing the blocking probability for dynamically establishing lightpaths. This type of routing is according to a random pattern of new connection requests and connection holding times. A routing algorithm establishes the paths that messages must follow to reach their destination. There are certain routing algorithms. These algorithms display interesting tradeoffs between their degree of adaptivity and the number of virtual channels needed for deadlock-free operation [3].

A. Wavelength Channels in Optical Spectrum

There are certain properties of the routing algorithm on which the performance of an interconnection network depends. Amongst which two are of greater importance: One is adaptivity that refers to the ability to route packets in the presence of contention or faulty components through alternative paths. This is just a reverse process of deterministic routing in which a message, originating at a specific source node, is always routed through the same path to reach a specific destination [3].

Another is Deadlock and live lock freedom which is the ability to guarantee that messages will not block across the network forever. When message is unable to advance towards its destination as it is blocked by other messages that cannot advance towards their destination in a similar manner, the deadlock situation occurs. In other word, it can be said that the deadlock situation occurs when messages indefinitely wander across the network and can never reach their destination. Live lock is another property of the routing algorithm. It may only occur when the routing algorithm in a network is non-minimal.[3]

B. *Sequential Algorithms*

In this class of algorithms, the cost objective used for increase optimization is not sure to be unique and is usually dependent on the ordering of assigning. This means that we look at each SD (Source-Destination) pair (in an ad-hoc order) and distribute each unit of traffic one at a time. The sequential algorithms are very different from the previous class of algorithms because the outcome of these algorithms is mainly depends on the order of demand routing.

C. Minimum Marginal Cost Routing

In this method, according to the traffic, we consider all the possible paths and choose the path those results in minimum increase in the overall cost. In other words, choose the path with the minimum marginal cost, where the marginal cost of a path is defined as the sum of marginal costs of the links in the path. Here is a step by step description:

1) Choose an SD pair w of the set of SD pairs that have not been routed yet.

2) For all paths Pw (paths that according to the SD pair w), calculate the marginal cost of routing one extra unit of traffic. Only consider the paths that have not been congested.

3) Choose the path with the lowest marginal cost.

4) Go to step 2 until all the demand for the SD pair w is satisfied.

5) Go to step 1 until there are no more SD pairs left to be routed.

D. Shortest Path Routing

This is the simplest method of all,for each unit of traffic, it uses the shortest feasible path where the length of a path is defined as the number of links in it. Note that if we use purely linear costs, this method and the previous minimum marginal cost method are same. Again here is a step by step description of this method:

1) Choose an SD pair w of the set SD pairs that have not been routed yet.
2) For all paths Pw (paths that's correspond to the SD pair w), find the shortest path that has not been routed.
3) Route all the traffic demand of w through this path until either all the traffic demand for w is satisfied or the path is routed.
4) Go to step 2 until all the demand for the SD pair w is satisfied.
5) Go to step 1 until there are no more SD pairs left to be routed.

Apart from wavelength conversion and space division multiplexing there is another method to reduce the bandwidth loss caused by the wavelength continuity constraint in wavelength routed networks called Wavelength rerouting [6] [17].

IV. REROUTING SCHEME FOR SURVIVABLE NETWORKS

Rerouting is an idea which was initially introduced in the design of circuit-switched telephone networks [7][8]. This is simply the action of switching an existing lightpath or connection from one route to another route without changing the source and destination. Wavelength rerouting scheme is a technique which is used for reduction of the bandwidth loss because of wavelength continuity constraint in wavelength routed network. Wavelength rerouting creates a wavelength-continuous route by shifting few existing lightpaths to new wavelengths without changing their route. It's going to a few existing lightpaths to new wavelengths by creating a wavelength-continuous route that satisfy a new connection request. It has also been applied to optical WDM networks recently. A complete survey of rerouting techniques can be found in [14] [5] [18]. Rerouting algorithms may generally be categorized as follows:

- Passive rerouting: - whenever the simple routing procedure failed. Then the rerouting procedure tries to get the new connection request by migrating Some existing lightpaths/connections [10] [2].
- Active rerouting: - active rerouting is same as passive rerouting, but the main difference is the rerouting procedure of active rerouting is typically controlled by a timer and it periodically shifts/migrates existing light paths/connections for better performance [2].
- Lightpath level rerouting: - At the full wavelength capacity, the traffic of lightpaths is rerouted in granular form [7][2].
- Connection level rerouting: - At the different bandwidth, the traffic of connections is rerouted in granular form [1].

Wavelength rerouting is applicable to networks with dynamic traffic demand. In the case of failure of any network component, it is also useful. When the components of the network such as node or link failed, then the lightpaths that currently exist in it also failed. New lightpath requires to be established between end nodes of failed lightpaths for restore the service on these lightpaths. For restoration of wavelength rerouting of affected lightpaths is done by with the help of unaffected lightpaths. [10] [2].

V. DESIGN AND IMPLEMENTATION

There are a number of routing techniques used in the optical network as a preliminary study. For the design of survivable optical network, shortest path (Dijkstra algorithm) algorithm is better than others. This algorithm is used for select a suitable path in the presence of different paths. Last of this section, study the blocking probability that be used for checking the fault in different paths.

A. Proposed model

A dynamic routing algorithm is proposed which is an improvement of the shortest path algorithm. In this algorithm, first of all the source-destination (SD) pair is selected and then the route is established using the shortest path algorithm (Dijkstra Algorithm). Next the route is checked for any fault. If the fault does not exist that means blocking probability is reduced. If the fault exists on the selected path then that path is left and the next path in the order of shortest ath is selected. In this way the blocking probability is reduced to a certain extent. Flow chart of this proposed routing algorithm can be easily illustrated by the figure 2. The algorithm works in two phases: In the first phase, a route for a new connection requests is selected on the basis of the shortest path.

If such a route does not exist the phase 2 is performed. In second phase, a route for a new connection request is selected and the path is checked for the fault if the fault exists then the next path in order of the shortest path algorithm is selected, leading to the adaptive algorithm.

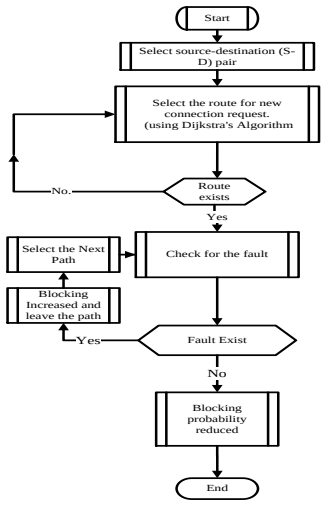

Figure 2. Proposed Routing Algorithm.

Working of proposed routing algorithm is given below according to the number of steps:

1. Initialize the number of channels
2. Initialize the maximum value of Load on the links
3. Initialize the numbers of paths in the network
4. Select the source destination pair
5. Find the path sequence for all paths
6. Initialize paths
7. Initialize the blocked calls
8. Initialize fault
9. Sort the paths in increasing order of blocking probability
10. Select the shortest path with least blocking probability
11. Check for route
12. If route exist
    a. Check for the fault on the path
    b. If fault exist
        i. Select the next path in order of blocking probability
        ii. blocked calls=blocked calls + 1
        iii. Go to step 10
    c. If no fault exist
        i. Select the same path
7. Clear all temp storage elements
8. Calculate the blocking probability in terms of %age
9. Plot the values

B. RESULTS

The routing algorithm proposed for survivable network and the performance of this routing is calculated in terms of blocking probability .We implement the routing algorithm on the network topology and find out different observations. Table I represent the network topology according to the source-destination pairs and tells us about necessary parameters like physical route, wavelength and route length, which used for the result of shortest path (Dijkstra) algorithm.

TABLE I PHYSICAL ROUTE AND NUMBER OF WAVELENGTHS

S-D Pair	Physical Route	Wavelength	Route Length
1-5	1-5	λ1	1
	1-4-5	λ1	2
	1-3-5	λ1	2
	1-2-5	λ1	2
	1-2-4-5	λ1	3
	1-2-3-5	λ1	3
	1-3-2-5	λ1	3
	1-3-4-5	λ1	3
	1-4-3-5	λ1	3
	1-4-2-5	λ1	3
	1-2-3-4-5	λ1	4

4.3.2 Scenario

In this section, scenario has been taken from the fixed values of number of channel and paths. The value of blocking probability is observed by varied the maximum values of load. Then suitable path is selected according to the minimum load or fault free.

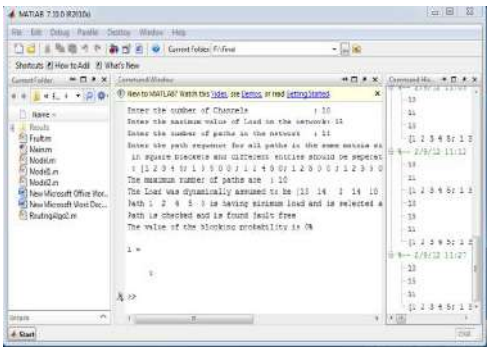

FIGURE 3. SCENARIO1

Scenario 1, the number of channels and links are given. By varied the value of load, the blocking probability is calculated and path is dynamically selected by using the simulation tool MATLAB 7.10.0 (R2010a), the environment created different observation with respect to varies the value of load.
The path is selected dynamically according to the proposed routing algorithm. According to different scenario, Table II. describe the values of the given parameters and conclude that blocking probability is directly proportional to the load.

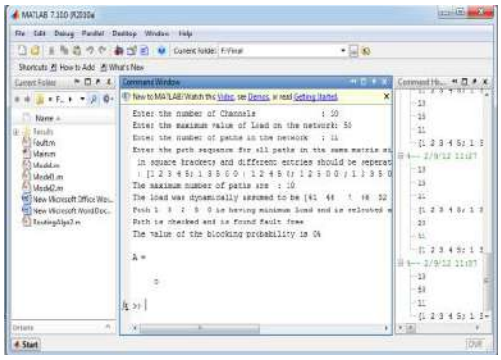

FIGURE 4. SCENARIO 2

Scenario 2, the load is equal to 50 Erlang and blocking probability is zero approximately.

TABLE II DESCRIBE THE RESULT OF DIFFERENT SCENARIO

S.no.	No. of channel	No. of path	Load(Erlang)	Selected path	Blocking probability (%)
1`	10	11	15	1-2-4-5	0
2	10	11	50	1-3-2-5	0
3	10	11	100	1-2-3-5	0.0056
4	10	11	1000	1-3-2-5	31.034

VI. CONCLUSION

The objective of this paper was to develop an efficient technique for designing survivable routing schemes for

optical networks and comparison of the proposed work with the conventional algorithms. In this paper, we have presented a quick and efficient heuristic for survivable routing. In current WDM networks, it is possible to support hundreds of WDM channels on a single fiber. Therefore, the cost of the transmitters and the receivers, and hence the number of lightpaths, is becoming the main factor in determining the cost of a WDM network. We have tried to keep the number of lightpaths required to implement a topology as low as possible. The results shown in this paper prove that the blocking probability of the proposed algorithm increased with the increase in the offered load per unit link. We have also compared the two conventional algorithm first fit routing algorithm and best-fit routing algorithm. The comparison clears that the blocking probability of the network for proposed algorithm is 8.6431 x 10-009% for proposed algorithm whereas its value is 4 x 10-2 % in case of conventional algorithm, which proves that the proposed algorithm is effective routing algorithm and it can be used for the networks with larger load.

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PATTERN RECOGNITION

Jaspreet kaur[1]
Department of Computer science,
Guru Nanak Dev University, Regional Campus
Gurdaspur, India
anukahlon35@yahoo.in

Avneet kaur[2]
Department of Computer science,
Guru Nanak Dev University, Regional Campus
Gurdaspur, India
jas.khurana03@gmail.com

Abstract*--Pattern Recognition is one of the very important and actively searched trait or branch of artificial intelligence. It is the science which tries to make machines as intelligent as human to recognize patterns and classify them into desired categories in a simple and reliable way. This review paper introduces the basic concepts of pattern recognition, the underlying system architecture and provides the understanding of various research models and related algorithms for classification and clustering.

***Keywords*-- Pattern Recognition, Supervised Learning, Unsupervised learning, PCA, ANN.**

I. INTRODUCTION

The process of recognizing patterns and classifying data accordingly has been gaining interest from a long time and human beings have developed highly sophisticated skills for sensing from their environment and take actions according to what they observe. So a human can recognize the faces without worrying about the varying illuminations, facial rotation, facial expressions, and facial biometrical changes. But if the point of implementing such recognition artificially came, then it becomes a very complex task. The fields of artificial intelligence have made this complex task possible by making machines as intelligent as human to recognize patterns in varying environmental conditions. Such a branch of artificial intelligence is known as pattern recognition. Pattern Recognition provides the solution to a lot of problems that fall under the category of either recognition or classification, such as speech recognition, face recognition, classification of handwritten characters, medical diagnosis etc.

A. Pattern

A pattern is a set of objects or phenomena or concepts where the elements of the set are similar to one another in certain ways or aspects. There are various definitions proposed for the term pattern. "A pattern is essentially an arrangement. It is characterized by the order of the elements of which it is made, rather than by the intrinsic nature of these elements. It is defined that a pattern is "opposite of a chaos; it is an entity, vaguely defined, that could be given a name". "It can also be defined by the common denominator among the multiple instances of an entity. For e.g., commonality in all fingerprint images defines the fingerprint pattern; thus, a pattern could be a fingerprint image, a handwritten cursive word, a human face, a speech signal, a bar code, or a web page on the Internet". The following are some of the examples of patterns.

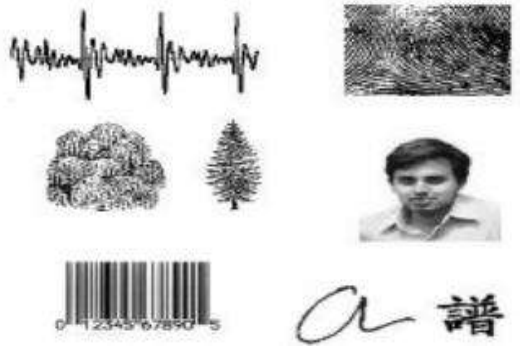

Fig. 1. Example of Patterns: Finger Print, Sound Wave, Tree, Face, Bar Code & Character Image.

B. Pattern category

It is a collection of similar, not necessarily identical objects. Often, individual patterns may be grouped into a category based on their common properties; the resultant is also a pattern and is often called a pattern category [1].

C. Pattern recognition

It is defined as the study of how machines can observe the environment, learn to distinguish various patterns of interest from its background, and make reasonable decisions about the categories of the patterns. During recognition, the given objects are assigned to a prescribed category.

D. Pattern recognition system

The design model of a pattern recognition system essentially involves the following three steps:

- Data acquisition and preprocessing: Here the data from the surrounding environment is taken as the input and given to the pattern recognition system. The raw data is then preprocessed by either removing noise from the data or extracting pattern of interest from the background so as to make the input readable by the system.
- Feature extraction: Then the relevant features from the processed data are extracted. These relevant features collectively form entity of object to be recognized or classified.
- Decision making: Here the desired operation of classification or recognition is done upon the descriptor of extracted features [5].

II. PATTERN RECOGNITION MODELS

There are four basic models followed in pattern recognition; these are statistical model, syntactical or structural model, template matching model and neural network based model.

A. Statistical model

It is the most intensively used model in pattern recognition systems because it is the simplest to handle. The statistical pattern recognition systems are based on statistics and probabilities. Here each pattern is described in terms of feature sets. Feature sets are chosen in such a way that different patterns occupy non-overlapping feature space. The effectiveness of the feature set is determined by how well patterns from different classes can be separated i.e., there is a proper interclass distance. After performing the analysis of the probability distribution of a pattern belonging to a certain class, a decision boundary is determined. Here the patterns are projected to some pre-processing operations to make them suitable for training purposes. Features are selected after analyzing the training patterns. System learns from the training patterns and adapts itself to recognize or classify the unknown test patterns. Feature measurement is done while testing, i.e., distance between the patterns is determined in the statistical space and then these feature values are presented to learnt system and in this way classification is performed [2].

B. Syntactic model

These models are also named as structural models for pattern recognition and are based on the relation between features. Here the patterns are represented by structures which can take into account more complex relations between features unlike the numerical feature sets used in statistical pattern recognition models. Also the patterns used in this model forms a hierarchical structure composed of sub-patterns. In this model, the patterns to be recognized are called primitives and the complex patterns are represented by the inter-relationship formed between these primitives and the grammatical rules associated with this relationship. In syntactic pattern recognition, a similarity is associated between the structure of patterns and the syntax of a language. The patterns are the sentences belonging to a language, primitives are the alphabet of the language, and using these primitives, the sentences are generated according to the grammar. Thus, the very complex patterns can be described by a small number of primitives and grammatical rules. This approach is considered to be an appealing model in pattern recognition because, in addition to classification, it also provides a description of how from the primitives the given pattern is constructed due to its hierarchical structure. This paradigm has been used in situations where the patterns have a definite structure which can be captured in terms of a set of rules. The implementation of a syntactic model approach, however, leads to many difficulties because of the segmentation of noisy patterns (to detect the primitives) and the inference of the grammar from training data. This may yield a combinatorial explosion of possibilities to be investigated, demanding a very large training sets and huge amount of computational efforts.

C. Template matching model

This is a widely used model in image processing to determine the similarity between two samples, pixels or curves to localize and identify shapes in an image. In this model, a template or a prototype of the pattern to be recognized is available. Each pixel of the template is matched against the stored input image while taking into account all possible position in the input image, each possible rotation and scale changes. In visual pattern recognition, one compares the template to the input image by maximizing the spatial cross-correlation or by minimizing a distance: that provides the matching rate. After calculating the matching rate for every possibility, select the largest one which exceeds a predefined threshold. It is a very expensive operation while dealing with big templates and using large sets of images. Also it does not work efficiently in the presence of distorted patterns. The given figure explains about the steps performed in template matching process. Herethe first figure is the input image and a small portion of it acts as a test template. Then matching is performed and the position of template is marked.

D. Neural network model

Neural networks can be viewed as a parallel computing systems consisting of an extremely large number of simple processors with many interconnections between them. Typically, a neural network or to be more specific, an artificial neural network (ANN) is a self-adaptive trainable process that is able to learn and resolve complex problems based on available knowledge. An ANN-based system behaves in the same manner as how the biological brain works; it is composed of interconnected processing elements that simulate neurons. Using this interconnection, each neuron can pass information to another. Artificial Neural network models attempt to use some organizational principles such as learning, generalization, adaptivity, fault tolerance and distributed representation, and computation in the network of weighted directed graphs in which the artificial neurons forms the nodes of the model and the directed edges (with weights) are connections between neuron outputs and neuron inputs. The weights applied to the connections results from the learning process and indicate the importance of the contribution of the preceding neuron in the information being passed to the following neuron. The main characteristics of all the neural networks are that they possess the ability to learn complex nonlinear input-output relationships, use sequential training procedures, and adapt themselves to the data. The following diagram is a two layer neural network with one input layer constituting of three neurons and one output layer with two neurons and corresponding weights are assigned in between them.

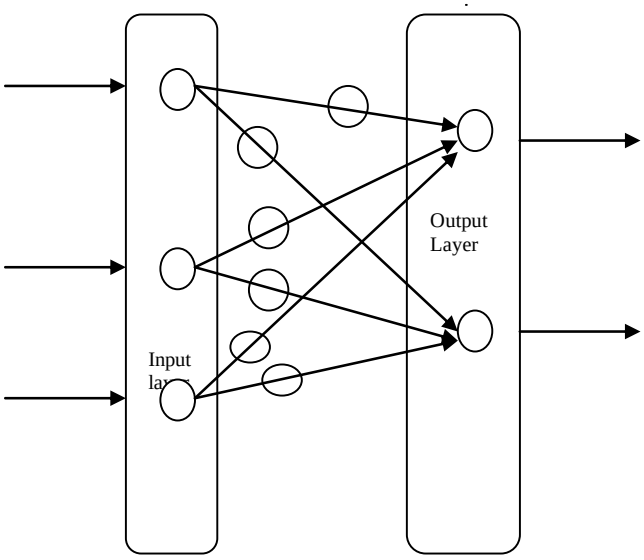

Fig.2. Example Of An Artificial Neural Network

Table 1. Highlights the important characteristics of the above explained pattern recognition models

Model	Representation	Recognition function	Typical Criterion
Statistical	Features	Discriminant function	Classification error
Syntactic or structural	Primitives	Rules, Grammar	Acceptance Error
Template Matching	Sample, pixel, curves	Correlation, distance measures	Classification error
Neural network	Sample, pixel, features	Network functions	Mean square error

III. PATTERN RECOGNITION ALGORITHMS

The field of pattern recognition has been explored widely by a number of researchers who as a result have developed various algorithms. The design pattern of all these algorithms consists of three basic elements, i.e., data perception, feature extraction and classification. There are various different techniques to implement these three basic elements. So which technique is chosen for each element in design cycle defines the algorithm characteristic of the pattern recognition algorithm.

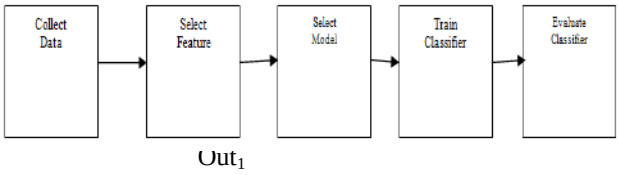

Fig.3. Basic Pattern Recognition Model

A. Supervised learning

Supervised learning is a process of allotting a function to some desired category as learnt from supervised training data. Here the training data consist of a set of training examples where each set consist of a pair consisting of an input object and a desired output value. A supervised learning algorithm learns from this training pair relationship and produces an inferred function. In simple terms, in supervised learning, there is a teacher who provides a category label or cost for each pattern in the training set which is used as a classifier So basically a supervised learning method is used for classification purpose. In the given figure, the input image consists of a mixture of two alphabets, i.e., A and B. Then the classification algorithm classifies the input to two different categories.

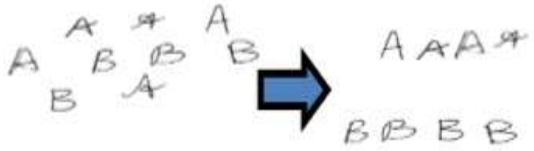

Fig.4. Example of Supervised Learning.

B. Unsupervised learning

Un-supervised learning can be defined as the problem of trying to find out the hidden structure in an unlabeled data set. Since the examples given to the learner are unlabeled, each algorithm itself classifies the test set. In simple terms, here no labeled training sets are provided and the system applies a specified clustering or grouping to the unlabeled datasets based on some similarity criteria. So an unsupervised learning method is used for clustering.

Here the input consists of some unlabeled values whose distinguishing feature is initially not known. The following input consists of such a combination with all values technically same but still its clusters are formed using some metric which is different for each algorithm [4].

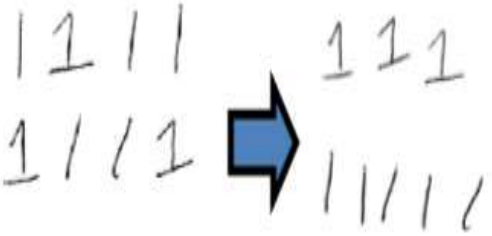

Fig.5. Example of Unsupervised Learning

IV. CLASSIFICATION ALGORITHMS

A. Linear Discriminant Analysis (LDA)

It is used to find a linear combination of features which characterizes or separates two or more classes of objects or events. LDA is a parametric approach in supervised learning technique. It was initially used for dimensionality reduction and feature extraction, and later moved for classification purpose also.LDA easily handles the cases where the within-class frequencies are unequal and their performances had been examined on randomly generated test data. Thus it maximizes the ratio of between-class variance to the within-class variance in any particular data set thereby guaranteeing maximal separability. Linear discriminant analysis has a close relation with Principal Component Analysis (PCA). Both methods are used for dimensionality reduction. LDA have been proven better algorithm when compared with PCA.The prime difference between LDA and PCA is that PCA does more of feature classification and LDA does data classification. In working with PCA, the location of the original data set changes when transformed to a totally different space whereas LDA doesn't change the location but only tries to provide more class separability and draw a decision region between the given classes.

B. Decision Trees

It is considered to be a decision support tool that uses a tree-like structure or model of decisions and all its possible consequences. It is one way to display an algorithm. These trees are basically used in operations research, mostly in decision analysis, to help identify a strategy most likely to reach a goal. In this process, a decision tree and the closely related influence diagram is used as a visual and analytical decision support tool where the expected values of competing alternatives are calculated. Decision trees are a simple, but very powerful form of multiple variable analysis. The trees provide unique capabilities which act to be supplement, complement, and substitute for

- Traditional statistical forms of analysis (such as multiple linear regressions)
- A lot of data mining tools and techniques (such as neural networks)
- The recently developed multidimensional forms of reporting and analysis found in the field of business intelligence. The decision trees are produced by algorithms which identify various ways of splitting the data set into branch-like segments. These segments form an inverted decision tree which starts with a root node at the top of the tree. Each node starting from root contains the name of field which is also called object of analysis. The decision rule is discovered based on a method that extracts the relationship between the object of analysis (that serves as the target field in the data) and one or more fields that serve as input fields to create the branches or segments. The values of the input field are used to estimate the likely value of the target field which can also be termed as an outcome, response, or dependent field or variable. Once the relationship is found, then one or more decision rules can be derived which describe the relationships between inputs and targets. Then these decision rules can be used to predict the values of new or unseen observations which contain values for the inputs, but might not contain values for the targets.

C. Artificial Neural Networks

It is an interconnected network of a group of artificial neurons. An artificial neuron can be considered as a computational model which is inspired by the natural neurons present in human brain. Unlike natural neurons, the

complexity is highly abstracted when modeling artificial neurons. These neurons basically consist of inputs (like synapses), which are further multiplied by a parameter known as weights (strength of each signals), and then computed by a mathematical function which determines the activation of the neuron. After this there is another function that computes the output of the artificial neuron (sometimes in dependence of a certain threshold). Thus the artificial networks are formed by combining these artificial neurons to process information.

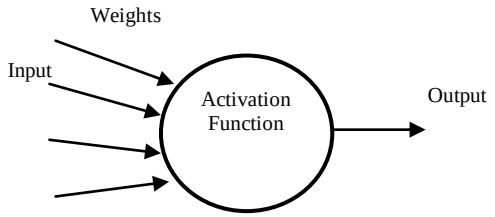

Fig.**6.** An Artificial Neuron

We can train ANN for best matched solution; ANN can perform fuzzy matching and provides the optimal solution. It also acts as a classifier in pattern recognition. It falls under the category of supervised learning where the model initially learns from the training data set and then classifies the test image using the learnt knowledge.

D. Support Vector Machine

A Support Vector Machine (SVM) performs classification by constructing an N-dimensional hyperplane that optimally separates the data into two categories. A support vector machine (SVM) is used in computer science for a set of related supervised learning methods that analyze input data and learns from it and then use it for performing classification and regression analysis. The standard SVM is a two-class SVM which takes a set of input data and predicts the possible class, for each input, among the two possible classes the input is a member of, which makes it a non-probabilistic binary linear classifier. Given the set of training examples where each one of them is marked as belonging to one of the two categories, the SVM training algorithm builds a model that assigns new examples into one category or the other. SVM is an efficient method of finding an optimal hyperplane for separating non-linear data also. Presently, the traditional two-class SVM is also used in multiclass classification where the data to be classified may belong to any one class among a number of classes [1].

V. CLUSTERING ALGORITHMS

A. Hierarchical Clustering:

It is a process used in data mining concept where it can be defined as a method of cluster analysis which works to build a hierarchy of clusters. It is a widely used data analysis tool. The idea behind hierarchical clustering is to build a binary tree of the data that successively merges similar groups of points and visualizing this tree provides a useful summary of the data. Hierarchical clustering strategies generally fall into two types:

- Agglomerative: This is a "bottom up" approach of hierarchical clustering where each observation starts with one single cluster, and then pairs of clusters are merged as one move up the hierarchy. In Agglomerative clustering, each level of the resulting tree is a segmentation of the data. Hence the algorithm results in a sequence of grouping and then it is up to the user to choose a natural clustering from this sequence.
- Divisive: This is a "top down" approach of hierarchical clustering where all the observations start in one cluster, and splits are performed recursively as one moves down the hierarchy. Here a dissimilarity measure is required between the sets of observations to decide which all clusters should be combined for agglomerative clustering, or where a cluster should split for divisive clustering. Mostly in hierarchical clustering, this measure is achieved by use of an appropriate metric and a linking criterion which specifies the dissimilarity of sets as a function of the pair wise distances of observations in the sets. [3]

B. K-means Clustering:

As a process employed in data mining, k-means clustering is defined as a method of cluster analysis which aims to partition n different observations into k different clusters in which each observation belongs to the cluster with the nearest mean. Although this problem is computationally very difficult and has been put under the NP hard problem set, there are efficient heuristic algorithms that are commonly employed and converge quickly to a local optimum. Such algorithms are similar to the expectation-maximization algorithm for mixtures of Gaussian distributions via an iterative refinement approach employed by both algorithms.

VI. APPLICATIONS OF PATTERN RECOGNITION

Within medical science, pattern recognition is the basis for computer-aided diagnosis (CAD) systems. CAD describes a procedure that supports the doctor's interpretations and findings.

Other typical applications of pattern recognition techniques are automatic speech recognition, classification of text into several categories (e.g., spam/non-spam email messages), the automatic recognition of handwritten postal codes on postal envelopes, automatic recognition of images of human faces, or handwriting image extraction from medical forms. The last two examples form the subtopic image analysis of pattern recognition that deals with digital images as input to pattern recognition systems.

Optical character recognition is a classic example of the application of a pattern classifier, see OCR-example . The method of signing one's name was captured with stylus and

overlay starting in 1990. The strokes, speed, relative min, relative max, acceleration and pressure is used to uniquely identify and confirm identity. Banks were first offered this technology, but were content to collect from the FDIC for any bank fraud and did not want to inconvenience customers..

- Artificial neural networks (neural net classifiers) and Deep Learning have many real-world applications in image processing, a few examples:
- Identification and authentication: e.g., license plate recognition, fingerprint analysis and face detection/verification.
- medical diagnosis: e.g., screening for cervical cancer or breast tumors;
- Defense: various navigation and guidance systems, target recognition systems, shape recognition technology etc [5].

VII. CONCLUSION

It has always been difficult to decide which algorithm is best to classify patterns with least computational effort, least time and maximum and best results. In this review paper, various categories of pattern recognition algorithms are discussed. Pattern recognition field has a wide range of applications in the field of classification, clustering, regression, sequence labeling and parsing among which this paper reviews the algorithms of the most applied field on pattern recognition, i.e., classification. The classification approach to pattern recognition uses labeled training set with which it classifies the test unlabeled data to the desired category.

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Performance Analysis of Mobile Ad-hoc Networks under Jellyfish Attack

Arminder Kaur
M.Tech Research Scholar
Dept. of Electronics & Communication
Amritsar College of Engg. & Tech.
Amritsar, Punjab, India
arminder05@gmail.com

Dr. TanuPreet Singh
Professor & Head
Dept. of Electronics & Communication
Amritsar College of Engg. & Tech.
Amritsar, Punjab, India
tanupreet.singh@gmail.com

Abstract-Mobile ad hoc networks (MANETs) are highly vulnerable as there is no presence of trusted centralized authority and dynamic network topology. Due to such characteristics of MANET various kind of attacks are possible. In this paper we have doneperformance analysis of MANET under JellyFish attack. There are three kinds of JellyFish attacks i.e. JF Reorder Attack, JF Periodic Dropping Attack, JF Delay Variance Attack.Specificallly, we study performance analysis of three reactive routing protocols i.e. AODV, DSR and TORA used in mobile ad hoc network under JF delay variance attack with increasing node density.We also study how the number of attackers and their positions affect the performance metrics of a connection such as packet delivery ratio, throughput, end-to-end delay, and delay jitter.

Index Terms- MANET, Jellyfish Attack, AODV, DSR, TORA, TCP.

I.INTRODUCTION

MANET contains mobile nodes, communicating in a multihop manner without any fixed infrastructure i.e, access points.A malicious attacker can easily access this kind of networkbecause of the lack of strong defence mechanism and high mobility of nodes. Compared to wired networks, MANETs are morevulnerable to security attacks due to the lack of atrusted centralized authority, lack of trust relationshipsbetween mobile nodes, easy eavesdroppingbecause of shared wireless medium, dynamic networktopology, low bandwidth, and battery andmemory constraints of mobile devices. Among all the research issues, security is anessential requirement in MANET environments.Jellyfish is a newdenial of service attack that exploits the end to end congestioncontrol mechanism of TCP (Transmission Control Protocol)which has a very devastating effect on the throughput. The Jelly fish attacker nodes fully obeys protocol rules, hence thisattack is called as passive attack. Due to JF attack, high end to end delay takes place in the network.

II. TYPES OF ATTACKS IN MANET

The security attacks in MANET can be classified into two major categories as usual, namely passive attacks and active attacks [8] as shown in Figure 1.

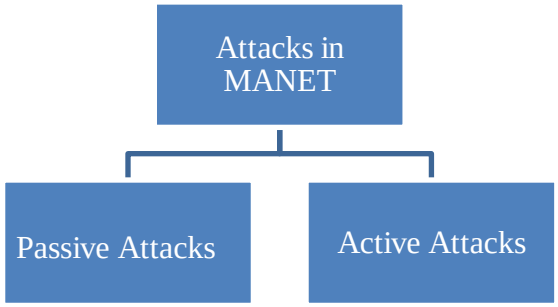

Figure 1.Attacks in MANET

A. Passive Attacks

A passive attack monitors unencrypted traffic and looks for clear-text passwords and sensitive information that can be used in other types of attacks.Passive attacks include traffic analysis, monitoring of unprotected communications, decrypting weakly encrypted traffic, and capturing authentication information such as passwords. The attacker does not disrupt the operation of a routing protocol but only attempts to discover valuable information by listening to the routing traffic.

The major advantage for the attacker in passive attacks is that in a wireless environment the attack is usually impossible to detect.

B. Active Attacks

In an active attack, the attacker tries to break secured systems. It can be internal (attacker within the network) or external (attacker outside the network). This can be done through viruses, wormsor Trojan horses. Active attacks include break protection features, to introduce malicious code, and to steal or modify information.It can disturb network operation by modifying or deleting information, injecting a false message or impersonating a node.

III. JELLYFISH ATTACK

- The Jellyfish attack is one of the denials of service attack. The Jelly fish attacker nodes fully obeys protocol rules, hence this attack is called as passive attack [12]. The goal of jellyfish node is to diminish

the good put, which can be achieved by dropping some of packets.

- Jellyfish attacks are implemented in the samemanner as blackhole attacks, except that an attacker, after gaining access to the routing path, will delay every data packet for a random amount of time ranging from zero to 10 seconds before forwarding the packet. Due to this nodes can change the sequence of the packets also drop some of the data packets. Due to JF attack, high end to end delay takes place in the network. So the performance of network (i.e. throughput etc) decreases substantially.
- Jellyfish attacks work on MANETs that use protocols with congestion control techniques, such as the Transmission Control Protocol (TCP), in the transport layer. In particular, many applications such as file transfer, messaging, and web will require reliable, congestion controlled delivery as provided by TCP. JF attacker disrupts the whole functionality of TCP, so performance of real time applications become worse. [7]
- JellyFish attack is related to transport layer of MANETstack. The JF attacker disrupts the TCP connection which is established for communication. Jelly fish attacks are targeted against closed-loop flows. The Jellyfish attack is one of those kinds.
- A malicious node launching Jellyfish attacks may keep active in both route discovering and packet forwarding in order to prevent it from detection and diagnosis, but the malicious node can attack the traffic via itself by reordering packets, dropping packets periodically, or increasing jitters. The Jellyfish attack is especially harmful to TCP traffic in that cooperative nodes can hardly differentiate these attacks from the network congestion.

Figure 2 shows the JellyFish Attack Snenario, where node JF is a Jellyfish, and node S starts to communicate with node D after a path via the Jellyfish node is established. Then the Denial of service attacks launched by node JF will cause packet loss and break off the communications between nodes S and D eventually.

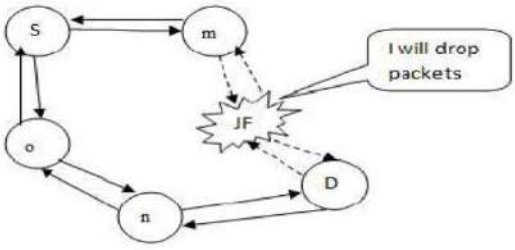

Figure 2. Jellyfish Attack Scenario

JellyFish attack is divided into three categories- JF Reorder Attack, JF Periodic Dropping Attack, JF Delay Variance Attack.

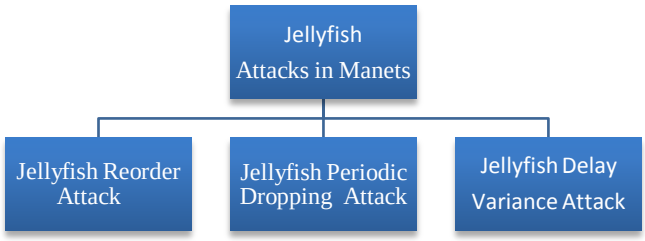

Figure 3. Types of JellyFish Attack

A. Jellyfish Reorder Attack

In this attack JF nodes maliciously re-order packets. In this attack, JF deliver *all* packets, yet after placing them in a re-ordering buffer rather than a FIFO buffer. Consequently, we will show that such persistent re-ordering of packets will result in near zero goodput, despite having all transmitted packets delivered.This attack is possible due to well known vulnerability of TCP. Jelly fish attacker uses this vulnerability to record packets. This is possible because of factors such as route changes or the use of multipath routing.[4]

B. Jellyfish Periodic Dropping Attack

The JF Periodic dropping attacking nodes drop all packets for a short duration (e.g., tens of ms) once per RTO. Periodic dropping is possible because of sarcastically chosen period by the mischievous node. This kind of periodic dropping is possible at relay nodes. Suppose that congestion losses force a node to drop a% of packets. Now consider that the node drops a% of packets periodically then TCPs throughput may be reduced to near zero even for small values of a [4].These attacks exploit a weakness in TCP which means that if packet losses occur periodically near the Retransmission Time Out (RTO) time-scale, then end-to-end throughput is almost reduced to zero.

C. JF Delay Variance Attack

In this type of attack, the malicious node randomlydelays packet without changing the order of thepackets [4] and then it delays data packets for some amount of time before forwarding. Due to JF delay variance attack, high end- to-end delay takes place inthe network and performance of the network (i.e. throughput etc) becomes worse.High delay variation can cause TCP to send traffic in bursts due to "self-clocking," which leads to increase collisions and loss. It also causes misestimationsof available bandwidth. High delay variation leadsto an excessively high Retransmission time out (RTO) value. Packets delayed by the JF attacker have the potential to significantly reduce throughput of network. Intruder (JellyFish) node waits for a variableamount of time before forwarding each packet. They maintain FIFO order of packets, but significantly increase delay variance.[3]

IV. PERFORMANCE METRICS:

A. Average Packet Delivery Ratio (PDR)

PDR is the ratio of data packets delivered to the destination to those generated by the sources.[1] It is calculated as follow:

$$PDR = \frac{Number\ \ of\ \ Packets\ \ Recieved}{Number\ \ of\ \ Packets\ \ Sent} * 100 (1)$$

B. Average Throughput (TP)

Average TP is the number of bytes received successfully [1] and it is calculated as follow:

$$TP = \text{Number of Bytes Received} * 8 * \text{Simulation Time} * 1000\text{kbps} \quad (2)$$

C. Average End-to-End Delay (e2e delay)

Average e2e delay is the average time of the data packet to be successfully transmitted across the network from source to destination. It includes all possible delays such as buffering during the route discovery latency, queuing at the interface queue, retransmission delay at the MAC, the propagation, and the transfer time[1]. The average e2e delay is computed as follow:

$$\text{e2e delay} = \sum_{i=1}^{n}(Ri - Si) / n (3)$$

Where n is the number of data packets successfully transmitted over the network, i is the unique packet identifier, Ri is the time at which a packet with a unique identifier i is received and Si is the time at which a packet with a unique identifier i is sent.

D. Average delay jitter

Delay jitter is the variation (difference) of the inter-arrival intervals from one packet received to the next packet received. Each receiver calculates the average per-source delay jitter from the received packets originated from the same source. The receiver then takes the average over all the sources to obtain the average per-receiver delay jitter. The average delay jitter is the average of the per-receiver delay jitters taken over all the receivers.[5]

V. IMPACT OF JELLYFISH ATTACK ON PERFORMANE OF MANET:

A.PERFORMANCE ANALYSIS OF THREE REACTIVE ROUTING PROTOCOLS (AODV,DSR,TORA) USED IN MANET UNDER JELLYFISH DELAY VARIANCE ATTACK.

Jellyfish attacker first needs togain access to the routing paths. If successful, it then delaysall data packets it receives for a random period of time ranging from zero to 10 seconds before forwarding them.under the presence of JF delay variance attack. Some of the observations are:

1)If we change number of nodes from 20 to 30 then increment in end-to-end delay is more in case of AODV protocol and less for DSR protocol under JF attack. So, with reference to delay DSR protocol performs well with increasing node density (as shownin Table I).

TABLE I. END-TO-END DELAY

	End-to-end Dealy(msec)					
	Node Density Twenty			Node Density Thirty		
	AODV	DSR	TORA	AODV	DSR	TORA
Normal Flow	60.56	5.56	6.16	215.81	10.1	41.26
JF Attack	68.75	6.1	12.44	301.04	12.1	65.29

Figure 4 shows end-to-end delay with normal flow (zero attackers) and also in the presence of JF attackers for all given three protocols. Node density is twenty. Figure 5 shows end-to-end delay with normal flow (zero attackers) and also in the presence of JF attackers for all given three protocols. Node density is thirty.

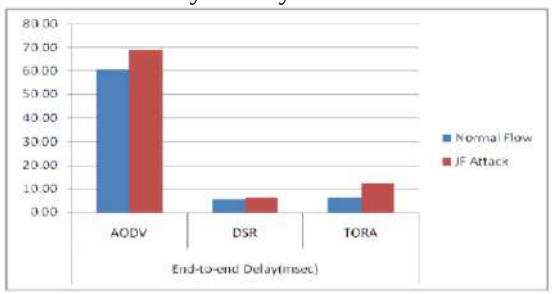

Figure 4. End-to-end Delay for node node density twenty [3]

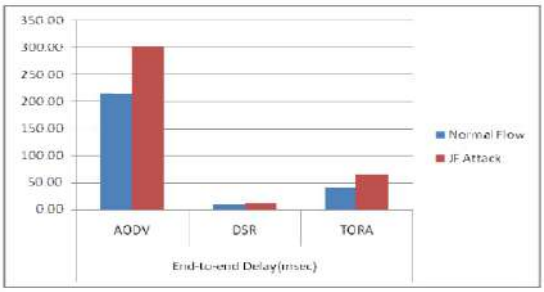

Figure 5.End-to-end Delay for node density thirty[3]

2) In case of throughput, the decrement in throughput is less for TORA and more for AODV protocol with increasing number of nodes. So, regarding throughput TORA protocol performs well with increasing nodes density (as shown in Table II).

TABLE II. THROUGHPUT

	Througput(Kbps)					
	Node Density Twenty			Node Density Thirty		
	AODV	DSR	TORA	AODV	DSR	TORA
Normal Flow	535.01	131.95	235.74	1125.50	296.87	821.65
JF Attack	451.66	113.32	203.23	996.02	247.57	763.50

Figure 6 shows throughput (kbps) with normal flow (zero attackers) and also in the presence of JF attackers for all given three protocols. Node density is twenty. Figure 7 shows throughput (kbps) with normal flow (zero attackers) and also in the presence of JF attackers for all given three protocols. Node density is thirty.

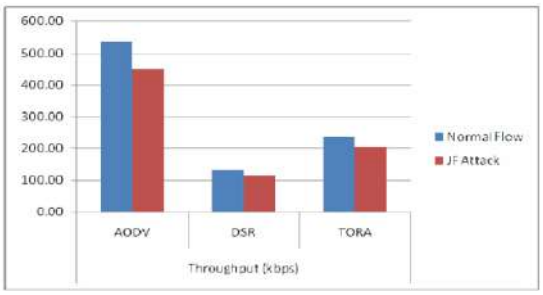

Figure 6. Throughput (kbps) for node density twenty [3]

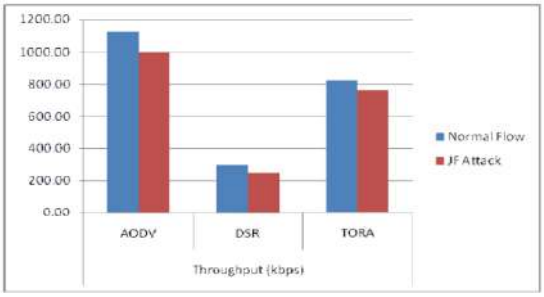

Figure 7. Throughput (kbps) for node density thirty [3]

3)Table III and Table IV shows the impact of node density on End-to-end delay and Througput.Some of the Key Findings are:

a) If we have a mobile ad hoc network in which probability of occurrence of JF attack is high and we want a good time efficient network service for information exchange with increasing number of nodes then we have to choose DSR protocol (as shown in Table III).

b) If we want a good throughput efficient and consistent service in the network with increasing node density then we have to go for TORA protocol (as shown in Table IV).

Table III : IMPACT OF NODE DENSITY (ND) ON END-TO-ENDDELAY

	Increment in End-to-end Delay (msec) under JF attack		
	AODV	DSR	TORA
ND=20	8.19	0.54	6.28
ND=30	85.23	2.01	24.03

Table IV : IMPACT OF NODE DENSITY (ND) ON THROUGHPUT

	Decrement in Throughput (bps) under JF attack		
	AODV	DSR	TORA
ND=20	833341.94	18633.41	32504.92
ND=30	129489.32	49291.27	58151.58

B. PERFORMANE ANALYSIS USING NUMBER OF ATTACHER AND THEIR POSITIONS IN MANET USING AODV ROUTING PROTOCOL

Jellyfish attack depends heavily on many factors such as the number of flows, node mobility, traffic load, and the number of attackers as well as their positions.[4] The more attackers there are in the network, the more damage they inflict on a flow in terms of packet delivery ratio, or delay and delay jitter (jellyfish attack).

1) Jellyfish Attack: Number of Flows

Figs. 8 and 9 show that the higher the number of attackers, the longer the EED and the larger delay jitter. The graphs also show that higher number of flows result in higher EED and delay jitter, as it creates a higher chance for jellyfish attackers to be in the routing paths. This explains that when there is only one flow in the network, it is harder for jellyfish attackers to locate the routing path and interfere with the data flow.

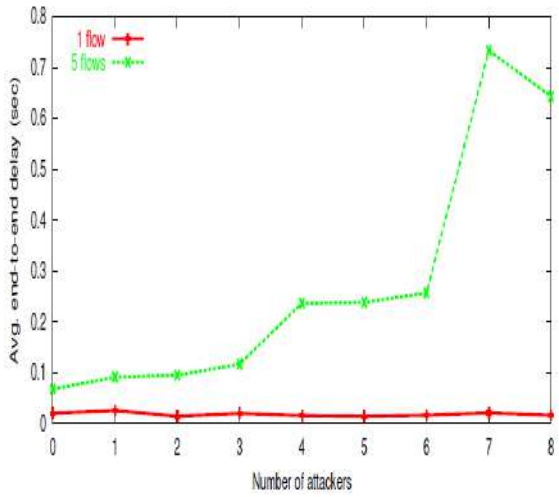

Figure 8: Number of flows: End-to-end delay[5]

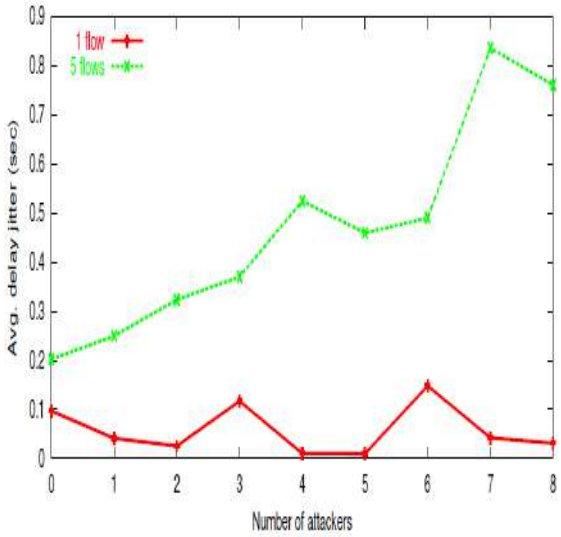

Figure 9: Number of flows: Delay jitter[5]

2)Jellyfish Attack: Node Mobility

In general, the higher the mobility speeds, the higher the EED and delay jitter. However, if the node mobility is too high (e.g., 5, 10 or 15 m/s), then the network will experience more frequent link breaks, resulting in very low PDR and throughput. nodes without any movement had higher PDR and throughput than nodes with mobility speeds of 5, 10, and 15 m/s but lower PDR and throughput than those with mobility speed of 1 m/s. (Figs. 10 and 11). However, there is one exception: the no-mobility case, which was expected to have the smallest EED and delay jitter, actually had higher EED and delay jitter than the 1 m/s case. It is because a slow mobility speed makes it a little harder for jellyfish attackers to invade into the routing paths.[5]

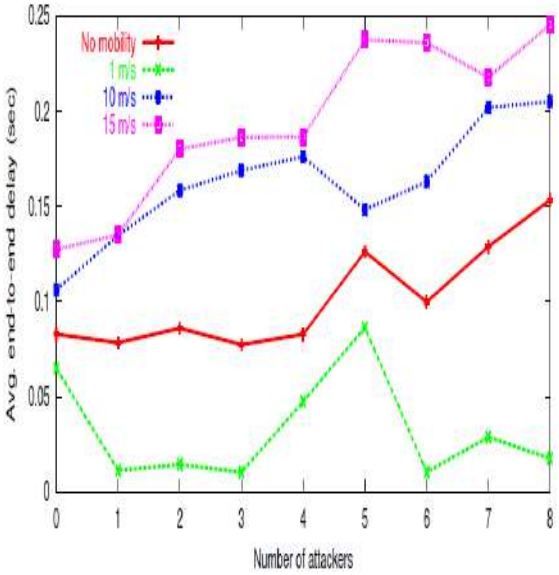

Figure 10: Node Mobility: End-to-end delay[5]

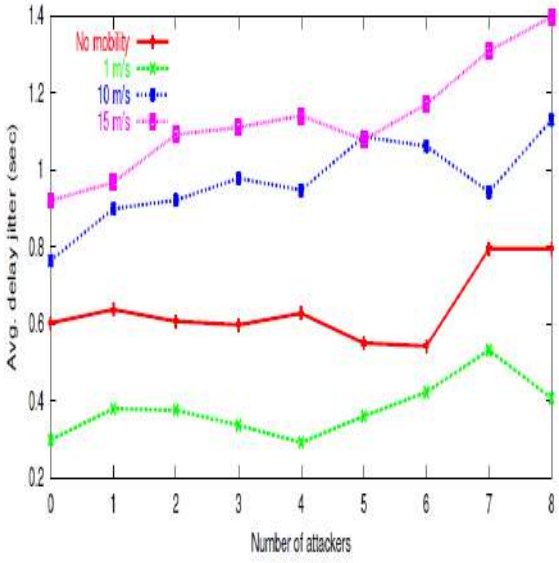

Figure 11: Node Mobility: Delay jitter[5]

The EEDs and delay jitters for different traffic loads as a function of the number of attackers are shown in Figs. 12and 13. As the number of attackers increased, the EEDs and delay jitters of all the traffic loads also increased. Moreover, the graphs show that with the same number of attackers, the higher the traffic load, the higher the EED and delay jitter. One of the reasons is due to higher transmission rate and more collisions in the network. Another reason is that with high traffic load, data packets arrive at a attacker node at a much higher rate. As a result, more data packets will be captured and delayed by the attacker, resulting in higher EED and delay jitter.

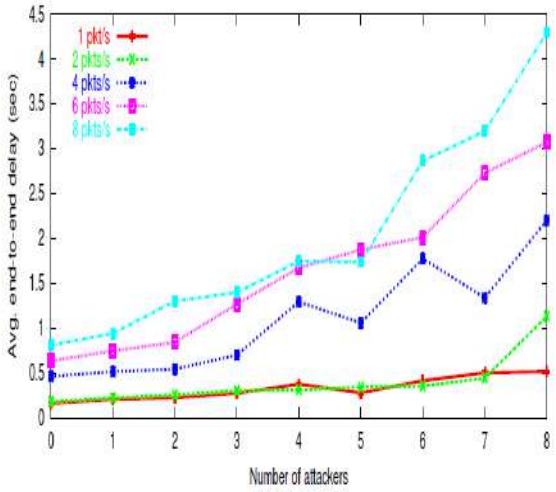

Figure 12: Traffic Load: End-to-end delay[5]

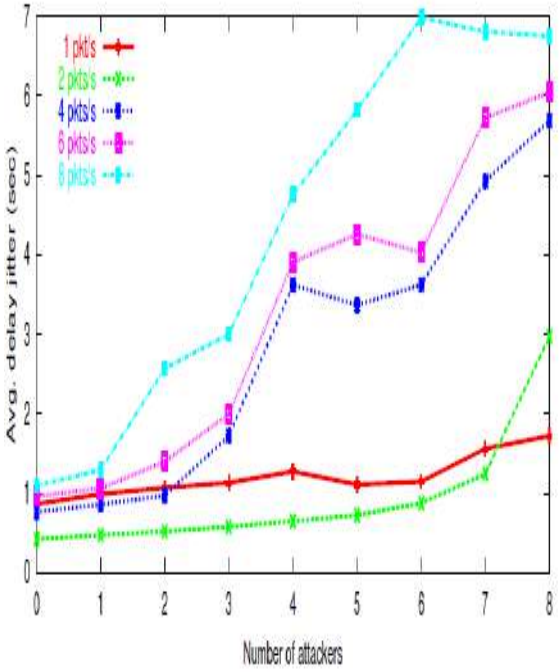

Figure 13: Traffic Loads: Delay jitter[5]

3) Jellyfish Attack: Traffic Load

4) Jellyfish Attack: Attack Positions

The effects of jellyfish attacks on the packet end-to-end delay and the delay jitter in the four cases near the senders, near the receivers, around the network center, and uniformly distributed over the entire network area. Figs.14 and 15 display the simulation results. The near-sender position was the most powerful attack location, causing the highest EED and delay jitter compared to other positions.

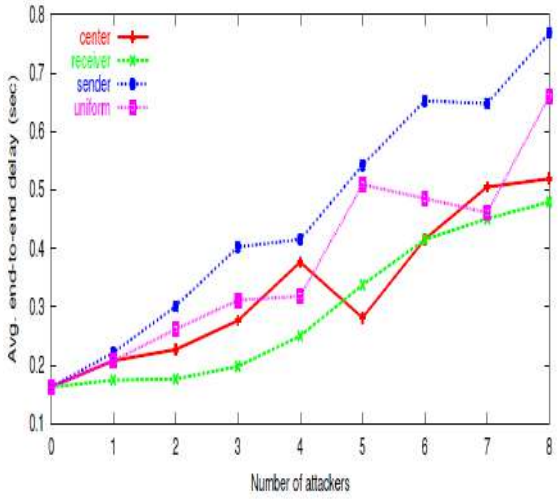

Figure14: Attack positions: End-to-end delay[4]

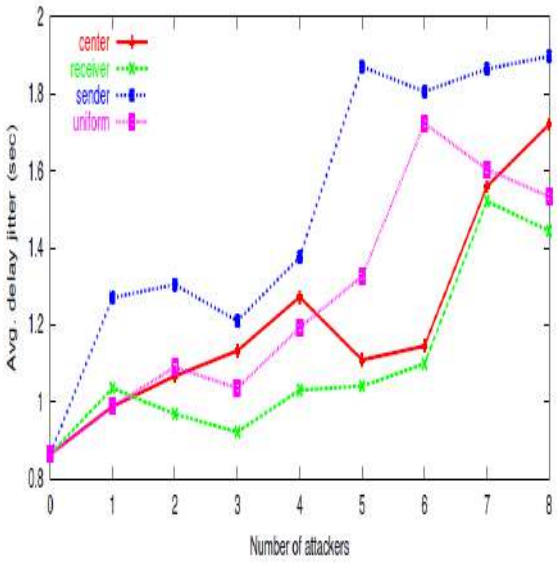

Figure 15: Attack positions: Delayjitter[4]

VI. CONCLUSION

This paper gives review about the Jellyfish attacks which increase the packet end-to-end delay and delay jitter.
Here, we try to evaluate the performance of three reactiveprotocols i.e. AODV, DSR and TORA which are implemented in mobile ad hoc network under the presence of JF delay variance attack. Some of the observations are:

If we have a mobile ad hoc network in which probability of occurrence of JF attack is high and we want a good time efficient network service for information exchange with increasing number of nodes then we have to choose DSR protocol (as shown in Table III). If we want a good throughput
efficient and consistent service in the network with increasing node density then we have to go for TORA protocol (as shown in Table IV).
We also try to evaluate the performance of MANET under jellyfish attackk using difeerentnumber of attacher and their positions using AODV routing protocol.Some of the observations are:
The more attackers there are in the network, the more damage they inflict on a flow in terms of packet delivery ratio or delay and delay jitter. In particular, a network witha high density of connections is easier for attackers to capturethe routes and hence the data packets. On the other hand, mobile nodes may create extra difficulties for attackers to intrude into the routing paths, as the paths may change due to node mobility. But if the mobility is too high, then the network performance will suffer because of frequent link breaks. With respect to attack positions, areas near the senders are the most damaging positions, which is consistent with earlier results.

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A REVIEW OF 4G TECHNOLOGIES

Parambir Singh
Assistant Professor
Department of Information Technology
Amritsar College of Engineering & Technology

Jagdeep Singh
Associate Professor
Department of Information Technology
Amritsar College of Engineering & Technology

Abstract- ***The goal of 4G is to replace the current proliferation of core cellular networks with a single worldwide cellular core network standard based on IP for control, video, packet data, and VoIP. In recent years, there has been a plenty of paradigm shifts occurring in the way people across the world could connect and collaborate. Nowadays, wireless connectivity is almost everywhere and getting highly affordable even for people who are in the bottom of the pyramid. However wireless connection is liable for several changes and challenges and therefore is far more complex to implement and sustain than a wired system. Now, with the cool arrival of third and fourth generation communication technologies, the inhibiting trends such as unpredictability, signal fading, latency, jitter etc., are gradually disappearing for the good. The fourth generation (4G) wireless networks are all set to turn the current networks into end-to-end IP networks. With the massive adoption of IPv6, every single device in the world will have a unique IP address thereby IP based devices, networks and environments are going to shine in the days to unfurl. This significant transition enables everything tangible in our midst to join into the raging Internet bandwagon in order to be remotely monitored, managed and manipulated.[1] If 4G is implemented correctly and comprehensively, it will truly and tantalizingly harmonize global roaming, high-speed connectivity, and transparent end-user performance on every mobile device in the world. 4G is set to deliver 100mbps to a roaming mobile device globally and up to 1gbps to a stationary device. This allows video conferencing, streaming picture-perfect video and much more. The maturity and stability of 4G technologies therefore breeds innovation at faster pace and hence possibilities for novel and people-centric services are huge. In this paper, we have highlighted the following critical issues for the leading wireless broadband standards such as WiMAX, Mobile WiMAX and 3GPP-LTE. This paper specifically discuss about the below-mentioned in detail.***

- ***The evolution of mobile service from the 1G (first generation) to 4G (Fourth Generation***
- ***The configuration details of Mobile WiMAX and LTE***
- ***Benefits and usage patterns of these systems***
- ***Comparison of these standards in order to enable users to choose the best as per his requirements and preferences.***

Keywords-WiMAX, 802.16e, 3GPP-LTE, SWOT

I. INTRODUCTION

Wireless technology for Internet access is rapidly spreading throughout the world. It will not be long until every corner of the globe is connected to the Internet via Wi-Fi. Portable laptop computers are produced, manufactured and released in a steady stream with upgraded 802.11 a/b/n connectivity chipsets, enabling technical and non-technical users to connect to the Internet via speedy wireless connections. Competent and compact wireless technologies have emerged and evolved in
order to fulfill the soaring expectations of businesses as well as end-users.[1] Currently third-generation (3G) communication technologies are on the widespread usage across the continents, countries and counties and cities. WiMAX (both fixed and mobile) versions are being pampered and promoted vigorously by standard bodies.

II. NEXT GENERATION COMUNICATION STANDARD

Equipment manufacturers, product vendors, and researchers have already plunged into experimenting and espousing next generation (4G) technologies. In a nutshell, accessing and availing information and Internet services anywhere, anytime, any device, any channel, and any media are becoming so common and casual these days with the maturity of wireless communication standards, infrastructures, and handy devices. Handheld terminals are undergoing real transformations in accommodating multiple functions through integration and miniaturization of hardware modules.

The Internet is stuffed with a number of professional and personal services that could be accessed using any kind of portable, wearable, nomadic and wireless devices. Especially for video and other rich services, we need true broadband technologies. That is, video, voice and data are getting smoothly merged to be transmitted through a single channel without much latency and viewed in a single device with all clarity. The 4G concept supports the provisioning of multiple types of services, ranging from simple network access to complex multimedia virtual reality, including voice communication services, which are themselves a challenge in packet-based mobile communications environments. Due to the heterogeneity of the access technologies, the Internet Protocol version 6 (IPv6) is being targeted as the common denominator across multiple access technologies, and make the solution basically independent of the underlying technology - and therefore future-proof. However, fitting such important concepts as support for Quality of Service (QoS),

Authentication, Authorization, Accounting and Charging (AAAC) and mobility into the native Internet architecture poses numerous difficulties and is a real challenge [2].
Voice services are now among the most demanding in terms of network design, imposing hard limits on network performance. In order to handle these services we will use the Expedited Forward (EF) concept of the differentiated services framework.4G will provide unconceivable amounts of bandwidth to the palm of a user. Matching current Local Area Network speeds, 4G networks will provide 100MBps on the move. Cheap end user costs, fast, always on, reliable connectivity, where ever you are, whatever you're doing. Some people view 3G as a stop gap until the real 4G network arrives, something which is due around 2010, and will impact every one, everywhere…

III. FEATURES OF 4G WIRELESS SYSTEMS

- Personalization: The operator may send the data to the user depending on his preference or the data can be filtered at the user end depending upon his requirement.
- User friendly: Due to the design in transparency in the design user can utilize the service properly.
- High Usability: The technology will support the end users anytime and anywhere.
- Transmission cost of various multimedia services at a very low cost.
- Support interactive multimedia, voice, video, wireless internet and other broadband services.
- High speed, high capacity and low cost per bit.
- Global mobility, service portability, scalable mobile networks.
- Seamless switching, variety of services based on Quality of Service (QoS) requirements
- Better scheduling and call admission control techniques.
- Ad hoc networks and multi-hop networks.
- Mobility of users across multiple terminals.

IV. TECHNOLOGY PATH

At the end of the 1940's, the first radio telephone service was introduced, and designed to users in cars to the public landline based telephone network. Then, in the 1960 a system launched by Bell Systems, called IMTS, or, "Improved Mobile Telephone Service", brought quite a few improvements such as direct dialing and more bandwidth. The very first analog systems were based upon IMTS and were created in the late 60s and early 70s. The systems were called "cellular" because large coverage areas were split into smaller areas or "cells", each cell is served by a low power transmitter and receiver.

1G: A term never widely used until 2G was available. This was the first generation of cell phone technology. Simple phone calls were all it was able to do [9].1G was an analog system, and was developed in the 70's, 1G had two major improvements, this was the invention of the microprocessor, and the digital transform of the control link between the phone and the cell site. 1G analog system for mobile communications saw two key improvements during the 1970s: the invention of the microprocessor and the digitization of the control link between the mobile phone and the cell site.
2G: 2G first appeared around the end of the 1980's, the 2G system digitized the voice signal, as well as the control link. This new digital system gave a lot better quality and much more capacity (i.e. more people could use their phones at the same time), all at a lower cost to the end consumer. Based on TDMA, the first commercial network for use by the public was the Global system for mobile communication (GSM).
2.5G (GPRS)
2.5G ("**second and a half generation**") is used to describe 2G-systems that have implemented a packet-switched domain in addition to the circuit-switched domain. It does not necessarily provide faster services because bundling of timeslots is used for circuit-switched data services (HSCSD) as well. The first major step in the evolution of GSM networks to 3G occurred with the introduction of General Packet Radio Service (GPRS).
3G: 3G systems promise faster communications services, entailing voice, facsimile and Internet data transfer capabilities. The aim of 3G is to provide these services anytime, anywhere throughout the globe, with seamless roaming between standards. ITU's IMT-2000 is a global standard for 3G and has opened new doors to enabling innovative services and application for instance, multimedia entertainment, and location-based services, as well as a whole lot more. In 2001, Japan saw the first 3G network launched.3G technology supports around 144 Kbps, with high speed movement, i.e. in a vehicle 384 Kbps locally, and up to 2 Mbps for fixed stations, i.e. in a building.
4G: For 1 and 2G standards, bandwidth maximum is 9.6 Kbit/sec, this is approximately 6 times slower than an ISDN (Integrated services digital network). Rates did increase by a factor of 3 with newer handsets to 28.8kbps. This is rarely the speed though, as in crowded areas, when the network is busy, rates do drop dramatically. Third generation mobile, data rates are 384 kbps (download) maximum, typically around 200kbps, and 64kbps upload. These are comparable to home broadband connections.

Figure 1: Enhancements in Technology

This table contains the information pertaining to the speed (uploading & downloading) of various generations and their availability in the market.

		RealWord (avg)		Theoratical (max)		
		Download	Upload	Download	Upload	Availabilty
2.5 G	GPRS	32-42Kbps	15Kbps	114Kbps	20Kbps	Today
2.75G	EDGE	175Kbps	30 /kbps	384Kbps	6oKbps	Today
	UMTS	226Kbps	30Kbps	384Kbps	64Kbps	Today
	W-CDMA	800Kbps	60Kbps	2Mbps	153Kbps	Today
3G	EV-DO Rev.A	1Mbps	500Mbps	3.1Mbps	1.8Mbps	Today
	HSPA 3.6	650Kbps	260Kbps	3.6Mbps	348Kbps	Today
	HSPA 7.2	1.4Mbps	700Kbps	7.2Mbps	2Mbps	Today
Pre-4G	WiMax	3-6Mbps	1Mbps	100Mbps+	56Mbps	Today
	LTE	5-12Mbps	2-5Mbps	100Mbps+	50Mbps	End 2010
	HSPA+	-----	-----	56Mbps	22Mbps	2011
	HSPA 14	2Mbps	700Kbps	14Mbps	5.7 Mbps	Today
4G	WiMax 2(802.16m)	----	----	100Mbps mobile/1Gbps Fixed	60Mbps	2012
	Avanced LTE	-----	----	100Mbps mobile/1Gbps Fixed		2012+

V. MOBILE WIMAX

Mobile WiMAX is a rapidly growing broadband wireless access technology based on IEEE 802.16-2004 and IEEE 802.16e-2005 air-interface standards. The WiMAX forum is developing mobile WiMAX system profiles that define the mandatory and optional features of the IEEE standard that are necessary to build a mobile WiMAX compliant air interface which can be certified by the WiMAX Forum. Mobile WiMAX is not the same as IEEE 802.16e-2005, rather a subset of the IEEE STD 802.16 standard features and functionalities. The WiMAX Forum Network Working Group (NWG) is developing the higher-level networking specifications for Mobile WiMAX systems beyond what is defined in the IEEE 802.16 standard that simply addresses the air interface specifications. The combined effort of IEEE 802.16 and the WiMAX Forum help define the end-to-end system solution for a Mobile WiMAX network.

VI. MAIN FEATURES OF MOBILE WIMAX

- **OFDMA** The mobile WiMAX air interface uses Orthogonal Frequency Division Multiple Access (OFDMA) as the radio access method for improved multipath performance in non-line-of-sight (NLOS) environments.
- **High data rates** The use of multiple-input multiple output (MIMO) antenna techniques along with flexible sub channelization schemes, adaptive modulation and coding enable the mobile WiMAX technology to support both peak downlink and uplink high data rates. Concerning the adaptive modulation
- **Quality of Service** The fundamental premise of the IEEE 802.16 medium access control (MAC) architecture is QoS. It defines service flows which can be mapped to fine granular IP sessions or coarse differentiated-services code points to enable end-to end IP based QoS.
- **Scalability** The mobile WiMAX technology utilizes scalable OFDMA (S-OFDMA) and has the capability to operate in scalable bandwidths from 1.25 to 20 MHz to comply with various spectrum allocations worldwide.
- **Security** The mobile WiMAX incorporates the most advanced security features that are currently used in wireless access systems. These include Extensible Authentication Protocol (EAP) based authentication, Advanced Encryption Standard (AES) based authenticated encryption, and Cipher-based Message Authentication Code (CMAC) and Hashed Message Authentication Code (HMAC) based control message protection schemes.
- **Mobility** The mobile WiMAX supports optimized handover schemes with latencies less than 50 ms to ensure real-time applications such as Voice over Internet Protocol (VoIP).

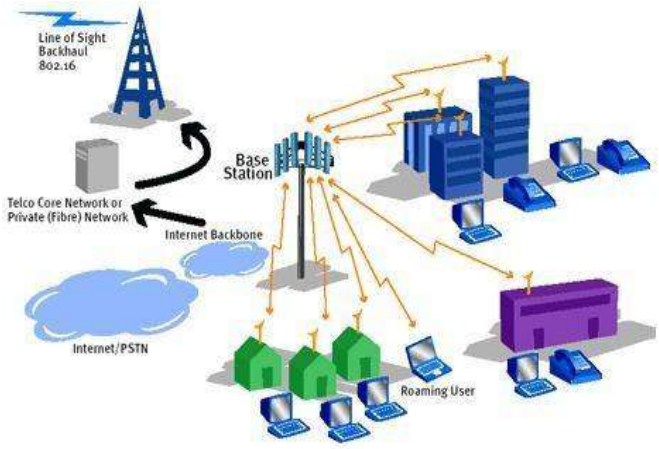

Figure 2: Mobile WIMAX

VII. 3GPP- LTE

The growing commercialization of Global System for Mobile Communications (GSM) and its evolution such as Universal Mobile Telecommunications System (UMTS) with High Speed Packet Access (HSPA) have been the focus topic of 3GPP. The GSM / UMTS system is perhaps the most successful communications technology family and its evolution to beyond 3G becomes important issue for the next global mobile-broadband solution. In parallel to evolving HSPA, 3GPP is also specifying a new radio access technology in Release 8 known as LTE in order to ensure the competitiveness of UMTS.

LTE focuses to support the new Packet Switched (PS) capabilities provided by the LTE radio interfaces and targets more complex spectrum situations with fewer restrictions on backwards compatibility. Main targets and requirements for the design of LTE system have been captured in and can be summarized as follows.

- **Data Rate:** Peak downlink rates of 100 Mbps and Uplink rates up to 50 Mbps for 20 MHz spectrum allocation, assuming 2 receive antennas and 1 transmit antenna at the terminal
- **Spectrum:** Operation in both paired (Frequency Division Duplex / FDD mode) and unpaired spectrum (Time Division Duplex / TDD mode). Enabling deployment in many different spectrum allocations with scalable bandwidth of 5, 10, 15, 20 MHz, and better efficiency (downlink target is 3-4 times better than release 6 and uplink target is 2-3 times better than release 6)
- **Throughput:** Mean user throughput per MHz is 3-4 times (downlink) and 2-3 times (uplink) better than release 6. Cell edge user throughput is also expected to be improved by a factor 2 for uplink and downlink
- **Latency:** Significantly reduced control-plane and user-plane requirements, i.e. less than 5ms in the transmission of an IP packet (user-plane), allow fast transition times of less than 100ms from camped state to active state (control plane)
- **Costs:** Reduced CAPEX and OPEX including backhaul for both operators and users, and effective migration from previous release shall be possible. Technologies of the future are expected to be Long Term Evolution (LTE), Ultra Mobile Broadband (UMB), and IEEE 802.16m WiMAX, the market research firm says. Research finds that 4G technologies will be OFDMA based and will support 100 megabits per second for wide-area mobile applications. In addition, 4G technology roll-outs will most likely start between 2010 and 2012 from Fig-4, and mobile operators will deploy 4G slowly at first, and rely on their EV-DO or HSPA networks to provide for more ubiquitous coverage.

VIII. A COMPARISON OF 802.16E AND 3GPP-LTE

We have studied various key elements of a comparison between the Mobile WiMAX and 3GPP-LTE standards as they converge to 4G broadband wireless access systems. This Comparison focuses mainly on the physical layer aspects of the radio access technology of these two standards as given below Table1.

IX. CONCLUSION

In this paper, we have compared and compiled the various characteristics of each promising and potential wireless broadband technology. As indicated above, there are some critical shortcomings in the present-day 3G technologies and hence technocrats and visionaries are betting and banking on the forthcoming 4G technologies in order to guarantee the envisioned goals behind true mobile broadband. As standards backed systems, solutions and services enable the seamless interoperability and spontaneous interaction, there will be more purposeful and real-time collaboration enhancing people productivity sharply. Service providers as well as consumers are very optimistic about the grand success of next-generation communication technologies in realizing and releasing a stream of people centric services in order to keep up their loyalty. On the other hand, professors and pundits are looking into the aspects of establishing unified, ubiquitous and autonomic communication. 4G standards are immensely contributing for these. Service orientation (SO) promises generation, deployment or delivery of design and run-time service composites, which are more people-aligned.

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	WIMAX	LTE
Network Architecture	IP based, Flat	IP based, Flat
Access Technology	DL: OFDMA (For Mobile WiMAX), UL: OFDMA (For Mobile WiMAX)	DL: OFDMA, UL:SC-FDMA
Duplexing Mode	TDD and FDD; Focus: TDD	TDD and FDD; Focus: FDD
Subcarrier Spacing (in kHz)	Support variable subcarrier spacing ranges from 7 to 20 kHz. Typically 10 kHz (For Mobile WiMAX)	15 kHz (Fixed)
Cell Radius	2-7 km	5 km
Cell Capacity	100-200 users	> 200 users (at 5 MHz), >400 users (for larger Bandwidth)
Spectral Efficiency (in bits/sec/Hz)	3.75	5
MIMO	DL: 2x2, 2x4, 4x2, 4x4 UL: 1x2, 1x4, Code Words: 1	DL: 2x2, 2x4, 4x2, 4x4 UL: 1x2, 1x4, 2x2, 2x4 Code Words:2
Mobility	120 km/h	350 km/h
Handovers	Mandatory: Optimized Hard Handover, Optional: FBSS and MDHO.	Inter frequency Soft Handovers are supported.
Roaming Framework	Work in process	Through existing GSM/UMTS network
Cyclic Prefix Length	Variable: 1/32, 1/16, 1/8 and 1/4.	Normal CP: 5.21 us Extended CP: 16.67 us
Frequency Bands or Spectrum (in GHz)	Licensed:2.3, 2.5, 3.5 Licensed Exempt: 5.8	Licensed, IMT 2000 bands (~2GHz)
Modulation	QPSK, 16-QAM and 64-QAM	QPSK, 16-QAM and 64-QAM
Coding	Turbo Encoder, Convolutional Encoder and LDPC	Turbo Encoder, Convolutional Encoder
Framing, TTI	Variable: 2 to 20 ms, Focus: 5 ms	Fixed: 1msec (2 slots of 0.5 ms)

Number of Symbols in Sub channel/Physical Resource Block	Number of symbols in a Sub channel: 24 x 2 in PUSC mode	Number of symbols in Physical Resource Block: 12x7 (Normal CP)
Peak Data Rate	DL: 75 Mbps, UL: 25 Mbps	DL: 100 Mbps, UL: 50 Mbps

Cell Radius	2-7 km	5 km
Cell Capacity	100-200 users	> 200 users (at 5 MHz), >400 users (for larger Bandwidth)
Spectral Efficiency (in bits/sec/Hz)	3.75	5
MIMO	DL: 2x2, 2x4, 4x2, 4x4 UL: 1x2, 1x4, Code Words: 1	DL: 2x2, 2x4, 4x2, 4x4 UL: 1x2, 1x4, 2x2, 2x4 Code Words:2
Mobility	120 km/h	350 km/h
Handovers	Mandatory: Optimized Hard Handover, Optional: FBSS and MDHO.	Inter frequency Soft Handovers are supported.
Roaming Framework	Work in process	Through existing GSM/UMTS network

Table 1: Comparison of IEEE802.16e and 3GPP-LTE

DETECTION AND SEGMENTATION OF BREAST CANCER MASS IN MAMMOGRAMS USING IMAGE PROCESSING TECHNIQUES

Rahul Vohra
Research Scholar
ACET, ECE Deptt
Amritsar ,Punjab
rvohra57@yahoo.co.in

Sandeep Kaushal
Associate Professor
ACET, ECE Deptt
Amritsar ,Punjab
Sandeep.laddi@gmail.co**Error! Hyperl reference not valid.**

Jaspinder Singh Sidhu
Assistant Professor
RIT, ECE Deptt
Amritsar ,Punjab

Abstract

Breast cancer is the second most dangerous disease in women worldwide, the risk increasing with the age. Breast cancer affects not only women but also men and animals too. Only 1%of all the cases are found in men. There are two types of breast lesions-malignant and benign.10%-30% of the breast cancer lesions are missed because of the limitations of the human observations which is very useful in detecting. Cancer begins in cells, the building blocks that make up tissues. Tissues make up the breasts and other parts of the body. Normal cells grow and divide to form new cells as the body needs them. When normal cells grow old or get damaged, they die, and new cells take their place. Sometimes, this process goes wrong. New cells form when the body doesn't need them, and old or damaged cells don't die as they should. The build up of extra cells often forms a mass of tissue called a lump, growth, or tumour. Cancer that forms in the tissues of breast, usually in the ducts (tubes that carry milk to the nipple) and in the lobules (glands that make milk) is the breast cancer. Early and accurate diagnosis is essential for patient's timely recovery. Generally , biopsy was used for the diagnosis, nowadays mammography, breast Magnetic resonance imaging (MRI) ultrasonography ,testing etc are done.

Keywords: Mammography, Magnetic Resonance Imaging, Fractal Dimension analysis, region growing, Morphological analysis.

I.INTRODUCTION

Early stages of breast cancer and Early stages of this disease is asymptomatic. If we should face any of the symptoms given below ,it is important that we must follow up with our physician. If there will be Change in the size or shape of the breast, nipple discharging take place, include bleeding, nipple pain or itching, change the color of the skin, thickening in the breast. it all depend upon the stages of cancer, if cancer is detected the surgeon first of all determine the staging of the cancer. First stage is the Presence of abnormal cells in breast ducts. Second stage is that in which there are cancer cells but not spread to lymph nodes. Third stage is that in which cancers are invasive and measure about 2-5cm in size and have spread to nearby lymph nodes under arm. Fourth stage in which cancers are invasive and locally advanced and its size should be more then 5cm. Fifth stage in which cancer have to be spread to other parts of the body. Although there are various options of treatments of breast cancer patients, which may include surgery, radiation therapy or chemotherapy. I have come to know that there is no known general theory of image enhancement. When an image is processed for visual interpretation, the viewer is the ultimate judge of how well a method works. The visual evaluation of image quality is highly subjective. The definition of a "good image" becomes an elusive standard used to evaluate algorithm performance. When the problem is the processing images for machine perception, this evaluation task is somewhat easier. For example, in a character recognition application, and not considering other issues such as computational requirements, the best image processing method would be the one that yields the best machine recognition results. However, even in situations when a clear criterion of performance can be imposed on the problem, a certain amount of trial and error usually is required before any image enhancement approach is selected. Image enhancement is used for enhancing a quality of images. The better result for Image enhancement has also used in real time enhancement.. IE techniques when applied to pictures and videos help the visually impaired in reading small print, using computers and television, and face recognition. Colour contrast enhancement, sharpening and brightening are

just some of the techniques used to make the images vivid. Medical imaging uses this for reducing noise and sharpening details to improve the visual representation of the image.My study involves a literature research on diagnostic techniques used for breast cancer and development of a computer-aided diagnosis tool using Matlab for breast segmentation in mammograms. Image enhancement techniques commonly used are spatial and frequency domain filters; moreover, fractal analysis could serve as a preprocessing stage before segmentation in mammograms. In order to extract boundaries of suspected tumor masses, region growing and morphological edge detection algorithms are implemented. They are cataloged into normal, cancer and benign classes.

II.SPATIAL DOMAIN METHOD

Spatial domain techniques directly deal with the image pixels. The pixel values are manipulated to achieve desired enhancement. Spatial domain techniques like the logarithmic transforms, power law transforms, histogram equalization are based on the direct manipulation of the pixels in the image. Spatial techniques are particularly useful for directly altering the gray level values of individual pixels and hence the overall contrast of the entire image. But they usually enhance the whole image in a uniform manner which in many cases produces undesirable results. It is not possible to selectively enhance edges or other required information effectively. Techniques like histogram equalization are effective in many images. The approaches can be classified into two categories: Point Processing operation (Intensity transformation function) and Spatial filter operations. An overview of some of the well known methods is discussed here. Point processing operations (Intensity transformation function) is the simplest spatial domain operation as operations are performed on single pixel only. Pixel values of the processed image depend on pixel values of original image. It can be given by the expression $g(x,y) = T[f(x,y)]$, where T is gray level transformation in point processing.

III.FREQUENCY DOMAIN METHOD

Frequency domain techniques are based on the manipulation of the orthogonal transform of the image rather than the image itself. Frequency domain techniques are suited for processing the image according to the frequency content. The principle behind the frequency domain methods of image enhancement consists of computing a 2-D discrete unitary transform of the image, for instance the 2-D DFT, manipulating the transform coefficients by an operator M, and then performing the inverse transform. The orthogonal transform of the image has two components magnitude and phase. The magnitude consists of the frequency content of the image. The phase is used to restore the image back to the spatial domain. The usual orthogonal transforms are discrete cosine transform, discrete Fourier transform, Hartley Transform etc. The transform domain enables operation on the frequency content of the image, and therefore high frequency content such as edges and other subtle information can easily be enhanced. Frequency domain which operate on the Fourier transform of an image.

- Edges and sharp transitions (e.g. noise) in an image contribute significantly to high frequency content of Fourier transform.

- Low frequency contents in the Fourier transform are responsible to the general appearance of the image over smooth areas. The concept of filtering is easier to visualize in the frequency domain. Therefore, enhancement of image f(x, y) can be done in the frequency domain based on DFT. This is particularly useful in convolution if the spatial extent of the point spread sequence h(x, y) Is large then convolution theory. $g(x, y)= h(x, y)* f(x, y)$ where g(x, y) is enhanced image.

IV.IMAGE ENHANCEMENT

Image enhancement is basically improving the interpretability or perception of information in images for human viewers and providing better input for other automated image processing techniques. The principal objective of image enhancement is to modify attributes of an image to make more suitable for given task and a specific observer. During this process, one or more attributes of an image are modified. The choice of attributes and the way they are modified are specific to a given task. Moreover, observer-specific factors such as the human visual system and the observer's experience will introduce a great deal of subjectivity into choice of image enhancement methods. Image enhancement is used in the following cases:- removal of noise from image, enhancement of dark image and highlight the edges of the objects in an image. The result is more suitable than the original image for certain specific applications. Processing techniques are very much problem-oriented. For example, the best technique for enhancement of X-ray image may not be best for enhancement of microscopic images .There exist many techniques that can be used to enhance an image without spoiling it. The image enhancement is the very good technique and very helpful to detect the tumor and it is also very helpful in medical science to visualize the tumor.

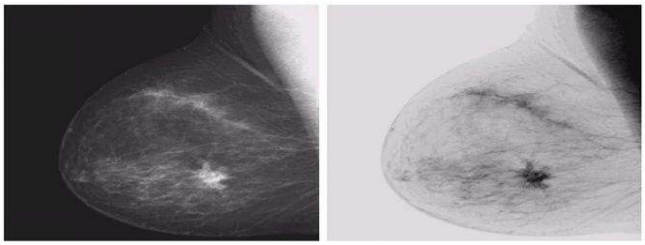

Fig. 1: Image Enhancement

V.IMAGE SEGMENTATION

In Segmentation the inputs are images and, outputs are the attributes extracted from those images. Segmentation divides image into its constituent regions or objects. The level to which segmentation is carried out depends upon the problem being solved. For the segmentation of intensity images like digital mammograms, there are four main approaches, namely, threshold techniques, boundary-based methods, region- based methods, and hybrid techniques which combine boundary and region criteria.

Region growing starts with a set of "seed" points and region grows by appending to each seed those neighboring pixels that have properties similar to the seed. Specific ranges of gray level are used as growing criteria. This first procedure is determining the seed regions. When dealing with mammograms, it is known that pixels of tumor regions tend to have maximum allowable digital value (255 in uint8 images). Based on this information, thresholding is used to detect the possible clusters which contain masses. Image features are then extracted to remove those clusters that belong to background or normal tissue as a first cut. Features used here include cluster area (total pixels involved in the cluster) and eccentricity. The centroid of the remaining clusters is used as seed. There are two criteria for a pixel to be annexed to a region: (1) the gray-level difference between any pixel and the seed had to be less than a specified parameter t which is 0.11 in this case. Parameter t needs to be evaluated from experiments, (2) pixel is 4-connected to at least one pixel in the annexed region.

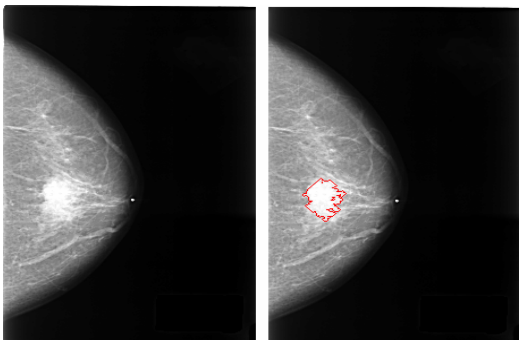

Fig. 2: Image segmentation

VI.BREAST CANCER SCREENING

Screening means examining a group of people in order to detect disease or to find people at increased risk of disease. In many countries, women between 50 and 69 years of age are offered an X-ray examination of the breasts – screening with mammography - every second or third year. The purpose of the screening examination is to find women who have breast cancer in order to offer them earlier treatment.

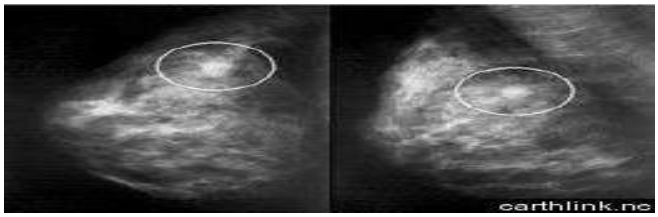

Fig. 3: Breast Cancer Screening

VII.PROPOSED WORK

I am proposing the following work the ultimate objective is to detect the presence and shape of breast cancer cell using image processing algorithms which are efficient and have high accuracy. Then it is to be analyzed visually and mathematically for better result conclusion. Breast border extraction and pectoral muscle suppression is also a part of preprocessing. The types of noise observed in mammogram are high intensity rectangular label, low intensity label, tape artifacts etc. One of the most important problems in image processing is denoising. Usually the procedure used for denoising, is dependent on the features of the image, aim of processing and also post-processing algorithms. Denoising by low-pass filtering not only reduces the noise but also blurs the edges. Spatial and frequency domain filters are widely used as tools for image enhancement. Low pass filters smooth the image by blocking detail information. Mass detection aims to extract the edge of the tumor from surrounding normal tissues and background, high pass filters (sharpening filters) could be used to enhance the details of images. Partial low and high pass filter when applied to mammogram image leads to best Image Quality. I am trying to do the Detection & Classification of breast cancer types based on imaging techniques. To do the Comparative analysis with various filtering technique to improve SNR. To detect structure and shape of the cancerous cell based on age group . techniques are used to detect the malignant cell, denoise them and then enhance the image as well. It will become very helpful in biomedical, and provide a huge advantage to them as it is quite.

VIII.METHODOLOGY

To achieve the objectives the following methods has been used. The database is taken from American Cancer Society. It consists of abnormal as well as normal images. Various imaging easy for them to clearly read the image and decide whether it is a benign or malignant cell. For image processing and image reading we are using software MATLAB 7.10 version 2010 in this image processing tool is used for the implementation of image properly. To analyze the performance of various images that in which portion malignant cell is to be placed will be detected by using various filters like sobel, Canny, Prewitt, Roberts, Laplacian etc. and abstract optimal response out of it. To mitigate the effect of malignant cell on the other part of the body there will be a routine check

up of the patient take place if the cancer cell is to be detected at earlier stage it is be convenient for physician to remove it properly and the self examine of the breast is the best method.

FLOW CHART

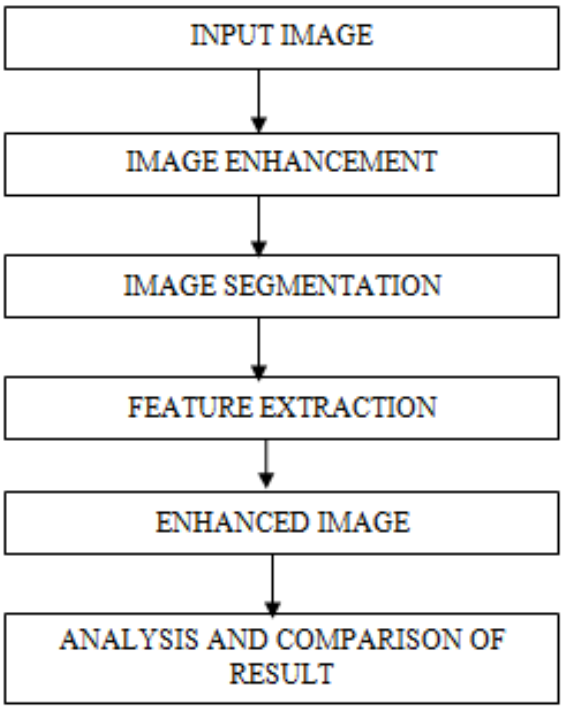

Fig. 4 Flow Chart

IX.CONCLUSION

Image enhancement algorithms offer a wide variety of approaches for modifying images to achieve visually acceptable images. The choice of such techniques is a function of the specific task, image content, observer characteristics, and viewing conditions. The review of Image enhancement techniques in Spatial domain have been successfully accomplished and is one of the most important and difficult component of digital image processing and the results for each method are also discussed. These enhancement tools such as filters, fractal analysis, and segmentation algorithms like region growing and morphological operations could be applied to other image processing fields. Review of preprocessing has been presented with contrast enhancement, segmentation, decomposition, pectoral muscle detection and suppression. Therefore preprocessing is used to reduce noise, edge-shadowing effect, accurately detect pectoral muscle, and suppress the pectoral muscle successfully without losing any information from the image. The resultant mammogram can be used further for the automated abnormalities detection of human breast like calcification, circumscribed masses, spiculated masses and other ill-defined masses, circumscribed lesions, asymmetry analysis etc.

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Developing a Conceptual Model of Tacit Knowledge Sharing

O. K. Harsh
Department of Computer Science & Engineering
Amritsar College of Engineering & Technology
Amritsar, India
oharsh@gmail.com

Rakesh Jaitly
Department of Computer Applications
Amritsar College of Engineering & Technology
Amritsar, India
rakesh_jaitly@acetedu.in

Jayant Vats
Department of Computer Applications
Amritsar College of Engineering & Technology
Amritsar, India
jayantvasu@gmail.com

Abstract: **Knowledge sharing and reuse of tacit knowledge is not only the rationale but also the main content of development. This article helps builds the model of tacit and explicit knowledge based on comprehensive model of knowledge management and its reuse, in order to bring about a new perspective as well as a new deliberation blueprint for the current application of tacit and explicit knowledge through the analyses on the existing circumstances of tacit and explicit knowledge sharing in society and other circles. With the initiation of social web ideas, some dispute that these new rising tools might be constructive in tacit knowledge sharing and reuse during demonstrating interactive and shared technologies. However, there is lack of literature to appreciate how and what might be the involvements of social media in assisting tacit and explicit knowledge sharing. Therefore, this paper is proposed to theoretically examine and design notion and distinctiveness with tacit and explicit knowledge construction and sharing necessity.**

I. INTRODUCTION

Requirements have been examined beside social media notions and uniqueness to observe how they chart jointly. The consequences demonstrate that societal media have capabilities to fulfill some of the major necessities of tacit and explicit knowledge sharing. The connections have been demonstrated in a theoretical skeleton, signifying more pragmatic studies to acknowledge verdicts of this work.

There are two types of knowledge components; they are explicit means documented and tacit means verbal or subjective. Explicit components exist in many forms including knowledge in the varieties of forms including databases and data-mining. On the other hand tacit knowledge which is the verbal (in social media used as a sentiments, behavior and ability (Crowly, 2000; Davenport & Prusak, 1998). Mathematically both tacit and explicit knowledge are opposite.

Sharing of knowledge is a very important aspect for the accomplishment of organizations. It is not always easy to locate relevant information, experts and exchanging knowledge with other people who outside the sphere while sharing information especially tacit information is difficult. Some organizations want to share information by establishing IT-system and also ready to reward even then it is difficult to share the knowledge.

Social media tries to contact professional people to share the tacit knowledge which sometimes turns out to be a better option for many organizations. However, it is the tacit knowledge which makes the distance between various kinds of people less through the discussion via seminar, conference or by any other means.

Explicit knowledge in the shape of data mining disclose the highest phase of knowledge comprehension that requires aptitude in data sphere, data investigation and agreement and artificial intelligence. Table 1 below compares the tacit and explicit knowledge.

TABLE I: PROPERTIES OF TACIT AND EXPLICIT KNOWLEDGE

Tacit Knowledge	***Explicit knowledge***
Resides in human minds	Articulated, structured and documented
Highly individual and personal	Learnt through instruction, recitation, or repetition
Learnt through experiences, skills, observation, intuitive feeling, mental modes, beliefs, and values	Easy to recognize, codify, formalize, store, share, communicate,
Unstructured, difficult to see,	- Can be found in books, journals, -databases,
codify, estimate, investigate, formalize, write down, capture and communicate accurately	- Consciously accessible
Unconscious knowledge (Both known and unknown to the holder)	- Know-that, know what
Job specific, context-specific	- Academic knowledge
Experience based, 'knowledge-in-Action	
Transferred through conversation and narrative (story-telling, discussions, etc.)	
Know-how	
Experts knowledge	

Tacit knowledge is the mainly significant and helpful dispersed database in society and it can gives shared knowledge in a variety of behaviors which could lastly release it. Social sharing of knowledge can provide us new techniques for business to discharge tacit knowledge within and exterior of their organization. However building up tacit knowledge in an institute is just accessible to those who are close to this.

Conventional techniques of dealing tacit knowledge are probable during telephone deliberations, cocktail and social meeting as well as during face-to-face meeting. However communal sharing of knowledge, which goes away from boundaries, time areas, away from cultures, permits community to exchange tacit knowledge in a deeply easier means. With communal sharing of knowledge, we can develop as the thought shape ups because it is a continuing dialogue. Because we know that how to signify shared tacit knowledge? No doubt each person speaks that social media can help to any trade to reveal tacit knowledge. Though, social networking is not always useful to support the diversity of argument that can generate tacit knowledge.

Social media can have the worth to the trade and may not have the codifying strategies but the relating strategies that permit community inside an organization is to discover each other to be familiar and construct the knowledge easier to attach and communicate. Social tools like Facebook are based on the company's policy and can use private or publicly accessible social networking tools. But by means of community tools we can build up talent that are precious in the office. In this way there is a transfer of knowledge and can also develop communication and collaboration skills which could be useful for their professional lives. NASA has created a useful method for obtaining tacit knowledge by videotaping engineers expressing stories concerning how they transport mission squads jointly.

Such videos permit public to take notice of those stories and understand them inside their possess skill and their own viewpoints on how they are going to sprint their missions. Organizations can "entirely" employ social media to tap into tacit knowledge because the good thing about the conversation groups is that they score flat across the entire production while culture is a main confront for the majority of institutes progressing out social media instruments.

Panahi et al. (2012) suggested a model supported on the finding a novel theoretical structure on the nexus involving social web proposal and tacit knowledge sharing activities of specialists in online communal communities. The model signifies that social media have capability to sustain numerous main needs of tacit knowledge sharing by giving a better place for social communication. However, this model lack in several respects firstly it cannot differentiates tacit from explicit for the purpose of modeling, second it does not say anything regarding the tiered structure of the knowledge as developed by Luan (2000, 2002) because without comparing with tiered structure we cannot make sure that at what level the tacit knowledge is being used, thirdly this model only mentions about the social media. Luan (2000, 2002) demonstrated that Customer Relationship Management (CRM) and portals together can resolve the knowledge management problem for the business.

II. PRESENT WORK

Present problem is that whether can we propose a model which not only accounts the solution of the above mentioned problems while also represent the use of both tacit and explicit knowledge at the various levels of hierarchy. In addition, we also want to learn that how the both types of knowledge (tacit and explicit) are equally important for not only for the business while also for the various purposes. Since Customer Relationship Management (CRM) contains all the three types of components for example operational, analytical and collaborative which are the parts of the data mining therefore applying Juan strategy (2000, 2002) looks an appropriate. In addition, we would also like to see that how the knowledge reusability affects the knowledge as time enhances in any organization.

Harsh (2007, 2009) submitted that knowledge reusability and time are important aspects in the changing knowledge environment. Therefore, both tacit and explicit knowledge and its reusability should be accounted with the time in order to explain the comprehensive knowledge management in the three dimensional systems. This work extended the well know Nonaka model (1994, 1995) from two to three dimensions. Considering above facts and including the concepts of well known knowledge management system, following model is being proposed in the present research (Figure 1):

Model of Figure 1 is well explainable since tacit and explicit knowledge are in opposite directions and both are perpendicular to time as well to reusability of knowledge. There are four types of knowledge representation as suggested by Nonaka (1994, 1995). Externalization through which we capture the information by communicating to others, writing a document, demonstrating presentation etc. are included in the knowledge base and it is the job of knowledge workers. Here knowledge reusability plays significant role because as the experience of knowledge workers increases because of their knowledge base (due to reusability with time) more and more process of externalization becomes possible by them.

Socialization which is the method of communication amid persons happens during the knowledge sharing (Nonaka and Takeuchi Model 1994, 1995) and enhances due to reuse of understanding (over the time), psychological models and attitude by workers. In this way the knowledge persists in workers minds amplified due to conversion of knowledge over the time. It is more close to knowledge mapping. With enhancements in time and reusability, it goes close to collaborative worker type environment. Thus here the tacit knowledge is rehabilitated into a different tacit knowledge.

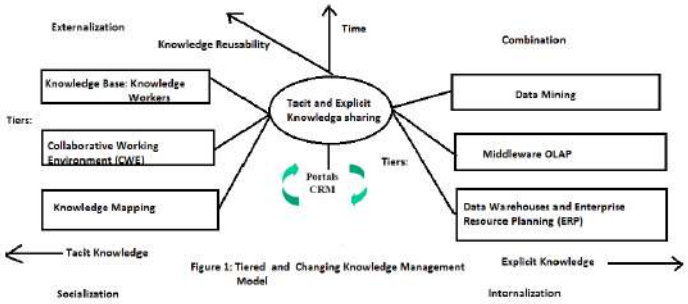

Figure 1: Tiered and Changing Knowledge Management Model

Furthermore, due to reusability the excellence of knowledge also boosted as a result of modification.

Third process which is the combination implies that as the reusability increases more qualitative knowledge becomes available because what happens in the data mining where the combination of various data are possible. Thus the workers will find more explicit knowledge in less time and moreover new type of knowledge is always found as the time increases. Thus not only the new data while as well as old data both combine to each other and create more useful knowledge. The role of middleware between combination and internalization can be explained very well here because it is equally responsible for combination and as well as internalization. In this process explicit knowledge is involved and therefore increases of reusability increase the real data.

Internalization which is the method of appreciating the information, placing it into contented with persisting knowledge (Nonaka and Takeuchi 1995) (and this is a part of data warehousing and enterprise resource planning (ERP)) increases with explicit knowledge. Reusability will add qualitative data to data warehousing and to ERP.

We can say that face-to-face assembly are the illustration of making tacit knowledge because it can be shared by community. Shared understanding is the illustration of casual knowledge where job of information technology is insignificant. Though, notion of groupware is used during great number of on-line gathering. Thus these help in the process of socialization and their repetitive use can boost the idea of reusability of social knowledge.

Groupware which is useful in socialization contains shared talent and conviction. Shared talent is very important for the process of tacit knowledge sharing and related activities. In the current model, shared space will be additional with additional alternative of reusable knowledge with time. This reusable knowledge enhances with the increase of effective space. Lotus Notes is a kind of a groupware and may be used for sharing of manuscripts. Groupware is also assists useful for the purpose of knowledge sharing.

III.CONCLUSION

In the present work a comprehensive solution to both tacit and explicit knowledge has been presented which directly links with the three tiered knowledge as well as their correlation with knowledge reusability with time. Our work suggests that knowledge reusability not only increases the entire knowledge of the system while it also enhances the quality of the knowledge because of this fact that knowledge is being repetitively reused which every-time resolves one or more dilemma. An experimental investigation of the present problem is required through the survey methodology which might resolve dilemma more effectively.

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Software Testing Techniques

Sukhdeep Kaur[1], Ritham Vashisht[2], Shobti Saini[3]
[1, 2, 3] Department of Computer Science and Engineering
Sri Sai College of Engineering and Technology
Pathankot, Punjab, India

Abstract*— In this paper main testing methods and techniques are mainly described. Software testing provides a means to shrink errors, cut maintenance and overall software costs. Several software development and testing methodologies, tools, and techniques have emerge over the last few decades capable to enhance software quality. One of the major troubles within software testing area is how to get an appropriate set of cases to test a software system.

Keywords—Software Testing, Level of Testing, Testing Technique, Testing Process

I. INTRODUCTION

Software testing is as elderly as the hill in the ancient times of digital computers. The testing of software is a vital way of assess the software to come to a decision its quality. Although testing generally consume 40~50% of development efforts, and consumes further split for systems that require high level of reliability, it is a main part of the software engineering.

Testing remains in reality helpful means to agree the excellence of a software system of non-trivial complexity as well as one of the most difficult and least understood area in software engineering. Testing, an imperative research area within computer science is expected to become still more important in the future. Automatic methods for ensure software correctness range from static techniques, such as (software) model checking or static analysis, to dynamic techniques, such as testing.

All these techniques have strength and weaknesses: model checking (with abstraction) is automatic, exhaustive, however might be suffering from scalability issue. Static analysis scale to extremely large programs but might give too many simulations warning, while testing only may neglect important errors, as it is essentially incomplete. Software testing is a constituent of the third phase which means checking if programs for specific inputs give correctly and estimated outcome.

For life-critical software (e.g., flight control) testing can be extremely expensive. Because of that, many risk analysis have been made. This term means the possibility that a software project will experience undesirable events, such as schedule delays, cost overruns, or complete cancellation. Testing is an activity performed for evaluating software quality and for improving it. Hence, the goal of testing is steadily detection of different classes of errors (error can be defined as a human action that produces an incorrect result, in a minimum amount of time and with a minimum amount of effort).

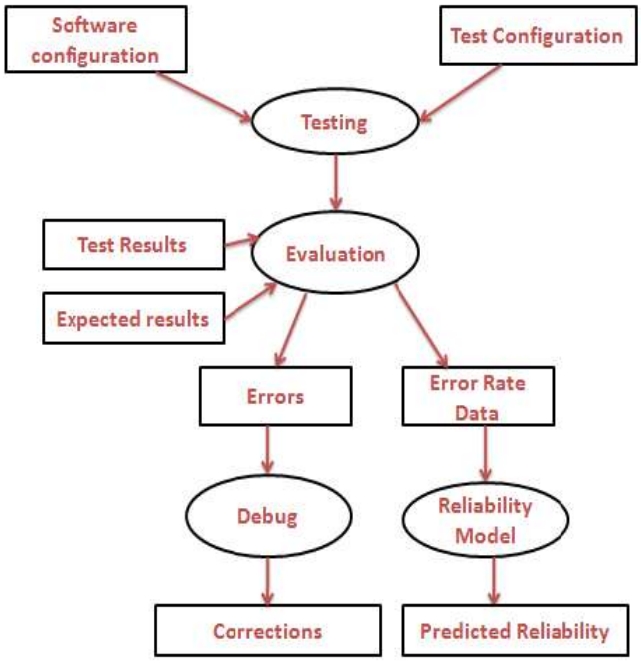

Figure 1: Test Information Flow

II. TESTING METHODS

Test cases are developed via various testing techniques to attain more effective testing. Through this, software completeness is provide and condition of testing which get the maximum probability of finding errors are selected. Thus, testers do not guess which test cases to select and test techniques enable them to blueprint testing conditions in a systematic manner. Moreover, if one combines all sort of existing test techniques, one will obtain improved results if one uses just one test technique. Software can be tested in two ways:

1. Black box testing

2. White box testing

1. BLACK BOX TESTING

- No knowledge of internal design or code required.
- Tests are based on requirements and functionality.

1.1. Black Box Testing Technique

- Incorrect or lost functions
- Boundary errors
- Errors in data structures or external database access
- Performance errors
- Initialization and termination errors

1.2. Black Box Testing/Functional Testing

- Based on requirements and functionality
- Not based on any knowledge of internal design or code
- Covers all collective parts of a system
- Tests are data driven

2. WHITE BOX TESTING

- Knowledge of the internal program design and code required.
- Tests are based on coverage of code statements, branches, paths, conditions.

2.1 White Box Testing Technique

- All independent paths in a module have been exercise at least once
- Exercise all logical decisions on their *true* and *false* side
- Execute all loops at their boundaries and inside their operational bounds
- Exercise internal data structures to guarantee their validity

2.2 White box Testing / Structural Testing

- Based on knowledge of internal logic of an application code
- Based on coverage of code statements, branches, paths, conditions
- Tests are logic driven

2.3 Other White Box Techniques

- Statement Coverage – execute all statements at least once

III. SOFTWARE TESTING LIFECYCLE – PHASES

There are five phases for testing as described below:

1. Requirements
   - Testing Cycle starts with the study of client requirements.
   - Understanding of the requirement is very important for testing the product

2. Test Case Design and Development
   - Component Identification
   - Test Specification Design
   - Test Specification Review

3. Test Execution
   - Code Review
   - Test execution and evaluation
   - Performance and simulation

4. Test Closure
   - Test summary report
   - Project concise
   - Project Documentation

5. Test Process Analysis
   - Analysis done on the reports and improving the application performance by implement latest technology and further features.

IV. LEVEL OF TESTING

1. Unit Testing
   - The most 'micro' level of testing.
   - Test done on particular functions or code modules.
   - Requires knowledge of the internal program design and code.
   - Done by Programmers not by testers.

2. Incremental Integration Testing
   - Continuous testing of an application when a new functionality is added.
   - Application functionality aspect are required to be independent sufficient to work separately before completion of development.
   - Done by programmers or testers.

2.1 Integration Testing

- Involves build a system from its components and testing it for problems that arise from component interactions.

2.1.1 Top-down integration

  - Develop the framework of the system and settle it with components.

2.1.2 Bottom-up integration

  - Integrate infrastructure components then add functional components.

- To make simpler error localization, systems should be incrementally integrated.

3. Functional Testing
   - Black box type testing geared to functional requirements of an application.

- Done by testers.

4. System Testing
   - To verify that the system components perform control functions
   - To perform intersystem test
   - To demonstrate that the system performs both functionally and operationally as specific
   - To perform appropriate types of tests relating to Transaction Flow, Installation.

5. Acceptance Testing
   - To verify that the system meets the user requirements.

6. Beta Testing
   - Relied on also heavily by large vendor, like Microsoft.
   - Allow early adopters easy access to a new product on the condition that they report errors to vendor. A good method to stress test a new system.

7. End-to-end Testing
   - Similar to system testing involve testing of a complete application environment in a situation in real-world use.

8. Regression Testing
   - Retesting after fix or modification of the software or its environment.

9. Load Testing
   - Testing is an application under heavy loads.
   - Testing of a website under a range of loads to decide, when the system response time degraded or fails.

10. Stress Testing
    - Testing under unusually heavy loads, heavy repetition of certain actions or inputs, input of large numerical values, large complex queries to a database etc.
    - Term repeatedly used interchangeably with 'load' and 'performance' testing.

11. Performance Testing
    - Testing how well an application complies with performance requirements.

12. Install/uninstall Testing:
    - Testing of full, partial or upgrade install/uninstall process.

13. Compatibility Testing
    - Testing how well software performs in a particular Hardware, Software, Operating System, Network environment.

14. Loop Testing
    - This white box technique focus on the strength of loop constructs. Four different classes of loops can be defined (1) Simple loops (2) Nested loops (3) Concatenated loops (4) Unstructured loops

15. Recovery Testing
    - Confirms that the system recovers from expected or unexpected events without loss of data or functionality
    - Shortage of disk space and unexpected loss of communication power out conditions.

V. TEST PLAN

1. Purpose of preparing a Test Plan
- Validate the adequacy of a software product.
- Help the people exterior the test group to understand "why'' and "how" of product validation.
- A Test Plan should be
  - Overall coverage of test to be conduct
  - Valuable and understandable by the people inside and outside the test group.

2. Scope
- The areas to be tested by the Quality Assurance (QA) team.
- Specify the areas which are out of scope such as screens, database, and mainframe processes etc.

3. Test Approach
- Detail on how the testing is to be performed.
- Any exact strategy is to be following for testing including configuration management.

VI. CONCLUSION

Software testing is a component of software quality control (SQC). SQC means control the quality of software engineering products, which is used to tests of the software system. Testing can show the occurrence of faults in a system; it cannot verify there are no remain faults. Component developers are responsible for component testing; system testing is the responsibility of a separate team. Integration testing is testing increments of the system; release testing involves testing a system to be released to a customer. Use knowledge and strategy to design test cases in fault testing. Boundary testing is designed to find out defects in the interfaces of complex components. Equivalence partitioning is a method of discover test cases, all cases in a partition should behave in the same manner. Structural analysis relies on analyze a program and derive tests from this analysis. Test automation reduces testing costs by following the test process with a series of software tools.

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Non-Destructive Quality Assessment of Pulses Grain using Image Analysis

Jaspreet Kaur
M.Tech Scholar
Electronics & Communication Engineering
Amritsar College of Engineering & Technology
Amritsar, India

Dr. Vijay Kumar Banga
Principal
Amritsar College of Engineering & Technology
Amritsar, India

***Abstract*— Food is essential substance consumed to maintain life and stimulate growth. Consumers are now more conscious about quality and source of their foods. Attempts made to determine the quality of food materials are numerous, but most of them are destructive in nature. Quality of food comprises external factors as appearance (size, shape, color, gloss), texture and flavor factors. Currently, these factors are determined by visual inspection. This method is subjective and tedious and can result in variation between inspectors. So this paper presents a fast approach that reduce the inaccuracy caused by inspector subjectivity and the labor requirement, thus benefiting producers, grain handlers and processors.**

***Keywords*—Assessment, Consumer, Food, Inspection, Quality**

I. INTRODUCTION

Pulses are important part of our food as they have high nutritional value. Pulses are grown in many regions across India. Also India is a leading producer and consumer of pulses in the entire world. The quality of pulse grains has distinct effect on the yield of pulses, so the proper inspection of quality is very important. During grain handling operations, information on grain type and grain quality is required at several stages before the next course of operation can be determined and performed[10]. Quality is the degree of excellence of a product .The quality of agricultural commodities is based on individual or a combination of various properties. External quality parameters like size,shape, colour, tenderness, and hardness are evaluated based on eye judgment and hand feel[3]. Quality control is of major importance in the food industry because after harvesting, based on quality parameter a food product has been sorted and graded in different grades field where significant developments have been made. Efforts are being geared towards the replacement of traditional human sensory panel with automated systems, as human operations are inconsistent and less efficient[7]. Non-destructive quality evaluation of agricultural products has become a major area of interest for the agricultural processing industry. Researchers have been working to find techniques for evaluating internal quality attributes of agricultural and food products non destructively. Traditionally quality of food product is defined from its physical and chemical properties by human sensory panel which is time consuming, may be varying results and costly [4]. With the advancement in computer technologies, digital image processing applications has been increasingly used for analysis of quality of food material. Automated machine based inspection using software system is more speedy, accurate, convenient, harmless and non-destructive in comparison with traditional methods [5]. This paper presents a non-destructive and an automated approach which overcomes the shortcomings of human sensory panel.

II. METHODOLOGY

Different samples of pulse grains are collected for analysis and the following steps are to be followed:

STEPS:
1 Spread the pulses grains uniformly on the white sheet to avoid overlapping of grains.
2 Capture the image of grains using digital camera
3 Convert this image into binary
4 Display number of pulse grains
5 calculate the parameter of grain for study
6 Threshold value will be assigned
7 Display the number of pure pulse grains
8 Repeat above steps for 10 samples

III. IMAGE ACQUISITION

Images of different samples of blackgram grains are captured under natural light by maintaining fixed background and same distance between camera and grains .The acquired image is converted to binary image. The acquired image and binary image are shown in figure 1 and figure 2 respectively.

Figure 1

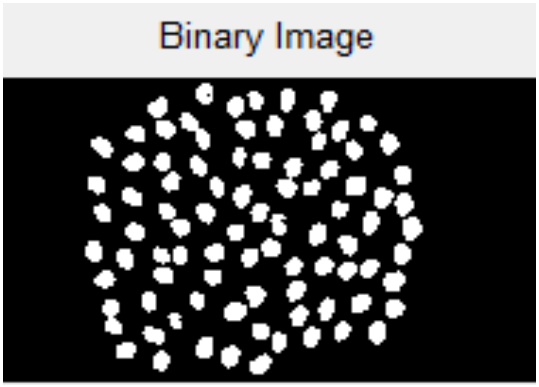

Figure 2

IV. Pixel Area Of Grains

Pixel area of any object in an image is defined by the total number of pixels enclosed within the boundary of the object. So we find the pixel area of each blackgram grain present in the sample image using MATLAB. Figure .3 shows the total no. of grains and corresponding pixel area of grains.

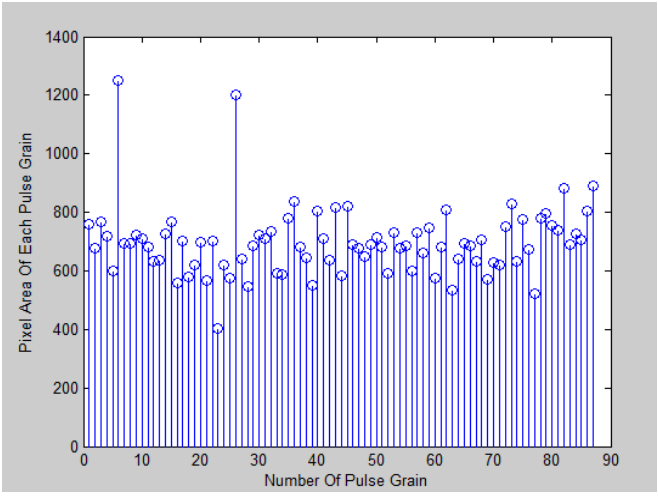

Figure 3

V. Rejecting The Broken Grains

We know from the data we have, that the broken or the half grain kernels occupies the lesser pixel area as compared to the healthy grains. So we set a threshold value of the pixel area for the average healthy grain kernel and the values lower than that of threshold will be discarded. In the present sample we took healthy grains with one broken grain and this broken grain is discarded in figure 4

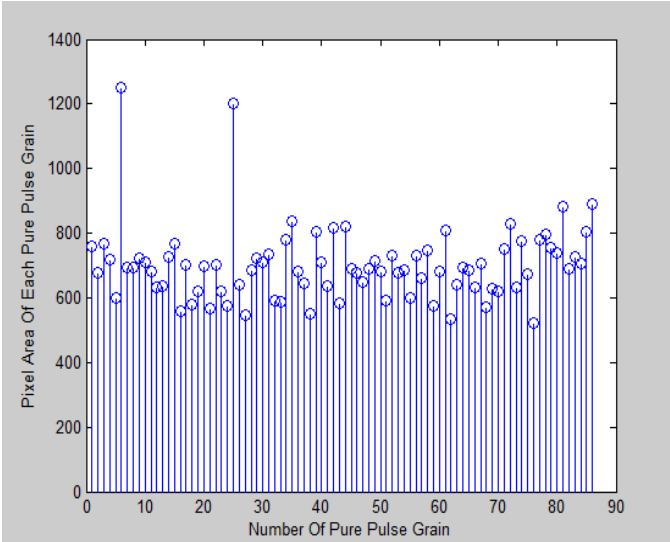

Figure 4

VI. Rejecting The Faded Grains

After discarding broken grains , we apply color algorithm on the sample. This is because still there might be some unhealthy grains in the sample whose pixel area lies above threshold but they are not pure black and healthy. Such type of grain affect the quality of pulses so they need to be discarded. This is to be done using MATLAB.

VII. Percentage Purity Of Given Sample

Percentage purity of the sample is calculated by dividing the number of pure pulse grain with the total number of grain present in the sample and multiplying with 100 i.e

$$\%age\ purity = \frac{No.of\ Pure\ Pulse\ Grains}{Total\ No.of\ Pulse\ Grains} X100$$

The analysis is done on ten samples and results are tabulated in table1.

TABLE I

Sample No.	No. of Pulse Grains	No. of pulse grains with desired pixel area	No. of pure black grains	% purity of the sample
1	87	86	84	96.55
2	90	82	78	86.66
3	97	93	85	87.62
4	86	77	68	79.06
5	83	71	62	74.69
6	89	75	71	79.77
7	95	83	79	83.15
8	93	88	83	89.24
9	82	77	69	84.14
10	88	75	67	76.13

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Parallelization Tools and Techniques of Parallelizing the Sequential Program

Ankita Bhalla

Dept. of Computer Science and Engineering,

Guru Nanak Dev University

Amritsar, Punjab, India

ankita.it90@gmail.com

Abstract:The need of parallel processing arises because some problems were too costly to be solved with the classical approach and we need to find the results as soon as possible. Parallelization is becoming necessity of parallel computing field. It is very difficult to parallelize the sequential program. This paper describes about loop parallelization that allows parallelizing the loops of the programs as we know loops take most CPU time. This paper discusses about speculative parallelism in which program is parallelized while maintaining its sequential order. Some tools are briefly discussed like HydraVM, PTRAN and Matlab parallel computing toolbox. This paper describes about variant based parallel execution of sequential programs which introduces concept of multiple variants in a sequential programs.

Keywords: HydraVM, Speculative Parallelism, Loop Parallelism, parallelization tools, Variant based competitive parallelism.

I. INTRODUCTION

Sequential program is defined as a set of instructions in a serial fashion. Instructions are executed line by line one after another. It takes so much time to compute large sequential programs which leads to performance degradation of computer systems. Parallelism is one of the key means for improving the performance of computer systems. Parallelism in programs is a fundamental characteristic of the program that denotes the independence of computations in a program. Parallelism provides the ability to perform several computations in a program concurrently because of their independence. Parallelism exploits the concurrency.

II. NEED OF PARALLELIZATION

The need of parallel approach arises because some problems were too costly to be solved with the classical approach and we need to find the results as soon as possible. If we solve problems sequentially then it take too much time and if we rewrite the same problems in parallel version from scratch, it is also not worthy. So it is better option to parallelize the sequential program.The criteria for evaluating the performance of a parallel program is the speedup that is the ratio of serial run time to the parallel run time to solve the same problem. [1] The speedup formula is

$$S= T_s/T_p$$

Where

T_s: Serial run time (i.e. time taken to solve problem sequentially.)

T_p: Parallel run time (i.e. time taken to solve problem parallely.) [1]

A. Amdahl's law

If we execute the parallel program on parallel processor, some portion of it cannot be executed parallely. That portion has to be executed sequentially by single processor. Let α be the portion which cannot be parallelized. The rest of (1 - α) will be executed in parallel. Here N is number of processing elements. Speed up is:

$S= 1 / (\alpha + ((1- \alpha)/N))$

In Amdahl's law, problem size remains fixed. If we increase the number of processors then speed up as well as efficiency decreases. This law focuses on execution of program must be completed as fast as possible.

B. Gustafson's Law

This law is correlated with Amdahl's law. It basically works on limitation of Amdahl's law. Amdahl's law is limited to fixed problem size. Gustafson's law states that as we increase the number of processing elements in parallel system problem size must increases but the execution time of the problem remain constant. This law focuses on

scalability of problem size having constant execution time. Speed up given by this law is
$S(P) = P - \alpha(P-1)$
P is number of processing elements and α is portion that has to be executed sequentially.

C. Sun Ni's Law

Sun Ni's law focuses on memory, which is associated with every processor, should be scaled up. This law treats Amdahl's law and Gustafson law as special cases in order to find memory bounded speed up. In this law degree of parallelism plays very important role. Here works performed by processors are considered very carefully. This law also includes communication overhead associated with processor in its formula.

III. PARALLELIZATION OF SEQUENTIAL PROGRAM

In this section various techniques which are used to parallelize the sequential programs are briefly described with their limitations.

A. Manual Parallelization

If the user decides to manually parallelize his program, he can freely decide which parts have to be parallelized and which not. This is called manual parallelization. Here user must be expert programmer that significantly involves in partitioning of the computations into multiple threads. He has to explicitly define the desired communication mechanisms (message passing or shared memory) and synchronization methods (locks, barriers, semaphores and so on) in the parallel program. When multiple threads must concurrently operate on the same data, it is often necessary to use locks to avoid race conditions between the threads [2].

Limitations

- This technique requires experts. So it is restricted techniques.
- It is good for small programs but for large and complex programs or applications it fails at some points. As we all know human are more prone to do mistakes.

B. Complier Automatic Parallelization

The easiest way to parallelize a sequential program is to use a compiler that detects, automatically or based on the compiling directives specified by the user, the parallelism of the program and generates the parallel version by finding interdependencies in the source code. The automatically generated parallel version of the program could be executed on a parallel system. The user does not have to be concerned about which part of the program is parallelized because the compiler will take such a decision when the automatic parallelization facility is used. [2]

Limitations

- User has a very limited control over parallelization.
- In a complex program that contains nested loops, procedure calls etc., it is very difficult to find and to analyze the dependencies which restricts the capabilities of such compilers.

C. Loop Parallelization

Parallelizing loops is one of the most important challenges because loops usually spend the most CPU time even if the code contained is very small. A loop could by parallelized by distributing iterations among processes. Every process will execute just a subset of the loop iterations range. Usually the code contained by a loop involves arrays whose indices are associated with the loop variable. This is why distributing iterations means dividing arrays and assigning chunks to processes.
If data affected by the inner loop are then referenced in the main loop, we need to synchronize data just after the end of the inner loop in order to be sure that the values accessed by the main loop are the updated one. The data synchronization was added just after the second loop end and the inner loop was distributed over multiple processes and processors. Every process will execute just a subset of the inner loop iterations range. Using the partial parallelization of a loop, we can minimize the load imbalance but the communication overhead will be higher as result of synchronization. [1]

For example in case of single loop, if I want to print "hello World" say 500 times or even more in MATLAB environment, it takes more time if it execute sequentially, but if it execute parallely on multiple processor it take very less time . Suppose it executes on MATLAB Parallel Computing toolbox which solves the problem using multicore processors, GPUs and computer clusters. However this toolbox provides 12 workers by default that works concurrently.

In MATLAB, Sequential program code for print "hello World" is:

```
For i: 1 : 500

Disp('Parallelizing the Sequential program")

End
```

In MATLAB Parallel Computing toolbox, code for print "hello World" on multiple workers is:

```
Matlabpool local 10     \\ to start 10 workers
```

Parfor i=1 : 500 \\ parfor is parallel for loop

Disp('Parallelizing the Sequential program')

End

Matlabpool close \\ close matlab workers

However program running on multiple works take less time. In this loop is distributed among multiple workers. Workers run concurrently and produce result frequently as compared to run same program sequentially.

Limitations

- Loop Parallelism concentrate mainly concentrate on for loops.
- This approach is not good if sequential programs consist of very complex nested loops.
- Here we need to take care of the partials results of the loops carefully. So synchronization plays vital role in this approach.

IV. PARALLELIZATION TOOLS

Nowadays trend is moving from sequential programs to parallel programs. As sequential programs are time consuming so we need to convert them into parallel programs by rewriting them. As we know in order to create parallel programs, parallel programming is required. Parallel programming must be portable as it has to run efficiently on heterogonous systems. To do this compiler of parallel programming has to do restructuring of program which is time consuming task. Here I m going to discuss briefly about some ready-made tools that convert sequential programs into parallel programs by extracting parallelism from sequential programs. These are explained as follows:

PTRAN: PTRAN (Parallel TRANslator) is parallelizing system at IBM's T.J. Watson Research Center which converts the legacy sequential Fortran program into parallel Fortran programs. It is source to source complier. This system mainly concern with Fortran written programs which make this tool very specific for converting the legacy sequential program into parallel program. But nowadays frotran is used very less as we are now moved towards 4GL. PTRAN is seldom used for parallelization of sequential program. [3]

HydraVM: HydraVM is a virtual machine that extracts parallelism automatically from sequential programs. A set of techniques including code profiling, data dependency analysis, and execution Analysis are applied on sequential code (at the byte level). HydraVM is built by extending the Jikes RVM. Jikes RVM (Research Virtual Machine) provides a flexible open testbed to prototype virtual machine technologies. HydraVM works in three phases.

1. The first phase focuses on detecting parallel patterns in the code by monitoring code execution and determining memory access and execution patterns. This may lead to slower code execution due to inspection overhead. Information collected here is stored in Knowledge Repository.
2. The second phase starts after collecting enough information in the Knowledge Repository about which blocks were executed and how they access memory. The Builder component uses this information to split the code into superblocks, which can be executed in parallel. New version of the code is generated and is compiled by the Recompilation component. The TM Manager manages memory access of the execution of the parallel version, and organizes transaction commit according to the original execution order. The manager collects profiling data including commit rate and conflicting threads.
3. The last phase is tuning the reconstructed program based on thread behavior (i.e., conflict rate). The Builder evaluates the previous reconstruction of superblocks by splitting or merging some of them, and reassigning them to threads. The last two phases work in an alternative way till the end of program execution, as the second phase represents a feedback to the third one. [4]

MATLAB Parallel Computing Toolbox: MATLAB Parallel Computing toolbox solves the problem using multicore processors, GPUs and computer clusters. Parallel computing toolbox creates multiple workers (called 'labs' or computations engines) on local machine. By default Matlab provide 12 workers to execute applications locally on a multicore desktop. Without changing the code, we can run the same application on a computer cluster or a grid computing service (using MATLAB Distributed Computing Server which we need to purchase). Matlab parallelize the programs or applications without using CUDA or MPI Programming. This toolbox allow to us to run sequential as well as parallel program. However to run parallel program on multicore processors firstly we must use matlabpool command to open as many workers we want (maximum workers are 12).

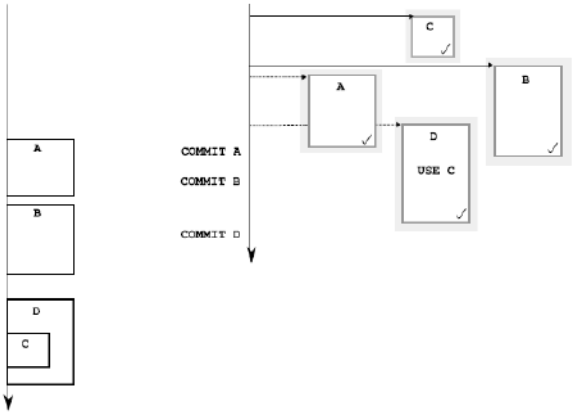
V. SPECULATIVE PARALLELIZATION VERSES VARIANT BASED COMPETITIVE PARALLEL EXECUTION

First of all speculative parallelization is discussed and then variant based parallelism is discussed briefly.

A.Speculative Parallelization

Speculative parallelization attempts to use the many processing cores by creating concurrency from a program but also maintaining the sequential program order. It overcomes the limitations of traditional parallelization by creating threads that are composed from the program and speculatively executing them in parallel. Additional hardware support is used to determine threads that violate dependencies and squash them, and to enforce sequential program order of concurrently executed speculative threads. As threads are use here it is also known as Thread Level Speculative parallelism.

Program Demultiplexing (PD, in short) is an execution paradigm based on speculative parallelization, for sequential programs. In sequential execution, the call site of a method represents the beginning of execution of that method, and happens on the same processing core as the program. However, in PD, the execution of a method occurs on another available processing core, speculatively, before the call site is reached in the program. Several such speculative executions of methods create concurrency in a program. The speculative execution is usually invoked after the method is ready, i.e. after its data dependencies are satisfied for that execution instance. Speculative threads in PD are composed of methods. Methods allow programmers to decompose a problem into several subtasks and enable them to write a complex and lengthy program.



a) Sequential Execution b) PD based Execution

Fig 1. Program demultiplexing overview

The sequential execution on the left represents execution of methods A, B, and D. Method C is called inside D. On the right side is the PD based execution. The methods are spawned for speculative execution. Method D uses the speculative execution of method C. Methods A, B, and D are committed when the call site in the program is reached. The speculative executions do not violate any data dependencies and this is indicated by the tick mark on the bottom right of the method's box. [5]

Limitations

- It may happen that the core gets destruct on which any thread speculatively executing. It may harm the execution of the thread where it requires.
- This approach is difficult to apply for complex programs which involve nested loops, interdependent code and so on.

B. Variant-based Competitive Parallel Execution

Competitive parallel execution (CPE) is a model to adapt and execute existing sequential programs to increase their performance on multi-processor and multi-core systems. The fundamental idea of CPE is to include variants of one or multiple regions of a sequential program and to let these variants compete at program execution time.CPE is a technique for modifying and executing existing sequential applications to increase their performance on parallel systems. Competitive parallel execution (CPE) is a simple yet attractive technique to improve the performance of sequential programs on multi-core and multi-processor systems. The central idea of CPE is to facilitate the introduction of multiple variants for parts of a program, where different variants are suited for different run-time conditions.

A sequential program is transformed into a CPE-enabled program by introducing multiple variants for parts of the program. The performance of different variants depends on runtime conditions, such as program input or the execution platform, and the execution time of a CPE-enabled program is the sum of the shortest variants. The purpose of creating variants is to make the program adaptive to different run-time conditions. Variants compete at run-time under the control of a CPE aware run-time system. The run-time system ensures that the behavior and outcome of a CPE-enabled program is not distinguishable from the one of its original sequential counterpart.

Fig 2 illustrates the general execution model of a CPE enabled program with an example. The execution alternates between sequential phases, where only a single variant is running, and competitive phases, where multiple variants are running in parallel. The example program in Figure 2 executes two sequential and three competitive phases. Variants compete against each other in every competitive phase. At the conclusion of a competitive phase the program state of the winning variant is synchronized with all its peers. The execution then proceeds to the succeeding competitive or sequential phase. [6]

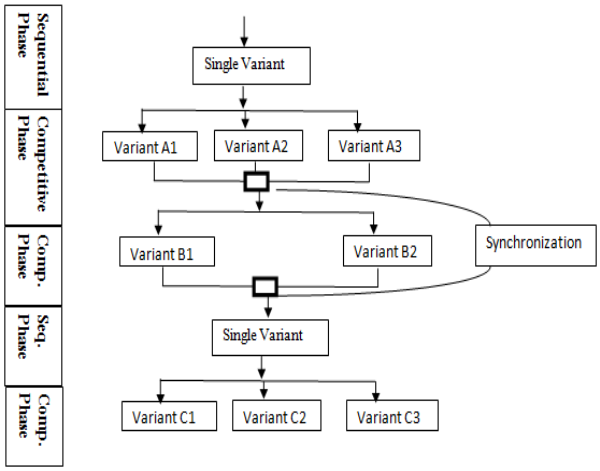


Fig 2. Execution Control of CPE

Fig 2: Example execution control flow of a CPE enabled program with two sequential and three competitive phases. Two or three variants compete in each competitive phase. A competitive phase ends upon completion of a variant, and the program state is synchronized to the state of this winner. The behavior and semantics of a CPE-enabled program must not be distinguishable from a sequential execution, in which only a single variant runs in each phase. The run-time system must provide two isolation properties to guarantee the semantical equivalence with the original sequential program:

1. The effects of a variant must be contained with respect to competing variants. A change in program state of one variant must thus not be observable by other variants.
2. The set of I/O operations performed by the CPE enabled program and the order in which they are performed must not have any side-effects that differ from a sequential execution of the program.

CPE model is not only restricted to flat competitive phases but also supports nested competitiveness.

Two different approaches to transform an existing sequential program into a CPE-enabled program:

- Computation-Driven Competitiveness
- Compiler-Driven Competitiveness

Computation-Driven Competitiveness: Here variants which are to be executed are present in the program. It is a simple and straightforward parallelization of heuristic algorithms. In this the process of enhancing a sequential program is a straightforward process. Here variants are executed in isolation with respect to each other. Thus process does not require any reasoning about data sharing, dead-locks and other difficulties intrinsic to concurrent programming. Also, the process does not require detailed knowledge of the inner-workings of the original program with all its data structures and algorithms. [6]

Compiler-Driven Competitiveness: Here variants of parts of a program are generated by selecting different optimization strategies during compilation. Compiler-driven CPE exploits the fact that many optimizing compilers are unable to identify the best optimization settings for many programs. Compiler-driven CPE therefore employs the compiler to generate variants for frequently executed parts of the program by applying different optimization strategies upon compilation. [6]

VI. CONCLUSIONS

This paper briefly discusses the ways of parallelizing the sequential programs. As compared to other approaches of parallelizing the sequential program, variant based competitive parallel execution is better. It can be beneficial for small programs as well as for large and complex programs. Unlikely in Speculative Parallelism where speculatively execute the independent part but that part may not be optimized and also its execution. But in this approach by using Complier driven competitiveness automatic select the best and optimized independent part called variant and its execution gives optimized results. This approach gives more correct results as compared to other approaches.

Also, instead of writing the parallel version of sequential program from scratch, the corresponding sequential program is converted into parallel program by using various parallelization techniques. We can correlate with re-engineering.

Overall it can be said that Compiler Driven Competitiveness – Variant based competitive parallel execution of sequential program is better approach because in this compiler itself generate the variants by using various optimizing techniques during compilation. So it is more automatic. In future this compiler driven approach can be explored to convert the sequential program into parallel program without rewriting from scratch.

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A Review on Data Warehousing

Aarti /Assistant Professor
Amritsar College of Engineering and Technology
Amritsar, India
Aarti.acet@yahoo.com

Abstract*— *A data warehouse is a relational data base organized to hold information in a structure that best supports reporting and analysis. A data warehouse is also a repository of information gathered from multiple sources stored under a unified schema, at a single site. It is a decision support database that is maintained separately from the organization's operational database Support information processing by providing a solid platform of consolidated, historical data for analysis. It is also a data management. Data warehouses are widely used within the largest and most complex businesses in the world. Use with in moderately large organizations, even those with more than 1,000 employees remains surprisingly low at the moment. In this paper I review the data warehousing components, functioning, design, models, different views, architecture, advantages, applications and discussed it.

Index Terms— Advantages, Architecture, Applications, Characteristics, Components, Design of Data Warehouse, Data Mart , ETL , Functioning of Data Warehouse, OLAP .

I. INTRODUCTION

A single, complete and consistent store of data obtained from a variety of different sources made available to end users in what they can understand and use in a business context. Also a process of transforming data into information and making it available to users in a timely enough manner to make a difference. A data warehouse is a relational database that is designed for query and analysis rather than for transaction processing. In addition to a relational database, a data warehouse environment includes an extraction, transportation, transformation, and loading (ETL) solution, an online analytical processing (OLAP) engine, client analysis tools, and other applications that manage the process of gathering data and delivering it to business users [12]. DW is typically a detailed and normalized database. Denormalization is convenient for a special part of the DW, called data mart (DM). DMs are specially suited for use in analytical decision support and thus require fast response from queries sent to them [2].The goal is to integrate enterprise wide corporate data into a single reository from which users can easily run queries [8]. It is a technique for assembling and managing data from various sources for the purpose of answering business questions. Thus making decisions that were not previous possible. A decision support database maintained separately from the organization's operational database [5]. Data warehousing concept consists of the tools and techniques

on, Transformation and loading, an OLAP engine, client analysis tools and other applications that are used to manage and process the data to provide decision support to the knowledge workers or decision makers. (Managers, analyst etc.)[15]. Data warehouse is a permanent storage of data in multidimensional tables. Data webhouse is a distributed data warehouse that is implement over the web with no central data repository .Data warehousing is the basis of automated decision support system. A Data Warehouse is defined as a copy of transaction data specifically structured for query and analysis [4]. Thus, data warehousing involves the construction of a huge repository where an integrated view of data is given, which is optimized for analysis purposes[4]. A physical repository where relational data are specially organized to provide enterprise-wide, cleansed data in a standardized format [10]. The concept of data warehousing is not hard to understand. The notion is to create a permanent storage space for the data needed to support reporting, analysis, and other BI functions. On the surface, it may seem wasteful to store data in more than one place. The advantages, however more than justify the effort and cost of doing so.

Data warehouses typically:

- Reside on computers dedicated to this function
- Run on a database management system (DBMS) such as Those from Oracle, Microsoft, or IBM
- Retain data for long periods of time
- Consolidate data obtained from many sources
- Are built around a carefully designed data model that transforms production data from a high speed data entry design to one that supports high speed retrieval. An Extract, Transform, and Load (ETL) software tool is used to obtain data from each appropriate source, including whatever ERP systems are in use. ETL tools read data from each source application, edit it, assign easy-to-understand names to each field, and then organize the data in a way that facilitates analysis. Data Warehouse is a Specialized Database.
    - Mostly reads
    - History
    - Lots of scans
    - Queries are long and complex
    - Summarized
    - Hundreds of users (e.g., decision-makers, analysts) [3].

The best data warehouses do some predigesting of the raw data in anticipation of the types of reports and inquiries that will be requested. This is done by developing and storing metadata (i.e., new fields such as averages, summaries, and deviations that are derived from the source data). There is some art involved in knowing what kinds of metadata will be

useful in support of reporting and analysis. The best data warehouses include a rich variety of useful metadata fields.

The most difficult thing about creating a good data warehouse is the design of the data model around which it will be built. Once a data warehouse is made operational, it is important that the data model remain stable. If it does not, then reports created from that data will need to be changed whenever the data model changes. New data fields and metadata need to be added over time in a way that does not require reports to be rewritten.[1] The benefits of a data warehouse are that it provides decision making information, organized in a way that facilitates the types of access required for that purpose and supported by a wide range of software designed to work with it. Web accessibility of a data warehouse is important because many analysis applications are Web-based, because users often access data over the Web (or over an intranet using the same tools) and because data from the Web may feed the DW.

1.1 NEED OF A DATA WAREHOUSE

In challenging times, taking good decisions become very difficult. The best decisions are made when all the relevant and required data is available for taking into consideration. The best possible source for that data is a well-designed data warehouse. The concept of data warehousing is deceptively simple. Data is extracted periodically from the applications that support business processes and copied onto special dedicated computers. There it can be validated, reformatted, reorganized, summarized, restructured, and supplemented with data from other sources. The resulting data warehouse becomes the main source of information for report generation, analysis, and presentation through ad hoc reports, portals, and dashboards.[1]

1.2 Characteristics of Data Warehouse

The concept of a Data Warehouse given by Bill Inmon , the father of Data Warehouse[6]. The characteristics are :

- Subject-oriented
- Integrated
- Time-variance
- Non-volatile

A data warehouse is a collection of data that is used primarily in organizational decision making[5].

Subject-oriented: A data warehouse is organized around the major subjects of the organization such as customer, supplier, product, sales, etc.., Focusing on the modeling and analysis of data for decision makers, not on daily operations or transaction processing[7].It provides a simple and concise view around a particular subject by excluding data that are not useful to the decision support process.

Integrated: A data warehouse is constructed by integrating multiple sources of data such as relational database, flat files and on-line transaction records.

Data cleaning and data integration techniques are applied to ensure consistency in naming conventions, encoding structures, attributes etc..,

Time Variant: Data warehouse maintains records of both historical and current data. So it can provide information in a historical perspective.

Non Volatile: Once data warehouse is loaded with data, it is not possible to perform any modifications in the stored data[5].

Others are :

– Web based
– Relational/multidimensional
– Client/server
– Real-time
– Include metadata

1.3 COMPONENTS OF DATA WAREHOUSE

The primary components of data warehouses are :

- Data Sources
- Data Transformation
- Reporting
- Metadata
- Operations
- Optional Components

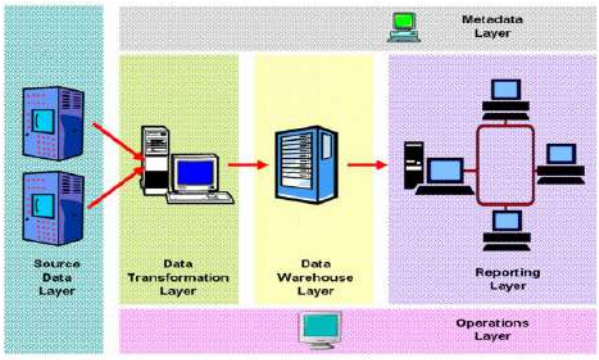

Fig. 1 Components of data warehouse

Data Sources:

Data sources refers to any electronic repository of information where data is passed from these systems to the data warehouse either on a transaction-by transaction basis for real-time data warehouses or on a regular cycle.

Data Transformation:

The Data Transformation layer receives data from the data sources, cleans and standardizes it, and loads it into the data repository.

Data Warehouse:

The data warehouse is a relational database organized to hold information in a structure that best supports reporting and analysis.

Reporting: The data in the data warehouse must be available to all the users if the data warehouse is to be useful.

Metadata:

Metadata or "data about data", is used to inform users of the data warehouse about its status and the information held within the data warehouse.

Operations:
Data warehouse operations comprises of the processes of loading, manipulating and extracting data from the data warehouse. It also covers user management, security, capacity management and related functions.

Optional Components:
In addition, the following components also exist in some data warehouses:

1. Dependent Data Marts: A dependent data mart is a physical database that receives all its information from the data warehouse
2. Logical Data Marts: A logical data mart is a filtered view of the main data warehouse but does not physically exist as a separate data copy.
3. Operational Data Store: An ODS is an integrated database of operational data. Its sources include legacy systems and it contains current or near term data.

1.4 FUNCTIONING OF DATA WAREHOUSING:

A data warehouse is based on a multidimensional data model which views data in the form of a data cube

- A data cube, such as sales, allows data to be modeled and viewed in multiple dimensions
  - Dimension tables, such as item (item_name, brand, type), or time(day, week, month, quarter, year)
  - Fact table contains measures (such as dollars_sold) and keys to each of the related dimension tables

In data warehousing literature, an n-D base cube is called a base cuboid. The top most 0-D cuboid, which holds the highest-level of summarization, is called the apex cuboid. The lattice of cuboids forms a data cube [7].

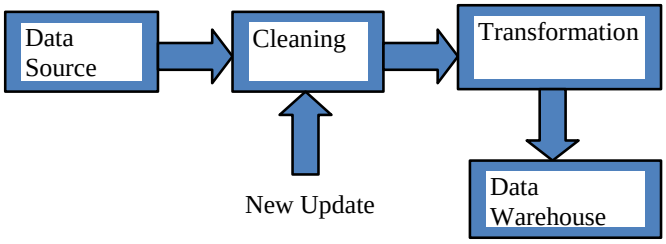

Fig. 1.1 Functioning of Data warehousing

a) Collection of data

- Data warehousing collect data from various data sources such as relational data base, flat files and on-line records which are stored in database inside the warehouse.
- The type of data collection used depends on the architecture of the ware house.

b) Integration

- Each and every data source uses from different schema.
- Data warehouse get data from different source with different schema and convert the data from various sources into a common integrated schema.

c) Star Schema

- The star schema is the simplest data warehouse schema. It is called a star schema because the diagram resembles a star, with points radiating from a center. The center of the star consists of one or more fact tables and the points of the star are the dimension tables[12].
- Does not capture hierarchies directly.

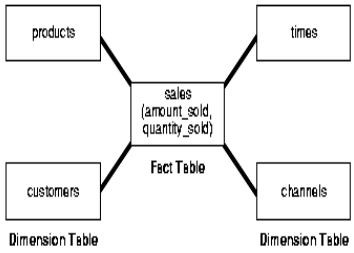

Fig. 1.2 Star Schema

d) Snowflake schema

- Represent dimensional hierarchy directly by normalizing tables.,forming a shape similar to snowflake
- Easy to maintain and saves storage

e) Fact constellations

Multiple fact tables share dimension tables, viewed as a collection of stars, therefore called galaxy schema or fact constellation[7].

f) Data transformation and cleaning

- The task of correcting and preparing the data is called data cleaning.
- Data source delivers data into the database of data warehouse it should be corrected.

a) Update of data

- Update on tables at the data sources must be sent to the data warehouse.
- If the tables in data warehouse are same as sources, the updation is easy[5].

1.5 DATA WAREHOUSE ARCHITECTURE

A Data Warehouse Architecture (DWA) is a way of representing the overall structure of data, communication, processing and presentation that exists for end-user computing within the enterprise [6]. The architecture of data warehouse is as follows:

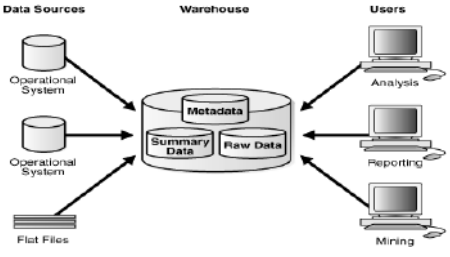

Fig.1.3 Data Warehouse Architecture

Load Manager : Data flows into the data warehouse through the "load manager". The data is extracted from the operational databases & supplemented by data imported from external sources.

Query Manager : It provides an interface between the warehouse& its users. It performs task like directing the queries to appropriate tables, monitoring the effectiveness of the indexes & summary data & query scheduling [6].

The load manager primarily performs an extract Transform load(ETL) operation :

- Data extraction.
- Data transformation.
- Data loading.

II. DESIGN OF DATA WAREHOUSE

- A difficult and expensive process
- Involve business and technical considerations. Viewed from different perspectives:
  - What information are needed
  - Models of data sources
  - Models of warehouse data
  - How to use the data
- Need many experiments [11].

The key consideration involved in the design of a data ware house is:

- Time span.
- Granularity.
- Dimensionality.
- Aggregations.
- Partitioning.

Design Component

- The data warehouse designer design the database of the data warehouse and the warehouse administrator manages the data warehouse. They both use the design component to design and store data [5].

Types of design

Bottom-up design

- Starts with experiments and prototypes.[7]

Top-down design

- Starts with overall design and planning.[7]

Hybrid design

Hybrid methodologies have evolved to take advantage of the fast turn-around time of bottom-up design and the enterprise-wide data consistency of top-down design.

2.1 DATA WAREHOUSE DESIGN PROCESS

- Choose a business process to model, e.g., orders, invoices, etc.
- Choose the grain (atomic level of data) of the business Process.
- Choose the dimensions that will apply to each fact table Record.
- Choose the measure that will populate each fact table record[11].

2.2 PRIMARY APPROACHES TO ORGANIZE THE DATA

There are two primary approaches to organising the data in

a data warehouse:

- Dimensional approach : Here, information is stored as "facts" which are numeric or text data that capture specific data about a single transaction or event, and "dimensions" which contain reference information that allows each transaction or event to be classified in various ways.
- Database normalization: In this style, the data in the data warehouse is stored in third normal form.

The main advantage of this approach is that it is quite straightforward to add new information into the database, while the primary disadvantage of this approach is that it can be quite slow to produce information and reports [6].

2.3 DIFFERENT VIEWS OF DATA WAREHOUSE

There are Four views regarding the design of a data warehouse.

- Top-down view allows selection of the relevant information necessary for the data warehouse
- Data source view exposes the information being captured, stored, and managed by operational systems
- Data warehouse view consists of fact tables and dimension tables
- Business query view sees the perspectives of data in the warehouse from the view of end-user.[7]

2.4 DATA WAREHOUSE MODELS

Enterprise warehouse

- collects all of the information about subjects spanning the entire organization

Data Mart

- A subset of corporate-wide data that is of value to specific groups of users. Its scope is confined to specific, selected groups, such as marketing data mart.
- Independent vs. dependent (directly from warehouse) data mart

Virtual warehouse

- A set of views over operational databases

- Only some of the possible summary views may be materialized [7].

2.5 Advantages of using data warehouse

- The major advantage of data warehousing is high returns on investment.
- Increased productivity of corporate decision-makers.
- Enhances end-user access to a wide variety of data.
- Increases data consistency.
- Decreases computing costs.
- Is able to combine data from different sources, in one place.
- It provides an infrastructure that could support changes to data and replication of the changed data back into the operational systems.

2.6 Problems and issues

- Underestimation of resources for data loading
- High maintenance
- Required data not captured
- Increased end-user demands
- Data homogenization
- Complexity of integration
- High demand for resources
- Data ownership[9]

2.7 Data warehouse applications

Three kinds of data warehouse applications

1. Information processing
   - supports querying, basic statistical analysis, and reporting using crosstabs, tables, charts and graphs
2. Analytical processing
   - multidimensional analysis of data warehouse data
   - supports basic OLAP operations, slice-dice, drilling, pivoting
3. Data mining
   - knowledge discovery from hidden patterns
   - supports associations, constructing analytical models, performing classification and prediction, and presenting the mining results using visualization tools.

2.8 Data Warehouse Tools & Utilities

- Data extraction: get data from heterogeneous external sources
- Data cleaning: detect & rectify errors in the data
- Data transformation: convert data from host format to Data Warehouse format.
- Load : sort, summarize, consolidate, compute views, check integrity, & build indices and partitions
- Refresh: propagate source updates to the warehouse [11].

2.9 Issues in using data warehouse

- Extracting, cleaning and loading data could be time consuming.
- Problems with compatibility with systems already in place e.g. transaction processing system.
- Providing training to end-users, who end up not using the data warehouse.
- Security could develop into a serious issue, especially if the data warehouse is web accessible [6].

III. Related Work

3.1 **A)** Usage in Business Intelligence

Business Intelligence (BI) - technology infrastructure for gaining maximum information from available data for the purpose of improving business processes. Business Intelligence systems are based on Data Warehouse technology. A Data Warehouse (DW) gathers information from a wide range of company's operational systems, Business Intelligence systems based on it. Data loaded to DW is usually good integrated and cleaned that allows to produce credible information which reflected so called 'one version of the true'[13]. Business intelligence encompasses data warehousing, business analytic tools, and content/ knowledge management. Technically, it is not necessary to build a data warehouse in order to create a BI environment [1]. Examples of the many ways in which data warehouse-based BI systems deliver value to their users include:

i) The generation of scheduled reports. Moving the creation of reports to a BI system increases consistency and accuracy and often reduces cost.

ii) Packaged analytical applications: A growing number of outstanding analytical software applications are coming onto the market.

iii) The creation of metadata: Metadata can include something as simple as an average. Data warehouses can be used to create and store a great deal of metadata of potentially great value.

iv) Security: A data warehouse makes it much easier to provide secure access to those that have a legitimate need to specific data and to exclude others.

These benefits make BI based on a data warehousing an Essential management tool for businesses that have Reached a certain level of complexity [1].

B) Hardware and I/O Considerations in Data Warehouses:

Data warehouses are normally very concerned with I/O performance. This is in contrast to OLTP systems, where the potential bottleneck depends on user workload and application access patterns. When a system is constrained by I/O capabilities, it is I/O bound, or has an I/O bottleneck. When a system is constrained by having limited CPU resources, it is CPU bound, or has a CPU bottleneck. Database architects frequently use RAID (Redundant Arrays of Inexpensive Disks) systems to overcome I/O bottlenecks and to provide higher availability. RAID can be implemented in several levels, ranging from 0 to 7[14].

IV. Future Scope

The future of data warehousing seems to be full of promises and significant challenges. As the world of business becomes more global and complex, the need for business intelligence and data warehousing tools also becomes more prominent. The fast improving information technology tools and techniques seem to be moving in the right direction to address the needs of the future business intelligence systems. The value of a data warehouse increases over time. Data Warehousing is not a new field that it is difficult to estimate what new developments are likely to most affect it. Clearly, the development of parallel DB servers with improved query engines is likely to be one of the most important. Parallel servers will make it possible to access huge data bases in much less time. Some of the popularized concepts and technologies that shape the future of data warehousing are Sourcing, Open source software, Cloud computing, Real-time data warehousing, Data management technologies and practices and Advanced analytics. OLAP constructs in RDBMS, world wide web and Integrated Tools are also the future of data warehousing.

V. Conclusion

I have reviewed the Data Warehousing Advantages, Applications, Characteristics, Components, Architecture, functioning, design, Data Warehouse Models, Different Views and Problems of Data Warehouse. Hence all the topics have been discussed. To conclude, all the topics related to data warehouse are performing in their related areas and every day a new issue arises related to Data warehousing. Data warehousing is the leading and most reliable technology used today by companies for planning, forecasting, and management for e.g. resource planning, financial forecasting and control etc. Data Warehousing is not a new phenomenon. All large organizations already have data warehouses, but they are just not managing them. Over the next few years, the growth of data warehousing is going to be enormous with new products and technologies coming out frequently. In order to get the most out of this period, it is going to be important that data warehouse planners and developers have a clear idea of what they are looking for and then choose strategies and methods that will provide them with performance today and flexibility for tomorrow. This review paper gives clear idea about the Data Warehousing Advantages, Applications, Characteristics, Components, Architecture, functioning, design, Data Warehouse Models, Different Views and Problems of Data Warehouse. Based on review of Data Warehousing I conclude that it has a great scope in various fields where large amount of data handling is concerned.

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An Automatic Modulation Classification Detection

Sandeep Singh

M. Tech , research scholar, Amritsar college of

Engineering and Technology, Amritsar, India

er.sandeepsingh91@gmail.com

Abstract*— Based on the inherent capability of automatic modulation classification (AMC), a new spectrum sensing method is proposed in this paper that can detect all forms of primary users signals. The study presented in this paper focuses on the sensing of some combined analog and digitally primary modulated signals. In achieving this objective, a combined analog and digital automatic modulation classifier was developed using an artificial neural network (ANN). The ANN classifier was combined with a GNU Radio and Universal Software Radio Peripheral version 2 (USRP2) for detecting primary users' signals. The detailed information on the development and performance of the CRE are presented in this paper. The performance evaluation of the developed CRE shows that the engine can reliably detect all the primary modulated signals considered. Comparative performance evaluation carried out on the detection method presented in this paper shows that the proposed detection method performs favorably against the energy detection method currently acclaimed the best detection method. The study results reveal that a single detection method that can reliably detect all forms of primary radio signals in a cognitive radio environment, can only be developed if a feature common to all radio signals is used in its development rather than using features that are peculiar to certain signal types only.

***Keywords*—** Automatic Modulation Classification , Universal Software Radio Peripheral (USRP) , Cognitive Radio (CR), Neural Network

I. INTRODUCTION

Automatic Modulation Classification (AMC) has been an established research topic for many years.The initial application of AMC was mostly in military electronic warfare, surveillance and threat analysis [1].The main purpose of AMC is to classify automatically the modulation type of the Intercepted signals. Many papers, e.g. [2–6], have been published suggesting different solutions for this problem. Recently, as intelligent radio communication systems emerges in modern civilian communication applications, AMC which is an important component in the adaptive modulation module, has attracted much attention from Cognitive Radio (CR) and Software Defined Radio (SDR) developers.

Automatic modulation classification (AMC) can be applied to identify the modulation types of transmitted signals usually corrupted by noise and multipath fading, and play a key role in various civilian and military applications. With rapid development of communication technology, communication system becomes complicated and various modulation types are adopted. For a cognitive radio (CR) user, it can change its transmitter parameters such as symbol rate and modulation type based on interactions with the environment in which it operates. Therefore, there is an emerging need for the intelligent system to correctly and quickly recognize the modulation type of received signal. In general, there are two main classes of AMC algorithm, the likelihood-based (LB) and feature-based (FB) methods, respectively [1]. In the LB approach, decision is made by comparing the likelihood ratio against a threshold.

A single user's feature-based approach for modulation recognition has been implemented in earlier works. However, several modulation types were still misclassified. One reason is that the feature parameters are not so divisive between different modulation types when the SNR of received signal is much lower. In this article, the application of cooperation between CR users for the purpose of modulation recognition is proposed to improve the recognition performance. By appropriately using the help from adjacent CR user, it can significantly improve the recognition performance of a system especially when one of the CR users' SNR is low. The main objective of this approach is to improve the modulation recognition rate of primary user in CR system especially when the user's SNR is low. The simulation result shows that the CMR has better performance than that non-cooperative mechanism.

In general, there are two main schemes for automatic modulation recognition [1], the likelihood-based (LB) and the feature-based (FB) methods, in which the FB method is prone to carry out. In the FB method, the classifier is composed of a feature extraction subsystem and a classifier design subsystem. There are a considerable number of methods used in feature extraction. They can be categorized in terms of different bases such as instantaneous parameters [7], the spectral correlation [8-9], the high order cumulants [10], the wavelet transform [11] and so forth. There are also many classifiers used for modulation recognition, such as the decision-tree classifier [12] and the neural network classifier . It is now widely accepted that neural network (NN) classifier obtains better recognition rate than decision-tree classifier.

These methods used for automatic modulation classification are summarized as below:

1. It is proposed a modulation classifier based on the changing of both the instantaneous frequency and the instantaneous frequency (Fabrizi, Lopes, & Lockhart, 1986). This method capable of discrimination among AM, FM, and DSB by using these two key features.
2. It is suggested a modulation classifier based on the envelope characteristics of the intercepted (receiving) signal (Chan & Gadbois, 1989). This classifier is used for the recognition of some analog modulated signals (AM, FM, DSB, and SSB).
3. It is suggested a modulation classifier for analog radio signals. In this method, variance of the instantaneous frequency normalized to the squared sample time is used as key feature to discriminate among the different modulation type (AM, DSB, SSB, FM, and CW) of interest (Nagy, 1994).
4. It is introduced a modulation classifier to discriminate among a low modulation depth AM and a pure carrier wave (CW) in a noisy environment (Jovanovic, Doroslovacki, & Dragosevic, 1994).
5. It is proposed a modulation classifier to discriminate among the USB and LSB signals. In this method, instantaneous frequencies of USB and LSB signals are used for recognition the modulation type (Al-jalili, 1995).
6. Nandi and Azzouz suggested a modulation classifier for the well-known analog modulation types, which are AM, DSB, VSB, LSB, USB, FM, and combined modulated signals. In this study, the maximum value of the spectral power density of the normalized-centered instantaneous amplitude, the standard deviation of the absolute value of the centered non-linear component of the instantaneous phase in the non-weak intervals of a signal segment, the standard deviation of the direct (not absolute) value of the centered non-linear component of the instantaneous phase, and the RF spectrum symmetry measure around the carrier frequency of the intercepted signal (Azzouz & Nandi, 1996).
7. Azzouz and Nandi (Azzouz & Nandi, 1996; Wong & Nandi, 2004) suggested a global procedure for analog and digital modulation classification. In this study, decision theoretic approach was used.
8. Swami and Saddler (Lanzi, 1997; Wong & Nandi, 2004) inspects the suitability of cumulates as features for digitally modulation. Here, decision theoretic approach was used too. The major shortcoming of this decision theoretic approach is the complexes of shaping the right hypothesis as well as careful analyses that are needed to set the correct threshold values (Wong & Nandi, 2004).
9. A lot of studies have realized on the topic of automatic modulation recognition using ANNs approximations (Kavalov, 2001; Kremer & Shiels, 1999; Nandi & Azzouz, 1998). Nandi and Azzouz (1997) proposed a single hidden layer ANN structure for automatic modulation classification. This network has a 4-node input layer, a 25-node hidden layer and a 7-node output layer. Nevertheless a degradation of performance at higher signal noise ratios (SNR) will appear when the ANN is trained on signals with lower SNR. The generalization capability of ANNs must be increased for overcoming
this shortcoming of ANNs classifiers. Therefore, a compact set of features, which capture all the major characteristics of the intercepted signals in a relatively small number of the components must be obtained from intercepted signal (Wu, Ren, Wang, & Zhao, 2004). Then, these features must be given to ANN inputs for modulations classification. For this reason, the wavelet transform is used for the extraction of key features at pattern recognition and classification areas (Graps, 1995).

II. COGNITIVE SYSTEM OVERVIEW

A) System model

The modulation recognition based on the BPNN approach is mainly composed of three steps [3]. First is the preprocessing, in which key features are extracted from every signal frame, which are the prominent characteristics of the received data for reducing the dimension of signals. Second is the training and learning phase for deciding about the classifier structure. Third is the test phase to decide about the modulation type of a signal. In this article, the proposed CMR method, which is applied in CR system is illustrated in Fig. 1. In the CR system, two CR users respectively extracted their feature parameters and send to the cooperative recognition center, which is composed of BPNN.

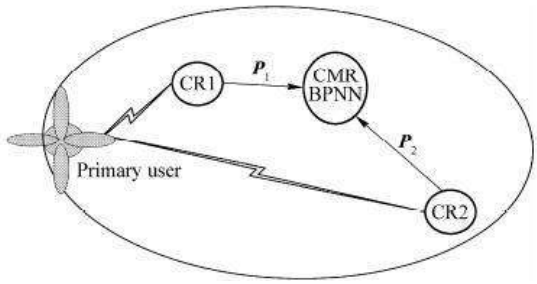

Fig. 1 Cooperative modulation recognition in cognitive radio

To correctly and efficiently recognize the modulation types of the primary user in the cognitive radio system, two CR users extracted their feature parameters 1 ***P*** and 2 ***P*** , respectively, which were then sent to the CMR BPNN classifier. With two sets of parameters, after normalization, and training and learning, the modulation type of the signal will be obtained by the CMR BPNN classifier.

2.2 BPNN algorithm

The structure of the NN is a three-layer network with the number of input nodes being determined by the number of features and that the number of the output neurons equals to that of the modulation types to be classified. The number of neurons in the hidden layer is arbitrary, depending on different training algorithms and application situations. BPNN is composed of neurons and weights. Neurons include input nodes, hidden nodes and output nodes. In this article, the BPNN classifier possesses three neuron layers. The first is input layer. The second is hidden layer, which uses the log-sigmoid function as the activation function. The last is output layer. BP algorithm [11] can be summarized as follows:
Step 1 Initialize weights to random values and set bias.

Step 2 Calculate output value of the network.
Step 3 Calculate the error with respect to target output.
Step 4 Calculate all the weight changes from the hidden layer to the output layer.
Step 5 Calculate all the weight changes from the input layer to the hidden layer.
Step 6 Repeat Step 2 to Step 5 until the cumulative error satisfies the stopping criterion.

III. CLUSTERING MODEL

Clustering analysis can discover the distribution characteristics and valuable relationships between data attributes, and artificial neural network has powerful capabilities of pattern recognition and nonlinear mapping based on standard data. Therefore, these two pattern recognition methods are studied in this paper, and a new modulation classification method is proposed based on the combination of clustering and neural network, in which a new algorithm is introduced to extract key features. System model is depicted in Fig. 1.

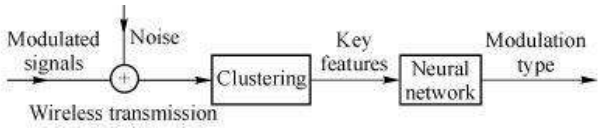

Fig 2. System Model

In Fig. 2, transmitted signals are modulated based on constellation diagrams, which are BPSK, QPSK, 8PSK, 16QAM, 32QAM, and 64QAM. Propagating through wireless channel, the signals are corrupted by additive white Gaussian\ noise (AWGN). Clustering and neural network are the two main algorithms adopted at the receiver to classify modulation types. The modulation classification algorithm based on the combination of clustering and neural network is mainly composed of three steps. First is preprocessing, in which constellation is recovered by FCM clustering after processing received signal, and cluster validity measure is taken to extract key features which discriminate between different modulation types. Second is the training and learning phase of neural network, in which conjugate gradient learning algorithm of Polak-Ribiere update is employed to train BP neural network. Third is the test phase to decide the modulation type of received signal.

IV. SEMI-BLIND ALGORITHMS

Communication intelligent (COMINT) plays an increasingly important role in military communications as communication technologies continue to advance. The ability of detecting an unknown modulated signal and being able to recognise its modulation type is an important feature in COMINT. This feature is usually referred to as modulation classification or modulation recognition [13]. In the civil arena, emerging digital communication technologies such as adaptive modulation [14,15], software defined radio , cognitive radio [16] are also making a good case for the study of automatic digital MC (ADMC). These emerging technologies share the common need for re-configurability during on-line operation. ADMC is utilized as a front end in determining the underlying modulation type of the incoming signal, and as the indicator to switch between modulation schemes. Obviously, ADMC is not the only way to achieve such re-configurability; however it is an extremely useful feature to have in these emerging technologies. Since the 90s, a range of feature based modulation classifiers that exhibit high degree of performance emerges. Examples of feature sets extracted for the problem include instantaneous signal parameters, statistical moments of complex constellation, variance of zero crossing interval sequence, phase moments, etc. Co-existing with these feature based classifiers, there is another major group of classifiers based on the quasi log likelihood ratios [17-19]. We refer the readers to for an excellent review of and comparison between the two classes of classifier. Generally, in these two classes of classifiers, specific features or likelihood ratios are designed carefully to tackle a close set of modulation schemes. Threshold values are then set manually by theoretical analysis and/or empirical testing. The threshold values can also be set automatically using learning machines, e.g., artificial neural networks and support vector machines.

In this work, we investigate the maximum likelihood classifier (MLMC)1 by Wen and Swami [20] and Sills [21]. In particular, we relax the requirement to have the knowledge of the SNR values and propose a simple method to estimate the SNR and we name the resulting classifier as the estimated maximum likelihood (EsML) modulation classifier.

Furthermore, we experiment on a simplified version of the ML classifier in which we drop the SNR information completely, and we name the resulting classifier as the minimum distance (MD) modulation classifier. We refer to these algorithms as semi-blind algorithms due to the fact that only the information of the constellation diagram of the modulation schemes investigated is required. In principle, extension to new modulation schemes in this class of semi-blind algorithms is straightforward, i.e., by simply adding a new classification sub-module to the existing library of sub-modules.

V. CONCLUSION

The dynamic spectrum access, which is one of the applications of cognitive radio technology, has been observed as a promising solution to the problem of radio spectrum scarcity and underutilization by introducing the opportunistic secondary usage of licensed frequency bands that are not efficiently utilized by their licensed owners. Following the general belief that spectrum sensing is the key functionality to enable DSA, this study focused on issues of spectrum sensing. An alternative spectrum sensing/ detection method using an AMC detection method was proposed and implemented using both hardware and software components. The performance evaluation of the developed CRE shows that the engine can reliably detect all the primary modulated signals considered. Comparative performance evaluation carried out on the detection method presented in this paper shows that the proposed detection method performs favorably with the energy detection method currently acclaimed the best detection method. The study results reveal that a detection method that would reliably detect all forms of primary radio signals in a cognitive radio environment needs to be developed using a feature common to all radio signals rather than using features that are peculiar to certain signal types only.

Six schemes of modulation signals received by a CR user can be correctly classified based on the CMR BPNN, with higher successful recognition accuracy even at a low SNR and strong robustness against real modulation signals with a wide range of SNR. The simulation results show that, with the cooperation between CR users, this cooperation algorithm has a better recognition performance than the methods without cooperation. Thus, it can be said that the proposed method is particularly significant for the implementation of intelligent terminals to correctly recognize the modulation type of primary user in cognitive radio.

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Data Mining-A Review

Jagdeep Singh
Associate Professor
Department of Information Technology
Amritsar College of Engg. & Tech., Amritsar

Parambir Singh
Assistant Professor
Department of Information Technology
Amritsar College of Engg. & Tech., Amritsar

Abstract

The amount of data being generated and stored is growing exponentially, due in large part to the continuing advances in computer technology. This presents tremendous opportunities for those who can unlock the information embedded within this data, but also introduces new challenges. In this paper we discuss how the modern field of data mining can be used to extract useful knowledge from the data that surround us. Those that can master this technology and its methods can derive great benefits and gain a competitive advantage.

What is Data Mining?

Data mining is a *process* that takes data as input and outputs knowledge. One of the earliest and most cited definitions of the data mining process, which highlights some of its distinctive characteristics, is provided by Fayyad, Piatetsky-Shapiro and Smyth (1996) [11], who define it as "the nontrivial process of identifying valid, novel, potentially useful, and ultimately understandable patterns in data". Note that because the process must be non-trivial, simple computations and statistical measures are not considered data mining. Thus predicting which salesperson will make the most future sales by calculating who made the most sales in the previous year would *not* be considered data mining. Although not stated explicitly in this definition, it is understood that the process must be at least partially automated, relying heavily on specialized computer algorithms (i.e., data mining algorithms) that search for patterns in the data.

It is important to point out that there is some ambiguity about the term "data mining", which is in large part purposeful. This term originally referred to the algorithmic step in the data mining process, which initially was known as the Knowledge Discovery in Databases (KDD) process. This entire process, as originally envisioned by Fayyad, Piatetsky-Shapiro and Smyth (1996), is shown in Figure 1. The first three steps in Figure 1 involve preparing the data for mining. The relevant data must be selected from a potentially large and diverse set of data, any necessary preprocessing must then be performed, and finally the data must be transformed into a representation suitable for the data mining algorithm that is applied in the data mining step.

As an example, the preprocessing step might involve computing the day of week from a date field, assuming that the domain experts thought that having the day of week information would be useful. An example of data transformation is provided by Cortes and Pregibon (1998). If each data record describes one *phone call* but the goal is to predict whether a *phone number* belongs to a business or residential customer based on its calling patterns, then all records associated with each phone number must be *aggregated*, which will entail creating attributes corresponding to the average number of calls per day, average call duration, etc.

The fourth step in the data mining process is the data mining step. This step involves applying specialized computer algorithms to identify patterns in the data. Many of the most common data mining algorithms, including decision tree algorithms and neural network algorithms. The patterns that are generated may take various forms (e.g., decision tree algorithms generate decision trees). At least for predictive tasks, which are probably the most common type of data mining task, these patterns collectively can be viewed as a *model*. For example, if a decision tree algorithm is used to predict who will respond to a direct marketing offer, we can say that the decision tree models how a consumer will respond to a direct mail offer. Finally, the results of data mining cannot simply be accepted, but must be carefully evaluated and interpreted.

The data mining process is an iterative process, although this is not explicitly reflected in Figure 1. After the initial run of the process is complete, the user will evaluate the results and decide whether further work is necessary or if the results are adequate. Normally, the initial results are either not acceptable or there is an expectation that further improvements are possible, so the process is repeated after some adjustments are made.

These adjustments can be made at any stage of the process. For example, additional data records may be acquired, additional fields (i.e., variables) may be generated from existing information or obtained (via purchase or measurement), manual cleaning of the data may be performed, or new data mining algorithms may be selected.

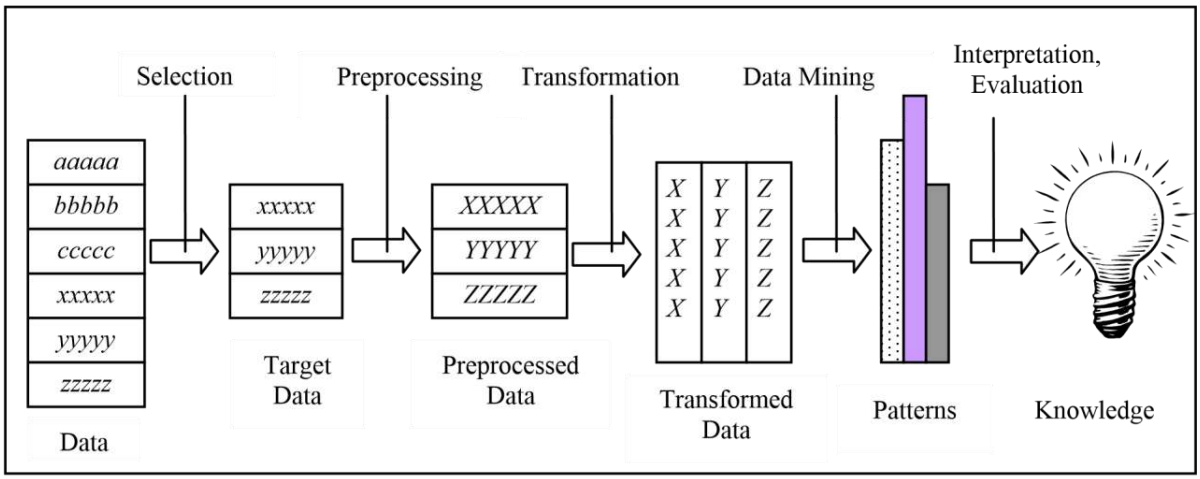

Figure 1: The Data Mining Process

For businesses, data mining is used to discover patterns and relationships in the data in order to help make better business decisions. Data mining can help spot sales trends, develop smarter marketing campaigns, and accurately predict customer loyalty. Specific uses of data mining include:

• **Market segmentation** – Identify the common characteristics of customers who buy the same products from your company.

• **Customer churn** – Predict those customers who are likely to leave the company and go to a competitor.

• **Fraud detection** – Identify transactions that are most likely to be fraudulent.

• **Direct marketing** – Identify the prospects who should be included in a mailing list to obtain the highest response rate.

• **Interactive marketing** – Predict what each individual accessing a web site is most likely interested in seeing.

• **Market basket analysis** – Understand what products or services are commonly purchased together, e.g., beer and diapers.

• **Trend analysis** – Reveal the difference in a typical customer between the current month and the previous one.

Data mining technology can generate new business opportunities by:

• **Automated prediction of trends and behaviors:** Data mining automates the process of finding predictive information in large database. Questions that traditionally required extensive hands-on analysis can now be directly answered from the data. A typical example of a predictive problem is targeted marketing. Data mining uses data on past promotional mailings to identify the targets most likely to maximize return on investment in future mailings. Other predictive problems include forecasting bankruptcy and other forms of default and identifying segments of a population likely to respond similarly to given events.

• **Automated discovery of previously unknown patterns:** Data mining tools sweep through databases and identify previously hidden patterns. An ex-ample of pattern discovery is the analysis of retail sales data to identify seemingly unrelated products that are often purchased together. Other pattern discovery problems include detecting fraudulent credit card trans-actions and identifying anomalous data that could represent data entry keying errors.

I. Data Mining Techniques

The analytical techniques used in data mining are often well-known mathematical algorithms and techniques. What is new is the application of those techniques to general business problems made possible by the increased avail-ability of data, and inexpensive storage and processing power. Also, the use of graphical interface has led to tools becoming available that business experts can easily use. Some of the tools used for data mining are:

• **Artificial neural networks** – Nonlinear predictive models that learn through training and resemble biological neural networks in structure.

• **Decision trees** – Tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset.

• **Rule induction** – The extraction of useful if-then rules from databases on statistical significance.

• **Genetic algorithms** – Optimization techniques based on the concepts of genetic combination, mutation, and natural selection.

• **Nearest neighbor** – A classification technique that classifies each record based on the records most similar to it in a historical database.

II. DATA MINING TASKS

At a high level, most data mining tasks can be categorized as either having to do with *prediction* or *description*. Predictive tasks allow one to predict the value of a variable based on other existing information. Examples of predictive tasks include predicting when a customer will leave a company (Wei and Chiu 2002), predicting whether a transaction is fraudulent or not (Fawcett and Provost 1997), and identifying the best customers to receive direct marketing offers (Ling and Li 2000). Descriptive tasks, on the other hand, summarize the data in some manner. Examples of such tasks include automatically segmenting customers based on their similarities and differences (Chen et al. 2006) and finding associations between products in market basket data (Agrawal and Srikant 1994) [2]. Below we briefly describe the major predictive and descriptive data mining tasks.

A. Classification and Regression

Classification and regression tasks are predictive tasks that involve building a model to predict a target, or dependent, variable from a set of explanatory, or independent, variables. For classification tasks the target variable usually has a small number of discrete values (e.g., "high" and "low") whereas for regression tasks the target variable is continuous. Identifying fraudulent credit card transactions (Fawcett and Provost 1997) is a classification task while predicting future prices of a stock (Enke and Thawornwong 2005) is a regression task. Note that the term "regression" in this context should not be confused with the regression methods used by statisticians (although those methods can be used to solve regression tasks).

B. Association Rule Analysis

Association rule analysis is a descriptive data mining task that involves discovering patterns, or associations, between elements in a data set. The associations are represented in the form of rules, or implications. The most common association rule task is *market basket analysis*. In this case each data record corresponds to a transaction (e.g., from a supermarket checkout) and lists the items that have been purchased as part of the transaction. One possible association rule from supermarket data is {Hamburger Meat} □ {Ketchup}, which indicates that those transactions that include Hamburger Meat tend to also include Ketchup. It should be noted that although this is a descriptive task, highly accurate association rules can be used for prediction (e.g., in the above example it might be possible to use the presence of "Hamburger Meat" to predict the presence of "Ketchup" in a grocery order).

C. Cluster Analysis

Cluster analysis is a descriptive data mining task where the goal is to group similar objects in the same cluster and dissimilar objects in different clusters. Applications of clustering include clustering customers for the purpose of market segmentation and grouping similar documents together in response to a search engine request (Zamir and Etzioni 1998).

D. Text Mining Tasks

Much available data is in the form of unstructured or semi-structured text, which is very different from conventional data, which is completely structured. Text is unstructured if there is no predetermined format, or structure, to the data. Text is semi-structured if there is structure associated with some of the data, as in the case for web pages, since most web pages will have a title denoted by the title tag, images denoted by image tags, etc. While text mining tasks often fall into the classification, clustering and association rule mining categories, we discuss them separately because the unstructured nature of text requires special consideration. In particular, the method for representing textual data is critical. Example applications of text mining includes the identification of specific noun phrases such as people, products and companies, which can then be used in more sophisticated co-occurrence analysis to find nonobvious relationships among people or organizations. A second application area that is growing in importance is sentiment analysis, in which blogs, discussion boards, and reviews are analyzed for opinions about products or brands.

Association Rule Mining

Association rule mining, one of the most important and well researched techniques of data mining, was first introduced in [4]. It aims to extract interesting correlations, frequent patterns, associations or casual structures among sets of items in the transaction databases or other data repositories. Association rules are widely used in various areas such as telecommunication networks, market and risk management, inventory control etc.

Association rule mining is to find out association rules that satisfy the predefined minimum support and confidence from a given database. The problem is usually decomposed into two subproblems. One is to find those itemsets whose occurrences exceed a predefined threshold in the database; those itemsets are called frequent or large itemsets. The second problem is to generate association rules from those large itemsets with the constraints of minimal confidence. Suppose one of the large item-sets is Lk, Lk= {I1, I2,…, Ik}, association rules with this itemsets are generated in the following way: the first rule is {I1, I2, … , Ik-1}!{Ik}, by checking the confidence this rule can be determined as interesting or not. Then other rule are generated by deleting the last items in the antecedent and inserting it to the consequent, further the confidences of the new rules are checked to determine the interestingness of them. Those processes iterated until the antecedent becomes empty. Since the second sub-problem is quite straight forward, most of the researches focus on the first sub-problem. The first sub-problem can be further divided into two sub-problems: candidate large itemsets generation process and frequent itemsets generation process.

Mathematically, support and confidence can be calculated by probability, $P(X \cup Y)$, and conditional probability, $P(Y|X)$, respectively (X denotes the premise and Y denotes the consequence in the sequence). That is,

$$\text{Support } (X \rightarrow Y) = P(X \cup Y)$$
$$\text{Confidence } (X \rightarrow Y) = P(Y|X)$$

Commonly used ARM algorithms include the Apriori algorithm and the frequent-pattern growth (FP-growth) algorithm.

E. Many businesses maintain huge databases of transactional data, which might include all purchases made from suppliers or all customer sales. Association analysis (Agrawal, Imielinki and Swami 1993) attempts to find patterns either within or between these transactions. Consider the data in Table 1, which includes five transactions associated with purchases at a grocery store. These data are referred to as market basket data since each transaction includes the items found in a customer's shopping "basket" during checkout. Each record contains a transaction identifier and then a list all of the items purchased as part of the transaction.

Table 1: Market Basket Data from a Grocery Store

Transaction ID	Items
1	{Ketchup, Hamburgers, Soda}
2	{Cereal, Milk, Diapers, Bread}
3	{Hot dogs, Ketchup, Soda, Milk}
4	{Greeting Card, Cake, Soda}
5	{Greeting Card, Cake, Milk, Cereal}

In market basket analysis, a specific instance of association analysis, the goal is to find patterns *between* items purchased in the same transaction. As an example, using the limited data in Table 1, a data mining algorithm might generate the association rule {Ketchup} □ {Soda}, indicating that a customer that purchases Ketchup is likely to also purchase Soda.

F. CLUSTER ANALYSIS

Cluster analysis (Jain, Murthy, and Flynn 1999; Parsons, Haque, and Liu 2004) automatically partitions data into meaningful groups based on the characteristics of the data. Similar objects are placed into the same cluster and dissimilar objects are placed into different clusters. Clustering is an unsupervised learning task in that the training data do not include the "answer" (i.e., a mapping from example to cluster). Clustering algorithms operate by measuring the similarity and dissimilarity between objects and then finding a clustering scheme that maximizes intra cluster similarity and inter-cluster dissimilarity. Clustering requires that a similarity measure be defined between objects, which, for objects with numerical attributes, may be the Euclidean distance between the points. Figure 2 shows one possible clustering of eleven objects, each described by three attributes. The cluster boundaries are denoted by the dashed shapes.

There are many reasons to cluster data. The main reason is that it allows us to build simpler, more understandable models of the world, which can be acted upon more easily. People naturally cluster objects for this reason all the time. For example, we are able to identify objects as a "chair" even if they look quite different and this allows us to ignore the specific characteristics of a chair if they are irrelevant. Clustering algorithms automate this process and allow us to exploit the power of computer technology.

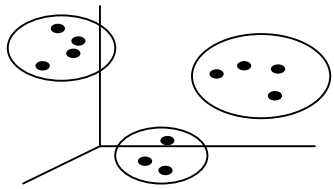

Figure 2: Eleven Objects Placed into Three Clusters

A secondary use for clustering is for dimensionality reduction or data compression. For example, one could identify ten attributes for a data set, cluster the examples using these attributes, and then replace the ten attributes with one new attribute that specifies the cluster number. Reducing the number of dimensions (i.e., attributes) can simplify the data mining process. Clustering can also aid with data compression by replacing complex objects with an index into a table of the object closest to the center of that objects cluster.

There are many specific applications of clustering and we list only a few here. Clustering can be used to automatically segment customers into meaningful groups (e.g., students, retirees, etc.), so that more effective, customized, marketing plans can be developed for each group. In document retrieval tasks the returned documents may be clustered and presented to the users grouped by these clusters (Zamir and Etzioni 1998) in order to present the documents to the user in a more organized and meaningful way. For example, clustering can be employed by a search engine so that the documents retrieved from the search term "jaguar" cluster the documents related to the jaguar animal separately from those related to the Jaguar automobile (the ask.com search engine currently provides this capability). The clustering algorithm can work effectively in this case because one set of returned documents will repeatedly have the term "car", "automobile" or "S-type" in it while the other set may have the terms "jungle" or "animal" appear repeatedly.

Finally, it is important to note that the collection, storage, transmission and use of usage data is often subject to legal constraints in addition to privacy expectations. Not surprisingly, methods for the anonymization of user data continue to be an active research topic.

There are a wide variety of data mining tools available. Some of these tools implement just one data mining method (e.g., decision trees) whereas others provide a comprehensive suite of methods and a uniform interface. Many of the tools provided by the academic community are available for free, while many of the commercial data mining tools can be quite expensive. The commercial tools are frequently provided by companies that also provide statistical tools and in these cases are often marketed as an extension to these tools.

III. CONCLUSION

Data mining initially generated a great deal of excitement. However, as data mining has begun to mature as a discipline, its methods and techniques have not only proven to be useful, but have begun to be accepted by the wider community of data analysts. As a consequence, courses in data mining are now not only being taught in Computer Science departments, but also in most business schools. Even many of the social sciences that have long relied almost exclusively on statistical techniques have begun to realize that some knowledge of data mining is essential and will be required to ensure future success.

All "knowledge workers" in our information society, particularly those who need to make informed decisions based on data, should have at least a basic familiarity with data mining.

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PERFORMANCE EVALUATION OF INTEGRATED PCA AND HUE BASED EDGE DETECTION

Simranjit Singh Walia[1], Gagandeep Singh[2]
Dept. of Computer Science & Engineering
[1,2]SIET, Manawala, Amritsar (Pb.).

Abstract-This paper presents a performance evaluation of different color based edge detection techniques. Edge detection has found to be most important step in many critical vision applications. It actually results in the black and white (binary) image where each object is differentiate by lines (either black or white). Edges are basically the area in the image where sharp changes exist. It has been found that the most of the existing techniques has neglected the use of colours while detecting the edges but in many applications a region can be categorized based upon the color. This paper has shown the result of different color based edge detectors i.e. hue, PCA and integrated Hue and PCA based methods. The results of fuzzy based edge detectors are also taken for experimental purpose. The experiments have shown that the three exist trade-off between fuzzy based and integrated hue and PCA based edge detectors.

Index terms: Edge detection, PCA, Hue, Morphological operations.

1. INTRODUCTION

Edge detection [1] plays a significant role in vision processing. Edge recognition is the name for a set of mathematical methods which target at classifying points in a image at which the image intensityvaries sharply or, has discontinuities. The points at which digital image intensityturns sharply are stereotypicallyordered into a set of line segments callededges. The similar problem of discovering discontinuities in 1D signal is identified as step detection and the problem of discovering signal discontinuities over the time is called as change detection. Edge detection is essentialinstrument in vision processing, machine vision and digitalimage processing, mainly in the areas of feature recognition.The problem is to find edges in an image [1], so the first step is the process of scene reconstruction. The edges can be used later for segmentation of the image into objects. The most straightforward edge detection can be done by using thresholds: pixels with gray level above some threshold are considered to be in one group and all the other pixels in the second. The edges should appear when you cross the border between the groups. This technique works in very straightforward domains, but by no means can provide as an edge detector in the real world.

More sophisticated approach [2] uses linear operators to find edges. For example if you relate a gradient operator on the image and only then relate the threshold technique, the result that you get is much better. Not only gradient operators can be used for edge detection. There are a lot of linear operators (for eg.Laplacian) that can serve this purpose. An edge [3] is not a physical entity, it is just like a shadow. It is where the picture ends and the wall starts. It is where the vertical and the horizontal surfaces of an object assemble. It is what happens between a bright window and the darkness of the night. Purely speaking, it has no width. If there were sensor with infinitely small footprints and zero-width point spread functions, an edge would be recorded between pixels within in an image. In reality, what happens to an edge from the distance [4] may even have other edges when looked closer? The edge stuck between a forest and a road in an aerial photo may not appear like an edge any more in an image engaged on the ground. In the ground image, edges may be originatein the region of each individual tree. If looks a few inches away from a tree, edges may be originate within the texture on the bark of the tree. Edges are basically scale-dependent and an edge may restrain other edges, but at a certain scale, an edge still has no width. Traditionally, edges [5] have been freely defined as pixel intensity discontinuities within an image.

While two experiments process the same image for the same purpose may not observe the same edge pixels in the image, two different applications may never agree. Inword, edge detection [6] is usually a subjective task. As a user of an edge detector, one should not imagine the software to automatically detect all the edge he or she desires and nothing more, because a program cannot possibly know what level of details the experimenter has in mind. Usually it is uncomplicated to detect those obvious edges, or those with high S/N ratio. But what about those not very visible? If a program detects all the pixel intensity discontinuities in an image, the result image will not be very much different from one fill of noise. On the other side, as a developer of an edge detector, one should not try to create a program that automatically produces the ideal result each and every user has in mind, because nobody can read other people's mind. Instead, a developer try to: 1) create a good but simple way to let the users express their idea about the edges they have in mind regarding a specific image; and to 2) implement a method to detect the type of edges a user ordered. In another word, an edge detector cannot probably be 100 percent automatic. It must be interactive, requiring a few input parameters at least.

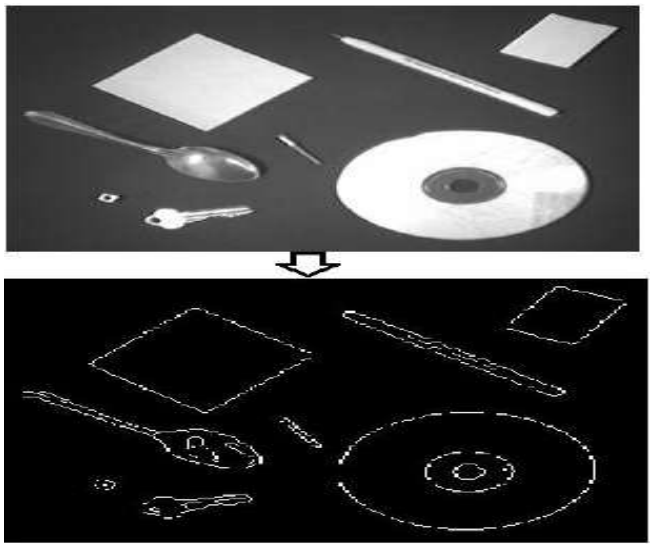

Figure 1 Edge detection

2. PRINCIPAL COMPONENT ANALYSIS (PCA)

PCA [2] is a statistical technique that utilizes theorthogonal change to transform a set of interpretations of probablyinterrelated variables into a set of principles of linearly uncorrelated variables namedprincipal components. The number of principal components is fewer than or equal to the number of real variables. This conversion is well-defined in such a way that the first PCA has the leadingpotentialvariance (i.e., accounts for as much of the variability in the data as possible), and each followingmodule in turn has the maximum variance possible under the restriction that it be orthogonal to (i.e., uncorrelated with) the earliermechanisms.PCA are guaranteed to be autonomous if the data set is mutuallygenerallydisseminated. PCA is sensitive to the comparative scaling of the inventive variables.

3. EDGE DETECTION TECHNIQUES

3.1 Edge detection usingPCA

First of all the input image will be taken; then PCA transformation will be applied. Now any edge detector operator will be used to detect the edge in the PCA.

Figure 1.2: PCA based edge detection

Figure 2 has shown the results of the edge detected using the PCA.

3.2 Edge detection for hue component

From color image to grey-scale image, leads to the result that some edges are misused. Moreover, most of the missing edges result from hue changes. As a result, we can present a

better edge detection model for color image once the problem of edge detection of hue component.

3.3Edge Fusion

Fusion is the process of merge insignificant information i.e. edges in our case from two or more images into a single final edge detected image. The resulting image will be more informative than any of the input images.

Figure 3: Edge detection using Hue components

3.4Morphological Thinning

Thinning is a morphological operation that is used to remove selected foreground pixels from binary images. It is commonly used to tidy up the output of edge detectors by reducing all lines to single pixel thickness. Thinning is normally only applied to binary images, and produces another binary image as output.It will be used to remove unwanted points on the edges in an image.

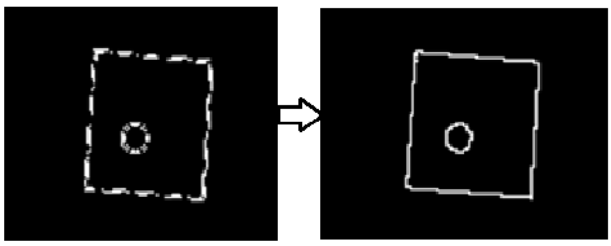

Figure 4: conversion of binary image into output image i.e. using thinning

4. RELATED WORK

Chen et al. (2010) [1] improved the efficiency and the performance of the color edge detection, a novel color edge detection algorithm has proposed. An improved Kuwahara filter is used to smooth the original image first. After edge detection with each channel independently in RGB color space, an adaptive threshold selection method is applied to predict the optimum threshold value and an edge thinning algorithm is used to extract accurate edge.XIAO et al. (2011) [2] has proposed a multi-scale edge detection algorithm which took soft threshold method to implement detail enhancement and noise reduction of the true color image. Firstly, obtaining the true color images at different scales through wavelet multi-scale edge detection algorithm, then based on the improved soft threshold filter function, selecting appropriate threshold of the obtained image edges to perform noise reduction while enhance the edge details of the reservation; and finally, carrying out the weighted 2-norm fusion of edges of different-scale-image.Wang and Yan (2012) [3] has presented a new edge detection approach based on vector morphological operators in color image processing. A new vector ordering in RGB color space has proposed. And then by analysing the characteristics of the noise contaminating image, vector morphological operators has proposed and these operators are applied in color edge detection.Xu et al. (2012) [4] has proposed a novel approach of edge detection for color image in order to efficiently preserve edge in noise appearance. Firstly, multi-structure elements are designed in order to construct morphological gradient operators with performance of noise suppressing. Then, the color image is transformed from RGB to HSV color space due to the latter is consistent with human vision perception. Finally, morphological edge detection operators in HIS color space based on multi-structure elements has been presented.Xin and Ki (2012) [5] has proposed an improved Canny algorithm to detect edges in color image. Algorithm is composed of the following steps: quaternion weighted average filter, vector Sobel gradient computation, non-maxima suppression based on interpolation, edge detection and connection. Algorithm is also applied to deal with color images of transmission line icing.Hao et al. (2013) [6] has studied that the premise of obtaining the clear object contour in traditional Canny operator is to set appropriate parameters, does not have the

adaptive ability. An adaptive Canny edge-detection method is proposed which Based on Canny theory. Adopt the 3*3 neighborhood instead of canny algorithm in 2*2 neighborhood to calculate the calculation gradient. Then, the maximum between-class variance (Otsu) method is used to obtain the high and low thresholds. Wang et al. (2013) [7] has discussed the problems that the traditional edge detection algorithms are sensitive to noise and the environment of plate scene is complex, plate image is smoothed with Gaussian filter, and by comparison of edge images from non-subsampled contour let edge detection algorithm and multi-scale wavelet edge detection algorithm, a new algorithm, pulse coupled neural network edge detection algorithm based on multi-scale wavelet transform is proposed. Firstly, multi-scale wavelet is used to detect edge of smoothed plate image, and then pulse coupled neural network is employed to debar the fake edge, followed by binary calculation with K-means clustering algorithm. Fu et al. (2013) [8] has compared the two improved methods, which are improved Sobel operator and improved wavelet transform using the multi-scale morphological filtering, subjective visual have achieved better results. However there are advantages and disadvantages in objective evaluations. So improvement is further done by using two improved methods with the wavelet transform fusion technology. The experimental results has shown that the fused image has increased significantly in information entropy and the average gradient compared to the improved Sobel operator, and it also has improved the peak signal to noise ratio and the distortion degree compared to the improved wavelet edge detection method. The fused image can concentrate the advantages of the two improved methods together and make complementary advantages. Eventually, the good de-noising effect and complete edge are achieved.Ju et al. (2012) [9] has proposed a novel image segmentation algorithm based on the adaptive edge detection and an improved mean shift. According to the OSTU method, an adaptive threshold algorithm has been applied to improve canny operator in edge detection. The edge detection method has better performance and strong adaptability. Then the resulting edge information is incorporated into the main two steps of image segmentation based on mean shift. Since the discontinuity and homogeneity information are combined flexibly, the proposed algorithm takes the best of local and global image information. Abid et al. (2013) [10] has proposed a new method for image edge detection based on multilayer perceptron (MLP). The method is based on updating a MLP to learn a set of contours drawn on a 3×3 grid and then take advantage of the network generalization capacity to detect different edge details even for very noisy images. The method is applied first to Gray scale images and can be easily extended to color ones. The method works well even for very low contrast images for which other edge operators fail.Lei and Fan (2014) [11] has proposed a novel color edge detection method based on the fusion of hue component and principal component analysis to solve the problems. First, a novel computational method of hue difference is defined, and then it is applied to classical gradient operators to obtain accurate edges for hue component. Moreover, complete object edges can be obtained by using the edge fusion of the first principal component and hue component of color image with low-computational complexity. The proposed gradient operators are found to be very effective to obtain better edge results for color images.

5. GAPS IN EARLIER WORK

The survey has shown that the following are the various limitations found in existing research.

1. The most of existing researchers has neglected the effect of true color on output images
2. No much effort is done by using improved canny edge detector which is based on8-neighbour approach
3. Edge detection of complex background images is also neglected

6. EXPERIMENTAL SET-UP AND RESULTS

The hue, PCA, integrated PCA and hue and Fuzzy based edge detectors has been designed and implemented using MATLAB. Different images are taken for experimental purpose the results has shown that the fuzzy based edge detectors has more efficient results over the available techniques. Subsequent section contains the result of designed and implemented algorithms.

Figure 5 has shown the input image. The image has not been effected by any issue like noise, poor atmosphere etc.

Figure 5Input image

Figure 6 has shown the Hue image of the image shown in the figure 5.

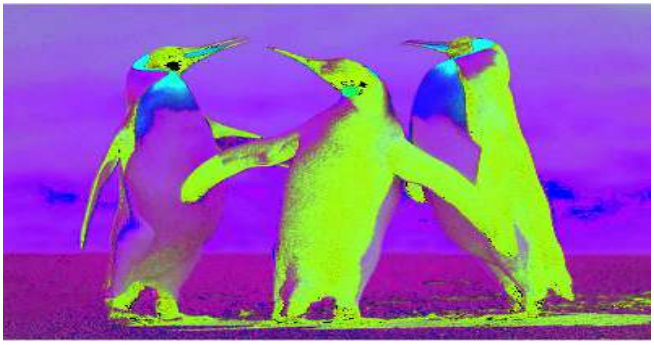

Figure 6 Hue image

Figure 7 has shown the Hue edge detected image of the image shown in the figure 6.

Figure 7 Hue edge detected image

Figure 8 has shown the PCA image of the image shown in the figure 5.

Figure 8 PCA image

Figure 9 has shown the PCA edge detected image of the image shown in the figure 8.

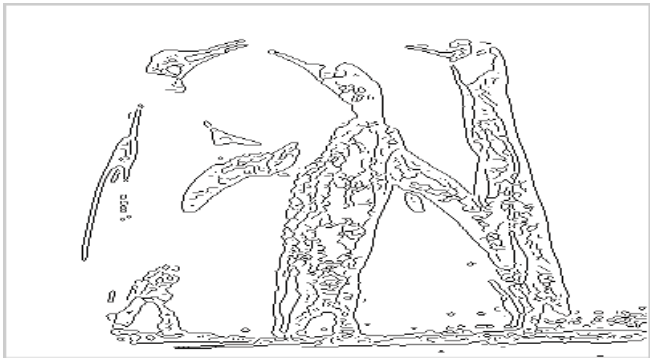

Figure 9 PCA edge detected image

Figure 10 has shown the integrated hue and PCA based edge detected image of the image shown in the figure 5.

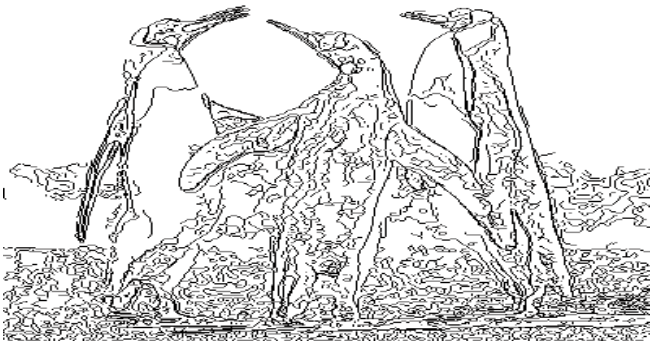

Figure 10 PCA and Hue based edge detected image

Figure 11 has shown the fuzzy based edge detected image of the image shown in the figure 5.

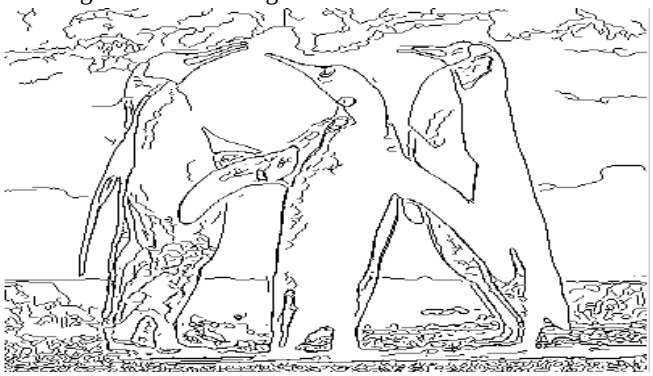

Figure 11 Fuzzy based edge detected image

The results has shown that the each techniques has quite effective results over each other but the result of integrated hue and PCA based edge detectors are quite more effective because of having maximum edges. But the result of the fuzzy based edge detectors are more informative and clear than others.

6. CONCLUSION& FUTURE WORK

This paper evaluated the performance of different color based edge detection techniques. Edge detection has found to be most important step in many critical vision applications. It has been shown in this paper that the most of the existing techniques has neglected the use of colours while detecting the edges but in many applications a region can be categorized based upon the color. This paper has shown the result of different color based edge detectors i.e. hue, PCA and integrated Hue and PCA based methods. The results of fuzzy based edge detectors are also taken for experimental purpose. The experiments have shown that the three exists trade-off between fuzzy based and integrated hue and PCA based edge detectors. Because each technique has its own feature; the result of integrated hue and PCA based edge detectors are quite more effective because of having maximum edges. But the result of the fuzzy based edge detectors are more informative and clear than others.

In near future we will propose an integrated PCA, hue and fuzzy based edge detector to enhance the results further.

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Cloud Computing and Green Management

Amardeep Singh
Computer Science and Engineering Department
Sri Guru Granth Sahib World University
Fatehgarh Sahib, Punjab, India
amardeep0033@gmail.com

***Abstract*- Cloud computing is a highly scalable and cost effective infrastructure for running HPC, enterprise and Web applications. However, the growing demand of Cloud infrastructure has drastically increased the energy consumption of data centers, which has become a critical issue. High energy consumption not only translates to high operational cost, which reduces the profit margin of Cloud providers, but also leads to high carbon emissions which is not environmentally friendly. Hence, energy-efficient solutions are required to minimize the impact of Cloud computing on the environment. In order to design such solutions, deep analysis of Cloud is required with respect to their power efficiency. Thus, in this chapter, we discuss various elements of Clouds which contribute to the total energy consumption and how it is addressed in the literature. We also discuss the implication of these solutions for future research directions to enable green Cloud computing. The chapter also explains the role of Cloud users in achieving this goal.**

***Keywords*-Cloud Computing, Green Management Information Technology, Green Cloud Architecture.**

I.Introduction

With the growth of high speed networks over the last decades, there is an alarming rise in its usage comprised of thousands of concurrent e-commerce transactions and millions of Web queries a day. This ever-increasing demand is handled through large-scale datacenters, which consolidate hundreds and thousands of servers with other infrastructure such as cooling, storage and network systems. Many internet companies such as Google, Amazon, eBay, and Yahoo are operating such huge datacenters around the world.

The commercialization of these developments is defined currently as Cloud computing [2], where computing is delivered as utility on a pay-as-you-go basis. Traditionally, business organizations used to invest huge amount of capital and time in acquisition and maintenance of computational resources. The emergence of Cloud computing is rapidly changing this *ownership-based* approach to *subscription-oriented* approach by providing access to scalable infrastructure and services on-demand. Users can store, access, and share any amount of information in Cloud. That is, small or medium enterprises/organizations do not have to worry about purchasing, configuring, administering, and maintaining their own computing infrastructure. They can focus on sharpening their core competencies by exploiting a number of Cloud computing benefits such as on-demand computing resources, faster and cheaper software development capabilities at low cost. Moreover, Cloud computing also offers enormous amount of compute power to organizations which require processing of tremendous amount of data generated almost every day. For instance, financial companies have to maintain every day the dynamic information about their hundreds of clients, and genomics research has to manage huge volumes of gene sequencing data.

Therefore, many companies not only view Clouds as a useful on-demand service, but also a potential market opportunity. According to IDC (International Data Corporation) report [1], the global IT Cloud services spending is estimated to increase from $16 billion in 2008 to $42 billion in 2012, representing a compound annual growth rate (CAGR) of 27%. Attracted by this growth prospects, Web-based companies (Amazon, eBay, Salesforce.com), hardware vendors (HP, IBM, Cisco), telecom providers (AT&T, Verizon), software firms (EMC/VMware, Oracle/Sun, Microsoft) and others are all investing huge amount of capital in establishing Cloud datacenters. According to Google¨s earnings reports, the company has spent $US1.9 billion on datacenters in 2006, and $US2.4 billion in 2007[3].

Cloud computing is an evolving paradigm which is enabling outsourcing of all IT needs such as storage, computation and software such as office and ERP, through large Internet. The shift toward such service-oriented computing is driven primarily by ease of management and administration process involving software upgrades and bug fixes.

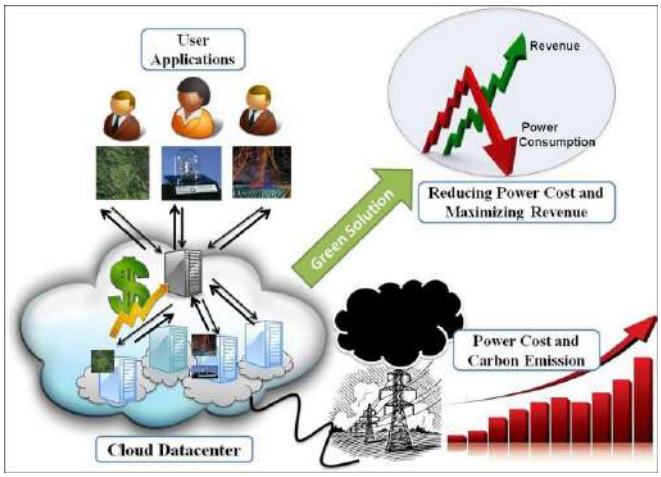

Figure 1. Cloud and Environmental Sustainability

II. Cloud Computing

It also allows fast application development and testing for small IT companies that cannot afford large investments on infrastructure. Most important advantage offered by Clouds is in terms of economics of scale; that is, when thousands of users share same facility, cost per user and the server utilization. To enable such facilities, Cloud computing encompasses many technologies and concepts such as virtualization, utility computing, pay as you go, no capital investment, elasticity, scalability, provisioning on demand, and IT outsourcing.

Table 1. Comparison of Significant Cloud Datacenters [6]

Cloud Datacenters	Location	Estimated Power Usage Effectiveness	% of Dirty Energy Generation	% of Renewable Electricity
Google	Lenoir	1.21	50.5% coal, 38.7% Nuclear	**3.8 %**
Apple	Apple,NC		50.5% coal, 38.7%Nuclear	**3.8 %**
Microsoft	Chicago,IL	**1.22**	72.8% Coal, 22.3%Nuclear	**1.1 %**
Yahoo	La Vista,NE	**1.16**	73.1% Coal, 14.6%Nuclear	**7 %**

II. Cloud Computing and Energy Usage Model: A Typical Example

In this section, through a typical Cloud usage scenario we will analyze various elements of Clouds and their energy efficiency. Figure 2 shows an end user accessing Cloud services such as SaaS, PaaS, or IaaS over Internet. User data pass from his own device through an Internet service provider's router, which in turn connects to a Gateway router within a Cloud datacenter. Within datacenters, data goes through a local area network and are processed on virtual machines, hosting Cloud services, which may access storage servers. Each of these computing and network devices that are directly accessed to serve Cloud users contribute to energy consumption. In addition, within a Cloud datacenter, there are many other devices, such as cooling and electrical devicies, that consume power. These devices even though do not directly help in providing Cloud service, are the major contributors to the power consumption of a Cloud datacenter. In the following section, we discuss in detail the energy consumption of these devices and applications.

A. User/Cloud Software Applications

The first factor that contributes to energy consumption is the way software applications are designed and implemented. The Cloud computing can be used for running applications owned by individual user or offered by the Cloud provider using SaaS. In both cases, the energy consumption depends on the application itself. If application is long running with high CPU and memory requirements then its execution will result in high energy consumption. Thus, energy consumption will be directly proportional to the application‟s profile. The allocation of resources based on the maximum level of CPU and memory usage will result in much higher energy consumption than actually required. The energy inefficiency in execution of an application emanates from inaccurate design and implementation. The application inefficiencies, such as suboptimal algorithms and inefficient usage of shared resources causing contention lead to higher CPU usage and, therefore, higher energy consumption. However, factors such as energy efficiency are not considered during the design of an application in most of the application domains other than for example embedded devices such as mobile phone.

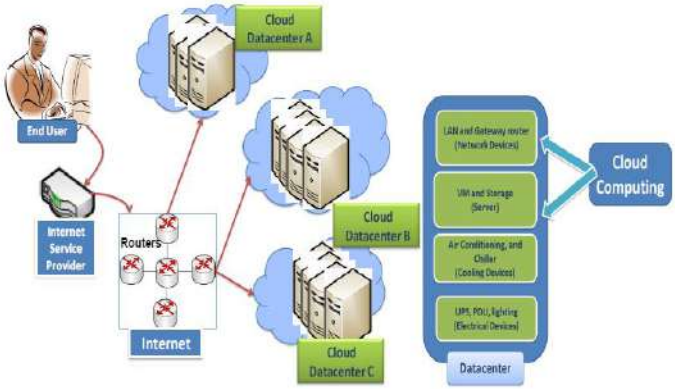

Figure 2. Cloud Usage Model

B. Cloud Software Stack for SaaS, PaaS, IaaS Level

The Cloud software stack leads to an extra overhead in execution of end user applications. For instance, it is well known that a physical server has higher performance efficiency than a virtual machine and IaaS providers offer generally access to a virtual machine to its end users [13]. In addition, the management process in the form of accounting and monitoring requires some CPU power. Being profit oriented, service providers regularly have to adhere to Service Level Agreements (SLA) with their clients. These SLAs may take the form of time commitment for a task to be completed. Thus, Cloud provider for meeting certain level of service quality and availability, provision extra resources than generally required. For instance, to avoid failure, fast recovery and reduction in response time, providers have to maintain several storage replicas across many datacenters. Since workflow in Web applications require several sites to give better response time to its end user, their data is replicated on many servers across the world. Therefore, it is important to explore the relationships among Cloud components and the tradeoffs between QoS and energy consumption.

C. Network Devices

The network system is another area of concern which consumes a non-negligible fraction of the total power consumption. The ICT energy consumption estimates [14] just for Vodafone Group radio access network was nearly 3 TWh in 2006. In Cloud computing, since resources are accessed through Internet, both applications and data are needed to be transferred to the compute node. Therefore, it requires much more data communication bandwidth between user‟s PC to the Cloud resources than require the application execution requirements. In some cases, if data is really large, then it may turn out to be cheaper and more carbon emission efficient to send the data by mail than to transfer through Internet

D. Datacenter

The Cloud datacenters are quite different from traditional hosting facilities. A cloud datacenter could comprise of many hundreds or thousands of networked computers with their corresponding storage and networking subsystems, power distribution and conditioning equipment, and cooling infrastructures. Due to large number of equipments, datacenters can consume massive energy consumption and emit large amount of carbon. According to 2007 report on computing datacenters by US Environmental Protection Agency (EPA), the datacenters in US consumed about 1.5% of total energy, which costs about $4.5 billon. This high usage also translates to very high carbon emissions which was estimated to be about 80-116 Metric Megatons each year. Table 3 lists equipments typically used in datacenters with their contribution to energy consumption. It can be clearly observed that servers and storage systems are not the only infrastructure that consumes energy in the datacenter. In reality, the cooling equipments consume equivalent amount of energy as the IT systems themselves. Ranganathan [17] suggests that for every dollar spent on electricity costs in large-scale datacenters another dollar is spent on cooling.

Table 2. Percent of Power Consumption by Each Datacenter Device

Cooling Device(Chiller ,Computer Room Air Conditioning(CRAC))	33 %+9%
IT Equipment	30%
Electrical Equipment(UPS, Power Distribution Units(PDU's),lighting)	28%

Further energy consumption occurs due to lighting, loss in the power distribution, and other electrical equipment such as UPS. In other words, the majority of power usage within a datacenter is used for other purposes than actual IT services. Thus, to achieve the maximum efficiency in power consumption and CO2 emissions, each of these devices need to be designed and used efficiently while ensuring that their carbon footprint is reduced.

III. Features of Clouds enabling Green computing

Even though there is a great concern in the community that Cloud computing can result in higher energy usage by the datacenters, the Cloud computing has a green lining. There are several technologies and concepts employed by Cloud providers to achieve better utilization and efficiency than traditional computing. Therefore, comparatively lower carbon emission is expected in Cloud computing due to highly energy efficient infrastructure and reduction in the IT infrastructure itself by multi-tenancy. The key driver technology for energy efficient Clouds is "Virtualization," which allows significant improvement in energy efficiency of Cloud providers by leveraging the economies of scale associated with large number of organizations sharing the same infrastructure. Virtualization is the process of presenting a logical grouping or subset of computing resources so that they can be accessed in ways that give benefits over the original configuration [20]. By consolidation of underutilized servers in the form of multiple virtual machines sharing same physical server at higher utilization, companies can gain high savings in the form of space, management, and energy.

According to Accenture Report [7], there are following four key factors that have enabled the Cloud computing to lower energy usage and carbon emissions from ICT. Due to these Cloud features, organizations can reduce carbon emissions by atleast 30% per user by moving their applications to the Cloud. These savings are driven by the high efficiency of large scale Cloud data centers.

A. Dynamic Provisioning

In traditional setting, datacenters and private infrastructure used to be maintained to fulfill worst case demand. Thus, IT companies end up deploying far more infrastructure than needed. There are various reasons for such over-provisioning: a) it is very difficult to predict the demand at a time; this is particularly true for Web applications and b) to guarantee availability of services and to maintain certain level of service quality to end users. One example of a Web service facing these problems is a Website for the Australian Open Tennis Championship [21]. The Australian Open Website each year receives a significant spike in traffic during the tournament period. The increase in traffic can amount to over 100 times its typical volume (22 million visits in a couple of weeks) [21]. To handle such peak load during short period in a year, running hundreds of server throughout the year is not really energy efficient. Thus, the infrastructure provisioned with a conservative approach results in unutilized resources. Such scenarios can be readily managed by Cloud infrastructure. The virtual machines in a Cloud infrastructure can be live migrated to another host in case user application requires more resources. Cloud providers monitor and predict the demand and thus allocate resources according to demand. Those applications that require less number of resources can be consolidated on the same server. Thus, datacenters always maintain the active servers according to current demand, which results in low energy consumption than the conservative approach of over-provisioning.

B. Multi-tenancy

Using multi-tenancy approach, Cloud computing infrastructure reduces overall energy usage and associated carbon emissions. The SaaS providers serve multiple companies on same infrastructure and software. This approach is obviously more energy efficient than multiple copies of software installed on different infrastructure. Furthermore, businesses have highly variable demand patterns in general, and hence multi-tenancy on the same server allows the flattening of the overall peak demand which can minimize the need for extra infrastructure. The smaller fluctuation in demand results in better prediction and results in greater energy savings.

C. Server Utilization

In general, on-premise infrastructure run with very low utilization, sometimes it goes down up to 5 to 10 percent of average utilization. Using virtualization technologies, multiple applications can be hosted and executed on the same server in isolation, thus lead to utilization levels up to 70%. Thus, it dramatically reduces the number of active servers. Even though high utilization of servers results in more power consumption, server running at higher utilization can process more workload with similar power usage.

D. Datacenter Efficiency

As we Know, the power efficiency of datacenters has major impact on the total energy usage of Cloud computing. By using the most energy efficient technologies, Cloud providers can significantly improve the PUE of their datacenters. Today‟s state-of-the-art datacenter designs for large Cloud service providers can achieve PUE levels as low as 1.1 to 1.2, which is about 40% more power efficiency than the traditional datacenters. The server design in the form of modular containers, water or air based cooling, or advanced power management through power supply optimization, are all approaches that have significantly improved PUE in datacenters. In addition, Cloud computing allows services to be moved between multiple datacenter which are running with better PUE values. This is achieved by using high speed network, virtualized services and measurement, and monitoring and accounting of datacenter.

IV. Green Cloud Architecture

From the above study of current efforts in making Cloud computing energy efficient, it shows that even though researchers have made various components of Cloud efficient in terms of power and performance, still they lack a unified picture. Most of efforts for sustainability of Cloud computing have missed the network contribution. If the file sizes are quite large, network will become a major contributor to energy consumption; thus it will be greener to run application locally than in Clouds. Furthermore, many work focused on just particular component of Cloud computing while neglecting effect of other, which may not result in overall energy efficiency. For example, VM consolidation may reduce number of active servers but it will put excessive load on few servers where heat distribution can become a major issue. Some other works just focus on redistribution of workload to support energy efficient cooling without considering the effect of virtualization. In addition, Cloud providers, being profit oriented, are looking for solutions which can reduce the power consumption and thus, carbon emission without hurting their market. Therefore, we provide a unified solution to enable Green Cloud computing. We propose a Green Cloud framework, which takes into account these goals of provider while curbing the energy consumption of Clouds. The high level view of the green Cloud architecture is given in Figure 3. The goal of this architecture is to make Cloud green from both user and provider's perspective.

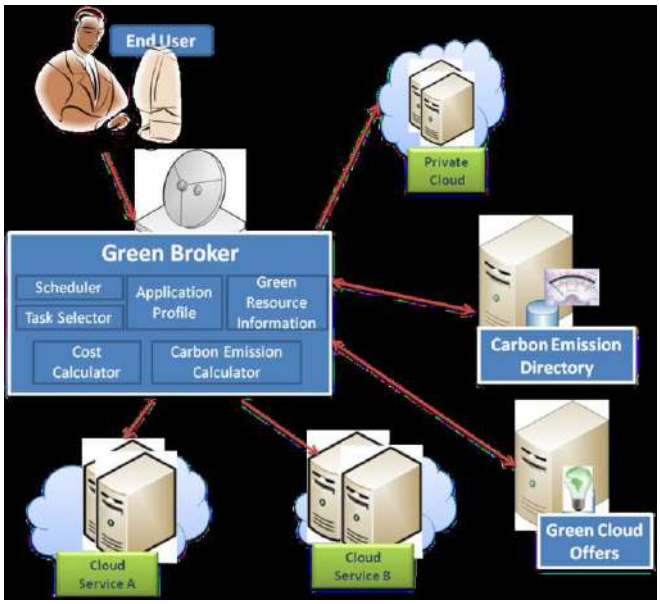

Figure 3. Green Cloud Architecture

The Green Cloud framework is designed such that it keeps track of overall energy usage of serving a user request. It relies on two main components, Carbon Emission Directory and Green Cloud offers, which keep track of energy efficiency of each Cloud provider and also give incentive to Cloud providers to make their service "Green". From user side, the Green Broker plays a crucial role in monitoring and selecting the Cloud services based on the user QoS requirements, and ensuring minimum carbon emission for serving a user. In general, a user can use Cloud to access any of these three types of services (SaaS, PaaS, and IaaS), and therefore process of serving them should also be energy efficient. In other words, from the Cloud provider side, each Cloud layer needs to be "Green" conscious.

A. SaaS Level

Since SaaS providers mainly offer software installed on their own datacenters or resources from IaaS providers, the SaaS providers need to model and measure energy efficiency of their software design, implementation, and deployment.

For serving users, the SaaS provider chooses the datacenters which are not only energy efficient but also near to users. The minimum number of replicas of user's confidential data should be maintained using energy-efficient storage.

B. PaaS level

PaaS providers offer in general the platform services for application development. The platform facilitates the development of applications which ensures system wide energy efficiency. This can be done by inclusion of various energy profiling tools such as JouleSort [5]. It is a software energy efficiency benchmark that measures the energy required to perform an external sort. In addition, platforms itself can be designed to have various code level optimizations which can cooperate with underlying complier in energy efficient execution of applications. Other than application development, Cloud platforms also allow the deployment of user applications on Hybrid Cloud. In this case, to achieve maximum energy efficiency, the platforms profile the application and decide which portion of application or data should be processed in house and in Cloud.

C . IaaS level

Providers in this layer plays most crucial role in the success of whole Green Architecture since IaaS level not only offer independent infrastructure services but also support other services offered by Clouds. They use latest technologies for IT and cooling systems to have most energy efficient infrastructure. By using virtualization and consolidation, the energy consumption is further reduced by switching-off unutilized server. Various energy meters and sensors are installed to calculate the current energy efficiency of each IaaS providers and their sites. This information is advertised regularly by Cloud providers in Carbon Emission Directory. Various green scheduling and resource provisioning policies will ensure minimum energy usage. In addition, the Cloud provider designs various green offers and pricing schemes for providing incentive to users to use their services during off-peak or maximum energy-efficiency hours.

V. Conclusions and Future Directions

Cloud computing business potential and contribution to already aggravating carbon emission from ICT, has lead to a series of discussion whether Cloud computing is really green. It is forecasted that the environmental footprint from data centers will triple between 2002 and 2020, which is currently 7.8 billion tons of CO2 per year. There are reports on Green IT analysis of Clouds and datacenters that show that Cloud computing is "Green", while others show that it will lead to alarming increase in Carbon emission. Thus, in this chapter, we first analyzed the benefits offered by Cloud computing by studying its fundamental definitions and benefits, the services it offers to end users, and its deployment model. Then, we discussed the components of Clouds that contribute to carbon emission and the features of Clouds that make it "Green". We also discussed several research efforts and technologies that increase the energy efficiency of various aspects of Clouds. For this study, we identified several

unexplored areas that can help in maximizing the energy efficiency of Clouds from a holistic perspective. After analyzing the shortcoming of previous solutions, we proposed a Green Cloud Framework and presented some results for its validation. Even though our Green Cloud framework embeds various features to make Cloud computing much more Green, there are still many technological solutions are required to make it a reality:

- First efforts are required in designing software at various levels (OS, compiler, algorithm and application) that facilitates system wide energy efficiency. Although SaaS providers may still use already implemented software, they need to analyze the runtime behavior of applications. The gathered empirical data can be used in energy efficient scheduling and resource provisioning. The compiler and operating systems need to be designed in such a way that resources can be allocated to application based on the required level of performance, and thus performance versus energy consumption tradeoff can be managed.

- To enable the green Cloud datacenters, the Cloud providers need to understand and measure existing datacenter power and cooling designs, power consumptions of servers and their cooling requirements, and equipment resource utilization to achieve maximum efficiency.
- For designing the holistic solutions in the scheduling and resource provisioning of applications within the datacenter, all the factors such as cooling, network, memory, and CPU should be considered. For instance, consolidation of VMs even though effective technique to minimize overall power usage of datacenter, also raises the issue related to necessary redundancy and placement geo-diversity required to be maintained to fulfill SLAs with users. It is obvious that last thing Cloud provider will want is to lose their reputation by their bad service or violation of promised service requirements.
- Last but not the least, the responsibility also goes to both providers and customers to make sure that emerging technologies do not bring irreversible changes which can bring threat to the health of human society. The way end users interact with the application also has a very real cost and impact. For example, purging of unsolicited emails can eliminates energy wasted in storage and network. Similarly, if Cloud providers want to provide a truly green and renewable Cloud, they must deploy their datacenters near renewable energy sources and maximize the Green energy usage in their already established datacenters. Before adding new technologies such as virtualization, proper analysis of overhead should be done real benefit in terms of energy efficiency.

In conclusion, by simply improving the efficiency of equipment, Cloud computing cannot be claimed to be Green. What is important is to make its usage more carbon efficient both from user and provider's perspective. Cloud Providers need to reduce the electricity demand of Clouds and take major steps in using renewable energy sources rather than just looking for cost minimization.

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Analysis of Optical Link using Dispersion Compensation Fiber Scheme

Rupinderjit Kaur

M.Tech Scholar
Dept.of Electronics&Communication
Amritsar College of Engg.&Tech, Amritsar,India
rupindernandha490@gmail.com

Gaurav Soni

Associate Professor
Dept.of Electronics&Communication
Amritsar College of Engg.&Tech.,Amritsar,India
gaurav.ece@acetedu.in

***Abstract*: In optical fiber communication system to improve the performance of the system and reduce the dispersion and losses in optical communication, there are various techniques are used to reduced dispersion and increase the transmission distance in single mode fiber. In this work we have analyzed performance of optical link using dispersion compensation fiber. System performance for optical channel has been compared by different wavelength of optical fiber. We have designed simulation model for dispersion compensation technique using optisystem. In this paper we analyzed SMF at different Modulation Scheme using DCF. On comparison we found which modulation technique has better performance &min BER are analyzed .It was found that NRZ at 980nm has better performance as Compared to return to zero. And the input power is taken about 7dbm, the corresponding BER Performance is better. By using fiber brag grating it has reduce dispersion only up to certain level not comparison to DCF.**

Keywords: Chromatic dispersion, optical communication, DCF, Q Factor, BER, RZ and NRZ.

I. INTRODUCTION

The advancement in the optical communication for long distance transmission leads to development of powerful optical amplifiers, which eliminate the need for costly conversions from optical to electrical signal and vice versa. various optical amplifiers such as erbium doped fiber amplifier (EDFA) semiconductor optical amplifier (SOA) ,Raman amplifier and hybrid optical amplifier (HOA) are used in fiber optic communication system to compensate the power losses. In high-capacity wavelength-division-multiplexed transmission systems, the increase of the channel bit rate from 10 to 40 Gbps and above changes the nature of the dominant nonlinear impairments. As transmission distance and number of channels increases, signals become more vulnerable to a number of debilitating fiber nonlinear effect. The transmission of optical signals in an optical communication system may be limited by optical effects such as chromatic dispersion. Several methods have been proposed to overcome the impairments caused by chromatic dispersion including fiber Bragg grating, optical phase conjugation, and dispersion compensating devices. The high value of negative dispersion is used to compensate for positive dispersion over large lengths of ordinary fiber. [1] The first generation light wave systems operating near 800nm started early in the 70's. During that period of time, it was realized that the repeaters spacing could be increased by operating the light wave system in the wavelength region near 1300nm, where the fiber loss is generally below 1dB/ km. The second generation of fiber optic communication systems became available and allowed a repeaters spacing in excess of 20km. However, the bit rate of early systems was limited to below 100Mb/s because of modal dispersion in multimode fibers (MMFs). This limitation was overcome by the use of single-mode fibers (SMFs). The third generation systems of 1550nm become available commercially. In such systems, the limiting factors are frequency chirping and the occasional transient of secondary laser mode, both factors lead to errors in the presence of fiber dispersion. A better performance is achieved by using dispersion-compensation fibers (DCFs).[2] In this paper for higher data rates non return-to-zero (NRZ) modulation format is better than that to RZ, hence the transmission of a 6-Gb/s RZ data signal through the transmission line and comparison of the performance to the NRZ system has been done. The RZ pulse occupies just a part of the bit slot, so it has a duty cycle smaller than 1 and a broad spectrum. The RZ signal has amplitude between adjacent 1's returns to zero. A RZ signal has spectrum peak power twice the larger than that of the NRZ signal with the same average power. The main characteristic of RZ modulated signals is a relatively broad optical spectrum, resulting in a reduced dispersion tolerance and a reduced spectral efficiency. The RZ pulse shape enables an increased robustness to fiber nonlinear effects. The NRZ performs better than RZ because the energy is confined in the center of each

bit-slot in the case of RZ case and thus more differential group delay (DGD) is required before the energy leaks out the bit-slot to result in inter-symbol interference. [3]

II. CHROMATIC DISPERSION

Dispersion is the spreading of light pulse as its travels down the length of an optical fiber. Dispersion limits the bandwidth or information carrying capacity of a fiber. The bit-rates must be low enough to ensure that pulses are farther apart and therefore the greater dispersion can be tolerated. [4] Chromatic dispersion occurs in single mode fiber. It occurs due to the inherent property of silica fiber i.e. refractive index varies with wavelength. Therefore, different wavelength channels will travel at slightly different speeds within the fiber. This results in a spreading of the transmission pulse as it travels through the fiber. Hence chromatic dispersion can be referred as a phenomenon which is created due to the dependence of group index to wavelength. Spreading of pulses leads to missing of some data which needs to be minimized so that original data can be attained. The original data can be attained by various dispersion compensation methods. In Single mode fiber (SMF), chromatic dispersion and polar mode dispersion takes place. Chromatic dispersion occurs due to dependence of group index Ng to wavelength. Figure 1 shows the broadening of pulses caused due to loss of information i.e. chromatic dispersion. And this becomes a limitation to the channel count, bit rates and transmission distances in the fiber optic. Hence, dispersion needs to be compensated by various dispersion compensating techniques.

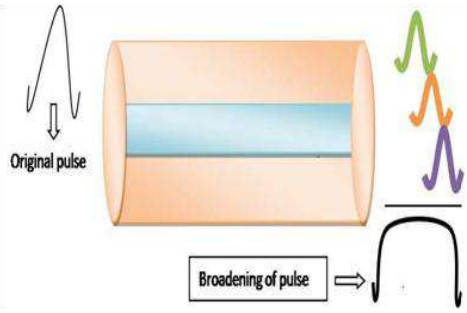

Fig. 1 Broadening of optical pulse due to dispersion [5]

III.DISPERSION COMPENSATION FIBERS:

This is simply a special type of fiber that has very large negative dispersion. Compensation of dispersion at a wavelength around 1550nm in a 1330 nm optimized single mode fiber can be achieved by specially designed fibers whose dispersion coefficient (d) is negative and large at 1550 nm. DCF's are used for upgrading the installed 1310 nm optimized optical fiber links for operations at 1550 nm. The higher the dispersion coefficient of the compensating fiber, the smaller will be required length of the compensating fiber. Dispersion compensation have a high negative dispersion -70 to -90ps/nm.km and can be used to compensate the positive dispersion in fiber. Spans made of SMF and DCF are good source as their high local dispersion is known to reduce the phase matching giving rise to four-wave mixing in WDM. [5]However dispersion is the main parameter which needs to be compensated for faithful signal transmission. Fiber Bragg's Grating is one of the solutions to compensate it, but only up to a certain level and by using dispersion compensation fiber it compensate the Chromatic dispersion to long distance. [6]

However, with the higher transmission speeds gigabites per second the chromatic dispersion became more and more essential on large distances. The technical problems related to the transmission in the second window, and particularly in the third transmission window became more and more dependent on the chromatic dispersion. Fig.2 illustrates the power losses caused by the chromatic dispersion on the distance in the III transmission window for the different transmission speeds, when a light source to propagate in a single-mode fiber characterized by the dispersion coefficient of 17 ps/nm/km, typical for most glassy fibers.

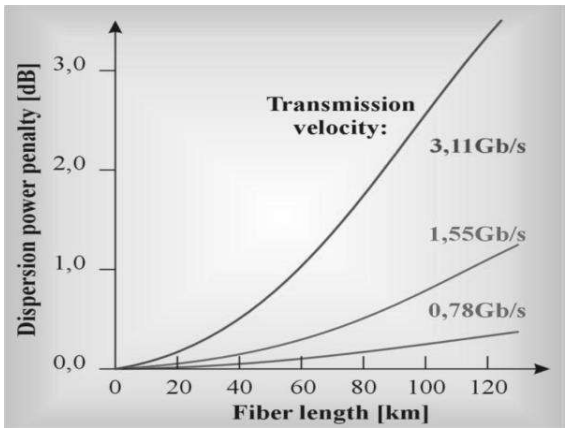

Fig.2 Attenuation caused by dispersion at transmission speed a) 0.78 Gb/s, b) 1.33 Gb/s, c) 3.11 Gb/s

For the optical fiber characterized by the chromatic dispersion of 17 ps/nm/km and propagating the light from the single-mode laser DFB at spectral width of 0.1 nm Usually, the maximum attenuation caused by dispersion can be tolerated up to the value of 2 dB, which means that at the transmission speed of 3.11 Gb/s we might apply the optical fiber with length up to 85 km without any regeneration. We can see that for the transmission speeds higher than 3 Gb/s dispersion plays an key role in case of larger distances and the transmission becomes dispersion-limited. Simply speaking, chromatic dispersion means that the different wavelengths travel with different velocities even for the single-mode optical fibers. The chromatic dispersion is the characteristic feature of the material and it is impossible to avoid it, it can be only reduce by dispersion compensation fiber.

IV.SIMULATION SETUP

In this section the simulation model of transmitter and receiver for optical fiber Communication is implemented on "OPTISYSTEM-7.0" software using 110 KM long Single mode fiber. Bit rate 6 Gbps. NRZ pulse generator has maximum amplitude of 1 auk. Both rise and fall time is 0.05 bit. A CW laser is taken as an optical source having frequency value of 193.1 THz with sweep power level 7 dBm for 980nm wavelength regions. MZM have the Excitation ratio 30 dB and symmetry factor -1. The loop control system has 1 loop. The PIN photo detectors have the Responsitivity 1 A/W and Dark current 10 and the down sampling rate is 800 GHz for the central frequency 194.1THz.Considering thermal noise 2.048e-023 W/Hz. The Random seed index is 0 with the filter sample rate 5GHz. A fourth order low pass Bessel filter is connected at the output having 100 dB depth and sweep value of Cut off frequency "0.7× Bit rate "Hz. An EDFA is considered having Gain and Noise figure of 20 dB, respectively with power and saturation power level of 10 dBm, the noise BW is 13 THz and noise bin spacing is 125 GHz. For centre frequency of 193.1 THz. SMF have wavelength can 980 with attenuation 0.2 dB/km, Dispersion 16 ps/nm/km and dispersion slope 0.08 ps/nm/km with β2=- 20 ps/km and β3=0 ps2/km. Differential group delay for PMD is taken 3ps/km with the PMD coefficient of 0.5 ps/km.

A dispersion compensated fiber is used before the SMF. The total length of fiber channel is remains same, however it is 20 km DCF and 110 km SMF. The value of dispersion coefficient β2 for DCF fiber, is calculated here in terms of β1 (dispersion coefficient for SMF) in such way so that after certain distance the total chromatic dispersion DT must be equal to zero. The parameters for DCF are reference wavelength 980 nm attenuation 0.6 dB/km, dispersion - 80 ps/nm/km, dispersion slope -0.21 ps/nm2/km, β2= -20 ps²/km, Differential group delay 3 ps/km, PMD coefficient 0.5 ps/km, mean scatter section 50 m, scattering section dispersion 100, lower calculation limit 1200 nm, upper calculation limit 1700 nm, effective area 30 um², n2= 3e-020 m²/w, Raman self-shift time 1 = 14.2 fes, Raman self-shit time 2 = 3 fes,. Raman contribution = 0.18 and orthogonal Raman factor 0.75.same parameter used for anthor modulation scheme i.e. for NRZ and RZ at 980nm with power level of 7dbm.In this model compare the different modulation format used by the optical fiber with the help of dispersion compensation fiber.

V.RESULT AND DISCUSSION

Comparison among NRZ and RZ Modulation Format at different Wavelength Using DCF On the Basis of Eye Diagram.Eye Diagram Gives the simulation result at different channel and different wavelength. As we can see from different diagram. The effect of dispersion compensation is very good. The signal quality is high, eye opening is very good. The eye diagram is common indicator of performance in digital transmission system. The eye diagram is an oscilloscope display of a digital signal, repetitively sampled to get a good representation of its behavior. In a radio system, the point of measurement may be prior to the modulator in a transmitter, or following the demodulator in a receiver, depending on which portion of the system requires examination. The eye diagrams shown in figure.

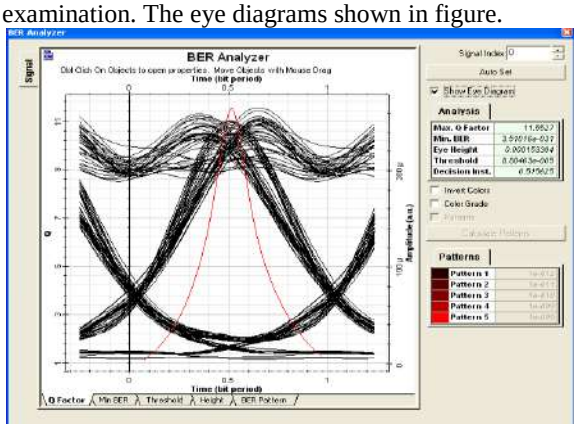

Fig: 4(a) Eye diagram for NRZ at 980nm for 7dbm power

Fig: 4(a) shows the eye diagram for NRZ at 980nm model. This diagram shows the Q factor at 7dbm power, and the Q factor is 11.5527.Q is one of the important indicators to measure the optical performance by which to characterize the BER Fig: 4(b) Shows eye diagram

for NRZ at 980nm for 7dbm power. This diagram shows the Min BER is 3.51016e-031.

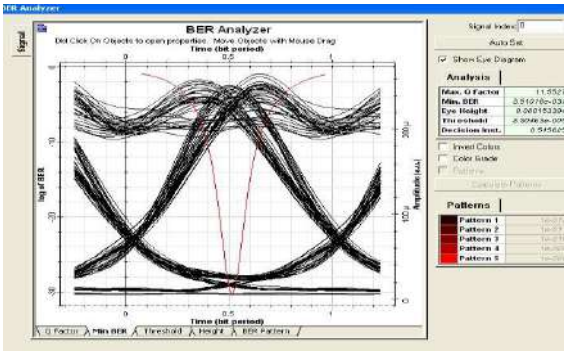

Fig: 4(b) Eye diagram analysis with reference to Min BER

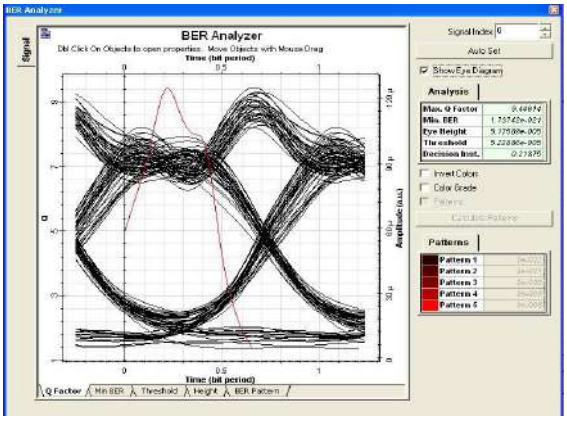

Fig 5 (a) Eye diagram for RZ at 980nm for 7dbm power

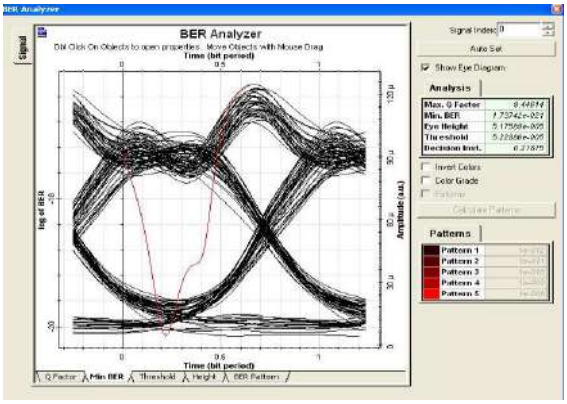

Fig:5(b)RZ at 980nm for 7dbm power

Fig 5(a) and (b) shows the eye diagram for RZ at 980nm wavelength at 7dbm power the Q factor and BER respectively 9.44614 and 1.73742e-021

On comparison among NRZ and RZ modulation scheme with the help of dispersion compensation fiber it shows that NRZ at 980nm has better performance as compared to RZ at 980nm.It has better Q factor as compared to Return to zero.

VI. CONCLUSION

On the basis of compared and analyzed the dispersion compensation fiber at 980nm for NRZ and RZ Modulation Scheme the simulation result shows that long distance communication is discussed.DCF using NRZ at 980nm with power 7dbm has better performance as compared to return to zero. This method offers improved value of performance parameter such as Q factor and min BER.The result shows using dispersion compensation fiber it reduce the dispersion at great extent in single mode fiber because the dispersion broadens the pulse as it travel through optical fiber and intersymbol Interferences occur. So it is better solution to used dispersion compensation fiber.

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Econophysics-developing a new link

Harpreet Kaur
Dept. of Applied Sciences
ACET
Amritsar,India
harpreet18kaur@yahoo.co.in

Navdeep Singh
Dept. of Applied Sciences
ACET
Amritsar,India
arora_navdeep@yahoo.com

***Abstract*— *Econophysics is an interdisciplinary research field relating physics and economics. It is the new field which applies theories and methods originally developed by physicists in order to solve problems in economics, usually those including uncertainty or stochastic processes and non linear dynamics. Its application to the study of financial markets has also been termed statistical finance referring to its roots in statistical physics.* There are indeed many parallels between economics and physics. The Objective of this paper is to explore these parallels briefly.**

***Index Terms*—Stochastic, non linear dynamics, Statistical physics.**

I. INTRODUCTION

Physics is driven by the quest for universal laws. Partly because of the extreme complexity of social phenomena, that quest has been largely abandoned in our postmodern world, where relativist philosophies of science enjoy disturbingly wide- spread acceptance. The theory of rational expectations says that wages and prices adjust instantaneously to new conditions because of perfect information just as Newtonian physics says that the gravitational configuration of the universe will change instantaneously in response to any infinitesimal change in the system, an inference that Einstein found troubling because it conflicted with his special theory of relativity.

II. Similarities and dissimilarities

The laws of physics are universal in space and time. The laws of economics are very much a function of the context. Going back to the earlier example, the mass of an electron does not change whether we are in the world of Newton or of Einstein. But in the world of economics, how firms, households and governments behave is altered by the reigning economic ideology of the time. To give another example, there is nothing absolute, for example, about savings being equal to investment or supply equaling demand as maintained by classical economics but there is something absolute about energy lost being equal to energy gained as enunciated by classical physics.

In natural sciences, progress is a two way street. It can run from empirical findings to theory or the other way round. The famous Michelson-Morley experiment that found that the velocity of light is constant led to the theory of relativity – an example of progression from practice to theory. In the reverse direction, the ferocious search now under way for the Higgs Boson – the God particle – which has been predicted by quantum theory is an example of traversing from theory to practice. In economics, on the other hand, where the human dimension is paramount, the progression has necessarily to be one way, from empirical finding to theory.

Karl Popper, by far the most influential philosopher of science of the twentieth century, propounded that a good theory is one that gives rise to falsifiable hypotheses. By this measure, Einstein's General Theory was a good theory as it led to the hypothesis about the curvature of space under the force of gravity which indeed was verified by scientists from observations made during a solar eclipse from the West African islands of Sao Tome and Principe. Economics on the other hand cannot stand the scrutiny of the falsifiable hypothesis test since empirical results in economics are a function of the context.

The centerpiece of Keynes' theory is the existence of inescapable uncertainty about the future which implies that risk cannot be measured precisely beyond a point, and that taking uncertainty seriously has profound implications for how one applies economics. Look at the parallel in physics. The foundation of quantum mechanics is Heisenberg's Uncertainty Principle which puts an irreducible limit on our ability to simultaneously determine the position and momentum of a particle.

Physicists know of 'singularities', or black holes if you will, where the laws of physics break down. In economics, the analogy would be Depression Economics. There is currently a fierce debate, especially in the US, about the quantum of fiscal stimulus and the timing of its withdrawal. Some economists,

notably Krugman, have argued that the size of the stimulus should be much larger than what the models suggest simply because 'in Depression Economics, the usual laws of economics do not apply'. Since the 1970s, a series of significant changes have taken place in the world of finance. One key year was 1973, when currencies began to be traded in financial markets and their values determined by the foreign exchange market, a financial market active 24 hours a day all over the world. During that same year, Black and Scholes published the first paper that presented a rational option-pricing formula. Since that time, the volume of foreign exchange trading has been growing at an impressive rate.

A second revolution began in the 1980s when electronic trading, already a part of the environment of the major stock exchanges, was adapted to the foreign exchange market. The electronic storing of data relating to financial contracts was put in place at about the same time that electronic trading became widespread. One result is that today a huge amount of electronically stored financial data is readily available. These data are characterized by the property of being high-frequency data - the average time delay between two records can be as short as a few seconds.

During the past 30 years, physicists have achieved important results in the field of phase transitions, statistical mechanics, nonlinear dynamics, and disordered systems. In these fields, power laws, scaling, and unpredictable (stochastic or deterministic) time series are present and the current interpretation of the underlying physics is often obtained using these concepts.

With this background in mind, it may surprise scholars trained in the natural sciences to learn that the first use of a power-law distribution - and the first mathematical formalization of a random walk - took place in the social sciences. . The first theoretical description of a random walk in the natural sciences was performed in 1905 by Einstein in his famous paper dealing with the determination of the Avogadro number. In subsequent years, the mathematics of the random walk was made more rigorous by Wiener and now the random walk concept has spread across almost all research areas in the natural sciences.The first formalization of a random walk was not in a publication by Einstein, but in a doctoral thesis by Bachelier . Bachelier, a French mathematician, presented his thesis to the faculty of sciences at the Academy of Paris on 29 March 1900, for the degree of Docteur en Sciences Mathematiques. His advisor was Poincare, one of the greatest mathematicians of his time. The thesis, entitled Theorie de la speculation, is surprising in several respects.It deals with the pricing of options in speculative markets, an activity that today is extremely important in financial markets where derivative securities- those whose value depends on the values of other more basic underlying variables - are regularly traded on many different exchanges. To complete this task, Bachelier determined the probability of price changes by writing down what is now called the Chapman-Kolmogorov equation and recognizing that what is now called a Wiener process satisfies the diffusion equation (this point was rediscovered by Einstein in his 1905 paper on Brownian motion).

The first power-law distribution in any field was observed in economics, and the existence and significance of economic power laws has been a matter of debate ever since. In 1963, Benoit Mandelbrot observed that the distribution of cotton price fluctuations follows a power law.

Later, more detailed observations of power laws were made by Rosario Mantegna and Eugene Stanley, who coined the term ***econophysics.***

On looking at the differences, the fundamental difference between physics and economics is that physics deals with the physical universe which is governed by immutable laws, beyond the light of human behaviour. Economics, in contrast, is a social science whose laws are influenced by human behaviour. Simply put, one cannot change the mass of an electron no matter how one behaves but one can change the price of a derivative by his behaviour. In nutshell, economics cannot lay claim to the immutability, universality, precision and exactitude of physics. Economics is a social science and its predictive power is at a fundamental level influenced by human behaviour and actions.

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Latest Research in Software Testing

Er. Rasneet Kaur Chauhan
Department of CSE
GNDU RC Gurdaspur

Er. Iqbal Singh
Department of ECE
GNDU RC Gurdaspur

Sharanjit Singh
Assistant Professor
GNDU RC Gurdaspur

Abstract— Software testing is any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets its required results. Although crucial to software quality and widely deployed by programmers and testers, software testing still remains an art, due to limited understanding of the principles of software. The difficulty in software testing stems from the complexity of software: we cannot completely test a program with moderate complexity. Testing is more than just debugging. Software testing is essential to software quality. This paper describes the purpose of testing as quality assurance, verification and validation, or reliability estimation. Testing can be used as a generic metric as well. Correctness testing and reliability testing are two major areas of testing. Software testing is a trade-off between budget, time and quality.

Index Terms-Software Testing , Levels, Tool.

I. INTRODUCTION

m with the intent of finding errors. Or, it involves any activity aimed at evaluating an attribute or capability of a program or system and determining that it meets its required results. Most physical systems fail in a fixed (and reasonably small) set of ways. By contrast, software can fail in many bizarre ways. Detecting all of the different failure modes for software is generally infeasible.

A. Software testing verifies and validates the product:

- meets the requirements that guided its design and development,
- works as expected,
- can be implemented with the same characteristics,
- satisfies the needs of stakeholders.

Unlike most physical systems, most of the defects in software are design errors, not manufacturing defects. Software does not suffer from corrosion, wear-and-tear -- generally it will not change until upgrades, or until obsolescence. So once the software is shipped, the design defects -- or bugs -- will be buried in and remain latent until activation. Software bugs will almost always exist in any software module with moderate size: not because programmers are careless or irresponsible, but because the complexity of software is generally intractable -- and humans have only limited ability to manage complexity. It is also true that for any complex systems, design defects can never be completely ruled out. Discovering the design defects in software, is equally difficult, for the same reason of complexity. Because software and any digital systems are not continuous, testing boundary values are not sufficient to guarantee correctness. All the possible values need to be tested and verified, but complete testing is infeasible. If inputs from the real world are involved, the problem will get worse, because timing and unpredictable environmental effects and human interactions are all possible input parameters under consideration.

A further complication has to do with the dynamic nature of programs. If a failure occurs during preliminary testing and the code is changed, the software may now work for a test case that it didn't work for previously. But its behavior on pre-error test cases that it passed before can no longer be guaranteed. To account for this possibility, testing should be restarted. The expense of doing this is often prohibitive.

II. OVERVIEW

Testing can never completely identify all the defects within software. A primary purpose of testing is to detect software failures so that defects may be discovered and corrected. The scope of software testing often includes examination of code as well as execution of that code in various environments and conditions as well as examining the aspects of code: does it do what it is supposed to do and do what it needs to do.

In the current culture of software development, a testing organization may be separate from the development team. There are various roles for testing team members. Information derived from software testing may be used to correct the process by which software is developed.

Every software product has a target audience. For example, the audience for video game software is completely different from banking software. Therefore, when an organization develops or otherwise invests in a software product, it can assess whether the software product will be acceptable to its end users, its target audience, its purchasers and other stakeholders.

A. Software testing makes assessment :

1) Defects and failure

Not all software defects are caused by coding errors. One common source of expensive defects is requirement gaps, e.g., unrecognized requirements which result in errors of omission by the program designer .Requirement gaps can often be non-functional requirements such as testability, scalability, maintainability, usability, performance, and security.

Software faults occur through the following processes. A programmer makes an error (mistake), which results in a defect (fault, bug) in the software source code. If this defect is executed, in certain situations the system will produce wrong

results, causing a failure. Not all defects will necessarily result in failures. A single defect may result in a wide range of failure symptoms.

2) Input combinations and preconditions

A fundamental problem with software testing is that testing under all combinations of inputs and preconditions (initial state) is not feasible, even with a simple product. This means that the number of defects in a software product can be very large and defects that occur infrequently are difficult to find in testing. More significantly, non-functional dimensions of quality (how it is supposed to be versus what it is supposed to do)—usability, scalability, performance, compatibility, reliability—can be highly subjective; something that constitutes sufficient value to one person may be intolerable to another.

Software developers can't test everything, but they can use combinatorial test design to identify the minimum number of tests needed to get the coverage they want. Combinatorial test design enables users to get greater test coverage with fewer tests. Whether they are looking for speed or test depth, they can use combinatorial test design methods to build structured variation into their test cases.

3) Economics

A study conducted by NIST in 2002 reports that software bugs cost the U.S. economy $59.5 billion annually. More than a third of this cost could be avoided if better software testing was performed.

It is commonly believed that the earlier a defect is found, the cheaper it is to fix it. The following table shows the cost of fixing the defect depending on the stage it was found. For example, if a problem in the requirements is found only post-release, then it would cost 10–100 times more to fix than if it had already been found by the requirements review. With the advent of modern continuous deployment practices and cloud-based services, the cost of re-deployment and maintenance may lessen over time.

4) Roles

Software testing can be done by software testers. Until the 1980s, the term "software tester" was used generally, but later it was also seen as a separate profession. Regarding the periods and the different goals in software testing, different roles have been established: manager, test lead, test analyst, test designer, tester, automation developer, and test administrator.

B. Testing purposes

1) To improve quality

As computers and software are used in critical applications, the outcome of a bug can be severe. Bugs can cause huge losses. Bugs in critical systems have caused airplane crashes, allowed space shuttle missions to go awry, halted trading on the stock market, and worse. Bugs can kill. Bugs can cause disasters.

Quality means the conformance to the specified design requirement. Being correct, the minimum requirement of quality, means performing as required under specified circumstances. Debugging, a narrow view of software testing, is performed heavily to find out design defects by the programmer. The imperfection of human nature makes it almost impossible to make a moderately complex program correct the first time. Finding the problems and get them fixed, is the purpose of debugging in programming phase.

2) For Verification & Validation (V&V)

Another important purpose of testing is verification and validation (V&V). Testing can serve as metrics. It is heavily used as a tool in the V&V process. Testers can make claims based on interpretations of the testing results, which either the product works under certain situations, or it does not work. We can also compare the quality among different products under the same specification, based on results from the same test.

TABLE I. ECNOMICS

Cost to fix a defect		Time detected				
		Requirements	Architecture	Construction	System test	Post-release
Time introduced	Requirements	1×	3×	5–10×	10×	10–100×
	Architecture	–	1×	10×	15×	25–100×
	Construction	–	–	1×	10×	10–25×

We cannot test quality directly, but we can test related factors to make quality visible. Quality has three sets of factors –functionality, engineering, and adaptability. These three sets of factors can be thought of as dimensions in the software quality space. Each dimension may be broken down into its component factors and considerations at successively lower levels of detail. Table I illustrates some of the most frequently cited quality considerations.

Good testing provides measures for all relevant factors. The importance of any particular factor varies from application to application. Any system where human lives are at stake must place extreme emphasis on reliability and integrity.

TABLE II. TYPICAL SOFTWARE QUALITY FACTORS

Functionality (exterior quality)	Engineering (interior quality)	Adaptability (future quality)
Correctness	Efficiency	Flexibility

Reliability	Testability	Reusability
Usability	Documentation	Maintainability
Integrity	Structure	

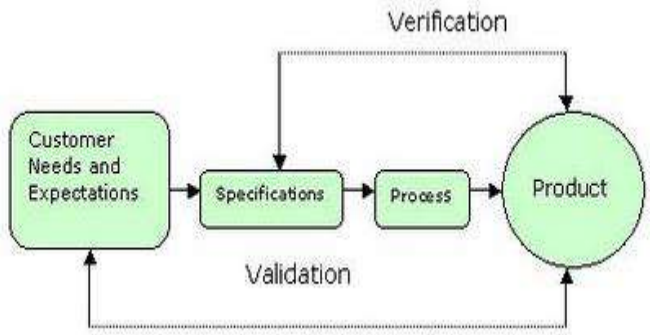

Fig. 1. Verification&Validation

3) For reliability estimation

Software reliability has important relations with many aspects of software, including the structure, and the amount of testing it has been subjected to. Software testing is not mature. We are still using the same testing techniques invented 20-30 years ago, some of which are crafted methods or heuristics rather than good engineering methods.

Software testing can be costly, but not testing software is even more expensive, especially in places that human lives are at stake. Solving the software-testing problem is no easier than solving the Turing halting problem. We can never be sure that a piece of software is correct. We can never be sure that the specifications are correct. No verification system can verify every correct program. We can never be certain that a verification system is correct either.

III. TESTING LEVELS

Tests are frequently grouped by where they are added in the software development process, or by the level of specificity of the test. The main levels during the development process as defined are unit-, integration-, and system testing that are distinguished by the test target without implying a specific process model. Other test levels are classified by the testing objective.

A. Unit testing

Unit testing, also known as component testing, refers to tests that verify the functionality of a specific section of code, usually at the function level. In an object-oriented environment, this is usually at the class level, and the minimal unit tests include the constructors and destructors.

Unit testing is a software development process that involves synchronized application of a broad spectrum of defect prevention and detection strategies in order to reduce software development risks, time, and costs. It is performed by the software developer or engineer during the construction phase of the software development lifecycle. Rather than replace traditional QA focuses, it augments it. Unit testing aims to eliminate construction errors before code is promoted to QA; this strategy is intended to increase the quality of the resulting software as well as the efficiency of the overall development and QA process.

B. Integration testing

Integration testing is any type of software testing that seeks to verify the interfaces between components against a software design. Software components may be integrated in an iterative way or all together ("big bang"). Normally the former is considered a better practice since it allows interface issues to be located more quickly and fixed.

Integration testing works to expose defects in the interfaces and interaction between integrated components (modules). Progressively larger groups of tested software components corresponding to elements of the architectural design are integrated and tested until the software works as a system.

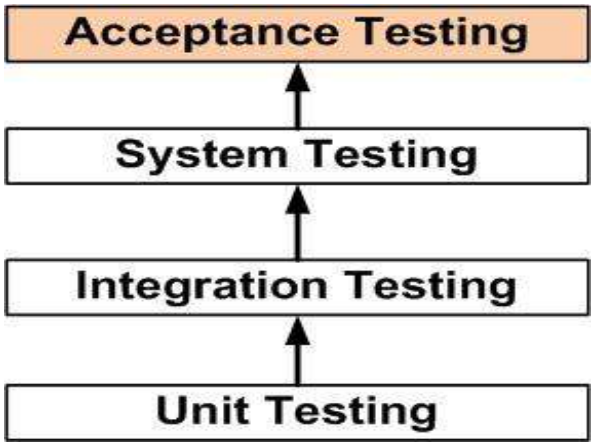

Fig. 2. Testing Levels

C. Component interface testing

The practice of component interface testing can be used to check the handling of data passed between various units, or subsystem components, beyond full integration testing between those units. The data being passed can be considered as "message packets" and the range or data types can be checked, for data generated from one unit, and tested for validity before being passed into another unit. One option for interface testing is to keep a separate log file of data items being passed, often with a timestamp logged to allow analysis of thousands of cases of data passed between units for days or weeks. Tests can include checking the handling of some extreme data values while other interface variables are passed as normal values. Unusual data values in an interface can help explain unexpected performance in the next unit.

D. System testing

System testing, or end-to-end testing, tests a completely integrated system to verify that it meets its requirements. For example, a system test might involve testing a logon interface, then creating and editing an entry, plus sending or printing results, followed by summary processing or deletion (or archiving) of entries, then logoff.

In addition, the software testing should ensure that the program, as well as working as expected, does not also destroy or partially corrupt its operating environment or cause other

processes within that environment to become inoperative (this includes not corrupting shared memory, not consuming or locking up excessive resources and leaving any parallel processes unharmed by its presence)

E. Acceptance testing

At last the system is delivered to the user for Acceptance testing as shown in Fig.2

IV. TESTING TYPES

A. Black-box testing

The black-box approach is a testing method in which test data are derived from the specified functional requirements without regard to the final program structure. It is also termed data-driven, input/output driven , or requirements-based testing. Because only the functionality of the software module is of concern, black-box testing also mainly refers to functional testing -- a testing method emphasized on executing the functions and examination of their input and output data. The tester treats the software under test as a black box -- only the inputs, outputs and specification are visible, and the functionality is determined by observing the outputs to corresponding inputs. In testing, various inputs are exercised and the outputs are compared against specification to validate the correctness. All test cases are derived from the specification. No implementation details of the code are considered.

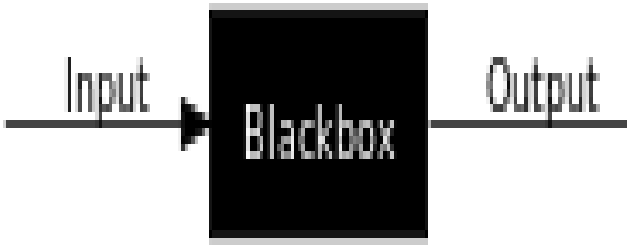

Fig. 3. Black-Box Testing[5]

The research in black-box testing mainly focuses on how to maximize the effectiveness of testing with minimum cost, usually the number of test cases. It is not possible to exhaust the input space, but it is possible to exhaustively test a subset of the input space. Partitioning is one of the common techniques. If we have partitioned the input space and assume all the input values in a partition is equivalent, then we only need to test one representative value in each partition to sufficiently cover the whole input space.

Good partitioning requires knowledge of the software structure. A good testing plan will not only contain black-box testing, but also white-box approaches, and combinations of the two.

B. White-box testing

Contrary to black-box testing, software is viewed as a white-box, or glass-box in white-box testing, as the structure and flow of the software under test are visible to the tester. Testing plans are made according to the details of the software implementation, such as programming language, logic, and styles. Test cases are derived from the program structure. White-box testing is also called glass-box testing, logic-driven testing or design-based testing.

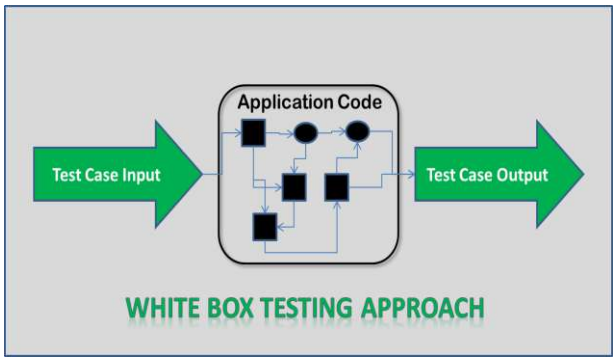

Fig. 4. Testing Approach[5]

There are many techniques available in white-box testing, because the problem of intractability is eased by specific knowledge and attention on the structure of the software under test. The intention of exhausting some aspect of the software is still strong in white-box testing, and some degree of exhaustion can be achieved, such as executing each line of code at least once (statement coverage), traverse every branch statements (branch coverage), or cover all the possible combinations of true and false condition predicates (Multiple condition coverage).

We may be reluctant to consider random testing as a testing technique. The test case selection is simple and straightforward: they are randomly chosen. Study in indicates that random testing is more cost effective for many programs. Some very subtle errors can be discovered with low cost. And it is also not inferior in coverage than other carefully designed testing techniques. One can also obtain reliability estimate using random testing results based on operational profiles. Effectively combining random testing with other testing techniques may yield more powerful and cost-effective testing strategies.

C. Security testing

Software quality, reliability and security are tightly coupled. Flaws in software can be exploited by intruders to open security holes. With the development of the Internet, software security problems are becoming even more severe.

Many critical software applications and services have integrated security measures against malicious attacks. The purpose of security testing of these systems include identifying and removing software flaws that may potentially lead to security violations, and validating the effectiveness of security measures. Simulated security attacks can be performed to find vulnerabilities.

D. Compatibility testing

A common cause of software failure (real or perceived) is a lack of its compatibility with other application software, operating systems (or operating system versions, old or new), or target environments that differ greatly from the original (such as a terminal or GUI application intended to be run on

the desktop now being required to become a web application, which must render in a web browser). For example, in the case of a lack of backward compatibility, this can occur because the programmers develop and test software only on the latest version of the target environment, which not all users may be running. This results in the unintended consequence that the latest work may not function on earlier versions of the target environment, or on older hardware that earlier versions of the target environment was capable of using. Sometimes such issues can be fixed by proactively abstracting operating system functionality into a separate program module or library.

E. Alpha testing

Alpha testing is simulated or actual operational testing by potential users/customers or an independent test team at the developers' site. Alpha testing is often employed for off-the-shelf software as a form of internal acceptance testing, before the software goes to beta testing.

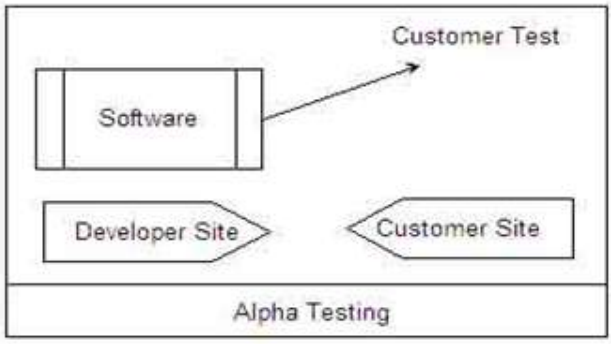

Fig. 5. Alpha Testing

F. Beta testing

Beta testing comes after alpha testing and can be considered a form of external user acceptance testing. Versions of the software, known as beta versions, are released to a limited audience outside of the programming team. The software is released to groups of people so that further testing can ensure the product has few faults or bugs. Sometimes, beta versions are made available to the open public to increase the feedback field to a maximal number of future users.

V. TESTING TOOLS

Program testing and fault detection can be aided significantly by testing tools and debuggers. Various testing tools are:

A. Mothora

Mothora is an automated mutation testing tool-set developed at Purdue University. Using Mothora, the tester can create and execute test cases, measure test case adequacy, determine input-output correctness, locate and remove faults or bugs, and control and document the test.

B. NuMega's Boundschecker Rational's Purify

They are run-time checking and debugging aids. They can both check and protect against memory leaks and pointer problems.

C. Ballista COTS Software Robustness Testing Harness

The Ballista testing harness is an full-scale automated robustness testing tool. The first version supports testing up to 233 POSIX function calls in UNIX operating systems. The second version also supports testing of user functions provided that the data types are recognized by the testing server. The Ballista testing harness gives quantitative measures of robustness comparisons across operating systems. The goal is to automatically test and harden Commercial Off-The-Shelf (COTS) software against robustness failures.

VI. LATEST RESEARCH AND ISSUES ON SOFTWARE TESTING

With the research and development on component system testing, form-modeling and analysis techniques in embedded software and the software credibility, new results and hot issues on software testing keep emerging in recent years, part of which are introduced as follows:

A. Test-driven development (TDD)

The programming is guided by testing. Before coding, we should write the related test code at first, after that, program the test code, then test the develop code by testing program and the cycle continues, until the development is completed. The recent popular XP mode strongly advocates this testing idea.

B. Iterative and incremental test

It is evolved from the iterate model. After finishing the iteration, the system will incrementally integrate some new functions until the completion of the entire system function. It mainly focuses on the cumulative function in the regression test and each iterative cycle test is completed by two parts: incremental test on the current iterative product and the regression test on the completed function of former iterative cycle. This is one of IBM favourite test methods.

C. GUI automation test

GUIATF is an automated testing framework based on object-oriented capture technology for GUI. About the method of testing case generation, a kind of automatic generation method of test data based on ant colony algorithm. By using bit coding, a model from input domain of the software under test to ant paths of the ant colony algorithm was established. This improved the diversity of ant paths and decreased the degrees of the precocity and stagnation. some applied the automatic generation idea of model-driven software code in MDA to the automatic generation of model-driven software testing cases and developed a framework which can automatically generate unit test case, thus improving the automation degree of the software testing .

D. Testability of component software

On the selection of the test case, a metadata selection method to select testing case. It embedded the information and case to component in order to achieve the generation of testing case, and used the method of UML to show the relevant use

case meta- model, testing case meta-model, the mapping between them, elements of the component metadata. A system , MTCGCBS, one of the GA, which introduced IGA and its advantages on the generation of component software testing case. In the mean time, they also raised an advanced method that is the “IIGA”, which brought the parallel, migration, self-adoption and immune operator into traditional genetic algorithm, and also proofed its convergence.

E. Embedded Software Simulation Test

We test various embedded software without significant modification by simulating the ARM embedded system on PC. A system is designed a testing development environment for MVC-based embedded software, which not only ensure the successful development of ESTDE but improve the repeatability and adaptability of the system.

VII. CONCLUSION

Software testing is an art. Most of the testing methods and practices are not very different from 20 years ago. It is nowhere near maturity, although there are many tools and techniques available to use. Good testing also requires a tester's creativity, experience and intuition, together with proper techniques.

Testing is more than just debugging. Testing is not only used to locate defects and correct them. It is also used in validation, verification process, and reliability measurement.

Testing is expensive. Automation is a good way to cut down cost and time. Testing efficiency and effectiveness is the criteria for coverage-based testing techniques.

Complete testing is infeasible. Complexity is the root of the problem. At some point, software testing has to be stopped and product has to be shipped. The stopping time can be decided by the trade-off of time and budget. Or if the reliability estimate of the software product meets requirement.

Testing may not be the most effective method to improve software quality. Alternative methods, such as inspection, and clean-room engineering, may be even better.

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WTISD Framework: Leveraging Broadband Role for Sustainable development

Kapil Goyal
Dept. Of Computer Sc. & IT
DAV College, Amritsar , India
goyal_kapil@yahoo.com

Abstract*:*The core objective of my research guidelines is to share best practices World Telecommunication and Information Society Day (WTISD) has been organizing since long focuses on leveraging ICT technologies to help advance sustainable development. ICTs are powerhouses of the global economy, offering solutions for sustainable economic growth and shared prosperity. Broadband connectivity is a transformative tool to achieve the three pillars of sustainable development- economic growth, social inclusion and environmental balance. Let us pledge together to bridge the digital divide and harness the power of technology to create a better and more sustainable future.

***Keywords: WTISD, ICT 2.0, Broadband Access, NTP 2012, USO, Social Inclusion*.**

I Introduction

Celebrated each year on 17 May, marks the establishment of the International Telecommunication Union in 1865. The theme for 2014 is 'Broadband for Sustainable Development. As ITU approaches its 150th anniversary next year, the paper basic aim to focus attention on multi-stakeholder commitment to achieve universal access to broadband connectivity and content and foster political will on achieving this objective; identify key gaps in broadband research and development, infrastructure, and packaged development of applications and services; define policy priorities for action in the areas of allocating radio frequency spectrum for broadband, universal access obligations and innovative financing mechanisms; and lead to technological solutions, particularly in the extension of broadband access into rural areas, least developed countries and small island developing states.

Given that estimates suggest that mobile broadband subscription may achieve 10 billion by the end of this decade and that over 90 per cent of international data traffic runs over fibre-optic cables ITU's thrust to push the broadband agenda for sustainable development focuses on the dual goals of supporting the deployment of mobile broadband based on ITU's International Mobile Telecommunications (IMT) and the continued rollout of fixed-line technologies. Broadband infrastructure development is a critical element in ensuring that ICTs are used innovatively as delivery vehicles for health, education, governance, trade and commerce in order to achieve sustainable socio-economic growth and address the post-2015 development agenda.

II Mission of WTISD: A Call for Action

- Develop and adopt national policies and plans promoting the roll-out of broadband networks, applications and services.
- Ensure broadband connectivity and digital inclusion for all, through broadband backhaul, wireless or wireline, and including satellite communications.
- Connect community tele-centres for Internet access, in particular schools.
- Develop and implement national policies to restructure current education systems and infrastructure, integrating science and ICT-related subjects with mainstream curricula to better respond to present industry needs and standards as well as future ICT workforce requirements

- Affordable network for all, enabling regulation and Content creation strategy

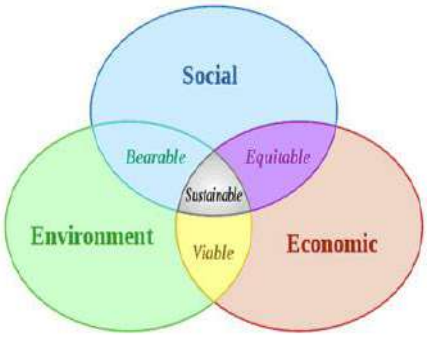

Fig no. 1

Diagram Shown above Representing Three Metric of sustainable development –

"Economic growth, Social inclusion and Environmental balance"

III Key Question to be answered:

I would like to engage my audience and initiate debate on following mentioned questions to be answered and may like to summarizes my discussion that how we can achieve Broadband role moves up in post-2015 sustainable development.

High-speed affordable broadband connectivity to the Internet is essential to modern society, offering widely recognized economic and social benefits. This brief will outline key issues and reasons governments should link their development policies to making universal broadband accessible for all.

- How can broadband technologies be leveraged in the future development context?
- What are the benefits? How can we get leverage and scale?
- What is the role of the private sector?
- What types of partnerships are needed?
- How can broadband investments be financed?
- What barriers need to be overcome?
- How can development agencies, international organizations, academia and NGO best leverage the assets that the private sector can bring?
- Can ICT help to create a new form of transparency in governance?

IV Some positive examples include:

The economic benefits of broadband – a 10% increase in penetration on average can create 1% sustainable GDP growth. Doubling broadband speed improves GDP 0.3%. In some countries, like Myanmar, the potential can be even greater (7%).

M-commerce – over $800 billion will be transacted globally by 2016. UNDP says up to 2.5 billion adults are financially excluded. Mobile commerce offers an enormous potential to improve social and financial inclusion.

Education – cloud computing is already starting to revolutionize the way that content is delivered and accessed (changes in learning, changes in teaching).

Health – in the future, half of all medical care could be delivered remotely and more efficiently.

Low carbon economy– The SMARTer2020 study shows that increased use of ICT could cut global greenhouse gas emissions by 16.5% by 2020, amounting to $1.9 trillion in gross energy and fuel savings

V Broadband Ecosystem Multi stakeholder Scenario

A)Key discussion points

Global internet governance means many things to different people, but the definition of multi-stakeholder is reasonably settled in the Tunis Agenda 2005. In the Tunis Agenda, governments realized that the multistakeholder model was the way forward. The key concept of the multi-stakeholder process is upheld by the national/regional IGFs. The three primaries attributes of a multi-stakeholder model are flexibility, scalability and expandability. These form a great foundation for a multi-stakeholder model along with transparency and accountability. Some of the characteristics of the multi-stakeholder process:

• All stakeholders are involved in the learning process.
• Stakeholders work toward a common goal.
• Work involves different sectors and scale.
• The objective is focused to bring about change.
• The process deals with structural changes.
• Agreements are created based on cooperation or consensus.

Fig.no.2

VI A holistic approach to broadband access

Acknowledging the importance of broadband in India, the Govt. Of India (GoI) has stepped up its efforts to drive mass adoption. Broadband access has received unprecedented attention in the National Telecoms Policy (NTP) 2012. The policy aims to deliver "broadband on demand" and enable all citizens and businesses — both in rural and in urban landscapes — to participate in the internet and web economy.

The GoI has committed roughly INR200 billion to investment in infrastructure through the Bharat Broadband Project to bring fiber to 250,000 villages — the largest publicly financed single project in the telecom internet space in over a decade. The Universal Service Obligation Fund (USOF) is the primary contributor in the investment.

Key discussion points

- The NTP 2012 aims to provide broadband on demand while ensuring equitable and inclusive development of broadband. It targets 175 million users by 2017 and 600 million users by 2020.
- NTP 2012 proposes sharing of networks at delivery and core level. Also, spectrum sharing and technology neutrality will allow operators to make the best possible use of the available spectrum and reduce unit cost of spectrum.
- Internet protocol (IP) traffic in India is expected to grow 11 times between 2011 and 2016. India is projected to have 15% of global internet users and 10.5% of connected devices by 2016
- For mass adoption, broadband needs to be made relevant so that there are enough takers for the generated capacity, especially in rural regions. Unless broadband is made transformational rather than transactional, it will not be very effective among the masses.
- The three Cs — content, cost of device and competitive tariff — will be important for driving future demand for internet. The scale of production in India will lower hardware cost, and efficient spectrum management along with active infrastructure sharing will help lower the tariffs.

VII Conclusion:

The paper puts forward new research that shows for the first time how nations across the world use their national broadband plans as a critical instrument of policy to leverage the full potential of broadband as an enabling infrastructure to speed up sustainable development. However, there are still many missed opportunities, which include the opportunity to reduce poverty and improve food security as well.

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Cooperative spectrum sensing in cognitive radio networks

Prabhjeet Kaur

M.Tech Scholar,

Dept. of Electronics & Communication

Amritsar College of Engg. & Tech

Amritsar, Punjab, India

Prabhjeetkaur007@gmail.com

Dr. V.K Banga
Principal and Professor

Dept. of Electronics & Communication

Amritsar College of Engg. & Tech

Amritsar, Punjab, India

vijaykumar.banga@gmail.com

Abstract **- Cognitive radio is an exciting emerging technology that has the potential of dealing with the stringent requirement and scarcity of the radio spectrum. Such revolutionary and transforming technology represents a paradigm shift in the design of wireless systems, as it will allow the agile and efficient utilization of the radio spectrum by offering distributed terminals or radio cells the ability of radio sensing, self-adaptation, and dynamic spectrum sharing. Cooperative communications and networking is another new communication technology paradigm that allows distributed terminals in a wireless network to collaborate through some distributed transmission or signal processing so as to realize a new form of space diversity to combat the detrimental effects of fading channels. One of the most important challenges for cognitive radio systems is to identify the presence of primary (licensed) users over a wide range of spectrum at a particular time and specific geographic location**.

Keywords- Cognitive radio, cooperative spectrum sensing; spectrum sensing; energy detection.

I. INTRODUCTION:

As wireless technologies continue to grow, more and more spectrum resources will be needed. Within the current spectrum regulatory framework, however, all of the frequency bands are exclusively allocated to specific services, and no violation from unlicensed users is allowed. A recent survey of spectrum utilization made by the Federal Communications Commission (FCC) has indicated that the actual licensed spectrum is largely underutilized in vast temporal and geographic dimensions. One of the primary requirements of cognitive radio is their ability to scan the entire spectral band for the presence or absence of primary users (PU). The available bands are analyzed to determine their suitability for communication. Some important parameters like SNR, link error rate, delays, interference and holding time can be used to determine the most appropriate band. Then after the selection of band cognitive radio transmission starts in that band. Actually cognitive radio use a cognitive cycle which observes its environment and modifies its transmission parameters accordingly. As recent measurements show, the spectrum scarcity is due to inefficient fixed frequency allocations rather than a

physical shortage in the spectrum. Spectrum utilization can be improved significantly by allowing a secondary user to utilize a licensed band when the primary user (PU) is absent. Cognitive radio (CR), as an agile radio technology, has been proposed to promote the efficient use of the spectrum [1]. By sensing and adapting to the environment, a CR is able to fill in spectrum holes and serve its users without causing harmful interference to the licensed user. To do so, the CR must continuously sense the spectrum it is using in order to detect the reappearance of the PU. Once the PU is detected, the CR should withdraw from the spectrum so as to minimize the interference it may possibly cause. This is a very difficult task, as the various Pus will be employing different modulation schemes, data rates, and transmission powers in the presence of variable propagation environments and interference generated by other secondary users. Another great challenge of implementing spectrum sensing is the hidden terminal problem, which occurs when the CR is shadowed, in severe multipath fading or inside buildings with a high penetration loss while a PU is operating in the vicinity. Cooperative communications is an emerging and powerful solution that can overcome the limitation of wireless systems [2], [3]. Cognitive radio is a model for wireless communication in which either a network or a wireless node changes its transmission or reception parameters to communicate efficiently avoiding interference with licensed or unlice the CR technology will enable the users to [4]:

•Determine which portions of the spectrum are available and detect the presence of licensed users. when a user operates in a licensed band (spectrum sensing);

•Select the best available channel (spectrum management);

•Coordinate access to this channel with other users (Spectrum sharing);

•Vacate the channel when a licensed user is detected (spectrum mobility).

Traditional wireless networks have predominantly used direct point-to-point or point-to-multipoint (e.g., cellular) topologies. In contrast to conventional point-to-point communications, cooperative communications and networking allows different users or nodes in a wireless network to share resources and to create collaboration through distributed transmission/ processing, in which each user's information is sent out not only by the user but also by the collaborating users [5]. Cooperative communications and networking is a new communication paradigm that promises significant capacity and multiplexing gain increase in wireless networks [6], [7].

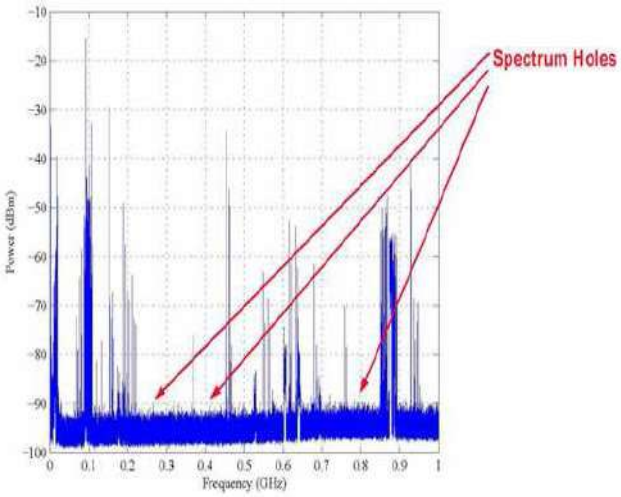


Fig **1.** Spectrum measurement across the 900 KHz -1 GHz band.

Fig 1. Shows the status of the spectrum band. Blue bar shows the spectrum usage status and red line are indicating the portion of the band which are not in use and spectrum is just wasting. Cognitive radio technology is aware of its frequency atmosphere. They can advance the spectral competence by sensing the environment and, in order to provide the quality of service to the primary user, filling the discovered gaps of unused licensed spectrum with their own transmissions. Precise spectrum awareness is the main concern for the cognitive radio system (secondary user). In this regard it is a proposal that adaptive transmission in unused spectral bands without causing interference to the primary user. The transmissions of licensed users have to be detected without failure and the main goal for adaptive transmission is the detection of vacant frequency bands. A scheme is propose to formulate a cognitive radio that is intelligent to detect vacant frequency bands professionally, to get maximum throughput without causing any detrimental harm to the primary user's quality of service.

2. SPECTRUM SENSING TECHNIQUES.

Spectrum sensing is a key element in CR communications, as it enables the CR to adapt to its environment by detecting spectrum holes. The most effective way to detect the availability of some portions of the spectrum is to detect the PUs that are receiving data within the range of a CR. However, it is difficult for the CR to have a direct measurement of a channel between a primary transmitter and receiver. Therefore, most existing spectrum sensing algorithms focus on the detection of the primary transmitted signal based on the local observations of the CR.

Energy Detection: If prior knowledge of the PU signal is unknown, the energy detection method is optimal for detecting any zero-mean constellation signals [8]. In the energy detection approach, the radio-frequency (RF) energy in the channel or the received signal strength indicator is measured to determine whether the channel is idle or not. First, the input signal is filtered with a band pass filter to select the bandwidth of interest. The output signal is then squared and integrated over the observation Interval. Lastly, the output of the integrator is compared to a predetermined threshold to infer the presence or not of the PU signal.

3. COOPERATIVE SPECTRUM SENSING

The critical challenging issue in spectrum sensing is the hidden terminal problem, which occurs when the CR is shadowed or in severe multipath fading.

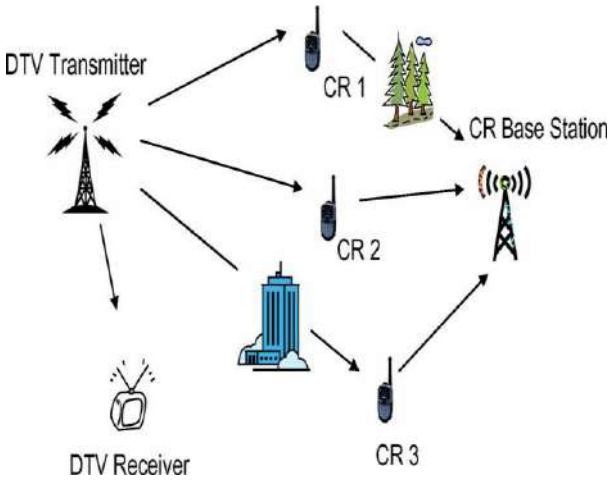


Fig. 2 shows that CR 3 is shadowed by a high building over the sensing channel.

In this case, the CR cannot sense the presence of the primary user, and thus it is allowed to access the channel while the PU is still in operation. To address this issue, multiple CRs can be designed to collaborate in spectrum sensing.

1) Every CR performs its own local spectrum sensing measurements independently and then makes a binary decision on whether the PU is present or not.

2) All of the CRs forward their decisions to a common Receiver.

3) The common receiver fuses the CR decisions and makes a final decision to infer the absence or presence of the PU.

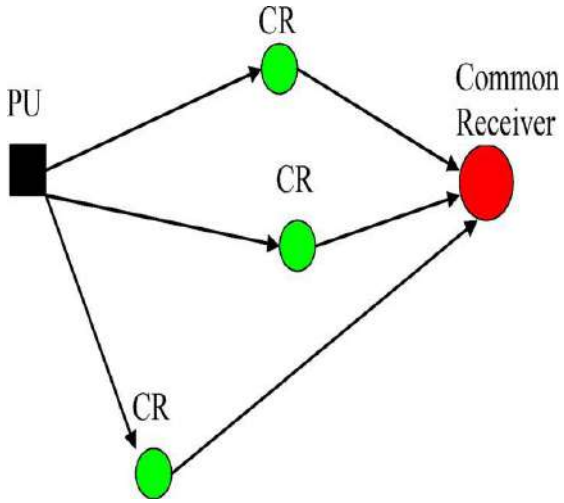


Fig. 3. Spectrum sensing structure in a cognitive radio network.

Sensing Diversity Gain: It can be seen that cooperative spectrum sensing will go through two successive channels: 1) sensing channel (from the PU to CRs) and 2) reporting channel (from the CRs to the common receiver). The merit of cooperative spectrum sensing primarily lies in the achievable space diversity brought by the sensing channels, namely, sensing diversity gain, provided by the multiple CRs. Even though one CR may fail to detect the signal of the PU, there are still many chances for other CRs to detect it. With the increase of the number of cooperative CRs, the probability of missed detection for all the users will be extremely small. Another merit of cooperative spectrum sensing is the mutual benefit brought forward by communicating with each other to improve the sensing performance [48]. When one CR is far away from the primary user, the received signal may be too weak to be detected. However, by employing a CR that is

Fig. 2. Cooperative spectrum sensing in CR networks. CR 1 is shadowed over the reporting channel and CR 3 is shadowed over the sensing channel.

located nearby the PU as a relay, the signal of the PU can be detected reliably by the far user.

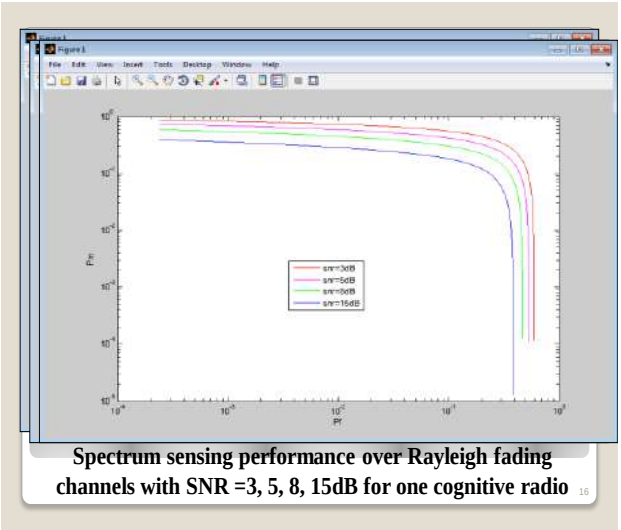
3. RESULTS AND DISCUSSION

The essence of spectrum sensing is a binary hypothesis-testing problem

H0: Primary user is absent
H1: Primary user is in operation

The instantaneous SNR of the received signal at the ith CR is _i, and u ¼ TW is the time–bandwidth product. By comparing the energy Ei with a threshold _i, the detection of PU signal is made. Therefore, the probability of false alarm is given by PðiÞ f ¼ ProbfEi > _ijH0g and the probability of detection is given by PðiÞ d ¼ ProbfEi > _ijH1g. Over Rayleigh fading channels, the average probability of false alarm, the average probability of detection, and the average probability of missed detection are given by [9], respectively.

In Fig. 4, the complementary receiver operating characteristic (ROC) curves (probability of missed detection versus probability of false alarm) of the energy detection in one CR are plotted for a variety of SNR values according to (3) and (5). In the plotting, we use u ¼ 5 and SNR of 0, 10, and 20 dB, respectively. A close observation of Fig. 4 shows that the energy detection performance of one CR gets worse when the SNR decreases. This will be the case when the CR experiences heavy shadowing or fading. In such a scenario, cooperative spectrum sensing can be applied with the help of multiple CRs [10], [11].



Spectrum sensing performance over Rayleigh fading channels with SNR =3, 5, 8, 15dB for one cognitive radio

4. CONCLUSION

Cognitive radio is a novel technology that can potentially improve the utilization efficiency of the radio spectrum. Cooperative communications can play a key role in the development of CR networks Cooperative spectrum sensing was then considered and shown to be a powerful method for dealing with the hidden terminal problem. However, under realistic scenarios, where the reporting channels are subject to fading and/or shadowing, the performance of cooperative spectrum sensing can be severely limited.

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Cryptography (Survey approach)

[1]Tarun Sharma [2]Jagpreet Singh, [3]Sandeepak Bhandari,
CT Institute of Technology & Research
Greater Kailash, G.T Road, Maqsudan
Jalandhar, www.ctgroup.in

Abstract:-Different cryptography techniques are used for secure data transmission over network. The digital data is Confidential, integrity and Availablebetween sender and receiver, as security is prior. Various techniques Available for cryptography, it includes CBC, CFM, CSM,RSA (Rivest Shamir and Adleman), DSA (Digital Signature Algorithm) and Diffie-Hellman. One of the latest cryptography technology available is Quantum cryptography.

Keywords: **symmetric, Asymmetric, hash function and quantum cryptography.**

I.INTRODUCTION

Cryptography Cryptography is derived from Greekwords. Crypto means "secret" and graphic means "writing". It is the practice of and study of technique that provide secure communication in the presence of third parties. An adversary(enemy) is malicious entity whose goal is to prevent the user of cryptosystem from achieving their goal(integrity and availability of data)As in the past cryptography refer only to the encryption and decryption of message using secret key,but now today it define three different mechanism such as symmetric key cryptography, asymmetric keycryptography and hashing. The main aim of cryptography is increasing theProduction of information, integrity and authenticity too.

A)Basic terms

 Plain text:Amessage in its natural form whichcan be easily readable and understandable by anyone.

Cipher Text: It is modified form of plaintext which is unreadable and understandable by anyone except the intended recipients.

Key: it is a piece of information that determines the functional output of cryptography algorithm or cipher. A key is a number that the cipher as an algorithm, operates on. To secure a message, we require an encryption algorithm, an encryption key and plaintext. To decrypt a message we need a decryption algorithm, a decryption key and cipher text.

Encryption: It is a process of changing the plaintext into cipher text in such a way that only authorized parties can read it

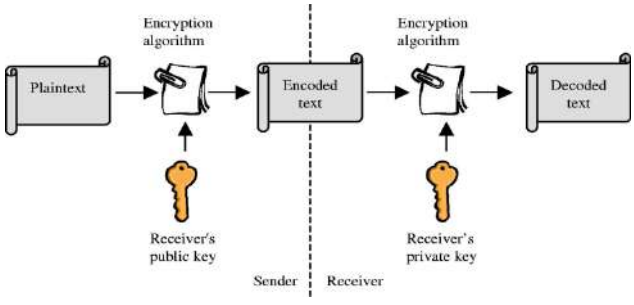
Decryption: It is the reverse process of encryption that is the changing of cipher text into plaintext. In otherwords, it is the process of decoding encrypted information so that it can be accessed again by authorized users.

Security goals in cryptography:

Confidentiality: confidentiality is probably the most aspect of information security .It is needed to protect confidential information. An organization need to protect against those malicious actions that endanger the confidentiality of its information. In the military, concealment of sensitive Information is the major concern. In industry, hiding some information from competitors is crucial to the operation of organization.Inbanking, customer's accounts need to be kept secret.

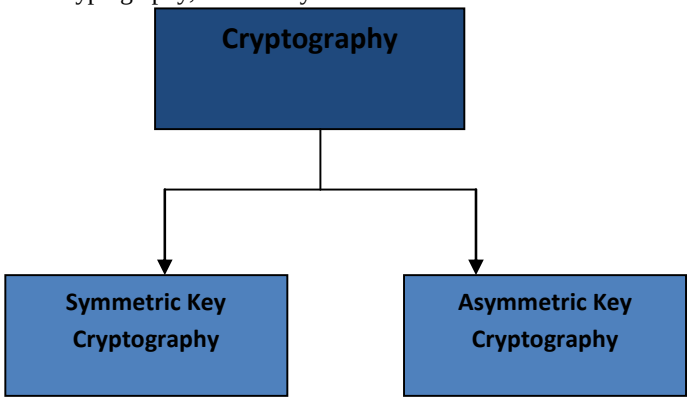
Confidentialitynot available for the storage of information only, it also applies to the transmission of information.

- Integrity: Information needs to be change constantly. For instance in a bank , when a customer deposits or withdraws money from his account, the balance of her account need to changed .Integrity means that change need to done only by authorized entities and through authorized mechanism.
- Availability: The third component of information security is availability. The information generated and saved by an organization needs to available to authorized entities. Information is useless if it is not available .Information need to be changed constantly, which means it must be accessible to authorized entities .The unavailability of information is just as harmful for an organization as lack of Confidentiality or integrity



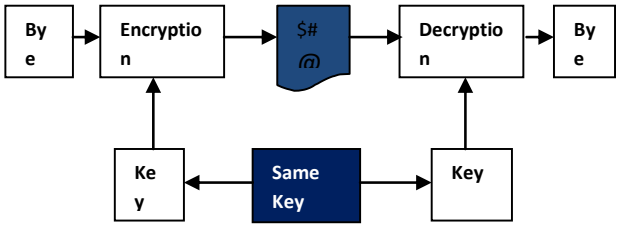
II.TERMINOLOGY

Several Fields, in which we can define the modern techniques of cryptography, are namely:-



2.1 Symmetric key Cryptography:-

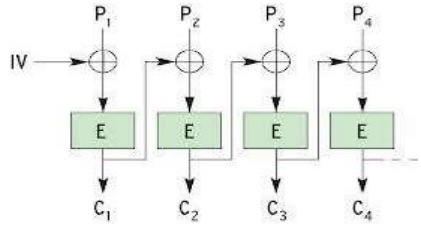
In symmetric key cryptography the same key is used for both encryption and decryption process that is single key is used for converting the cipher text into plaintext and vice versa. The key need to be secured that's why it is also known as secret key cryptography and private key cryptography as shown in figure . The sender uses the key to encrypt the plaintext into cipher text and then send it to the receiver. The receiver applies the same key todecrypt the cipher text and recover the plaintext.



Symmetric key encryption can be categories into stream cipher and block cipher.

- Stream cipher: Encrypt the digits that are bytes of message one at time and required some form of feedback so that keys constantly changing.
- Block cipher: In block cipher number of bits is taken as input encrypt then as single unit. On each block the same key is used. 64 bits of block are commonly used. The Advanced Encryption standard(AES) algorithm used 128 bit block .approved by NIST in December 2001.

Operations Mode:The block cipher can be implemented in four different modes:Cipher Block Chaining (CBC) Mode: In cipher block chaining mode, the encryption or decryption depends upon the output of previous block that is output of an block becomes the input of next block.

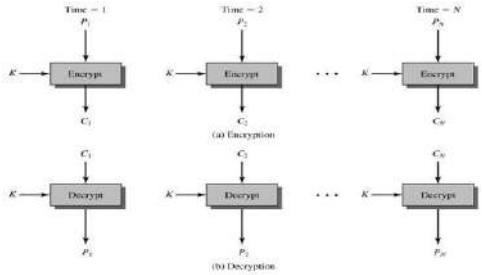


For example: To encrypt the third block(P3),first XOR it with the second cipher text block(C2) and then pass it through the encryption process .In this way C2 depends on C1.If someone exchange C1 with C3, for example ,c2 will not decrypt correctly.

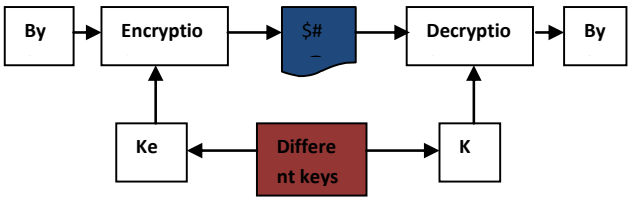
Cipher feedback mode (CFM): Cipher feedbackmode was used in those condition in which the amount of sending orreceiving data one byte at atime. For this, data encryption standard are used. Other way is to create a 1 byte .Cn dependent on 1 byte Pn and another byte, which depend on 8 previous bytes it self .

Cipher Stream Mode (CSM): In this mode , to encrypt or decrypt 1 bit of data at a time and at the same time be independent of previous bit .In this mode data are XORed bit by bit with a long , 1 bit stream that is generated by an initialization vector in a looping process.

Electronic code Block(ECB) Mode: In electronic code block, themessage is divided into 64 bit block and encrypts each block separately .The encryption of each and every block is independent of all other blocks in ECB mode. Electronic Code Book is used when a volume of plaintext is separated into several blocks of data, in which each block of data can be encrypted independently of other blocks. Although, Electronic Code Book has the capability to support a separate encryption keyfor each block type.



2.2 Asymmetric KeyCryptography: The other technique of cryptography is Asymmetric key cryptography. In Asymmetric key cryptography which requires two keys private key and public key.



Asymmetric cryptography or public-key cryptography is cryptography in which a pair of keys is used to encrypt and decrypt a message so that it arrives securely. A network user receives a key pair(private and public) from a certificate authority. Any other user who wantsto send anencrypted message can get the intended recipient's public key from a public directory,and then use this key to encrypt the message, and which can be send to the receiver. When the receiver receive the message, then he/she will decrypt the message with their private key, which no other one have access it.

WestfieldDiffie and Martin Hellman, researchers of Stanford University, first publicly announced asymmetric encryption in their 1977 paper, New Directions In Cryptography. An asymmetric algorithm, as outlined in the Diffie-Hellman paper, is a*none-way* function. An one way function is easy to implement in one direction, but difficult or impossible to implement in reverse form. For example, it will be easy to calulate the product of two given numbers, but it is computationally much difficult to find the two factors given only their product. As given, both the product and one of the factors, it will be easy to calculate the second factor, which illustrates the fact that , hard direction of the computation can be made easy when access to some secret key is given.The algorithm used by function, is known universally, and knowledge does not capable to the decryption of the message. The only added information that is required and sufficient for decryption is the recipient's secret key..

Latest algorithm available for asymmetric key cryptography techniques includes the following algorithm:

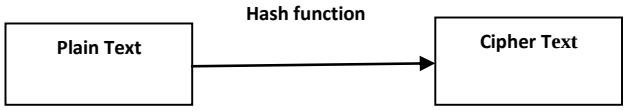
Diffie-Hellman:- Diffie-Hellman key exchange, also known as exponential key exchange, is a method of digitalencryption that uses numbers raised to specific powers to produce decryption keys on the basis of components that are never directly transmitted, make the task of a will-be code breaker mathematically overwhelming.Diffiehellman algorithm used for exchange of secret key between sender and receiver and , it not used for authentication purpose.

Key exchange algorithm (KEA):key exchange is any method in cryptography by which cryptographic keys are exchange between sender and receiver and allow to use a cryptography algorithm.

Digital Signature Algorithm (DSA):-Digital Signature Algorithm is a federal information processing standard for digital signature. It was developed by the national institute of standard and technology in august 1991 for use in DigitalSignature standard. Digital Signature usedfor message authentication.

RSA(Rivest, Shamir,Adleman):-RSA is one of the cryptosystem, which is firstly practically usable publickey cryptosystem and is widely used for secure data transmission over a network. In such type of cryptosystem the encryption key is public and differs from the decryption key which is kept secret. This algorithm is based on modular exponentiation number end andNarrechosen with the property that if A is a number less than N (Ae mod N) d mod N=A.RSA uses a variable size encryption nblock and a variable size key

Hash Function:-A Hash functionH is transformation that accept a variable length m as input and return a string as output whose is fixed, that is h=H(m).



Some basic requirements for cryptography hash function are as follows:-

Input:Variablelength,Output: fixed length(x): relatively is easy to compute for any given x, collision free and one way. A hash function can be define in one way If it is hard to invert where " hard to invert" means that given a hash value h, it is computationally impossible to calculate some input x such that H=h(x).

Various Hash Algorithms:Now days various hash algorithms are available as follows:

Message Digest (MD) algorithm: MD is an algorithm that is used for data integrity through the creation of a 128-bit message digest from data input, input can be of any size that is claimed to be as unique to that specific data as a fingerprint is to the specific individual. MD, which was developed by Professor Ronald L. Rivest of MIT.Rivest is intended for use with digital signature applications, it requirethat files must be compressed by a secure method before being encrypted with a secret key, undera public key cryptosystem. According to the standard, it is computationally imposssibe to find that any two messages that have been input to the MD algorithm could have as the output the same message digest, or that a wrong message can be created through apprehension of the message digest.

MD2: The MD2 Message-Digest Algorithmis one of the cryptographic hash functiondesign by Ronald Rivestin 1989. This algorithm is used for system with. Less storage MD2 is specified in RFC 1319. As MD2 is no longer much secure, even as of 2014, it remains in use in public key infrastructures

as part of certificatesgenerated with MD2 and RSA.It is optimized for 8 bits computers.
MD4: It was also developed by Ronald Rivest, MD4 similar to MD2 but it aimed at 32 bit machine. MD4 was developed for fast processing in software.
MD5:MD5 is modified version of MD4.MD5 is slower than MD4 but MD5 much more secure than MD4.MD5 consists of four rounds , which is little bit different from rounds that are in MD4

Secure hash algorithm (SHA):-SHA stands for "secure hash algorithm".There are four different varieties of SHA algorithms are SHA-0, SHA-1, SHA-2, and SHA-3.

SHA-0:- SHA-0 is produce160-bit hash function published in 1993 under the name "SHA":

SHA-1:SHA-1 is a similar to cryptographic hash function developed by united states national security agency and also similar to SHA-0 .SHA-1 has value is relate as hexadecimal number,40 digit long.

SHA-2:-SHA-2 published in 2001 and it is different from the SHA-1 hash function.

SHA-3:-SHA-3 is a cryptographic hash function developed by Guido Bertoni.

Latest technology:-
Quantum cryptography: ID Quantique introduce a quantum cryptography system;will follow by the Magictechnologies. These system use photons to send secret encryption keys, hiding each key behind the most famous tent of quantum mechanics, the Heisenberg uncertainty principle. Any e-mail message, telephone call or financial encrypted with these keys will be safe
The another encryption technique is RSA encryption which allow two people send each other private message over the internet using a public key and private key .Cracking RSA is difficult but, now a days supercomputer can do it.RSA keeps improving as the fast processing of machines improved but it will absolutely useless if scientist ever develop a quantum computer.Quantum cryptography uses our current knowledge of physics to develop a cryptosystem that is not able to be defeated - that is, one that is completely secure against being compromised without knowledge of the sender or the receiver of the messages. The word *"quantum"* refers to the basic fundamental behavior of the smallest particles of matter and energy: quantum theory explains everything that exists and nothing can be in violation of it.Quantum cryptography's fundamentals is different from traditional cryptographic's fundamentals is that,quantum cryptography relies more on physics, rather than mathematics, as a key aspect of its security model.

III.CONCLUSION:

Cryptography as an essential part of data transmission to provide security.The use of cryptography, to prevent intruders from being able to use the information that they capture. Confidentiality, Integrity and availability are major goals of cryptography. Authentication, Authorization and digital signatures are a very important applications of public-key cryptography. Now a day this can be crack by super or quantum computer.Toenhance security quantum cryptography is developed to provide more security in future.

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Comparison between CISCO Three-Layered hierarchical Model, OSI Model and TCP/IP Model

[1]Jagpreet Singh, [2]Sandeepak Bhandari, [3]Tarun Sharma
CT Institute of Technology & Research
Greater Kailash, G.T Road, Maqsudan
Jalandhar, www.ctgroup.in

Abstract:*This paper illustrates the comparative study of the three models namely CISCO three-layered hierarchical model, OSI model and TCP/IP model. These models are used for build the network's according to different scenario and their requirement. The whole paper is divided into 4 sections section 1, 2 and 3 provides the introduction to these three models and Section 4 provides the comparative study of these three models. OSI reference model which define a hierarchical architecture that logically partitions the functions required to support system to system communication.TCP/IP and CISCO model both provided reliability but CISCO is less expensive as compared to TCP/IP.TCP/IP is flexible as new protocol can be added for supporting newer application.*

Keywords — Cisco three-layered model, OSI model, TCP/IP model and suite

INTRODUCTION

A computer or data network is a telecommunications network that allows computers to exchange data. In computer networks, networked computing devices pass data to each other along data connections. The connections (network links) between nodes are established using either cable media or wireless media. The best-known computer network is the Internet.

Networking play an important role in our daily Life, Through networking we share lot of things like emails, msg etc.so, there are three model that use for networking like Cisco model that describe how network should be designed in layers, OSI model concerned with how different system communicate over networks and last TCP/IP is a suite of specific network protocols.

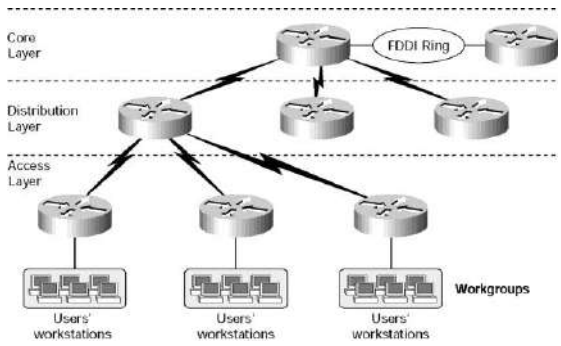
- Networking is a complicated subject, and by splitting it into more manageable chunks (layers) via a reference model, understanding it becomes easier. This is why a reference model is important.
- Each part of a reference model aims to explain how one or more elements of the network function, and what role they play in relation to others.
- Hardware and software are responsible for interacting with other hardware and software on different devices, but on the same layers. Since data can only actually transmit at the physical layer, data must pass up and down logical layers for communication to happen. This will become clearer in a bit.

Imagine a large website project. Typically there isn't just one guy who does everything. More often there are designers, information architects, frontend developers, programmers and a multitude of other people involved. In other words, the job is split into several smaller chunks, just like a networking reference model aims to do the same by splitting networking functions into layers.

Cisco three-layered hierarchical model

Cisco has defined a hierarchical model known as the hierarchical internetworking model. This model simplifies the task of building a reliable, scalable, and less expensive hierarchical internetwork because rather than focusing on packet construction; it focuses on the three functional areas, or layers, of your network. Hierarchical network design helps us to make networks more reliable and predictable. Level by level design help to understand networking factions easily like, we can use tools like access lists at specific level and can avoid them from others.

Cisco layer model consist of the following three layers. The Core layer, The Distribution layer, The Access layer. However, that the three layers are logical and are not necessarily physical devices.



Core layer: It refer to transmission media (leased line or RF base). The core layer is also known as the backbone or foundation network because all other layers rely upon it. Its aim to reduce the latency time in the delivery of packets.

The main responsibility of core layer is to see heavy traffic, so speed and traffic issues are concerned at this layer.

Examples of core layer Cisco equipment include:

Cisco switches such as 7000, 7200, 7500, and 12000 (for WAN use), Catalyst switches such as 6000, 5000, and 4000 (for LAN use),T-1 and E-1 lines, Frame relay connections, ATM networks, Switched Multimegabit Data Service (SMDS).

Distribution layer: This layer includes LAN-based routers and layer 3 switches. This layer ensures that packets are properly routed between subnets and VLANs in your organization. Basic function of distribution layer is routing, filtering and WAN access and find out the method by which packets can access the core. This layer is also called the Workgroup layer.

The distribution layer is responsible for routing. Here are the functions which should be done at distribution layer.

- Enabling routing between all VLANs.
- Defining broadcast and multicast domains.

Examples of Cisco-specific distribution layer equipment include 2600, 4000, 4500 series routers

Access layer: This layer includes hubs and switches. This layer is also called the desktop layer because it focuses on connecting client nodes, such as workstations to the network. This layer ensures that packets are delivered to end user computers. In the access layer, you have the ability to expand or contract collision domains using a repeater, hub, or standard switch.

OSI (open system interconnection) model

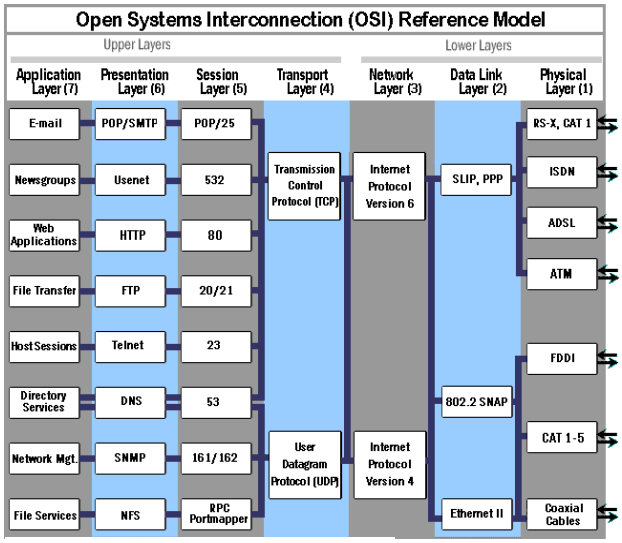
OSI is a theoretical model that aims to explain how computers can network together. The model has 7 layers, where each layer communicates directly with its adjacent layers

When the networking was introduced the only problem that was being faced was that different window computers were not able to communicate with each other. To solve this problem the OSI reference model introduced Layered Architecture.

The term "open" in OSI was used because the stress of the model was to provide a way for networks to be interconnected without regard to the underlying hardware, as long as the communications software adhered to the standards.OSI (Open Systems Interconnection) is a "reference model" for how messages should be transmitted between any two points in a telecommunication network. Its purpose is to guide product implementers so that their products will consistently work with other products.

The OSI model is still very much relevant in "the real world today".

In theoretical terms it helps you understand how networks and network protocols work. In "the real world" it helps you understand which devices and protocols can interact with each other. For example how a switch interacts with a router.



Usage of OSI Model Today scenario-

- The OSI model isn't always applicable, and doesn't always fit with what you're doing.

Therefore it's important not to try to "make it fit", when it doesn't make sense. Only use the OSI model if it makes your life easier, otherwise, screw it.OSI is easier for planning, setups and troubleshooting problems.

The Seven layer of The OSI model

7.) Application Layer: - The application layer serves as the window for users and application processes to access network services. It is responsible for sending and receiving data between user level processes. When you download or send emails, your e-mail program contacts this layer. This layer provides network services to the end-users like Mail, ftp, telnet, DNS. It is a service layer that provides these services:

It may be convenient to think of the application layer as the high-level set-up services for the application program or an interactive user.

6.) Presentation Layer: - The presentation layer ensures that the communications passing in the appropriate form for the recipient. For example, a presentation layer program may format a file transfer request in binary code to ensure a successful file transfer. Programs in the presentation layer address three aspects of presentation:
Presentation layer used to present the data so that destination is understood. It is concerned with syntax (<,>,<=,>=,?) and semantics(something meaningful).Different data processing technique like compression,decompression,encryption and decryption are run here.

5.) Session Layer: - The Session layer (sometimes called the "port layer") manages the setting up and taking down of the association between two communicating end points that is called a connection. In simple: it create, maintain and terminate the session. Three- way handshake request, negotiation, and acknowledgement are some important part of this layer. Dialog control also the important part of session layer (to check whether everything is going as desired or not) if not then the session will be terminated.

4.) Transport Layer: - The Transport layer ensures the reliable arrival of messages and provides error checking mechanisms and data flow controls. The Transport layer provides services for both "connection-mode" transmissions and for "connectionless-mode" transmissions. In simple: It provides both reliable as well as unreliable delivery of message because at this layer TCP (connection-oriented) and UDP (connection-less) are used. The segmentation is done over here. Error correction before retransmission of data.

3.) Network Layer: - This layer converts the segments from the Transport layer into packets (or datagram) and is responsible for path determination, routing, and the delivery of these individual packets across multiple networks without guaranteed delivery. Some basic terms:

- Routers are used over here.
- IP addresses are used.
- Packets are formed.
- Packet filtering is done at this layer.

2.) Data Link Layer: - The Data Link Layer is the protocol layer which transfers data between adjacent network nodes in a wide area network or between nodes on the same local area network segment. Examples of data link protocols are Ethernet for local area networks (multi-node), the Point to point protocol (PPP), HDLC and ADCCP for point-to-point (dual-node) connection. Main functions of data link layer are: It defines the Media Access Control (MAC) or hardware addresses, physical or hardware topology for connections, Link establishment and termination: establishes and terminates the logical link between two nodes, Frame traffic control, sequencing and acknowledgement.

1.) Physical Layer: - The physical layer supports the electrical or mechanical interface to the physical medium. For example, this layer determines how to put a stream of bits from the upper (data link) layer on to the pins for a parallel printer interface, an optical fiber transmitter, or a radio carrier. The physical layer is usually a combination of software and hardware programming and may include electromechanical devices. It does not include the physical media as such. Some important function: Data is transmitted in bit form, Different electrical and mechanical aspects are defined over here like voltage, frequency, bandwidth etc.,End to end connectivity.

Layers	Protocols
Application/Process	TELNET,FTP,TFTP,SNMP,SMTP, POP-3,DNS,DHCP,HTTP,LPD, LPR,NFS,X-WINDOWS
Host to Host	TCP and UDP
Internet	IP,ICMP,ARP,RARP
N/W Access	SLIP,PPP

How to Remember the OSI Model?
Simply repeat this sentence:
All people seem to need data processing.
All (application) People (presentation) Seem (session) to (transport) Need (network) Data (data link) Processing (physical).

TCP/IP Model/Suite

TCP/IP is a suite of many protocols, named after the two most important ones — TCP and IP.TCP/IP is used to build the largest network in human history: The Internet! In other words TCP/IP provides the mechanisms for implementing the Internet. The TCP/IP Model describes only 4 layers, where OSI has 7. TCP/IP layers are very similar to those found in OSI, but because they were thought up before OSI was created, they are naturally not based on OSI.

The four Layer in TCP/IP Model:

4.) Application Layer:-

This layer is equivalent to Application, Presentation and Session layer in OSI. It provides a way for application to use a network services.e.g-Google.com when you use a browser to access google.com, the browser serves as the application layer of the TCP/IP model.

3.) Transport (Host to Host) Layer:-

It is responsible for ensuring logical connections between hosts, and transfer of data. In other words, it acts as the delivery service used by the application layer above. Data can be delivered with or without reliability.

2.) Internet Layer:-

This layer is equivalent to Network layer in OSI.It ensures routing of data between different networks and subnets.IP and ARP (Address Resolution Protocol) are the main protocols used here.

1.) Network Layer:-

This layer is equivalent to Data Link and Physical layer in OSI.it does things such as place data in frames and passes it between hosts.

Comparison

OSI model v/s CISCO three-layered hierarchical model

The OSI model established by ISO and Cisco three-layered hierarchical model established by CISCO company. The OSI model is concerned with how different systems communicate over networks, the Cisco hierarchical model is a blueprint that defines how networks should be designed in layers. Each layer is to have its own roles and responsibilities, but the goal is to create a network that delivers high performance, is manageable, and keeps required roles in their place. While this model was designed by Cisco, its use can by all means be adapted to account for the switching and routing equipment of any vendor. Hierarchical model makes enterprise network scalable and facilitates more efficient network control and monitoring, as well as troubleshooting network issues. Cisco logically defined the three layers and is not necessarily physical devices. You must have look at the OSI Reference model, the seven layers of the OSI Reference model illustrate the functions but not necessarily protocols. Sometimes a protocol plants to more than one layer of the OSI Reference model and sometimes more than one protocols communicate within a single layer. Just like when you deploy physical implementation of hierarchical networks, you may have more than one device in a single layer or you might have a single device that executing functions at two layers. So, the definition of the layers is logical, not physical. The OSI model was designed to ensure different types of equipment (such as network adapters, hubs, and routers) would all be compatible even if built by different manufacturers but in Cisco three-layered hierarchical model only the equipment that's are manufactured by CISCO is used. In OSI model the application, presentation and session layer are upper layer and responsible for communication from a user interface to an application while in Cisco three-layered hierarchical model the access layer also called desktop layer are responsible for communication. In Cisco three-layered hierarchical model core layer act as a backbone of network if failure occur in core layer then it affect every user that are connected in network.

OSI model v/s TCP/IP model

The OSI (Open System Interconnection) Model breaks the various aspects of a computer network into seven distinct layers. Each successive layer envelops the layer beneath it, hiding its details from the levels above. The OSI Model isn't itself a networking standard in the same sense that Ethernet and TCP/IP are. Rather, the OSI Model is a framework into which the various networking standards can fit. The OSI Model specifies what aspects of a network's operation can be addressed by various network standards. So, in a sense, the OSI Model is sort of a standard's standard. There are numerous benefit of layering like easier to learn , easier to develop the network, multivendor interoperability (same networking standards),modular engineering (one vendor works on one layer, another works on another layer).TCP/IP, the protocol on which the Internet is built, is actually not a single protocol but rather an entire suite of related protocols. TCP is even older than Ethernet. It was first conceived in 1969 by the Department of Defense. Currently, the Internet Engineering Task Force, or IETF, manages the TCP/IP protocol suite.OSI model and TCP/IP model are both used to standardized the networking model.TCP/IP is the most popular model today. TCP/IP protocols are identified by RFC numbers, and each of the protocol belongs to one of the 4 layers of TCP/IP model: Key Differences b/w OSI and TCP/IP-

- Both are models used to explain how networking can function.
- Like the seven-layer OSI Reference Model, TCP/IP protocols are based on a layered framework.
- Both contain a set of layers where each communicate with the layer immediately above and below itself, ensuring that data can be transferred from the user, down to a level where it can be physically transmitted
- OSI is a theoretical reference model where TCP/IP is a suite of specific network protocols.
  In other words, TCP/IP is not so much theoretical, as it is a description of actively used protocols in a network.
- OSI is a generic, protocol-independent standard. Think of it as guidelines to how a network can be built.
- The Internet as we know today is based on TCP/IP, which is the biggest reason TCP/IP adoption is so huge.
- OSI has 7 layers and TCP/IP has 4.

TCP/IP model v/s CISCO three-layered hierarchical model

The TCP/IP model explain how the protocol suite works to provide communication but in CISCO all work of communication is handle by access layer because this layer closest to users, where they attach to the network. The hierarchy in Cisco three-layered model helps to understand where things belong, how adjust mutually and which utility go where, a hierarchy can connect body units whichever vertically or horizontally and directly or indirectly while the TCP/IP model is a protocol suite that's provides a different-different service to user like remotely access of device etc.The network model like TCP/IP model is a database model conceived as a flexible way of representing the objects and their relationships where the hierarchical model structures data as a tree of records ,with each record having one parent record and many children like access layer, the network model allow each record to have multiple parent and child records, forming a lattice structure. The chief argument in favor of network model, in comparison to

hierarchical model was that it allowed a more natural modeling of relationship between entities.

Conclusions

OSI model is a reference model, but it is practically not implemented. By referring the OSI reference model, a network can be setup and design the network, that is flexible, robust, and interoperable.OSI is not a protocol, the main goal of OSI model is to show how to facilitate communication between different systems without requiring changes to the logic of the underlying hardware and software. CISCO three-level model is practically implemented. This model describe, how one can optimal use of networking devices (router, switches etc).TCP/IP is a protocol suite, it use several protocols on its several layers (4 layers).it provides both type of communication reliable (connection-oriented) and unreliable (connection-less).In future we can add new protocol to TCP/IP suite according to requirement such SCTP (stream control transmission protocol) it is use for voice over the internet.

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Performance Investigation of QoS parameters of Routing Protocols DSR and TORA In MANET

Sangeeta Bhatti
Department of Computer Science & Engineering
SSCET, Badhani, Pathankot, Punjab, India
Sangeetabhatti290@gmail.com

Dr. Jyoteesh Malhotra
Department of Electronics & Computer Engineering
Guru Nanak Dev University, Regional Campus
Jalandhar, Punjab, India
jyoteesh@gmail.com

Abstract— MANET provides network among the mobile nodes without any fixed infrastructure.These mobile nodes do not require any centralized control or infrastructure for communication. These nodes do not require any centralized control or infrastructure for communication. The stable routing is very critical task due to the infrastructure less environment in MANET. The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes. Preemptive DSR(PDSR) is the modified version of DSR. The main objective of this paper is to analyze and compare the performance of DSR and Temporarily Ordered Routing Algorithm (TORA) of MANET. It discusses the effect of variation in number of nodes and average speed on protocol performance.

Keywords- Mobile Ad Hoc Networks, DSR, TORA.

INTRODUCTION

A wireless network is any type of computer network that uses wireless data connections for connecting network nodes. A wireless ad hoc network is a decentralized type of wireless network. The network is ad hoc because it does not rely on a pre existing infrastructure , [4] such as routers in wired networks or access points in managed (infrastructure) wireless networks. Instead, each node participates in routing by forwarding data for other nodes, so the determination of which nodes forward data is made dynamically on the basis of network connectivity. Ad hoc networks can use flooding for forwarding data. Routing in ad-hoc networks has been a challenging task, since the wireless networks came into existence. The main reason behind the nature of ad-hoc networks is that the network topologies cannot be static. Due to this non-static nature of Ad-hoc networks various performance challenges [5] for routing protocols have been raised. Mobile Ad-hoc Network usually has a dynamic nature and has limited bandwidth. The key issues in MANET are routing and the growth of mobile networks is very fast due to their highly dynamic distributed nature.

Quality of Service (QoS)

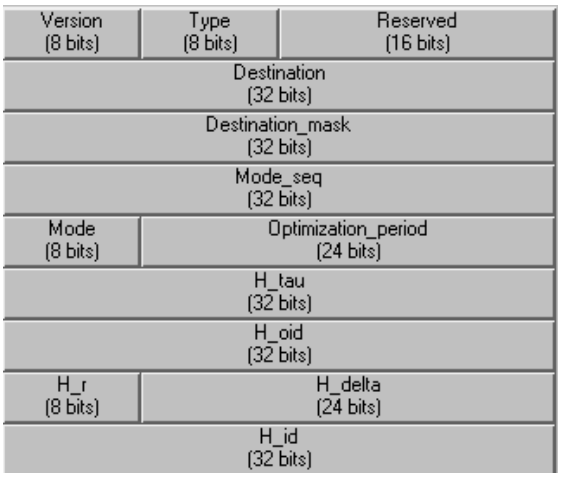
In mobile ad-hoc networks Quality of Service requires assimilation of vertical-layer or cross-layer. QoS is an intricate task for the developers, as the topology of an ad hoc network will regularly vary. [7] Reserving resources and sustaining a certain quality of service, while the network condition constantly changes, is very challenging. Performance characteristics such as jitter, delay, bandwidth, packet loss probability measures the quality of service to be achieved. The quality of the link remains varying during the connectivity time of ad-hoc networks, [8] thereby the quality parameters are more difficult to be maintained.

Temporally Ordered Routing Algorithm (TORA)

TORA [1] is a routing algorithm. It is mainly
used in MANETs to enhance scalability. TORA is an adaptive routing protocol. It is therefore used in multi-hop networks[1]. A destination node and a source node are set. TORA [2] establishes scaled routes between the source and the destination using the Directed Acyclic Graph
(DAG) built in the destination node. This algorithm does not use shortest path theory, it is considered secondary. TORA builds optimized routes using four messages. Its starts with a Query message followed by an Update message then clear message and finally Optimizations message. TORA is a distributed algorithm so that routers only need to maintain knowledge about their neighbors. TORA also maintains states on a per destination basis like other distance-vector algorithms. It uses a mix of reactive and proactive routing. Sources initiate route requests in a reactive mode. At the same time, selected destinations may start proactive
operations to build traditional routing tables. Usually, routes to these destinations may be consistently or frequently required, such as routes to gateways or servers.

TORA supports multiple path routing. It is said that TORA minimizes the communication overhead associated with adapting to network topology changes [1]. The reason is that TORA keeps multiple paths and it does not need to discover a new route when the network topology changes unless all routes in the local route cache fail. Hence, the trade off is that since multiple paths are used, routes may not always be the shortest ones. TORA is a complex algorithm compared with DSR. It has four operations: (i) creating routes, (ii) maintaining routes, (iii) erasing routes, and (iv) optimizing routes.

When a source needs to establish a connection to a destination, it sends a Query packet identifying the destination for which the route is requested. The destination, or a node that has a valid route to it, responds by sending an Update packet containing its "height" with respect to the destination. Nodes receiving the Update set a greater value to their height, thus forming a directed graph from the source to the destination. When the next-hop link towards a destination has been broken, the node sets its height to be a local maximum compared to the heights of its neighbors and transmits an Update.

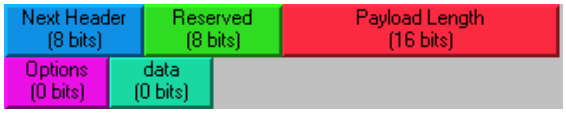


Packet format: TORA

Dynamic Source Routing (DSR)

The Dynamic Source Routing (DSR) [3] protocol is a distance-vector routing protocol for MANETs. When a node generates a packet to a certain destination and it does not have a known route to that destination, this node starts a route discovery procedure. Therefore, DSR is a reactive protocol. One advantage of DSR is that no periodic routing packets are required. DSR also has the capability to handle unidirectional links. Since DSR discovers routes on-demand, it may have poor performance in terms of control overhead in networks with high mobility and heavy traffic loads. Scalability is said to be another disadvantage of DSR [4], because DSR relies on blind broadcasts to discover routes. There are two main operations in DSR, [5] route discovery and route maintenance which work together to allow nodes to discover and maintain source routes to arbitrary destinations in the network. DSR has a unique advantage by virtue of source routing. As the route is part of the packet itself, routing loops, either short – lived or long –

lived, cannot be formed as they can be immediately detected and eliminated. This property opens up the protocol to a variety of useful optimizations. a node initiates a route discovery process through the network. This process is completed once a route is determined or all possible permutations have been examined. Once a route has been established, it is maintained by a route maintenance process until either the destination becomes inaccessible Long every path from the source or until the route is no longer desired.



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Packet format: DSR

TABLE 1.COMPARISON OF THE TWO ROUTING PROTOCOLS

Parameters	DSR	TORA
Method	Unicast	Broadcast
Broadcast	Full	Local
Routing Topology	Full	Reduced
Source	Yes	No
Update information	Route error	Node height

SIMULATION MODEL DESIGN AND IMPLEMENTATION

The network has 100 mobile wireless workstations placed as shown in figure 2. In this research, work four different scenarios were considered.

1. All the stations in this scenario generating Ad-Hoc Routing Parameter on the base of DSR Protocol.

2. All the stations in this scenario generating Ad-Hoc Routing Parameter on the base of TORA Protocol.

3. All the stations in this scenario generating Ad-Hoc Routing Parameter on the base of TORA Protocol. And both the traffic types i.e. http and ftp are considered.

4. All the stations in this scenario generating Ad-Hoc Routing Parameter on the base of DSR Protocol. And both the traffic types i.e. http and ftp are considered.

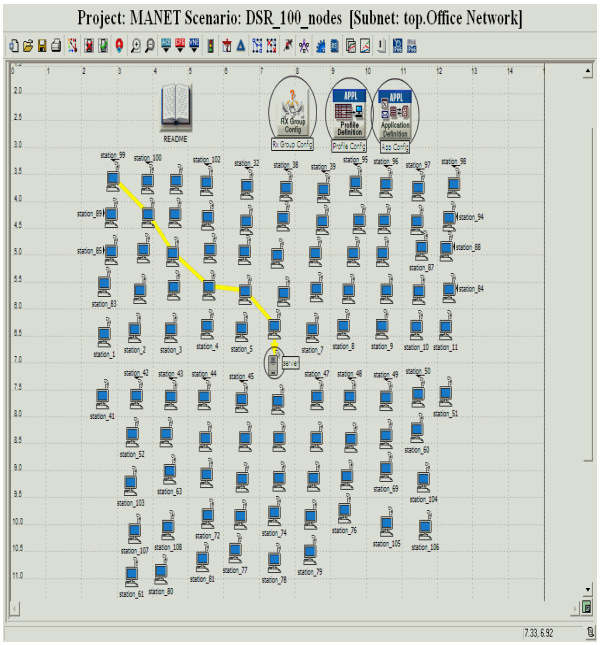

Figure 1. Simulation Network Model with DSR_100 mobile nodes.

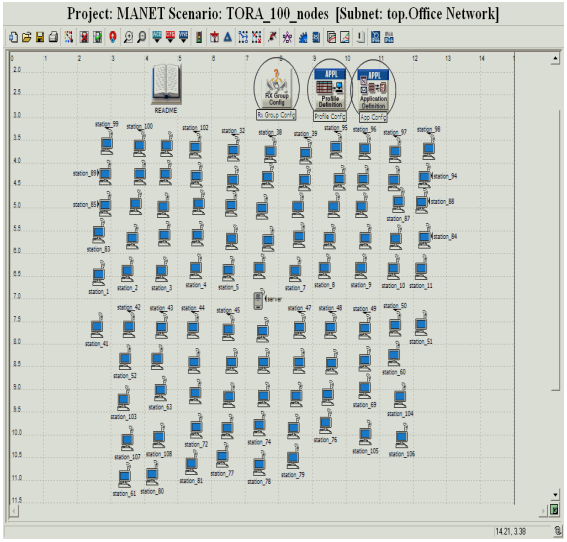

Figure 2. Simulation Network Model with TORA_100 mobile nodes.

Figure 1: Simulation Network Model consists with 100 mobile nodes. network shows a 100 node DSR network. All nodes in the network are configured to run DSR and multiple HTTP sessions.The Rx Group Config node is added to speed up the simulation. It is configured to eliminate all receivers that are over 1500 meters away The DSR routes are exported so that it can be displayed on the network

Figure 2: Simulation Network Model consists with 100 mobile nodes. network shows a 100 node TORA network. All nodes in the network are configured to run TORA and multiple HTTP sessions.The Rx Group Config node is added to speed up the simulation. It is configured to eliminate all receivers that are over 1500 meters away The TORA routes are exported so that it can be displayed on the network.

Step 1: Since here we are comparing different scenario so create one full scenario.
Step 2: Apply above mentioned parameter to the entire scenario is same.
Step 3: Create different Scenario with duplicate scenario and changes in according to applying concept.

It is configured to eliminate all receivers that are over 1500 meters away. This network shows a 100 node DSR and TORA network. All nodes in the network are configured to run DSR and TORA multiple HTTP sessions.

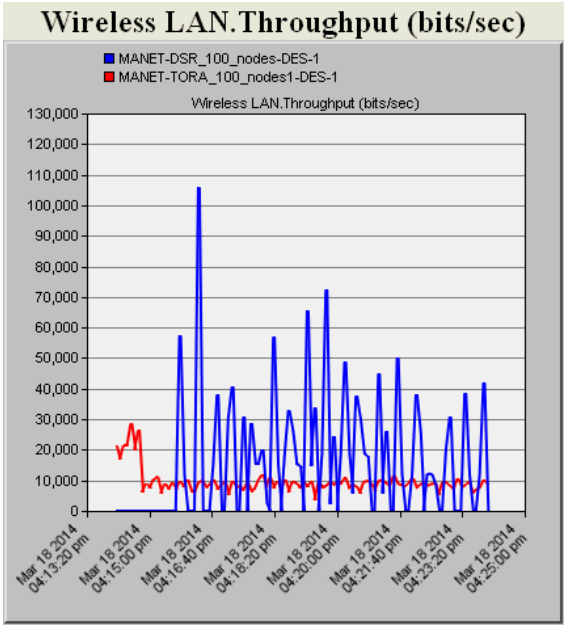

Figure 3 Comparision of throughput of in DSR and TORA with and with traffic type as HTTP .

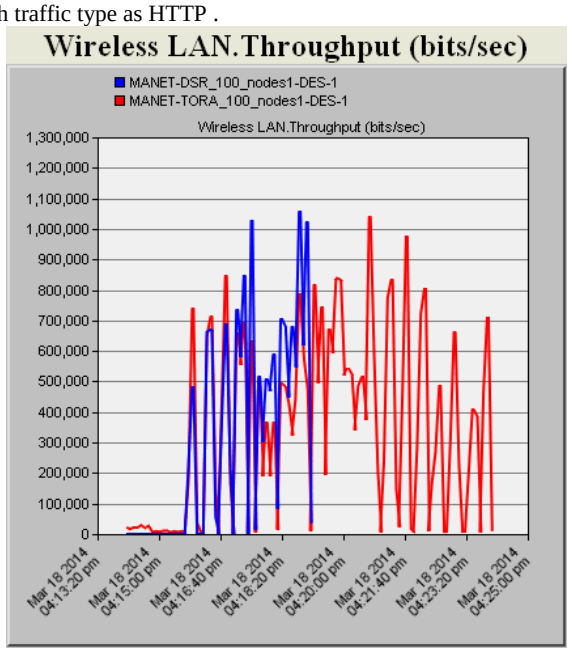

Figure 4. Comparision of throughput of in DSR and TORA with and with traffic type as HTTP and FTP .

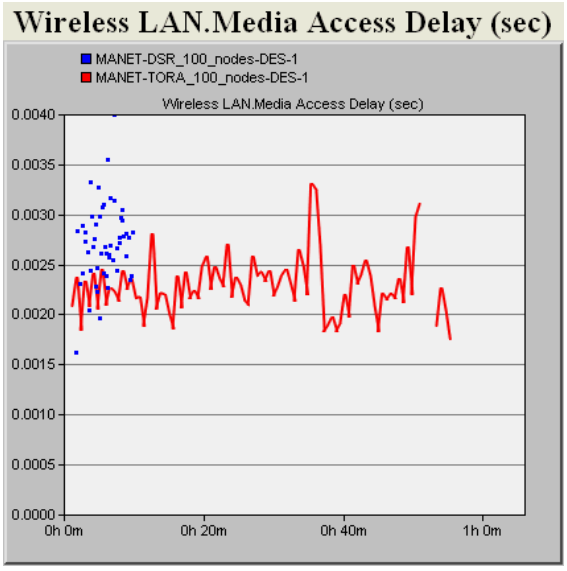

Figure 5. Comparision of mac delay in DSR and TORA with and with traffic type as HTTP.

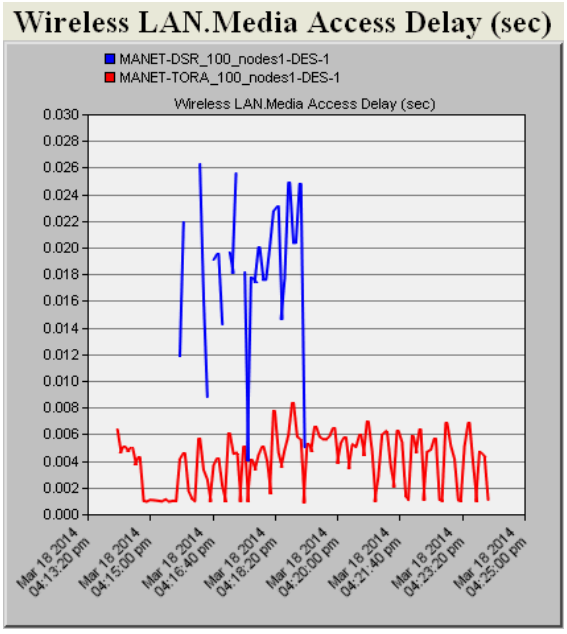

Figure 6. Comparision of mac delay in DSR and TORA with and with traffic type as HTTP and FTP

Results Analysis

a. Throughput (bits/sec)

Represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLANnodes of the network.

In the case when both the traffic types are considered, throughput is higher in TORA than DSR. In case of only http the throughput of DSR is Greater than TORA, as in TORA firstly the throughput varies and then it becomes constant.

b. Media Access Delay(sec)

It includes total of queuing and contention delays of the data.

When both the protcols are compared on the basis of Media Access Delay in case of http traffic type DSR offers higher rate of delay as compared to TORA. In the case when both the traffic types are considered, mac delay is higher in TORA than DSR.

CONCLUSION

In this research paper, an attempt has been made to focus on the performance analysis of routing protocols viz. DSR and TORA with the working diagrams on the basis of two QoS parameters i.e. media access delay and throughput. The focus of the study is on these parameters in our future research work and effort will be made to increase the performance of these routing protocols in Ad-hoc networks by taking more QoS parameters.

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Spiral Shaped Directional Coupler

Iqbal Singh
GNDU RC GURDASPUR
email: iqbalpannu90@gmail.com

Rasneet Kaur Chauhan
GNDU RC GURDASPUR
email:shenam.chauhan@gmail.com

S.B. Rana
Assistant Professor
GNDU RC Gurdaspur

Abstract*— *A directional coupler inserted in a transmission line allows precise monitoring of the RF energy flow in that line while introducing minimum perturbation of the main line signal in the sampling process. Merrimac directional couplers are precision devices carefully designed for monitoring incident and reflected power. A CMOS power amplifier (PA) with a compact spiral-shaped directional coupler for a mobile UHF RF identification (RFID) reader is proposed here, and its output power combiner and the directional coupler are implemented using an integrated passive device process. The two-chip solution not only enables a CMOS PA to be highly efficient, but also allows the directional coupler and the power combiner to be mounted in a compact standard package. A polar transmitter is implemented using the CMOS PA with the directional coupler to verify the operation of the proposed configuration for a UHF RFID reader. Measurements indicate that the CMOS PA with the directional coupler transmits 27.3 dBm of output with 44.6% of power-added efficiency and that the implemented polar transmitter satisfies the required UHF RFID reader specifications.

I. INTRODUCTION

A Directional Coupler is a four-port wave guide junction as shown in Fig. 1. It Consists of a primary waveguide1-2 & a secondary waveguide 3-4.When all the ports are terminated in their characteristics impedances, there is free transmission of power without reflection, between port 1 and 2, and there is no transmission of power between port 1 and 3 or between port 2 and 4 because no coupling exists between these two pairs of ports.

II. CHARACTERSTICS

A figure below illustrates the basic operation of a directional coupler:

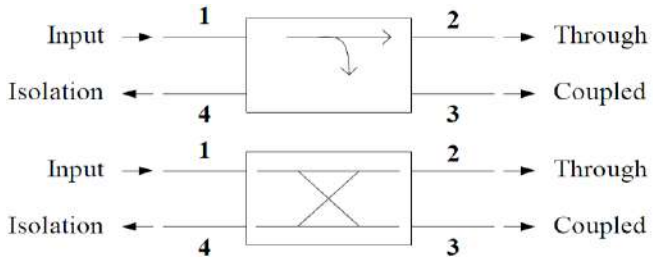

Fig. 1. The operations of a directional coupler

The arrows indicate the assumed directions of time average power flow. We can deduce the operation of this network directly from the S matrix, assuming all the ports are matched. Of course, the directional coupler is not ideal and the S matrix above is only approximately realized in practice where S11 is not exactly 0. A directional coupler has four ports, defined as: P1 input, where we inject the input signal, P2 through which the output signal appears, P3 coupled, where we obtain a sample of the input signal and isolated and P4 , which must be completed by a 50 ohm load (if that were the characteristic impedance of the component) if we want, that works comply with all specifications. The performance of directional couplers is characterized by the following three values.

A. Coupling (C)

This parameter gives its name to the component and is considered the most critical in deciding their use and application in an electronic system. The power comes through P1, is distributed in a controlled form that leaves between P2,P3, P4 and lost along the way, between the doors, P1-P2 , P1-P3 and P1-P4 . Coupling is defined as the ratio between the power coming through P1 and P3, for a given frequency (we will see that this ratio varies with frequency that we apply to the entry, though we support the constant power for all frequencies). Being a constant value for a defined carrier, if the input power increases P1, it is an increase predictive of the power in the coupled port P3 and vice versa. We notice that in this way, we can determine the value of the input power, using the information of power in the coupled port, without having to disconnect anything in the circuit. It is expressed in decibels.

$$C(\mathrm{dB}) = 10\log_{10}\frac{P1}{P3} = -20\log_{10}|S12| \quad (1)$$

B. Directivity (D)

The directivity is the ability to transfer power from the input port to the coupled port and to reject the power that can come from the through port, due to reflections on this. From our point of view, it is a parameter that defines the technical and technological quality of directional coupler.

$$D(\mathrm{dB}) = 10\log_{10}\frac{P3}{P4} = -20\log_{10}\frac{|S31|}{|S14|} \quad (2)$$

A reduced value of directivity has a bad influence, not only limiting the accuracy of a reflect meter, but also with the capacity of producing deviations in the coupled power level from a coupler. These phenomena appear even in the case of a minor discrepancy on the through line.

In general terms, we cannot make a direct measurement of the directivity of a coupler due to the fact that it involves a

low-level signal, which has the possibility of being camouflaged by the coupled power from a reflected wave on the through arm.

C. Losses

When we are speaking about looses, we fundamentally must consider two types of loses: those of insertion, that are taking place in the road from P1 to P2 , and those of coupling, that are taking place in the road from P1 to P3 . We do not take into consideration those produced because of the reflection and those dissipative because they are less significant comparing with the first mentioned ones.

1) Insertion Loss

This kind of loses take place in the main road between the entrance and the exit of the directional coupler P1-P2 and are related with the transmission environment that join the two ports.

III. Applications of Directional Couplers

A. A CMOS Power Amplifier with Inte- grated-Passive-Device Spiral-Shaped Directional Coupler for Mobile UHF RFID Reader

MOBILE UHF RF identification (RFID) systems, which cover the frequency range from 860 to 960 MHz, utilize Electromagnetic (EM) waves to transfer and receive data between a tag and a reader for identification. The integrated reader in a mobile terminal first activates passive tags, detects backscattered signals from the tags, and then recognizes the properties of the objects that contain the tags.

One of the essential issues of mobile UHF RFID is to integrate the reader system in a single chip using a CMOS process. CMOS technology enables reader system integration with high yield, low power consumption, and low manufacturing cost. Fig. 2.1 shows a conventional UHF RFID reader front-end system that has the direct-conversion transceiver structure. According to previous papers [1]–[3], it is possible to integrate a large portion of a UHF RFID reader system in a single CMOS chip, excluding an antenna, a power amplifier (PA), and a circulator.

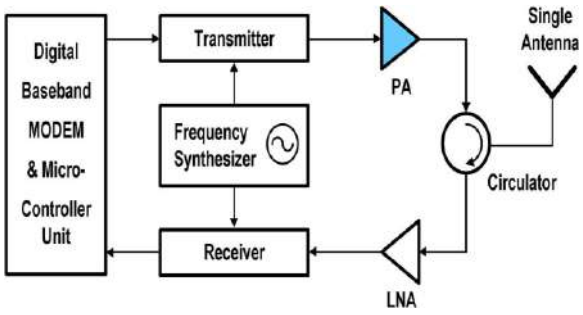

Fig. 2. Conventional UHF RFID reader RF front-end.

Although improved performances of CMOS PAs have recently been reported in the literature [11] & [13], it is still unavoidable that a fully integrated PA using standard CMOS technology undergoes a degra-dation of power-added efficiency (PAE) due to the low quality factor of on-chip inductors or transformer which are fabricated on a moderately conductive Si substrate, especially when those passive components are used for output impedance matching circuits.

Typically, in the case of a UHF RFID reader, an external PA based on a compound semiconductor process, such as InGaP/GaAs, has been used in the form of a discrete module.

In this paper, we propose a spiral-shaped directional coupler in a compact size using an integrated passive device (IPD) process on a highly resistive substrate. An IPD directional coupler for a UHF RFID reader was first introduced in [6] with notable isolation at 912 MHz using lumped components, but that confi-guration suffers from insertion loss higher than 1.1 dB. The compact directional coupler proposed in this work demonstrates relatively low insertion loss and sufficient isolation through the frequency range of interest for UHF RFID reader applications. Additionally, a power combiner for a CMOS PA is also implemented on the same IPD substrate and it combines the output power from two pairs of a differ-ential PA and performs an impedance transformation from low impedance to 50.

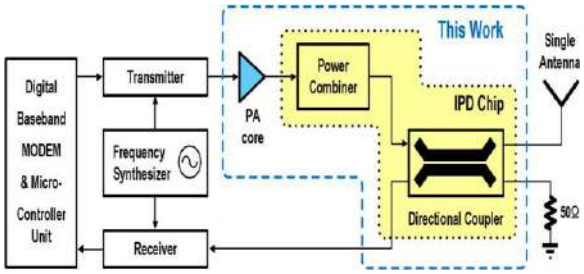

Fig.4 Proposed UHF RFID reader RF front-end.

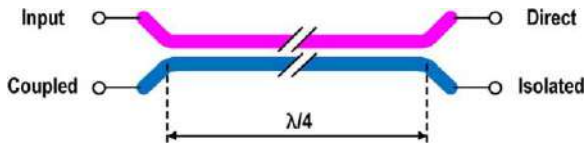

Fig. 3. Conventional parallel-coupled directional coupler

The proposed RF front-end architecture for a UHF RFID reader is shown in Fig. 2. It is revealed that the overall PAE of a CMOS PA can be improved by designing the output matching components using the IPD process [7]–[10].

The designed module, including the CMOS PA and the compact directional coupler, is applied to a polar transmitter for a UHF RFID reader, as described in [10] and [11], for the further improvement of power efficiency of the overall transmitter.

Fig. 5 shows the diagram of a conventional direct-ional coupler. It is a four-port component with input, direct, coupled, and isolated ports. Usually, it is appl-ied to a UHF RFID reader with the input port connec-ted to the output of a PA, the direct port connected to an antenna, the isolated port connected to the input of a receiver, and the coupled port connected to a 50- resistor. To be adopted in UHF RFID reader applications, the following parameters should be considered for a directional coupler: coupling factor,

insertion loss, and isolation. The coupling factor of a directional coupler in an RFID reader is related to the required noise figure of the receiver and the insertion loss of the transmitter between the PA and antenna. According to the link budget analysis in [1], the minimally detectable power level at a reader antenna is about 53 dBm for the recognition distance of 1 m between a tag and a reader when the one-tone output power is 27 dBm. Since the link loss in the air for 1 m range is about 31 dB, the received power at a tag is about 4 dBm, which is much higher than the sensitivity of a state-of-the-art tag (18.5 dBm) [5]. The output power of the modulated backscattering signal from a tag is 22 dBm, provided that the tag antenna gain is 2 dB and the reflected power from a tag antenna is only 1%.

It is assumed that the noise bandwidth of the receiver is 120 kHz at the data rate of 40 kb/s and that the minimum required signal-to-noise(SNR_{min}) ratio is 11.6 dB for the bit error rate of 0.001% [1], [12]. The reported performance in previous literature for UHF RFID readers [1]–[4] shows that the noise figure of the receiver chain at the normal mode is about 32–39 dB. Consequently, the coupling factor, should be more than 19.6 dB, according to the worst case estimation of the noise figure at a receiver. However, as the coupled power of a directional coupler is increased, the insertion loss from the input port to the direct port through the forward path is also increased.

To decrease the insertion loss, it is desirable to lower the coupling factor of a directional coupler so long as the required noise figure of the receiver is not so tight to meet the sensitivity specification of a UHF RFID reader. The high isolation of a directional coupler for a UHF RFID reader is necessary for the suppression of transmitter power leakage into the receiver. Based on the linearity analysis in [4], it is recommended to make $P1_{dB}$the of the receiver at least 6 dB larger than the power of the self-jammer so as to prevent the receiver from desensitization or blocking conditions. Therefore, if the output power of the PA is 27 dBm, the maximum allowable power level at the input port of the receiver against the blocking condition caused by self-jamming is 2 dBm and the required isolation of the directional coupler for the UHF RFID reader should be higher than 25 dB for the entire UHF RFID band.

IV. SPIRAL-SHAPED DIRECTIONAL COUPLER

Fig. 6 illustrates the layout diagram and circuit symbol of the proposed directional coupler. Its structure is derived from a transmission-line transformer with two spirally coupled lines. The design procedure is as follows. First, two metal lines inter wound with a small space between the primary side and the secondary side are placed and the S-parameters are extracted by EM simulation. Second, a capacitor C1 is inserted between the two ports of the secondary side. Next, an additional capacitor C2 is inserted between the two ports of the primary side to form an *LC* tank. Finally, additional shunt capacitors (C3and C4) for impedance matching are placed, as shown in Fig. 6(b).

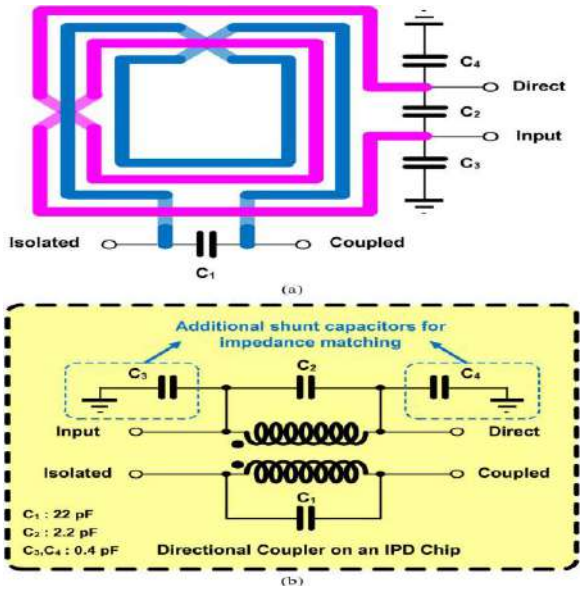

Fig. 4. Proposed spiral-shaped directional coupler. (a) Simplified layout. (b) Schematic symbol.

The S-parameters of the directional coupler are extracted from a four-port vector network analyzer with the effect of the metal lines on the test fixture de-embedded. The bond-wire effect is included in the measurement of the performance for the consideration of the actual implementation of the entire CMOS transceiver with a PA. The measured S–parameters are shown in Fig.7. The -parameter designations are as follows: S_{11} stands for the return loss of the input port, S_{21} is the main-line insertion loss, S_{31} is the isolation, and S_{41} is the coupling factor.

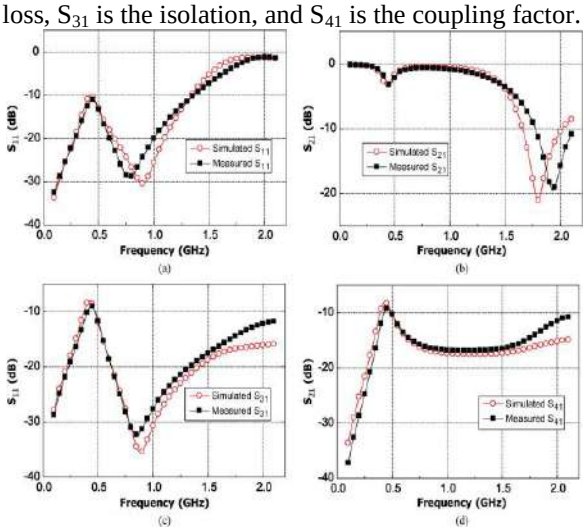

Fig. 5. Measured S-parameters of the spiral-shaped directional coupler. (a)S_{11} (b) S_{21} (c) S_{31} (d) S_{41}

The insertion loss in the range of interest is from 0.69 to 0.76 dB, the isolation from 32.3 to 29.1 dB, and the coupling factor from 16.4 to 16.7 dB. It is estimated that the discrepancies, including the up-shift of the null position near the second harmonic around 1.7–1.9 GHz in S_{21}, may be attributed to the underestimation of the coupling coefficient

of the transformer in the designed directional coupler during the EM simulation.

V. CONCLUSION

A CMOS PA with a spiral-shaped directional coupler has been proposed and implemented on a single IPD chip with a power combiner of a CMOS PA. This CMOS PA works as a polar transmitter for UHF RFID reader applications. Including directional coupler loss, the implemented CMOS PA demonstrates a peak output power of 27.3 dBm and a peak PAE of 44.6% in the UHF RFID band. This work suggests an eligible solution for integrating an entire UHF RFID reader transceiver CMOS IC including a PA and an additional IPD chip for a power combiner and a directional coupler in a compact standard package with high power efficiency.

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VARIOUS ISSUES IN DATA MINING

Rasneet Kaur Chauhan	Iqbal Singh	Sharanjit Singh
Department of CSE	Department of ECE	Assistant Professor
GNDU RC Gurdaspur	GNDU RC Gurdaspur	GNDU RC Gurdaspur

Abstract— Data mining (sometimes called data or knowledge discovery) is the process of analyzing data from different perspectives and summarizing it into useful information - information that can be used to increase revenue, cuts costs, or both. Data mining software is one of a number of analytical tools for analyzing data. It allows users to analyze data from many different dimensions or angles, categorize it, and summarize the relationships identified. Technically, data mining is the process of finding correlations or patterns among dozens of fields in large relational databases. In this paper, we have discussed about various data mining techniques, technologies used and some of the issues also.

Index Terms- Data Mining, Decision Trees , Stream Data Mining, Security.

I. INTRODUCTION

The objective of data mining is to identify valid, novel, potentially useful, and understandable correlations and patterns in existing data. In the popular mind, data mining refers to finding answers from a company's data that an analyst or executive has not thought to ask. The reality is not quite that grand. Data mining, however, does create both data and insights that add to the knowledge of the organization.

Data mining can be bottom up (explore raw facts to find connections) or top down (search to test hypotheses). Bottom up data mining tries to find hypotheses that can then be tested. This approach is different from that used in most information systems studies, where the investigator states the hypothesis and then tests it by using t-tests or other statistical techniques.

Usually, data mining leads to steady incremental changes rather than major transformations.It is a process of extracting hidden predictive information from large databases. It is a powerful new technology to help companies focus on the most important information in their data warehouses. Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions[1].

For a commercial business, the discovery of previously unknown statistical patterns or trends can provide valuable insight into the function and environment of their organization. Data-mining techniques can generally be grouped into two categories: predictive method and descriptive method.

A. Descriptive method

It a method of finding human interpretable patterns that describe the data. Data mining in this case is useful to group together similar documents returned by search engine according to their context.

B. Predictive method

In this method, we can use some variables to predict unknown or future values of other variable. It is used to predict whether a newly arrived customer will spend more than 100$ at a department store.

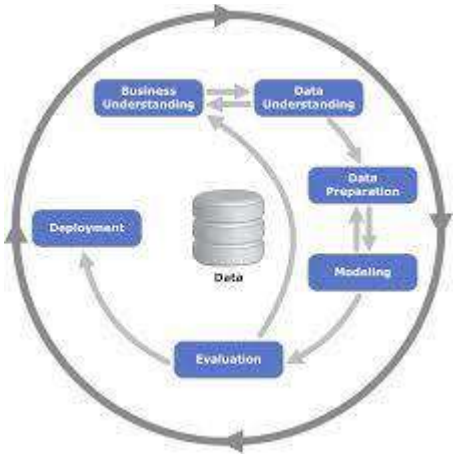

Fig. 1. Data Mining

II. CAPABILITIES OF DATA MINING

Data mining is primarily used today by companies with a strong consumer focus - retail, financial, communication, and marketing organizations. It enables these companies to determine relationships among "internal" factors such as price, product positioning, or staff skills, and "external" factors such as economic indicators, competition, and customer demographics. And, it enables them to determine the impact on sales, customer satisfaction, and corporate profits. Finally, it enables them to "drill down" into summary information to view detail transactional data[2]. 0

With data mining, a retailer could use point-of-sale records of customer purchases to send targeted promotions based on an individual's purchase history. By mining demographic data from comment or warranty cards, the retailer could develop products and promotions to appeal to specific customer segments[3].

Oracle Data Mining (ODM) provides powerful data mining functionality as native SQL functions within the

Oracle Database. Oracle Data Mining enables users to discover new insights hidden in data and to leverage investments in Oracle Database technology. With Oracle Data Mining, you can build and apply predictive models that help you target your best customers, develop detailed customer profiles, and find and prevent fraud. Additionally, Oracle Data Mining models can be included in SQL queries and embedded in applications to offer improved business intelligence.

A. Oracle Data Miner

The free Oracle data miner GUI is an extension to Oracle SQL Developer that enables data analysts to work directly with data inside the database, explore the data graphically, build and evaluate multiple data mining models, apply Oracle Data Mining models to new data and deploy Oracle Data Mining's predictions and insights throughout the enterprise. Oracle Data Miner work flows capture and document the user's analytical methodology and can be saved and shared with others to automate advanced analytical methodologies

For businesses, data mining is used to discover patterns and relationships in the data in order to help make better business decisions. Data mining can help spot sales trends, develop smarter marketing campaigns, and accurately predict customer loyalty.

B. Various uses of Data Mining

Specific uses of data mining include:

- Market segmentation - Identify the common characteristics of customers who buy the same products from your company. ●Customer churn - Predict which customers are likely to leave your company and go to a competitor.
- Fraud detection - Identify which transactions are most likely to be fraudulent.
- Direct marketing - Identify which prospects should be included in a mailing list to obtain the highest response rate.
- Interactive marketing - Predict what each individual accessing a Web site is most likely interested in seeing.
- Market basket analysis - Understand what products or services are commonly purchased together; e.g., beer and diapers.
- Trend analysis - Reveal the difference between a typical customer this month and last.

Data mining technology can generate new business opportunities by:

- Automated prediction of trends and behaviors Data mining automates the process of finding predictive information in a large database. Questions that traditionally required extensive hands-on analysis can now be directly answered from the data. A typical example of a predictive problem is targeted marketing. Data mining uses data on past promotional mailings to identify the targets most likely to maximize return on investment in future mailings. Other predictive problems include forecasting bankruptcy and other forms of default, and identifying segments of a population likely to respond similarly to given events.
- Automated discovery of previously unknown patterns Data mining tools sweep through databases and identify previously hidden patterns. An example of pattern discovery is the analysis of retail sales data to identify seemingly unrelated products that are often purchased together. Other pattern discovery problems include detecting fraudulent credit card transactions and identifying anomalous data that could represent data entry keying errors.

Using massively parallel computers, companies dig through volumes of data to discover patterns about their customers and products. For example, grocery chains have found that when men go to a supermarket to buy diapers, they sometimes walk out with a six-pack of beer as well. Using that information, it's possible to lay out a store so that these items are closer [4].

III. WORKING OF DATA MINING

While large-scale information technology has been evolving separate transaction and analytical systems, data mining provides the link between the two. Data mining software analyzes relationships and patterns in stored transaction data based on open-ended user queries. Several types of analytical software are available: statistical, machine learning, and neural networks.

A. Relationships in data Mining

Generally, any of four types of relationships are sought:

- Classes: Stored data is used to locate data in predetermined groups. For example, a restaurant chain could mine customer purchase data to determine when customers visit and what they typically order. This information could be used to increase traffic by having daily specials.
- Clusters: Data items are grouped according to logical relationships or consumer preferences. For example, data can be mined to identify market segments or consumer affinities.
- Associations: Data can be mined to identify associations. The beer-diaper example is an example of associative mining.
- Sequential patterns: Data is mined to anticipate behavior patterns and trends. For example, an outdoor equipment retailer could predict the likelihood of a backpack being purchased based on a consumer's purchase of sleeping bags and hiking shoes.

B. Data Mining Elements

Data mining consists of five major elements:

- Extract, transform, and load transaction data onto the data warehouse system.
- Store and manage the data in a multidimensional database system.
- Provide data access to business analysts and information technology professionals.
- Analyze the data by application software.
- Present the data in a useful format, such as a graph or table.

C. *Data Mining Levels*

Different levels of analysis are available:

- Artificial neural networks: Non-linear predictive models that learn through training and resemble biological neural networks in structure.
- Genetic algorithms: Optimization techniques that use processes such as genetic combination, mutation, and natural selection in a design based on the concepts of natural evolution.
- Decision trees: Tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decision tree methods include Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID) . CART and CHAID are decision tree techniques used for classification of a dataset. They provide a set of rules that you can apply to a new (unclassified) dataset to predict which records will have a given outcome. CART segments a dataset by creating 2-way splits while CHAID segments using chi square tests to create multi-way splits. CART typically requires less data preparation than CHAID.
- Nearest neighbor method: A technique that classifies each record in a dataset based on a combination of the classes of the k record(s) most similar to it in a historical dataset (where k 1). Sometimes called the k-nearest neighbor technique.
- Rule induction: The extraction of useful if-then rules from data based on statistical significance.
- Data visualization: The visual interpretation of complex relationships in multidimensional data. Graphics tools are used to illustrate data relationships.

IV. TECHNOLOGICAL INFRASTRUCTURE

Today, data mining applications are available on all size systems for mainframe, client/server, and PC platforms. System prices range from several thousand dollars for the smallest applications up to $1 million a terabyte for the largest. Enterprise-wide applications generally range in size from 10 gigabytes to over 11 terabytes, NCR has the capacity to deliver applications exceeding 100 terabytes. There are two critical technological drivers:

- Size of the database: the more data being processed and maintained, the more powerful the system required.
- Query complexity: the more complex the queries and the greater the number of queries being processed, the more powerful the system required.

Relational database storage and management technology is adequate for many data mining applications less than 50 gigabytes. However, this infrastructure needs to be significantly enhanced to support larger applications. Some vendors have added extensive indexing capabilities to improve query performance. Others use new hardware architectures such as Massively Parallel Processors (MPP) to achieve order-of-magnitude improvements in query time. For example, MPP systems from NCR link hundreds of high-speed Pentium processors to achieve performance levels exceeding those of the largest supercomputers[5].

V. RESEARCH ISSUES

Many issues still need to be addressed to reap quality knowledge from the sophisticated algorithms available for data mining. For example:

-How good is the quality of discovered knowledge?

-Does the same method always produce the same results?

-Are different tools required for different application domains?

-What factors affect tool performance?

- How do human cognitive factors affect the results?

A. *Developing a Unifying Theory of Data Mining*

Several respondents feel that the current state of the art of data mining research is too “ad-hoc.” Many techniques are designed for individual problems, such as classification or clustering, but there is no unifying theory. However, a theoretical framework that unifies different data mining tasks including clustering, classification, association rules, etc., as well as different data mining approaches (such as statistics, machine learning, database systems, etc.), would help the field and pro- vide a basis for future research. There is also an opportunity and need for data mining researchers to solve some longstanding problems in statistical research, such as the age-old problem of avoid- ing spurious correlations. This is sometimes related to the problem of mining for “deep knowledge,” which is the hidden cause for many observations[6].

B. *Scaling Up for High Dimensional Data and High Speed Data Streams*

One challenge is how to design classifiers to handle ultra-high dimensional classification problems. There is a strong need now to build useful classifiers with hundreds of millions or billions of features, for applications such as text mining and drug safety analysis. Such problems often begin with tens of thousands of features and also with interactions between the features, so the number of implied features gets huge quickly.

One important problem is mining data streams in extremely large databases (e.g. 100 TB). Satellite and computer network data can easily be of this scale. However, today's data mining technology is still too slow to handle data of this scale. In addition, data mining should be a continuous, online process, rather than an occasional one-shot process. Organizations that can do this will have a decisive advantage over ones that do not. Data streams present a new challenge for data mining researchers.

One particular instance is from high speed network traffic where one hopes to mine information for various purposes, including identifying anomalous events possibly indicating attacks of one kind or another. A technical problem is how to compute models over streaming data, which accommodate changing environments from which the data are drawn. This is the problem of "concept drift" or "environment drift." This problem is particularly hard in the context of large streaming data. How may one compute models that are accurate and useful very efficiently? Hence, incremental mining and effective model updating to maintain accurate modeling of the current stream are both very hard problems[3].

C. Stream data mining

Stream data refers to the data that flows into and out of the system like streams. Stream data is usually in vast volume, changing dynamically, possibly infinite, and containing multi-dimensional features. Typical examples of such data include audio and video recording of scientific and engineering processes, computer network information, web click streams, and satellite data flow. Such data cannot be handled by traditional database systems, and moreover, most systems may only be able to read a data stream once in sequential order. This poses great challenges on effective mining of stream data.

First, the techniques to summarize the whole or part of the data streams are studied, which is the basis for stream data mining. Such techniques include sampling, load shedding and sketching techniques, synopsis data structures , stream cubing , and clustering.

D. Mining Complex Knowledge from Complex Data

One important type of complex knowledge is in the form of graphs. Recent research has touched on the topic of discovering graphs and structured patterns from large data, but clearly, more needs to be done.

Another form of complexity is from data that are non-i.i.d. (independent and identically distributed). This problem can occur when mining data from multiple relations. In most domains, the objects of interest are not independent of each other, and are not of a single type. We need data mining systems that can soundly mine the rich structure of relations among objects, such as interlinked Web pages, social networks, metabolic networks in the cell, etc.

Yet another important problem is how to mine non-relational data. A great majority of most organizations' data is in text form, not databases, and in more complex data formats including Image, Multimedia, and Web data. Thus, there is a need to study data mining methods that go beyond classification and clustering. Some interesting questions include how to perform better automatic summarization of text and how to recognize the movement of objects and people from Web and Wireless data logs in order to discover useful spatial and temporal knowledge.

E. Distributed Data Mining and Mining Multi-Agent Data

The problem of distributed data mining is very important in network problems. In a distributed environment (such as a sensor or IP network), one has distributed probes placed at strategic locations within the network. The problem here is to be able to correlate the data seen at the various probes, and discover patterns in the global data seen at all the different probes. There could be different models of distributed data mining here, but one could involve a NOC that collects data from the distributed sites, and another in which all sites are treated equally. The goal here obviously would be to minimize the amount of data shipped between the various sites — essentially, to reduce the communication overhead[8].

In distributed mining, one problem is how to mine across multiple heterogeneous data sources: multi-database and multi-relational mining.

F. Data Mining for Biological and Environmental Problems

Many researchers that we surveyed believe that mining biological data continues to be an extremely important problem, both for data mining research and for biomedical sciences. An example of a research issue is how to apply data mining to HIV vaccine design. In molecular biology, many complex data mining tasks exist, which cannot be handled by standard data mining algorithms. These problems involve many different aspects, such as DNA, chemical properties, 3D structures, and functional properties.

G. Data Mining Process-Related Problems

Important topics exist in improving data-mining tools and processes through automation, as suggested by several researchers. Specific issues include how to auto- mate the composition of data mining operations and building a methodology into data mining systems to help users avoid many data mining mistakes. If we automate the different data mining process operations, it would be possible to reduce human labor as much as possible. One important issue is how to automate data cleaning. We can build models and find patterns very fast today, but 90 percent of the cost is in pre-processing (data integration, data cleaning, etc.) Another issue is how to perform systematic documentation of data cleaning. Another issue is how to combine visual interactive and automatic data mining techniques together. He observes that in many applications, data mining goals and tasks cannot be fully specified, especially in exploratory data analy- sis. Visualization helps to learn more about the data and define/refine the data mining tasks[2].

H. Security, Privacy, and Data Integrity

Several researchers considered privacy protection in data mining as an important topic. That is, how to ensure the users' privacy while their data are being mined. Related to

this topic is data mining for protection of security and privacy. One respondent states that if we do not solve the privacy issue, data mining will become a derogatory term to the general public.

I. Dealing with Non-Static, Unbalanced and Cost-Sensitive Data

An important issue is that the learned models should incorporate time because data is not static and is constantly changing in many domains. Historical actions in sampling and model building are not optimal, but they are not chosen randomly either. If this process continues, then each time a new model is learned, its training set has been created using a different selection bias. Thus, a challenging problem is how to correct the bias as much as possible.

Furthermore, the costs of different outcomes are dependent on the examples; for example, the false negative cost of direct marketing is directly proportional to the amount of a potential donation. Traditional methods for obtaining these costs relied on sampling methods. However, sampling methods can easily give biased results.

VI. CONCLUSION

In this paper, we try to inspect the issues in the data mining, which may be a main disturbance to the operation of it. Due to the mobility and open media nature, the data mining are much more prone to all kind of security risks, such as information loss, privacy issues, streaming high quality data . As a result, the security needs in data mining are much higher than those in the storage techniques.

First we introduce the basics of data mining techniques. We then discuss some typical and dangerous issues in the data mining techniques, most of which are caused by the characteristics of the mobile ad hoc networks such as Dealing with Non-Static, Unbalanced and Cost-Sensitive Data, Security, Privacy, and Data Integrity and many more. The existence of these challenges has made it necessary to find some effective security solutions and eliminate all these issues from data mining.

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SECURITY ISSUES IN CLOUD COMPUTING

Rasneet Kaur Chauhan
Department of CSE
GNDU RC Gurdaspur

Er. Iqbal Singh
Department of ECE
GNDU RC Gurdaspur

Sharanjit Singh
Assistant Professor
GNDU RC Gurdaspur

Abstract— Cloud Computing is a flexible, cost-effective, and proven delivery platform for providing business or consumer IT services over the Internet. However, cloud Computing presents an added level of risk because essential services are often outsourced to a third party, which makes it harder to maintain data security and privacy, support data and service availability, and demonstrate compliance. Cloud Computing leverages many technologies (SOA, virtualization, Web 2.0); it also inherits their security issues, which we discuss here, identifying the main vulnerabilities in this kind of systems and the most important threats found in the literature related to Cloud Computing and its environment as well as to identify and relate vulnerabilities and threats with possible solutions.

Index Terms- Cloud Computing, Security, Service models,

I. INTRODUCTION

Cloud Computing appears as a computational paradigm as well as a distribution architecture and its main objective is to provide secure, quick, convenient data storage and net computing service, with all computing resources visualized as services and delivered over the Internet. The cloud enhances collaboration, agility, scalability, availability, ability to adapt to fluctuations according to demand, accelerate development work, and provides potential for cost reduction through optimized and efficient computing.

Typical cloud computing providers deliver common business applications online that are accessed from another Web service or software like a Web browser, while the software and data are stored on servers. Most cloud computing infrastructures consist of services delivered through common centers and built-on servers. It can also be viewed as a centralized system. Clouds often appear as single points of access for consumers' computing needs. Commercial offerings are generally expected to meet quality of service (QoS) requirements of customers, and typically include service level agreements (SLAs).

Organizations use the Cloud in a variety of different service models (SaaS, PaaS, IaaS) and deployment models (Private,Public, Hybrid). There are a number of security issues/concerns associated with cloud computing but these issues fall into two broad categories: Security issues faced by cloud providers (organizations providing software platform or infrastructure as a service via the cloud) and security issues faced by their customers. In most cases, the provider must ensure that their infrastructure is secure and that their clients' data and applications are protected while the customer must ensure that the provider has taken the proper security measures to protect their information.

Security concerns relate to risk areas such as external data storage, dependency on the "public" internet, lack of control, multi-tenancy and integration with internal security. Compared to traditional technologies, the cloud has many specific features, such as its large scale and the fact that resources belonging to cloud providers are completely distributed, heterogeneous and totally virtualized.

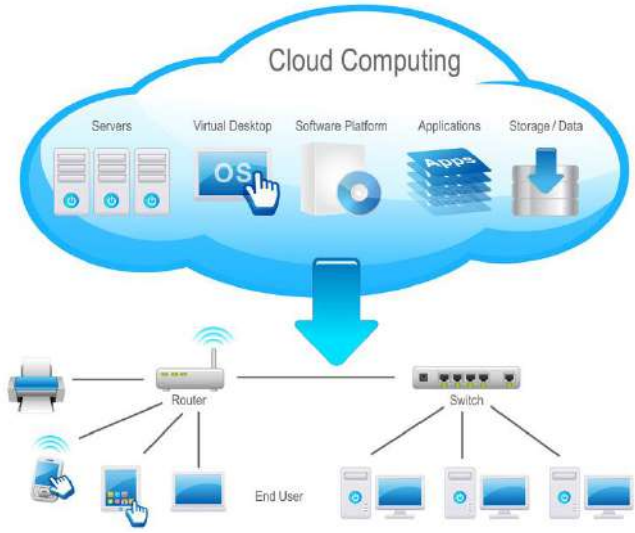

Fig. 1. Cloud computing

Traditional security mechanisms such as identity, authentication, and authorization are no longer enough for clouds in their current form . Security controls in Cloud Computing are, for the most part, no different than security controls in any IT environment. However, because of the cloud service models employed, the operational models, and the technologies used to enable cloud services, Cloud Computing may present different risks to an organization than traditional IT solutions. Unfortunately, integrating security into these solutions is often perceived as making them more rigid [4].

A cloud solution provider must ensure that customers will continue to have the same security and privacy controls over their applications and services, provide evidence to customers that their organization are secure and they can meet their service-level agreements, and that they can prove compliance to auditors.

II. CLOUD COMPUTING "AS A SERVICE"

The cloud services are delivered in three forms viz. Infrastructure-as-a-Service (IaaS), Software-as-a-Service (SaaS) and Platform-as-a-Service (PaaS). The services are

delivered over the network by using Web browser, Web Based mail etc. The term cloud computing may be applied to products categorized broadly into three categories:

A. *Software-as-a-Service (SaaS)*

Applications served over the Internet, like Google Docs. In this multitenant service model, the consumers use application running on a cloud infrastructure. The cloud infrastructure including (servers, OS, Network or application etc.) is managed and controlled by the service provider with the user not having any control over the infrastructure. Some of the popular examples are SalesForce.com, NetSuite, IBM, Microsoft and Oracle etc.

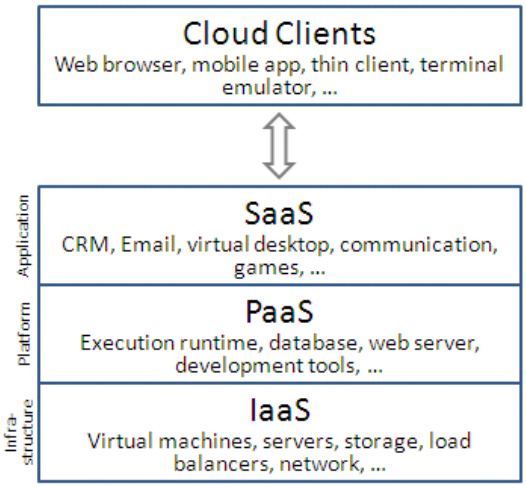

Fig. 2. Service Models

B. *Platform-as-a-Service (PaaS)*\

Specialized APIs for building applications on the Internet, like Google App Engine or Force.com. With this model, the provider delivers to user a platform including all the systems and environments comprising software development life cycle viz. testing, deploying, required tools and applications. The user does not have any control over network, servers, operating system and storage but it can manage and control the deployed application and hosting environments configurations. Some popular PaaS providers are GAE, Microsoft's Azure etc.

C. *Infrastructure-as-a-Service (IaaS)*

Low-level services for basic storage and computing. A variety of services are now available: Amazon Web Services, Windows Azure, and now Google Compute Engine. In this service model, the provider delivers to user the infrastructure over the internet. With this model, the user is able to deploy and run various software's including system or application softwares. The user has the ability to provision computing power, storage, networks. The consumers have control over operating systems, deployed applications, storage and partial control over network. The consumer has no control over underlying infrastructure. Some important IaaS providers are GoGrid, Flexiscale, Joyent, Rackspace etc.

III. DEPLOYMENT MODELS

Cloud systems can be deployed in four forms viz. private, public, community and hybrid cloud as per the access allowed to the users and are classified as follows:

A. *Private cloud:*

This deployment model is implemented solely for an organization and is exclusively used by their employees at organizational level and is managed and controlled by the organization or third party. The cloud infrastructure in this model is installed on premise or off premise. In this deployment model, management and maintenance are easier, security is very high and organization has more control over the infrastructure and accessibility.

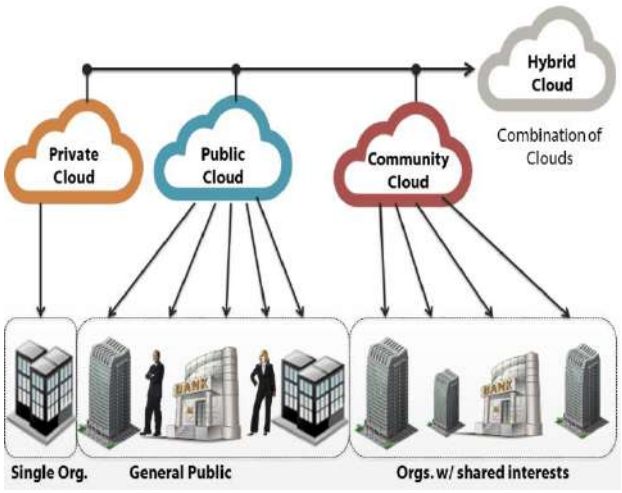

Fig. 3. Deployment Models

B. *Public cloud*

This deployment model is implemented for general users. It is managed and controlled by an organization selling cloud services. The users can be charged for the time duration they use the services. Public clouds are more vulnerable to security threats than other cloud models because all the application and data remains publicly available to all users making it more prone to malicious attacks. The services on public cloud are provided by proper authentication.

C. *Community cloud*

This cloud model is implemented jointly by many organizations with shared concerns viz. security requirements, mission, and policy considerations. This cloud is managed by one or more involved organizations and can be managed by third party. The infrastructure may exist on premise to one of the involved organization or it may exist off premise to all organizations.

D. *Hybrid cloud:*

This deployment model is an amalgamation of two or more clouds (private, community, public or hybrid). The participating clouds are bound together by some standard protocols. It enables the involved organization to serve its needs in their own private cloud and if some critical needs

(cloud bursting for load-balancing) occur they can avail public cloudservices.

IV. BUISNESS BENEFITS AND RISKS

A. Benefit

It has following business benefits:

1) Optimized server utilization

As most enterprises typically underutilise their server computing resources, cloud computing will manage the server utilisation to the optimum level.

2) Cost saving

IT infrastructure costs are almost always substantial and are treated as a capital expense (CAPEX). However if the IT infrastructure usually becomes an operating expense (OPEX). In some countries, this results in a tax advantage regarding income taxes. Also, cloud computing cost saving can be realised via resource pooling.

3) Dynamic scalability

Many enterprises include a reasonably large buffer from their average computing requirement, just to ensure that capacity is in place to satisfy peak demand. Cloud computing provides an extra processing buffer as needed at a low cost and without the capital investment or contingency fees to users.

4) Shortened development life cycle

Cloud computing adopts the service-orientates architecture (SOA) development approach which has significantly shorter development life cycle that that required by the traditional development approach. Any new business application can be developed online, connecting proven functional application building blocks together.

5) Reduced time for implementation

Cloud computing provides the processing power and data storage as needed at the capacity required. This can be obtained in near-real time instead of weeks or months that occur when a new business initiative is brought online in a traditional way[3].

B. Risks

For all the above benefits of cloud computing, it also incorporates some unique and notable technical or business risk as follows:

1) Data location

Cloud computing technology allows cloud servers to reside anywhere, thus the enterprise may not know the physical location of the server used to store and process their data and applications. Although from the technology point of view, location is least relevant, this has become a critical issue for data governance requirements. It is essential to understand that many Cloud Service Providers (CSPs) can also specifically define where data is to be located.

2) Commingled data

Application sharing and multi-tenancy of data is one of the characteristics associated with cloud computing. Although many CSPs have multi-tenant applications that are secure, scalable and customisable, security and privacy issues are still often concerns among enterprises. Data encryption is another control that can assist data confidentiality[4].

3) Cloud security policy / procedures transparency

Some CSPs may have less transparency than others about their information security policy. The rationalisation for such difference is the policies may be proprietary. As a result, it may create conflict with the enterprise's information compliance requirement. The enterprise needs to have detailed understanding of the service level agreements (SLAs) that stipulated the desired level of security provided by the CSPs.

4) Cloud date ownership

In the contract agreements it may state that the CP owns the data stored in the cloud computing environment. The CSP may demand for significant service fees for data to be returned to the enterprise when the cloud computing SLAs terminates[5].

5) Lock-in with CSP's proprietary application programming interfaces (APIs)

Currently many CSPs implement their application by adopting the proprietary APIs. As a result, cloud services transition from one CSP to another CSP, has become extremely complicated, time-consuming and labour-intensive.

6) Compliance requirements

Today's cloud computing services, can challenge various compliance audit requirements currently in place. Data location; cloud computing security policy transparency; and IAM, are all challenging issues in compliance auditing efforts. Examples of the compliance requirement including privacy and PII laws are Payment Card Industry (PCI) requirements; and financial reporting laws.

7) Disaster recovery

It is a concern of enterprises about the resiliency of cloud computing, since data may be commingled and scattered around multiple servers and geographical areas. It may be possible that the data for a specific point of time cannot be identified. Unlike traditional hosting, the enterprise knows exactly where the location is of their data, to be rapidly retrieved in the event of disaster recovery. In the cloud computing model, the primary CSP may outsource capabilities to third parties, who may also outsource the recovery process. This will become more complex when the primary CSP does not ultimately hold the data.

V. SECURITY ISSUES IN CLOUD COMPUTING

A. Secure data transfer

All of the traffic travelling between your network and whatever service you're accessing in the cloud must traverse the Internet. Make sure your data is always travelling on a secure channel; only connect your browser to the provider via a URL that begins with "https." Also, your data should always be encrypted and authenticated using industry standard protocols, such as IPsec (Internet Protocol Security), that have been developed specifically for protecting Internet traffic.

B. Secure software interfaces

The Cloud Security Alliance (CSA) recommends that you be aware of the software interfaces, or APIs, that are used to interact with cloud services. "Reliance on a weak set of

interfaces and APIs exposes organizations to a variety of security issues related to confidentiality, integrity, availability, and accountability," says the group in its Top Threats to Cloud Computing document. CSA recommends learning how any cloud provider you're considering integrates security throughout its service, from authentication and access control techniques to activity monitoring policies.

C. Secure stored data

Your data should be securely encrypted when it's on the provider's servers and while it's in use by the cloud service. Few cloud providers assure protection for data being used within the application or for disposing of your data. Ask potential cloud providers how they secure your data not only when it's in transit but also when it's on their servers and accessed by the cloud-based applications. Find out, too, if the providers securely dispose of your data, for example, by deleting the encryption key.

D. User access control

Data stored on a cloud provider's server can potentially be accessed by an employee of that company, and you have none of the usual personnel controls over those people. First, consider carefully the sensitivity of the data you're allowing out into the cloud. Second, ask providers for specifics about the people who manage your data and the level of access they have to it.

E. Data separation

Every cloud-based service shares resources, namely space on the provider's servers and other parts of the provider's infrastructure. Hypervisor software is used to create virtual containers on the provider's hardware for each of its customers. But CSA notes that "attacks have surfaced in recent years that target the shared technology inside Cloud Computing environments." So, investigate the compartmentalization techniques, such as data encryption, the provider uses to prevent access into your virtual container by other customers.

F. Resource Management and Scheduling

Resources management can be consider at various levels viz. hardware, software, virtualization level with performance, security and other parameters being dependent on the management and provisioning of resources. It includes the management of memory, disk space, CPU's, cores, threads, VM images, I/O devices etc. Resource provisioning can be defined as allocation and management of resources to provide desired level of services. Job scheduling is a type of resource provisioning where jobs execution order is established in order to finish job execution to optimize some parameters viz. turnaround time, response time, waiting time, throughput and resource utilization. Since cloud computing is a combination of many existing technologies, existing job scheduling strategies are eligible to be applied on cloud system. The major issues of job scheduling on cloud systems are partitioning of jobs into parallel tasks, interconnection network between clouds or processors, assigning priority to jobs and selection of processors or cloud to allocate the job(s), job flexibility, level of pre-emption supported, workload characteristics, memory allocation, task execution monitoring, recourse allocation requirements, topology, nature of the job, effect of existing load, load balancing, parallelism, job migration policy, redundant Resource selection, synchronization, communication overheads, job pre processing requirements etc. The job scheduling is one of critical process that must be decided very carefully and wrong selection of scheduling strategy can lead to devastating effect on performance leading to wastage of resources while falling to meet Quality of Service (QoS) standards.

G. Trust

Trust between the Service provider and the customer is one of the main issues cloud computing faces today. There is no way for the customer to be sure whether the management of the Service is trustworthy, and whether there is any risk of insider attacks. This is a major issue and has received strong attention by companies. The only legal document between the customer and service provider is the Service Level Agreement (SLA). This document contains all the agreements between the customer and the service provider; it contains what the service provider is doing and is willing to do. However, there is currently no clear format for the SLA, and as such, there may be services not documented in the SLA that the customer may be unaware that it will need these services at some later time.

H. Legal Issues

There are several regulatory requirements, privacy laws and data security laws that cloud systems need to adhere to. One of the major problems with adhering to the laws is that laws vary from country to country, and users have no control over where their data is physically located.

I. Confidentiality

Confidentiality is preventing the improper disclosure of information. Preserving confidentiality is one of the major issues faced by cloud systems since the information is stored at a remote location that the Service Provider has full access to. Therefore, there has been some method of preserving the confidentiality of data stored in the cloud. The main method used to preserve data confidentiality is data encryption; however encryption brings about its own issues, some of which are discussed later.

J. Authenticity (Integrity and Completeness)

Integrity is preventing the improper modification of information. Preserving Integrity, like confidentiality is another major issue faced by cloud systems that needs to be handled, and is also mainly done by the use of data encryption.

In a common database setup, there would be many users with varying amount of rights. A user with a limited set of rights might need to access a subset of data, and might also want to verify that the delivered results are valid and complete (that is, not poisoned, altered or missing anything

A common approach to such a problem is to use digital signatures; however, the problem with digital signatures is that not all users have access to the data superset, therefore they cannot verify any subset of the data even if they're provided with the digital signature of the superset; and too many possible subsets of data exist to create digital signatures for each.

Recently, researchers have tried to find solutions to this problem. The primary proposal is to provide customers with the superset's signature and some metadata along with the query results. This metadata (called verification objects) lets customers fill in the blanks of the data which they don't have access to and be able to validate the signature. There are two primary variations of this idea, one based on Merkle trees and the other based on signature aggregation

VI. ENCRYPTION

The main method used for ensuring data security in the cloud is by encryption. Encryption seems like the perfect solution for ensuring data security; however, it is not without its drawbacks. Encryption takes considerably more computational power, and this is multiplied by several factors in the case of databases .Cryptography greatly affects database performance because each time a query is run, a large amount of data must be decrypted; and since the main operation on a database is running queries, the amount of decryption operations quickly become excessive. There are several approaches developed to handle data encryption; each having its own compromises and downsides, some provide better security mechanisms, and some focus on facilitating more operations to the customers. Some of these methods are mentioned below:

A. Early Approaches

Early approaches have used extensions to the query language that simply applied encryption before writing to the database and apply decryption before reading from the database.

B. Querying Encrypted Data

There are several methods that were proposed to handle Querying of Encrypted Data. In the proposed scheme, several cryptographic methods were used to encrypt the data in each cell of each table to be stored in the cloud. When a user needs to query this data, the query parameters are encrypted and checked against the stored data. No data decryption is done in the cloud, thus protecting the Authenticity and integrity of the information. When the results of the query is returned (in encrypted form) to the user, the user then decrypts the data and uses it.This scheme also has significant improvements for select queries over previous related schemes.

C. Key Management

Since encryption is the main method used to ensure data security, naturally we would be faced with the problem of key management. The encryption keys cannot be stored on the cloud, therefore the customer must manage and control a key management system for any cryptographic method used. For simple encryption schemas such as the "Early Approaches" described above, there might not be a problem since a single encryption and decryption key can be used for the entire system. However, almost any real database requires a more complex system .This simple system to manage keys might even have to take the form of a small database which would have to be a secure local database; which again, may defeat the purpose of moving the original database to the cloud. Clearly Key Management is a real problem for cloud systems using encryption, and recent research has been done on using two-level encryption which allows the Key Management system to be stored in the cloud. This scheme is efficient, and may be the solution to the Key Management problems cloud systems faces; however, it hasn't yet been applied specifically to database encryption.

D. Data Splitting

Some methods have been developed that serve as alternatives to encryption. These methods are generally faster than encryption but have their own drawbacks. Data Splitting was initially developed by Divyakant Agrawal and his colleagues. The idea is to split the data over multiple hosts that cannot communicate with each other; only the owner who can access both hosts can collect and combine the separate datasets to recreate the original. This method is extremely fast compared to encryption but it requires at least two separate, but homogeneous service providers.

VII. CONCLUSION

Cloud Computing offers some incredible benefits: unlimited storage, access to lightening quick processing power and the ability to easily share and process information; however, it does have several issues, and most of them are security related. Cloud systems must overcome many obstacles before it becomes widely adopted, but it can be utilized right now with some compromises and in the right conditions. People can enjoy the full benefits of cloud computing if we can address the very real security concerns that comes along with storing sensitive information in databases scattered around the internet.

One of the main problems that need to be addressed is coming up with a clear and standardized format for the Service Level Agreement (SLA), a format that fully documents all of the services, what services and processes would be provided by the service provider to back up its assurances. When customers have the right level of expectations and the insecurities are deemed manageable, cloud computing as a whole will gain ground and take hold as usable technology.

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Cloud Computing and Its Barriers: A Review

Bhawna Dhawan
M.Tech Research Scholar
Deptt. of CSE
PTU Regional Centre
ACET, Amritsar
Bhawnadhawan52@gmail.com

Amarpreet Singh
Associate Professor
Deptt. of CSE
ACET, Amritsar
amarmandeep@yahoo.com

Anjali Arora
B.Tech Research Scholar
anjali.arora65@gmail.com

Abstract

Due to fast development of technologies and success of internet, computers and their resources have become cheaper and more available. This technological trend has enabled the one new term called cloud computing, in which resources resides on general network to use by multiple users and from different locations. It is also known as on-demand fashion. Today, companies are more interested in cloud computing and shifting their core business on to cloud platforms. Cloud computing just wants an internet connection with a web browser. Cloud computing is a new technology as new paradigm for hosting and delivering services over the internet. In this paper, we will analyze the barriers of cloud computing. There are various obstacles which a company has to face while using cloud computing paradigm. Every coin has two sides, as we can say that's with cloud computing too. So it has positive as well as negative impact on organization. Cloud computing is browser and platform independent. So, it can be easily access by all the operating systems and all browsers. This paper addresses the model of cloud computing with its appropriate services, modes and barriers.

Keywords:-model, modes, services and barriers

I. INTRODUCTION

Cloud computing is providing utility oriented IT services to worldwide users. It enables the multiple users to use the resources which resides on different locations from the multiple locations. The idea behind cloud computing is that the whole working environment resides in the web browser. The client must have an internet connection. Cloud computing also includes the term called cloud operating system.

This facility allows you to access your personal desktop, with your application, music, my pictures etc. from any location just after the login through a normal internet browser. No matter where you are, just login into your cloud operating system and have access to your resources. Cloud computing offers you various services namely – software as a services (SAAS)-end users, platform as a services (PAAS)-application developers, infrastructure as a services (IAAS)-network architects. In cloud computing, resources are sharable. The motive of cloud computing is to provide all the functionality across the network. Cloud computing is achieving gradual popularity, concerns with the security, issues of the organized data. Cloud computing fulfilled the rational trends of technologies and other types of computing.

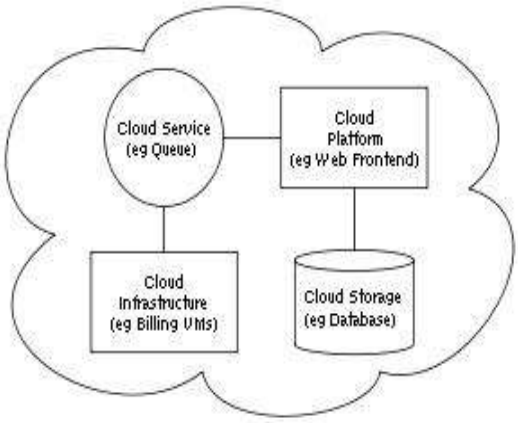

Fig1:-Cloud Computing Model [15]

II. EVOLUTION OF CLOUD COMPUTING

The concept of cloud computing started in late 1980's after the concept of grid computing. Grid computing may be described as the virtual pool of the resources but it is different from cloud computing. Grid computing focuses on running multiple computers in parallel to solve an individual problem but cloud computing focuses on multiple resources such as computing resources to serve a "services" to the end user. Cloud computing is the big term in IT industry. Its gradual popularity is pushing its concept at very high place including academies, colleges, and schools for a better world. Schools and colleges are organizing the workshops on the cloud computing. Cloud computing came into existence in 2008,with the practice of providing remote access to computing functions through network dates back to the main frame time sharing system of 1960's and 70's.

Table I Cloud growth [1]

Year	2008	2012	Growth
Cloud IT spending	$16B	$42B	27%
Total IT spending	$383B	$494B	7%
Total cloud spending	$367B	$452B	4%
Cloud total spend	4%	9%	

This survey conducted by International Data Corporation (IDC). This shows the evolution of cloud computing to be implemented or accepting in IT industry [1].

III. CLOUD COMPUTING AND ITS DEFINITIONS

Cloud computing is the combination of two words which is used to share a variety of computing concepts that involve a large number of computers connected through a network such as internet. The concept of cloud computing is very simple but vast. In this, vast computing resources will reside in a remote location (rather than your personal computer) and we can easily connect and use them as needed. In simple language or in layman language, we describe the cloud computing is a pool of sharable resources, which can access from any location where we may or may not reach. As a beginning, here is a definition "an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be access from any connected device over the internet. There are various examples of cloud computing such as Amazon's elastic computing cloud(EC2) offering computational services that enable people to use cpu cycles without buying more computers or storage services such as those provided by Amazon's simple storage service(S3) or companies like nirvanix allowing organizations to store data and documents without adding a single on-site server and Saas companies like salesforce.com delivering CRM services, so client can manage customer information without installing specialized software.

Different definitions by different authors:

According to Chris Poelker,

Cloud computing is simply a way to describe how organizations can take some or all of their existing IT infrastructure and operations and hand it over to someone else[2].

According to Reuven Cohen,

The simplest explanation for cloud computing is describing it as, "Internet centric software". This new cloud computing software model is a shift from the traditional single tenant approach to software development to that of a scalable, multi-tenant,multi-platform, multi-network and global[2].

According to Forester Research,

"A pool of abstracted, highly scalable and managed compute infrastructure capable of hosting end – customer applications and billed by consumption."[3]

According to Thomas Weisel,

"A hosted infrastructure model that delivers abstracted IT resources over the internet."[3]

According to James Urquhart,

"Cloud Computing describes a system architecture period. This particular architecture assumes nothing about the physical location, internal composition or ownership of its component parts."[3]

A report from the university of California Berkeley summarized the various aspects of cloud computing are- "[5] The illusion of infinite computing resources; [6] the elimination of an upfront commitment by cloud users; and [7] the ability to pay for use…as needed.. "[10]. The national institute of standards and technology (NIST) describes it as "…a pay- per-use model for enabling available, convenient, on demand network access to a shared pool of configurable computing resources [4].

Cloud computing is the mixture of pre-existing technologies. It is the assemblage of the various technologies. The technologies co-relate with each other to make a replica of eco-system for cloud computing. Cloud computing full blown at different rates and in different context.

IV. MODES OF CLOUD COMPUTING-(Deployment model)

Cloud computing mainly has three types such as Public cloud, private cloud and hybrid cloud.

- Public Cloud: - It is also known as external cloud. It describes cloud computing in the traditional sense. In this computing infrastructure is hosted by cloud vendor at the vendor premises and it can be shared by various organizations such as Amazon, Google, Microsoft, Sales force.[9-10]

- Private Cloud: - It is only made for particular organizations. This type of cloud having the computing infrastructure is dedicated to a particular organization and not shared with other organizations i.e. external access is denied. This cloud is more expensive and more secure when compared to the public cloud. There are various examples of private clouds such as HP, Data center, IBM, Sun, Oracle, 3-tera.[9-10]

- Hybrid Cloud: - It is the assembling of public as well as private cloud. Some organizations may host critical applications on private cloud where as less security concerns on public cloud. Uses of public and private cloud together are called hybrid cloud. The best example to describe this is Banking System.[9-10]

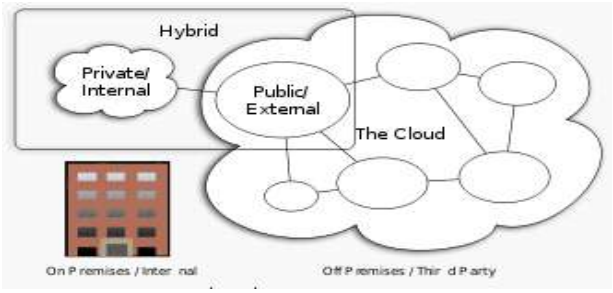

Fig2:- Modes of cloud computing[15]

V. SERVICES OFFERED BY CLOUD COMPUTING- (Service Model)

Cloud computing offer their services according to three fundamental models or services such as infrastructure as a service (IAAS), Platform as a Service(PAAS) and software as a service(SAAS) where IAAS provides more abstraction.

- Software as a Service (SAAS) - End users: - This type of service also known as on-demand software where users are provided with access to application software. Users don't need to worry about the installation, set-up and running of the application and running of the application. Egs; - Google Apps, Microsoft office 365. It provides software as a service. In this, operating environment largely irrelevant, fully functional applications provided. It uses the web to deliver applications that are managed by a third-party vendor and whose interface is accessed on the client's side [11].

- Platform as a Service (PAAS) - This service provides the computing platforms to the users which typically contain operating system, programming language, execution environment, database, web server, etc. Egs; AWS elastic Beanstalk, Heroku, Google App engine. It allows the creation of web applications quickly and easily and without the complexity of buying and maintaining the software and infrastructure underneath it [11].

- Infrastructure as a Service (IAAS):- This service provides computing infrastructure, physical or virtual machine disk image library, block and file based storage, firewalls, load balancers, IP addresses virtual

local area networks etc to the user. Examples: Amazon EC2, Window Azure, Rack space. In this, resources are distributed as a service. It allows for dynamic scaling [11].

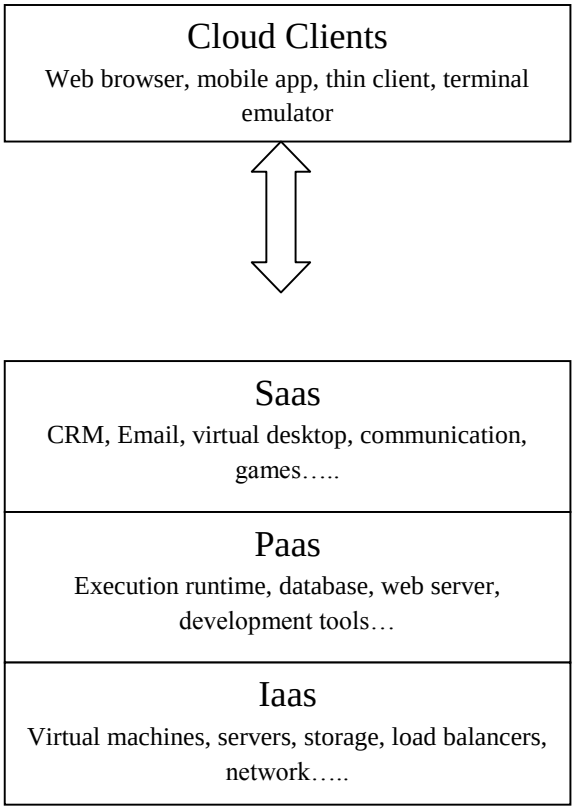

Fig3:-Services of Cloud Computing [15]

VI. BARRIERS:-

Though cloud computing is the huge concept, but it has some barriers too. There are some barriers which has been faced by cloud computing.

- Security: - Cloud computing provides us the platform where we can work from any location. It is the new computing model which deals with an uncertainty about the security at all levels. In this, users do not have control of or know where their data is being stored.[12]
  .
- Interoperability :- A universal set of standards and interfaces have not yet been defined , resulting in a significance risk of vendor lock-in.[12]
- Control: - the amount of control that the user has over the cloud environment varies greatly. Users do not have complete control on their data storage.[12]
- Open Access:- Cloud computing provides an open access to computing power.[4]
- Reliability: - Many cloud infrastructures leverage commodity hardware that is known to fail unexpectedly. Clouds don't run of existing cloud infrastructures sometimes [12].
- Platform or language independent: - Sometimes some cloud environments support specific platforms and particular languages [12].
- Backup: - In cloud computing environment, clouds does not provide any kind of back up of your data [1].
- Privacy: - In public cloud, cost is less, but privacy is also less. In this environment, cloud does not provide privacy because here data exchange between the customers through the internet openly [1].
- Trust: - Trust is the big characteristic to be considered in any business. But cloud computing is failed to make trust between consumer and provider [1-13].
- Talent shortage: - There are not enough knowledgeable personnel to deal with the cloud-based systems. People are not too familiar with this concept. They does not know anything about cloud computing. Cloud computing demands high technical skills, networking skills etc. but in some areas, people does not know about this concept [14].

- Budget Road locks: - The budget limitation is the serious problem in cloud computing. IT departments have static budgets that must be closely managed [14].

- Infrastructure Readiness: - Every company has its own standards and infrastructure. So, there is the possibility of mismatching of the infrastructure between consumer and provider [14].

- Stable Internet: - In cloud computing, you must have the stable internet connection to work efficiently. But in villages, where villagers does not have internet connection. Cloud computing demands the stable connection.

- Slow than local software: - Cloud computing provides less speed rather than other technologies. In this you work from another location on another location. So, transferring of files and accessing of files consumes time. So, sometimes it provides less speed.
- Integrity: - Cloud computing does not provide the concept of integrity. It does not give the sureity of delivery of integrated data. Third party can modify the data through some specific techniques

VII. CONCLUSION

Cloud computing is latest development that provides easy access to high performance computing resources and storage infrastructure through web services. Cloud computing delivers the potential for efficiency, cost savings and improved performance to governments, organizations, private and individual users. It also offers a unique opportunity to developing countries to get closer to developed countries. The paper addresses the issues that can arise during the deployment of cloud services.

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Various Aspects and Challenges In Cloud Computing-A Review

Simarjeet Kaur
M.Tech Research Scholar
Deptt. of CSE
ACET, Amritsar
Simarjeet01_khehra@yahoo.com

Amarpreet Singh
Associate Professor
Deptt. of CSE
ACET, Amritsar
amarmandeep@yahoo.com

Abstract- Cloud computing is a process that provide different types of services to the user that provides flexible, reliable, exception free data. It is also used to increase the performance of the users system. Various aspects and challenges are two different considerations which play crucial role. In this paper addresses various aspects of cloud and challenges in the cloud computing environment.

KEYWORDS: IAAS, SAAS, PAAS, SLA

I. INTRODUCTION

In today's world, Cloud Computing plays an important role. It is big area of storage large amount of data and information. Cloud computing basically is used to transfer the services over the network.some features of the cloud computing is similar as a previous computing model i.e. multiprocessing model. Multiprocessing means multiple users perform different process with single computer system. Mostly due to presence of large amount of data also increase the chance of attack. Today cloud computing process is a tool that takes care of large data storage and the save us from spending a lot on extra hardware devices for storage the data. Cloud computing challenges also play an important role. Different types of challenges we can discuss for improve the cloud computing process in future.[1]

II. SECURITY ISSUES IN CLOUD COMPUTING

A. Cloud Deployment Models

In cloud computing model, various types of services provided. Those different services ranges are high or low according to requirements. In the cloud computing model three different types of cloud deployment model are used as shown in Fig. a [1]

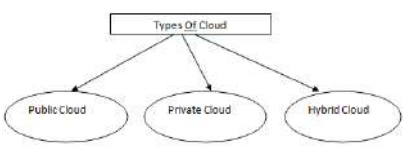

Fig.1: Cloud deployment models [1]

Public Cloud

Public cloud can be used by any person. It is open to all. Various types of problems can occur because data can be access by everyone. It can be access by unlimited person. It is not safe than other cloud model because it does not provide any security during accessing data. Amazon Web services are the examples of public cloud. Its advantage is that any person can access data at any place and any time. It's also some disadvantage is that some hacker can attack for accessing information and important information is lost.

Private Cloud

Private cloud can be access by an organization itself. This cloud can play an important role for organization and business. Only organization and business users can access the services of private cloud. It is access by limited person and provides more security rather than public cloud. It is more reliable and prevents the data from unauthorized so that data cannot be loss. It is an advantage of the private cloud. It has disadvantage that only limited users can use data and information.

Hybrid Cloud

Hybrid cloud is the combination of private and public clouds. It is more secure and highly reliable than other models. It is also known as open architecture because different devices are connected with each other. Virtualized environment is an example of hybrid cloud. It is used for describing the configuration of the different devices and links. Large amount of data is present and store. We does not need for extra hardware device. Users can access data and information at any place and any time.[2]

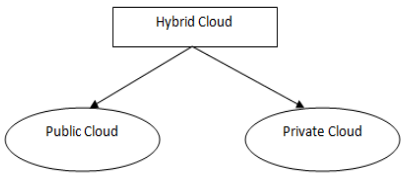

Fig 2: Hybrid Cloud

III. CLOUD COMPUTING SERVICE DELIVERY MODELS:-

Cloud computing service delivery models play an important role for security purpose. Three different types of models can be use for delivery models, which are explained as follows:-

SAAS

SAAS stands for software as a service. In this model, vendor provides hardware architecture software and also interacts with one or more person with the help of front end. It is widely use by market or organization. Persons can access every record with the different services which provide by software as a service.

PAAS

PAAS stands for platform as a service. It is a collection of software and product development tools. It is mostly use for API's, websites portals. In this stack present, where all different layers are present. Virtual machine play an important role in the PAAS.It is mostly use for protect PASS from different types of attack. With the help of virtual machine, security provides to the data means only authorized persons or users can access the data.

IAAS

IAAS stands for infrastructure as a service. It is use by single user means only authenticate user can access the data. For example, an organization can pay for some data or backup according to the requirement as per user.IAAS play a crucial role in the business and organization for the online requirement. Due to IAAS user can not pay extra money for hardware component such as servers, processing power and networking devices like router, repeater, hub, connectors etc. [3]

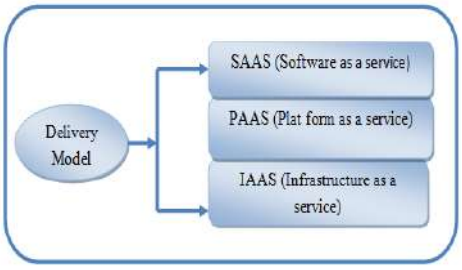

Fig 3: Cloud delivery models [3]

IV. DIFFERENT TYPES OF CLOUD COMPUTING SECTIONS

In cloud computing model two different types of section use which are follows:-

a) Front End
b) Back End

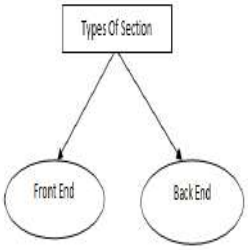

Fig 4: Clouds Section

FRONTEND

Front-end is one section of cloud computing .without front end user cannot interact with computer. It is use for all functions. Front end perform any function with the help of backend. It act like a user computer where different types of applications present for execute different functions of the cloud computing. Same interface can not be use by different users.

BACK END

Back End is another section of cloud computing. It is also use for executes different functions with the help of front end. Without front end, back end cannot execute different functions. In the back end different PC's servers and data storage requirement available .collection of all these services single cloud can make. With the help of these requirements, users can implement different types of functions. [4]

V. APPLICATIONS OF CLOUD COMPUTING MODEL

In the cloud computing, various types of applications can be use and available. Following Fig shows the various types of applications:-

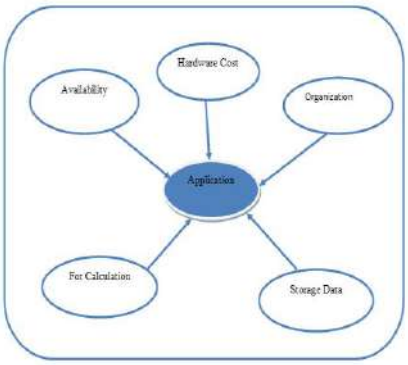

Fig 5: Clouds Applications

Availability

User can perform various applications of the cloud computing at any time and every place. For connection between different services, internet connections are available. This network connection provides the link between different services and user can perform any function.

Hardware Cost

In the cloud computing, user does not need any extra hardware for accessing various types of services. For this reason hardware cost is less. Cloud computing process can perform at less expensive PC's because basically require middleware layer, keyboard and mouse. Middleware layer is used for perform various services of cloud computing.

Organization

Cloud computing is play an important role for an organization. It helps to reach at some goal of the organization do not need for pay extra money for every employ of the organization. Due to cloud computing process organization can pay only one software for accessing all the services.

Storage Devices

Cloud computing is used for storage different types of data and information. It is used for provide the large amount of space .User does not need extra storage devices for various types of data and information. Due to cloud computing, Performance of the system is increase and does not any problem occur in implementation.

For Calculation

In the past time, more time is waste for execute the complex calculations and various types of the problem phase by users. Now, grids are available which improve the execution speed of the complex calculations and do not waste more time.[4]

V. CLOUD COMPUTING CONCERNS

In the cloud computing, two types of concerns play a crucial role. These types of concerns can be shown in Fig. 6

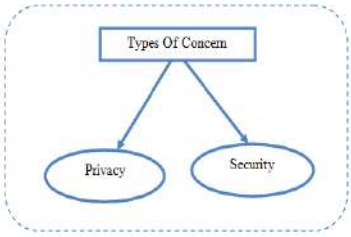

Fig 6: Clouds Concerns

PRIVACY

Privacy concern has biggest role in cloud computing model. Only authenticate user can access information and data. Authenticate user mean keys are available for encode and decode the data. It has some limitation. Any user can not access the data from the cloud computing source. It has some benefits and also some disadvantage. Due to privacy data cannot be lost and change. It is benefit but also data cannot be shared by every user. It is disadvantage of the privacy.

SECURITY

Security is another concern of the cloud computing. It is used for protect the data from external attack. The information cannot be changed and easily transfer from one place to another. Followings are the different techniques for protect the information from attack and unauthorized. These different types of techniques can be shown in a Fig.7 as follows

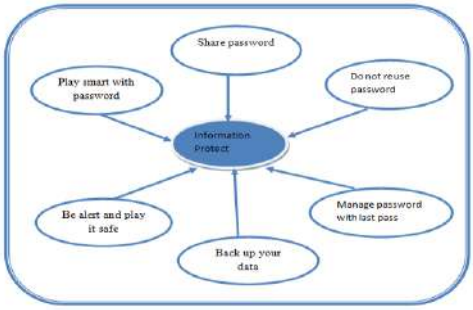

Fig 7: Clouds Information Protect

Play Smart with Password

Password are mostly used for protect the data from unauthorized. Always keep the password to be complex so that unauthorized person cannot guess the password easily. With the complex password user can protect the information and does not any changes occur in the data during transfer from one place to another place.

Do Not Reused Password

If user can use same password for different sites means for various emails, facebook account, twitters and for banking purpose. Any person can easily guess the password and change the entire password. User can not access that data or mails whose passwords are changed. So keeps every site passwords can be different and remove the reusability.

Share Password

With the sharing password, some problems can be occur likes loss data and information which is more necessary. Password cannot be shared with any person. If any person is trustworthy then share the password with that person.

Be Alert And Play It Safe

When any user can access information at public computer then properly exit from that email. For example ,In café or college when any user can access data then properly logout or exit from application so that another unauthorized person cannot access data and does not change the information.

Backup Your Data

Cloud storage can occur in various different varieties i.e. gigabytes and easily access information. It is simplest and

easiest way to access the backup data rather than from different browser.

Manage Passwords With Last Pass

Last Pass means only single password use for all different services. It acts like a master password. Less time is used for access the information from different browser. It is mostly used for history of the all data and information.[4][5]

VI. CLOUD COMPUTING CHALLENGES

In the cloud computing various types of challenges can occur because Users can phase problems during authentication. Followings are the different types of challenges:-

Security

Security issues can play a crucial role in cloud computing. Some security issues which are common i.e. data changes or miss use, hacker hack the data etc.The new challenge for cloud computing is multitenancy model and pooled computing resources.For handling these type challenges, Novel technique is used. Novel technique is used for protect the data from unauthorized so that data and information can not be changed.

Costing Model

Due to cloud computing process, user does not need to use extra hardware device for store the large amount of data. Users can easily access the data and information so it is less expensive but when user transfer the data from one place to another place, extra money is used. It is new challenge in cloud computing.

Charging Model

It is another type of challenge in cloud computing. It has a crucial role in the cloud. When users can redesign and redevelopment of the previous cloud system, extra charge is necessary .Due to extra charge and it is more expensive process. Various types of an error can also occur during changes in the system.

SLA

SLA stands for service level agreement. This agreement is used for shows the grantees, validations, reliable, available and flexible data and information of different services of the cloud computing. It does not provide all these facilities for individual service. It is used for single cloud system where various types of services are present. It is a challenge for cloud computing. Users need some additional information from SLA like individual service agreement, users feedback etc. [6]

VII. CONCLUSION

Cloud computing is a set of services which help the user for access and store data and information. It is new technique. It provides reliable, flexible, error free data and increase the performance of the system. In this paper cloud computing architecture, aspects and challenges are explained. These different types of challenges can occur. During future time, we can expect that these different challenges are handled by different techniques.

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An Overview On Cloud Computing

Sania Gupta
M.Tech Scholar,
Dept of Computer Science & Engineering,
PTU Regional Centre
Amritsar College of Engineering and Technology, Amritsar
Email Id- Saniagupta02@gmail.com

Amarpreet Singh
Associate Professor,
Dept of Computer Science and Engineering,
Amritsar College of Engineering and Technology, Amritsar
Email Id- amarmandeep@yahoo.com

Raghav puri
M.tech (Research Scholar)
Department of Electronics and Communication Engineering
Global institute of engineerging and technology

Abstract- Cloud computing is simply a new way of looking about virtual servers. it is the new name for an old idea. Cloud computing is to use remote server whose specifics are unknown to you. Cloud computing is evolving as a key resource for sharing software, applications and business process. The leading companies are gradually moving applications and data to the internet. It is evolving as the next-generation architecture of it enterprises. It is used in a way to increase capabilities or add capabilities on the fly without infrastructure, training new personnel, or licensing new software. cloud computing helps us with the requirements which we want i.e can access data from anyplace which we want.

Keywords-IAAS, PAAS, AAS

I. INTRODUCTION

Cloud computing is storage device. With the help of this computing we can access data from anywhere. Cloud computing refers to applications and services that run on a distributed network using virtualized resources and accessed by common Internet protocols and networking standards. It is basically a term for anything that involves hosted services over the internet. Cloud Computing," to put it simply, means "Internet Computing." The Internet is commonly visualized as clouds; hence the term "cloud computing" for computation done through the Internet. With Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. Besides, databases in cloud are very dynamic and scalable. Cloud computing is unlike grid computing, utility computing, or autonomic computing. In fact, it is a very independent platform in terms of computing. The best example of cloud computing is Google Apps where any application can be accessed using a browser and it can be deployed on thousands of computer through the Internet [3].

Cloud computing is a strong solution that delivers IT as a service. It is an Internet-based computing solution where shared resources are provided like electricity distributed on the electrical grid. It is a model of networks. Computers in the cloud are configured to work together and the various applications use the collective computing power as if they are running on a single system. The flexibility of cloud computing is a function of the allocation of resources on demand. Before computation. Maybe Clouds can save the world; possibly people can have everything they need on the cloud. Cloud computing is the next natural step in the evolution of on-demand information technology services and products. The Cloud is a metaphor for the Internet, based on how it is depicted in computer network diagrams, and is an abstraction for the complex infrastructure it conceals. It is a style of computing in which IT-related capabilities are provided "as a service", allowing users to access technology-enabled services from the Internet (i.e., the Cloud) without knowledge of, expertise with, or control over the technology infrastructure that supports them. Email was probably the first service on the "cloud". As the computing industry shifts toward providing Platform as a Service (PaaS) and Software as a Service (SaaS) for consumers and enterprises to access on demand regardless of time and location, there will be an increase in the number of Cloud platforms available [2].

II. HISTORY OF CLOUD COMPUTING

In 1950 Scientist Herb Grosch postulated that the entire world would operate on dump terminals powered by 15 large data centres. In 1960 John McCarthy opined that "computation may someday be organised as a public utility. In 1966 Douglas Parkhill's book, "The Challenge of the Computer Utility" explained all the modern-day characteristics of cloud computing. In 1969 ARPANAT developed, UNIX created. In 1970 ARPANAT transformed itself into internet. In 1990 Internet age started. In 1991 CERN released Internet for general use. In 1993-94 Browsers such as Mosaic & Netscape launched. In 1995 the online auction "eBay" was founded as Auction Web in San Jose, California, on September 5, 1995, by French-born Iranian-American computer programmer Pierre Omidyar. Jeff Bezos created Amazon.com, Inc. in 1994, and the site went online in 1995. It is named after the Amazon River, one of the largest rivers in the world, which in turn was named after Amazons, the legendary nation of female warriors in Greek mythology. In 1999 Salesforce.com launched in March 1999 by former Oracle executive Marc Benioff, Parker Harris, Dave Moellenhoff, and Frank Dominguez as a company specializing in software as a service (SaaS). Napster launched. In 2000 Dot-com bubble bursts: After the dot-com bubble, Amazon played a key role in the development of cloud computing by modernising their data centres. Having found that the new cloud architecture resulted in significant internal efficiency improvements whereby small, fast-moving "two-pizza teams" could add new features faster and more easily, Amazon initiated a new product development effort to provide cloud computing to external customers. In 2006 Amazon launched Amazon Web Service (AWS) on a utility computing

basis although the initial released dated back to July 2002. Amazon Web Services (AWS) is a collection of remote computing services (also called web services) that together make up a cloud computing platform, offered over the Internet by Amazon.com. The most central and well-known of these services are Amazon EC2 and Amazon S3. In 2008 Eucalyptus became the first open-source, AWS API-compatible platform for deploying private clouds. Eucalyptus is a software platform for the implementation of private cloud computing on computer clusters. Open Nebula became the first open-source software for deploying private and hybrid clouds. Open Nebula is an open-source cloud computing toolkit for managing heterogeneous distributed data centre infrastructures. Open Nebula is sponsored by C12G. C12G Labs is an enterprise software company which provides Open Nebula-based software and services. C12G (numeronym for Cloud Computing) was founded in April 2010. In 2007 Sales force launches Force.com, a web productivity tool. Force.com is a cloud computing platform as a service system from Salesforce.com.

2007-2010 With launch of iPhone, HTC's first Android phone, Android-Apps, Samsung's Smartphone and a whooping sale of 1 million iPad in the first month of it's launch, the enterprise market saw huge transformation that scripted a completely different IT market story driven totally by consumers. Cloud services got much needed boost with the launch of i-services for iPhone and iPad costumers. Cloud applications hosted on far away Data Centres became a rage which ultimately launched the golden era of cloud computing and services based upon "as a service" delivery-model. In 2011 the year that truly made a mark for Cloud Computing. Several start-ups were founded that leveraged the cloud services [4].

III. TYPES OF CLOUDS

To describe the cloud computing we should define many acronyms in this field. Basically there are two types of cloud models on which different types depend and these are [5]:

A. Service Model

It basically consist of services that we can access on cloud computing. It has further three fundamental Clouds as shown in fig 1.

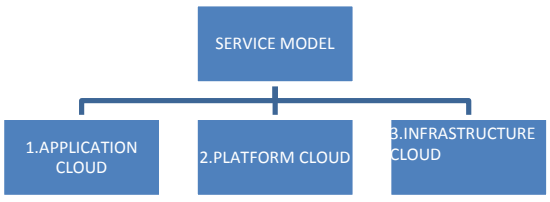


Fig-1 Service Model with 3 types of clouds

- *Application Cloud (AaaS)*

AaaS refers to the Application as a Service. It is also known as SaaS which refers to the Software as a Source. The Software as a Service (SaaS) model implies the use of various applications in rent. It's so-called Cloud Computing. The essence of the model is that the customer does not buy the software, but pays for the service which it provides. It is complete operating environment with applications, management, and the user interface. In AaaS application is provided to the client via browser and its the responsibility of the customer to begin and ends with entering and managing its data and interaction. From the application to infrastructures responsibility is of vendor. The figure of SaaS is shown as fig 2.

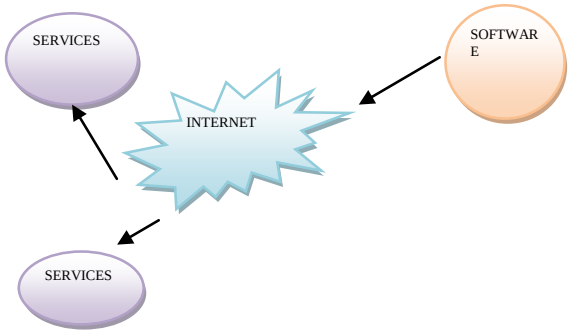
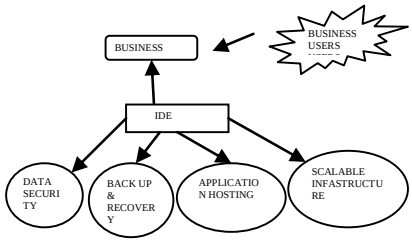


Fig-2 Software as a Service (SaaS).

- *Platform Cloud (PaaS)*

PaaS refers to the Platform as a Service. PaaS provides virtual machines, operating systems, applications, services, development frameworks, transactions, and control structures. The client can deploy its application on the cloud structure or use applications that were programmed using languages and tools that are supported by the PaaS service provider. The service provider manages the cloud infrastructure, the operating systems, and the enabling software. The client is responsible for installing and managing the application that it is deploying as shown in figure 3.



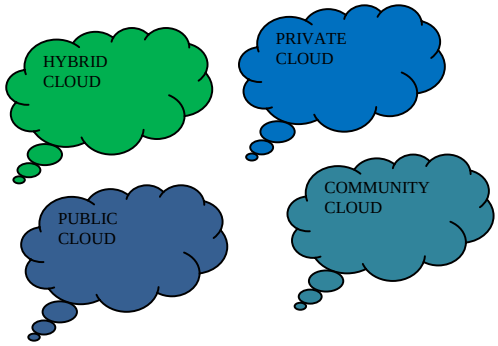
Platform as a Service (PaaS).

- *Infrastructure Cloud (IaaS)*

IaaS refers to the Infrastructure as a Service. IaaS provides virtual machines, virtual storage, virtual infrastructure, and other hardware assets as resources that clients can provision. The IaaS service provider manages the entire infrastructure, while the client is responsible for all other aspects of the deployment. This can include the operating system, applications.

B. Deployment Model

Deployment model defines the purpose and the nature of the cloud. It has further four fundamental clouds as shown in Figure 4 .



Deployment Model.

- *Private Cloud*

It owned or leased by a single organisation and is operated solely for that organisation. The private cloud infrastructure is operated for the exclusive use of an organization. The cloud may be managed by that organization or a third party. These are the types of clouds which exist within the boundaries (firewall) of an organization. It is totally managed by an enterprise and has all the features of Public Clouds with a major difference that it has to take care the underlying IT infrastructure. They are more secure as they are internal to an organization and they shuffle resources according to their business needs. They are best suited for the applications which are related to tight security and follow some stringent policies or are meant for regulatory purposes. It is not very easy for an organization to go with a Private Cloud due to its complexity and management so they are often used by enterprises who have made huge investments in their IT infrastructure and have the man power and abilities to manage it.

- *Public Cloud*

The public cloud infrastructure is available for public use alternatively for a large industry group and is owned by an organization selling cloud services. These are the clouds which are open for use by general public and they exist beyond the firewall of an organization, fully hosted and managed by vendors like Google, Amazon, Microsoft, etc. They strictly follow "Pay as you go" model which helps start ups to start small and go big without investing much in the IT infrastructure. Here a user does not have a control on the management of the resources. Everything is managed by the third party and it's their responsibility to apply software updates, security patches etc. Though they are quite effective and eases an organization effort since everything is already there, it does face some criticism, especially on security related issue.

- *Hybrid Cloud*

A hybrid cloud combines multiple clouds (private, community of public) where those clouds retain their unique identities, but are bound together as a unit. A hybrid cloud may offer standardized or proprietary access to data and applications, as well as application portability. They consist of external and internal providers, via a mix of public and private clouds. Secure & critical apps are managed by an organization and the not-so-critical & secure apps by the third party vendor. They have a unique identity, bound by standard technology, thus enabling data and application portability. They are used in the situations like *Cloud Bursting.* In most countries, we are going to see lot of investment in the Hybrid Clouds in the next decade, for the simple reason, that lot of companies are sceptical about the Cloud's Security and they prefer that the critical data be managed by themselves and the non-critical data by the external provider. From an end-user perspective, Public Clouds will be more interesting for them, we all use public clouds services like Microsoft Office Web apps, Windows Live Mesh 2011, Google Docs, etc; whereas enterprises will be having an interest in private & hybrid clouds.

- *Community Cloud*

A community cloud is one where the cloud has been organized to serve a common function or purpose. It may be for one organization or for several organizations, but they share common concerns such as their mission, policies, security, regulatory compliance needs, and so on. A community cloud may be managed by the constituent organization(s) or by a third party.

IV. ADVANTAGES OF CLOUD COMPUTING

A. Convenience

You can access your data anywhere you can connect to the Internet

.

B. Security

Most companies use industrial level security software and practices which make it harder for hackers to get at your data. That's harder, but not impossible.

C. Backups

You have a backup of your data in case your local computer crashes.

D. *Collaboration*

With your permission, others can access, view, and modify your documents.

E. Environmentally friendly

It takes fewer resources to cloud compute, thus saving energy. Some businesses take it a step further and incorporate cloud computing into their telecommuting strategies

.

F. *It is cheap*

Many cloud services are free or cheap. If you are paying for the services it is normally per month, or per year, often this is a much lower upfront cost than buying the software outright.

G. *Automatic upgrades*

Rather than having to re-buy software every time a new version comes out most cloud services do continuous upgrades as you go.

H. *Less infrastructure*

All you are going to need is a computer with an internet connection. You do not need to worry about setting up office networks or your own servers. This reduces hardware and maintenance costs. Also because all the software and data is held elsewhere the laptop or desktop computer you use does not need to be as powerful or have as much storage.

I. *Access*

Because the information and programs you need are on the internet all you need to access them is an internet enabled device, like a laptop, tablet or Smartphone. You do not need to be in the office or have your business computer with you.

V. LIMITATIONS OF CLOUD COMPUTING

A. Security breaches

Remember, I said that remote server security makes it harder, but not impossible, for hackers to reach your data. If there is a compromise of the server(s) where your data is stored, your personal information may be exposed to the world. There's also a good chance that more than just your information may be affected—we're talking possibly millions of other users.

B. Outages

Have you ever been unable to access your email due to your provider being down? Now, imagine if you needed a document for an important business meeting or presentation and your storage provider's site was down. Believe me it happens, and it happens at the most inconvenient times.

C. Storage limits

While your local hard drive may be able to hold 500GB or more of data, unfortunately a remote server may only allow you to freely store about 5GB. If you want more room, you'll have to pay. Still, even with a paid account, it can't begin to touch the amount of room you have locally. There also may be a limit on the size of the data that can be stored.

D. Slow speeds

Uploading and downloading of large documents may take a long time.

E. Limited features

If you use remote software that's provided by the storage service to manipulate and modify your data, it usually lacks the features of a program running locally.

F. Control

Your sensitive business information and customer details are all stored on a server, somewhere, which is looked after by some people you have never met. Anyone with an internet connection who can guess your email address and password can have access to it.

G. Stability

As recent cases have shown that the cloud can be vulnerable to outages, power cuts, storms and a multitude of other factors which can knock data centres offline. If the data centre goes offline your business goes offline.

H. Unpredictability

Many cloud computing companies are in their infancy. Some get bought and sold, others go out of business. Many of them use third party companies such as Amazon to perform vital parts of their service. HMRC like you to keep you business records for six years, can you guarantee that the cloud service you are using will still exist, or be economical to use in six years time?

I. Access

If your internet connection goes down you cannot access any of your information or software.

VI. CONCLUSION

The cloud computing system has the ability to execute all of the programs that a computer can execute and run. The applications of cloud computing are basically limitless. Clients have access to the cloud environment and all applications, programs, and data from anywhere they have a computing device and internet connection. Data is no longer restricted to the hard drive which reduces hardware costs and the need for more advanced hardware because the cloud provider takes care of all of those needs. With cloud computing, you have access to high bandwidth, memory, and physical space. A cloud computing system gives businesses with high demands access to a myriad of computer applications with the business paying a metered fee to their cloud computing provider. Cloud computing allows businesses to store data on a third party's hardware which eliminates the need for more front end physical space. With so many benefits, it is easy to understand why cloud computing is now the most preferred choice for businesses of all sizes and industry.

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Wimax vs Wi-Fi: A Comparative Study

Er. Iqbal Singh
Department of ECE
GNDU RC Gurdaspur

Er. S.B. Rana
Assistant Professor
GNDU RC Gurdaspur

Er. Rasneet Kaur Chauhan
Department of CSE
GNDU RC Gurdaspur

***Abstract*---- This paper presents description of two wireless technologies Wi-Fi and Wimax and their comparison so as to provide a better wireless infrastructure. Each technology is evaluated on some key characteristics. At the end a better technique is concluded for the end user in terms of quality of service and cost effectiveness.**

Keywords—OFDMA, WIMAX, Redundancy, X-OR

I. INTRODUCTION

IEEE has developed various standards over time for wireless communication. 802.15(Bluetooth), 802.11 (Wi-Fi), and 802.16 (WiMAX) are among the few. All the standards fulfill certain criteria. These standards are built over time to provide reliable communication.

Wi-Fi has been commercially very much successful worldwide. It provides close range communication. It provides internet access over short range at high data rates. Current Wi-Fi systems based on IEEE 802.11a/g support a peak physical-layer data rate of 54Mbps and typically provide indoor coverage over a distance of 100 feet. Wi-Fi has become the defacto standard for "last feet" broadband connectivity in homes, offices, and public hotspot locations. In the past couple of years, a number of municipalities and local communities around the world have taken the initiative to get Wi-Fi systems deployed in outdoor settings to provide broadband access to city centers and metro-zones as well as to rural and underserved areas. It is this application of Wi-Fi that overlaps with the fixed and nomadic application space of WiMAX. Wi-Fi systems can typically provide a coverage range of only about 1,000 feet from the access point.Demand for WiMAX is increasing due to its wide range and access to remote areas. The main goal of WiMAX is to provide cheap and fast connectivity of both voice and data communication to remote and difficult terrain locations. While both technologies have some identical technical characteristics, however they are approaching the wireless space from completely different perspectives. Aim of this paper is to compare the technological and commercial aspects of both the technologies in order to find which will lead in building the wireless infrastructure in future.

In the first part of the paper both the technologies are examined for their better understanding and underlying aspects. Then these are compared on certain system dynamics. The last part concludes the better technology for providing better cost efficient services.

II. OVERVIEW

A. Wi-Fi

Wi-Fi network provided connectivity within computers, laptops, and other devises without the complexity and infrastructure of wires. It has a large market share. Almost all laptops shipped nowadays are equipped with in-built Wi-Fi systems. Its main aim was to provide communication among mobile devices. Smart-phones can access Wi-Fi. They can serve as hot-spots. It was designed to provide connectivity in close range such as houses, buildings, offices, hotels, etc.

A user with a mobile computing device such as a laptop, cell phone, or PDA which is Wi-Fi enabled can connect to the global Internet when it is within in range of an access point. The region which is covered by one or more access points is called a hotspot. Hotspots can range from a single room to a few thousand square feet of overlapping hotspots. Wi-Fi can also be used to create a mesh network. Wi-Fi also allows connectivity in peer-to-peer (wireless ad-hoc network) mode, which enables devices to connect directly with each other [1]. This connectivity mode is useful in consumer electronics and gaming applications [1].

The original 802.11 standard was published in 1999 and provides for data rates at up to 2Mbps at 2.4 GHz, using either Frequency Hopping Spread Spectrum (FHSS) or Direct Sequence Spread Spectrum (DSSS).

These products use different radio frequencies:

- 802.11a and 802.11b

It uses Orthogonal Frequency Division Multiplexing (OFDM) to provide data rates up to 54 Mbps in the 5 GHz U-NII bands. In addition to being un-crowded, more spectrums in the U-NII bands allows room for 12 non-overlapping channels, compared to just three in the 2.4 GHz ISM bands. Both of these factors make operating in the U-NII bands far less prone to interference. However, at 5 GHz, more path loss occurs due to increased absorption of the RF energy by walls and other solid objects. This, combined with a decrease in range due to the higher data rates, may require that more access points be installed to effectively cover an area comparable to that of 802.11b. There are now chip sets appearing that include both 802.11a and 802.11b capability, and technology is being developed to allow the seamless handoff of communication between overlapping 802.11a and 802.11b networks[2].

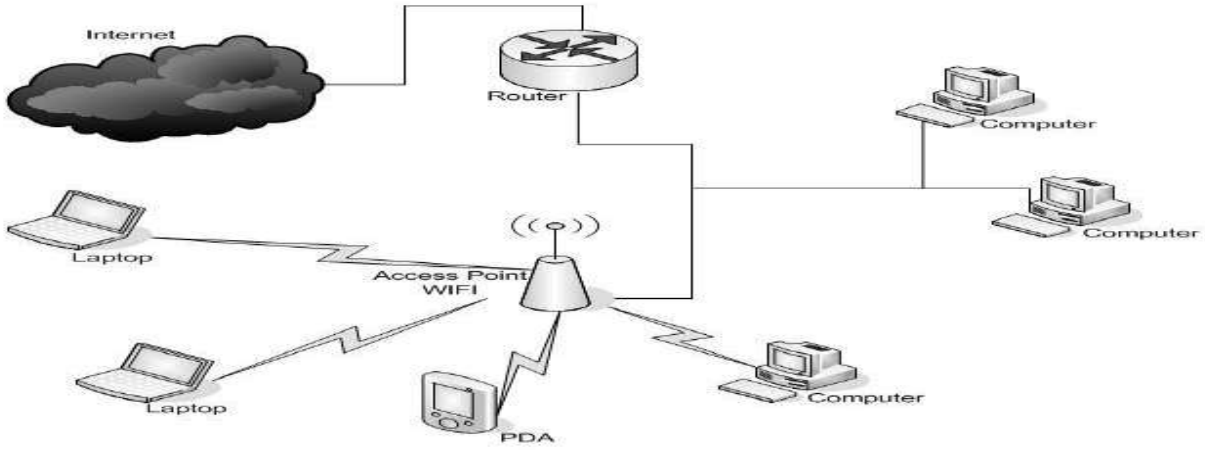

Figure 1: Wi-Fi Network[3]

● 802.11g

The 802.11g task group is working on a supplement to the 802.11 standard that defines a technology for operation at 2.4 GHz that offers higher data rates (up to 22 Mbps) using OFDM, while remaining backwards compatible to 802.11b. In addition, the supplement 7 will specify even higher data rates using two different methods (up to 33 Mbps using PBCC-DSSS and up to 54Mbps using CCK-OFDM) which manufactures can optionally incorporate. [2]

● 802.11e

The 802.11e task group is working to enhance the current 802.11 MAC to expand support for applications with quality of service requirements. (Security issues formerly being considered by the 802.11e task group are now being considered by the 802.11e task group) The intent is to make 802.11 fully capable of supporting applications from both business and home environments, including multimedia

B. WiMAX

IEEE standard 802.16, also known as WiMAX, is a technology for last-mile wireless broadband as an alternative to cable and DSL

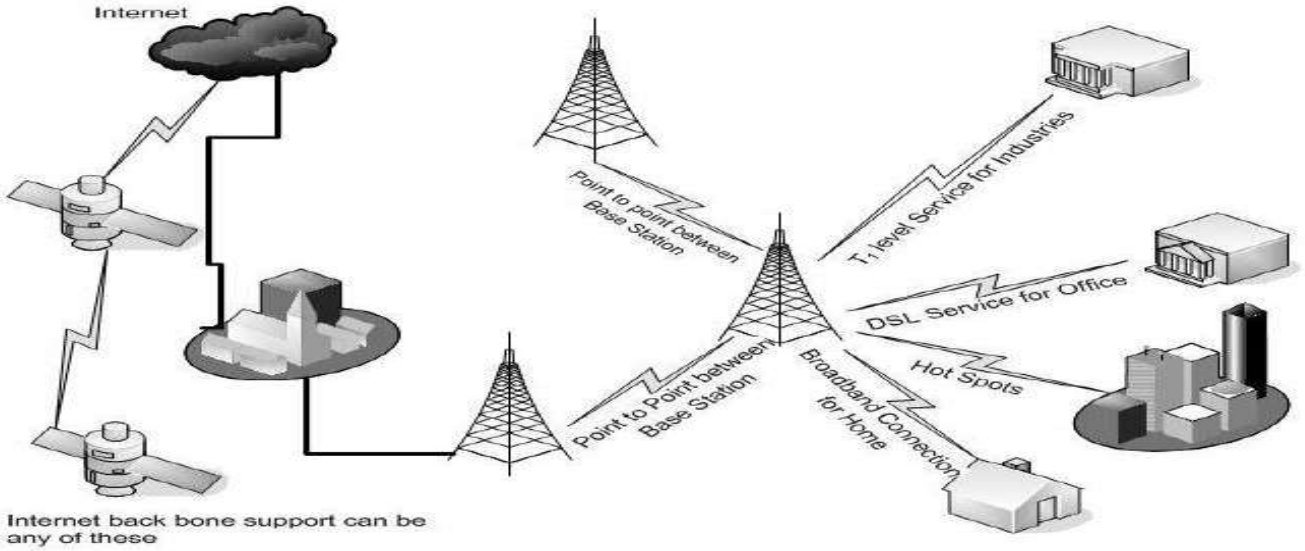

Figure 2: WiMAX[3]

and where the cost is high. It's intended to deliver high speed data communication, and it also has the ability to maintain dedicated links and VoIP services at a reliable and high quality speed. It provides coverage to the 'last mile'. Its data rates are comparable with cable networks and DSL (Digital Subscribe Lines) rates. It is being seen as a replacement to the ageing wired networks by many companies. The drawback of conventional broadband services is being eliminated with WiMAX by providing network access while roaming outside home or office.

Due to advantages like higher data rates and vast coverage WiMAX has vast furure scope of being utilized in various application areas. WiMAX can be used in two ways. Firstly as a back-bone to the existing 802.11 hotspot or secondly users can directly connect to it using laptops, PDA or mobile phones. Until now, connecting the remote areas using wired networks involves lots of infrastructure. Maintaining good healthy status over time of these wired networks is also a big issue. Cost involvements are tremendous. But WiMAX provides solution to these issues in a cost effective manner without compromising with quality [3]. One of the biggest advantages of WiMAX is its ability to provide network in natural disasters in a very short span of time. WiMAX has proved itself when it was used to assist with communications in Aceh, Indonesia, after the Tsunami [4]. Its operation is in two frequency ranges; higher frequency range, 11 – 66 GHz, and lower frequency range, which is sub 11 GHz. For higher frequency ranges LoS is required but it is not essential for lower frequency range. WiMAX, with a theoretical data rate of 70 Mb/s in 20 MHz channels (2-11GHz spectrum) , allows a few hundreds of DSL connections but it operates up to 124Mbps in the 28MHz channel (in 10-66GHz), [5]. The maximum range WiMAX, covered is about 50 km [5]. But in practice this range may be decrease to 20 km and even 8 km when there are obstacles [5].

III. System Dynamics for Wireless Technology

This paper focuses on the hypothesis that which wireless technology, WiMAX or Wi-Fi provides a better solution in the wireless access infrastructure. It is to find out whether one technology is better than the other or the combination of both provides the better solution. There are some key dynamics on the basis of which present day technologies are being analyzed. In this paper the systems are evaluated on the basis of following characteristics: efficiency, maximum range, dependability, security, market issue and mobility.

A. Efficiency

Efficiency is measured on the basis latency and of band-width. It is the factor determining the various applications that can be used on a network. The network with lesser bandwidth can support small applications such as transfer of text files. On the other hand the network with higher bandwidth can support audio/video conversations and high speed internet. The other factor is latency. It should not be greater than 20 ms.

B. Maximum Range

It can be calculated as the distance between two base stations. Supporting hand-offs between two cells is also considered under this topic. Maximum range limits the area over which contiguous services can be provided. It also limits the cost factor.

C. Dependability

Dependability is defined as up to which extent a user can depend on the wireless system. Is it reliable or not? Characteristics like packet losses, disconnected calls, environmental factors, etc. realizes dependability. Dependability is very crucial as some applications may require relatively higher dependability. Frequent packet losses will limit the speed and applications like video calls would not be able to overcome this. So such applications will not prefer wireless technology. Hence it is key issue in designing wireless infrastructure.

D. Security

Today all have an access to the internet. Users share private data to which unauthorized access is not acceptable. For this authentication of users and encryption of data is done. Banking is one major area where unauthorized access is too harmful. So security is above all.

E. Mobility

Mobility is referred to as providing reliable communication to the mobile access point. Naturally, a wireless infrastructure environment needs to be mobile to provide connection to the end user at any place they visit. Connections must be sustained at vehicular speeds.

F. Market Comparison

Market is the last determining factor. In fact success and acceptance of any technology is based on the market. Its demand and customer satisfaction will determine its success.

IV. Wi-Fi VERSUS WiMAX

A. Radio Technology

WiMAX and Wi-Fi differs in the sector of radio technology. The IEEE 802.11 WLAN standards describe four radio link interfaces operating mainly in unlicensed radio band from 2.4-5 GHz [6]. The WiMAX 802.16a standard operates at 2-11 GHz [6]. At lesser frequencies NLoS(Non Line of Sight) is supported so the customer need not to be aligned with the base station. Wi-Fi operation mainly is in unlicensed frequency spectrum, while WiMAX can be operated in both licensed and unlicensed bands. Within IEEE 802.16a's 2-11 GHz range, four bands are most attractive [6]:

- Licensed 2.5-GHz MMDS
- Licensed 3.5-GHz Band
- Unlicensed 3.5-GHz Band
- Unlicensed 5 GHz U-NII Band

For modulation technique used in the IEEE 802.11b radio link is direct sequence spread spectrum that is called complementary coded keying (CCK) [6]. 0Quadrature Phase Shift Keying (QPSK) coding is used. The 802.11a and 802.11g utilizes 64-channel orthogonal frequency division multiplexing (OFDM) [6]. Encoding is done on 64 sub carriers using Binary Phase Shift Keying (BPSK), Quadrature Phase Shift Keying (QPSK), or one of 2 levels of Quadrature Amplitude Modulation (16-, or 64- QAM) [6].

3 techniques are specified by IEEE 802.16a [6]

- SC-A: Single Carrier Channel
- OFDM: 256-Sub-Carrier Orthogonal Frequency Division Multiplexing.
- OFDM-A: 2,048-Sub-Carrier Orthogonal Frequency Division Multiplexing

B. Efficiency

For Wi-Fi standards IEEE 802.11b upper limit of bandwidth is 25 MHz and 20 MHz for either IEEE 802.11a or g networks [6]. It offers bit rates 54 Mbps. Wi-Fi has latency in the range of 50 ms hence little bit higher latency.

WiMAX, operates at 1.25-20 MHz [6]. Bit rate varies for WiMAX but it mainly lies in a range of 70-100Mbps, depending on transmission bandwidth. Latency for WiMAX ranges between 25-40 ms.

Now B/W efficiency measured in terms of bps/Hertz of WiMAX and Wi-Fi is compared. With data rates supported on 25 MHz channel (1-11 Mbps), efficiency of 802.11b is 0.04-0.44 bps/Hertz [6]. For 802.11a or 802.11g on its 20 MHz channel with Tx rate 6-54 Mbps 2.4 to 2.7 bps/Hertz. For WiMAX, at 70-Mbps transmission rate on a 14-MHz radio channel, bandwidth efficiency is up to 5- bits/Hertz [9]. Hence the bandwidth efficiency decreases with increase in transmission range.

C. Maximum Coverage Range

With the use of OFDM modulation with high spectral effectiveness WiMAX has range of 8 km (NLOS) to 50 km (LOS) [5]. Users sparsely distributed can be served. For increase in range, smart antennas and mesh topology is used. High power OFDM is used in 802.16 is for increasing range up to tens of kilometers.

In IEEE802.11 standards different version of basic CDMA and OFDMA approach is used. It requires lower energy and hence limited range. Designed mainly for indoor applications its optimized range is up to 100 meters.

D. Security

Security provided in both techniques is different from each other. It is an issue that cannot be overlooked. In Wi_Fi security lacks as encryption is optional. But better encryption techniques are now available: • Wired Equivalent Privacy (WEP): An RC4-based 40- or 104-bit encryption technique. • IEEE 802.11i/WPA2: It is a IEEE standard which will be based on a more robust encryption technique called the Advanced Encryption Standard. • Wi-Fi Protected Access (WPA): A new standard from the Wi-Fi Alliance that uses the 40- or 104-bit WEP key.

As WiMAX is designed for public network security is important. Data transmitted is encrypted. 168-bit Digital Encryption Standard (3DES) is used for encryption. The same encryption also used on most secure tunnel VPNs. Advanced Encryption Standard (AES) in WiMAX are also applied in some areas to maximize the security.

E. Mobility Management

It is supported by mobile WiMAX through IEEE 802.16e. It supports hand-offs. Data rates are up to 500 kbps, equivalent to the highest speed cellular offerings (e.g. Verizon Wireless' 1xEV-DO service) [6]. Currently mobility management is not supported by Wi-Fi. But recently IEEE has begun to development of a roaming standard for Wi-Fi. However, WLAN switch vendors like Cisco, Aruba, and Airespace have developed their own proprietary hand-off protocols [6].

F. Market

Market oriented works has been done for Wi-Fi. The two examples are Wireless ISPs and Wi-Fi mesh networks.

1) Wireless ISPs (WISPs): Its idea is to provide Internet WLAN technology and a shared Internet connection in a public location designated a hot spot. TMobile and Wayport currently provides this type of service. It faces two road blocks:- Technical and Business oriented. From a technical viewpoint, you always have to be within range of hotspot, and from a business viewpoint, users have to pay monthly basis and then the users have to be in the hot spot always to access the internet which is not a feasible. So markets of WISP are in danger.

Table1: Comparison between IEEE 802.11 and IEEE 802.16[6]

	802.11 (Wi-Fi)	**802.16 (WiMAX)**
Primary Application	Wireless LAN	Wireless MAN mainly designed for broadband wireless
Range and Coverage	Mainly designed for indoor Optimized for 100 meters No mesh topology is supported	Designed for outdoor NLOS performance Optimized for 50 km Mesh topology is supported
Scalability	MAC designed to support tens of user	MAC designed to support thousands of users
Frequency Band	Unlicensed Band 2.4 GHz to 5 GHz	Licensed and Unlicensed Band 2 GHz to 11 GHz
Channel Bandwidth	On the range from 20-25 MHz	Adjustable range from 1.25 to 20 MHz
Bandwidth Efficiency	0.44 to 2.7 bps/Hz	<=5 bps/Hz
Radio Technique	OFDM 64 channels and Direct Sequence Spread Spectrum	OFDM 256 Channels
Security	Security is optional here. Better encryption technique like WPA and WEP available now	3 DES (128 bit)
Mobility	In Development phase now	Mobile WiMAX build in to 802.16e
QoS	Contention Based MAC (CSMA/CA) QoS is proposed in IEEE 802.11e	Grant Request MAC Mainly designed to support voice and video

2) *Wi-Fi Mesh Network:* Wi-Fi mesh networks are mainly used to support public safety applications and also to provide Internet access to end users. However, mesh technologies are not within the range of the Wi-Fi standards.

3) *WiMAX:* It is providing WLAN broadband services[7] successfully. In India BSNL is providing WiMAX services in areas where wired infrastructure was absent, especially in rural areas.

4) *Quality of Service (QoS):* Wi-Fi is based on a contention based MAC (CSMA/CA).Hence no guaranteed QoS is provided. Different service level for each user is not permitted. In a step oriented provide QoS in Wi-Fi, two operating modes are incorporated in 802.11-e standard. Wi-Fi Multimedia Extensions (WME) and Wi-Fi Scheduled Multimedia (WSM) QoS in IEEE 802.16 is based on a request/grant protocol. Its support multiple QoS which is build in MAC. It is designed to supports different service levels such as ,T1/E1 for business and best effort to consumer. Delay sensitive services are supported. The dynamic TDMA based technique allows the suitable support for multicast and

broadcast. In the below the key difference between Wi-Fi and WiMAX is described.

V. CONCLUSION

This paper has studied two emerging wireless standard technologies; Wi-Fi (IEEE 802.11), WiMAX (IEEE 802.16) Technical aspects were compared. It clear that WiMAX signals the arrival of the next wave of Wireless Access Infrastructure. Limited range and data capability of Wi-Fi helps WiMAX to make a promise of taking high speed wireless out of home to the road and everywhere. The main advantage of the WiMAX technology is that it is flexible. Well suited for fixed and nomadic users and also give another advantages by operating in licensed or unlicensed bands. In this paper, it is seen that WiMAX looks like a strong contender to build wireless access infrastructure. Now we will have to wait and see that this technology can capture the market or not. To conclude, it's obvious that the WiMAX standard aim not to replace Wi-Fi in its applications but rather to enhance it in order to form a modern wireless access infrastructure.

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EAR BIOMETRICS AND ITS COMPARISON WITH OTHER BIOMETRICS

Girish Kumar[1]
Research Scholar
PTU,Jalandhar,India
girishvansh@gmail.com

HS Soach[2]
HOD, GPC-ASR
Soch_hs@yahoo.com

Ms. Manpriya Kaur[3]
ACET,ASR, india
friya.arora@gmail.com

Abstract-The ear recognition techniques in image processing become a key issue in ear identification and analysis for many geometric applications. This paper first reviews the source of ear image identification, compares the different applied models being currently used for the ear image modeling, details the algorithms, methods and processing steps and finally tracks the error and limitation from the input database for the final result obtain for ear identification.

INTRODUCTION

In general, biometrics is the science of measuring physical properties of living beings.

"**Biometrics is the automated recognition of individuals based on their behavioral and biological characteristics.**" (ISO/IEC)

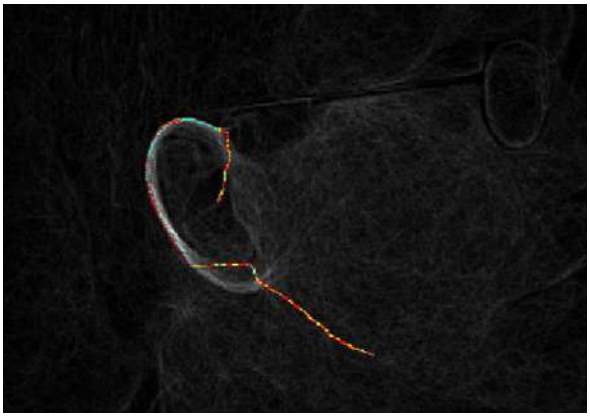
Biometrics technologies and applications have attracted increasing attention over the past two decades (in particular since the events of '9/11') because of -

- advances in computation and imaging
- the receptiveness of decision-makers in government and business to solutions, substantive or otherwise, for perimeter control, the identification of criminals, reduced identity theft or forgery and enhanced security in electronic transactions
- media coverage that has reflected both claims made by vendors (or those seeking research/commercialization funding) and utopian/dystopian visions in science fiction
- access to public and private capital for biometrics research and development, fuelling recurrent biometrics booms

Biometric identification methods have been proved to be very efficient, more natural and easy for users than traditional methods of human identification by Iannarelli [2]. Among various physiological biometrics, ear biometrics has been found to be interesting and promising in the recent past. The ear of human goes through minute changes as course of age. It also has no changes as expression change. So ear biometrics emerges as an efficient biometric method for human identification and could be used like other biometrics. Database for a ear based biometric system is prepared by processing images of the ears of authorized personnel, followed by extraction of characteristic features for each image. Personnel wishing to enter would have their ears focused to the camera lens at the entrance and the image would be processed and compared for a match against the database. The stored features would have to be sufficiently distinct so as to be able to distinguish one ear from all the others, and sufficiently robust so that the same features would be produced every time the ear image is taken. These are conflicting requirements and present a challenge to the system designer. Ears have certain advantages over the more established biometric traits such as face, fingerprint etc; they have a rich and stable structure that is preserved well even at the old age. The ear does not suffer from changes in facial expression and is firmly fixed in the middle of the side of the head so that the immediate background is predictable. Collection does not have any associated problems, as may be the case with direct contact fingerprint scanning as well as may happen with iris and retina measurements. The size of the ear is large compared with the iris, retina, and fingerprint and therefore is more easily captured.

Like other biometric systems, an ear recognition system can have two main modules: database creation module and verification module. The database of authorized person is prepared by processing images of the ear. It extracts features for each image and stores in the database. At the time of verification features from the query image of a person are extracted and finally are compared with the corresponding features of the person. Thus the features have to be sufficiently distinct so as to be able to distinguish one ear from all the others, and sufficiently robust so that the same features would be produced every time the ear image is taken. These requirements present a challenge to the system designer.

Ears: Better Unique IDs Than Fingerprints



On a planet hosting 6.7 billion human beings, having proof you're unique is of equal importance. The ear, it turns out, may be the best identification yet.

Through a new shape-finding algorithm called "image ray transform," which boasts 99.6 percent accuracy, the outer ear may prove to be one of the most accurate and least intrusive ways to identify people.

Fingerprint databases of U.S. government agencies alone store the records of more than 100 million people, but prints can rub off or callous over during hard or repetitive labor. With the advent of computer vision, researchers and identification industries are seeking easier and more robust biometrics to get their hands on.

"When you're born your ear is fully formed. The lobe descends a little, but overall it stays the same. It's a great way to identify people," said Mark Nixon, a computer scientist at the University of Southampton.

"There's real power in using the appearance of an ear for computer recognition, compared to facial recognition. It's roughly equivalent if not better," said computer scientist Kevin Bowyer of Notre Dame, who is pursuing his own ear-recognition technology and not involved with Nixon's work. "If you've got a profile image for someone, this is a great way to use it."

Recent technologies use computer vision to convert human features, such as faces and irises, even the gait of a person's walk, into reliable alternatives to fingerprints. Nixon and his team have pursued using ears as one biometric for years, and through what he called a "blue-sky research effort," his colleagues created the highly capable image-ray-transform algorithm.

The technology can identify an ear time after time with 99.6 percent accuracy. It works by unleashing a ray-producing algorithm on an image to seek out curved features. When a ray finds one, the software draws over the part and repeats the analysis. In a few hundred or thousand cycles, it cleanly paints the ear more than any other face structure.

"The rays fly around the image and get caught in tubular things. The helix, or outer edge, of an ear is a wonderful tube that rays keep hitting," said Alastair Cummings, the Southampton University computer scientist who developed the algorithm. "There are dozens of ways of doing ear biometrics, but this is a very good one."

From there, another program turns the curves into a unique set of numbers, something that could be used as an ear-based ID.

Nixon and Cummings acknowledged some limitations of the system, including hair covering the ears, less-than-ideal lighting conditions, and different IDs generated from different angles. And using the ear as a biometric isn't without critics.

"I have seen no scientific proof that the ear doesn't change significantly over time. People tend to believe notions like these, and they are repeated over time," said Anil Jain, a computer scientist at Michigan State University who was not involved in the study. "Fingerprinting has a history of 100 years showing that it works, unless you destroy your fingerprints or work in an industry that gives you calluses."

Using the ear is not about replacing existing biometrics such as fingerprints, Bowyer said. Rather, it's about supplementing them, especially when it comes to catching crooks.

"It's easy to say, 'Hey there's fingerprints, faces and irises, why do we need more?' For some applications that's a valid question," he said. "But when you're doing surveillance, where a person isn't being cooperative for obvious reasons, you want anything you can get. If you have images of ears, it's dumb to throw that away."

What's more, he says, there really aren't studies proving the agelessness of any human biometric — including fingerprints.

"Who over the age of 40 could think these things don't age?" Bowyer joked. "Some have said 'irises are for life,' but in some of our lab's work we've noticed degraded biometric performance even in those."

To address limitations of the approach, we need to demonstrate that ears do hold up over time. In addition, it is hoped to pair their new biometric with other computer-vision technologies, such as face recognition, to bolster its reliability. And if the algorithm can be made to work quickly in three dimensions, a fuzzy clip of a criminal walking by a security camera could be turned into grade-courtroom evidence.

EAR BIOMETRICS MAY BEAT FACE RECOGNITION

A new type of ear-shape analysis could see ear biometrics surpass face recognition as a way of automatically identifying people, claim the UK researchers developing the system.

The technique could be used to identify people from CCTV footage, or incorporated into cell phones to identify the user, says Mark Nixon, a biometrics expert at the University of Southampton.

Ears are remarkably consistent, he says. Unlike faces, they do not change shape with different expressions or age, and remain fixed in the middle of the side of the head against a predictable background. "Hair is a problem," Nixon admits. "But that might be solved by using infrared images."

In an initial small-scale study involving 63 subjects - all taken from a database of face profiles - Nixon and his colleague David Hurley found their method to be 99.2% accurate.

This is a great starting point, says Nixon, but in theory the method could be greatly improved. "There are more fixed features available in an ear than we have been measuring," he says.

Order of magnitude

Much larger populations are needed to determine how reliably it could be implemented. But an initial analysis of the decidability index - a measure of how similar or dissimilar each of the ears were - indicates how unique an individual ear might be.

They found that this index was an order of magnitude greater than for face analysis, but not as large as for iris biometrics.

Ears have been used to identify people before now, but other methods have used an approach similar to face recognition. This involves extracting key features[3], such as the position of the nose and eyes - or in the case of the ear, where the channels lie. These are then represented as a vector, describing where features appear in relation to each other.

The new approach instead captures the shape of the ear as a whole and represents this in code, allowing the whole ear shape to be compared.

EAR PRINT

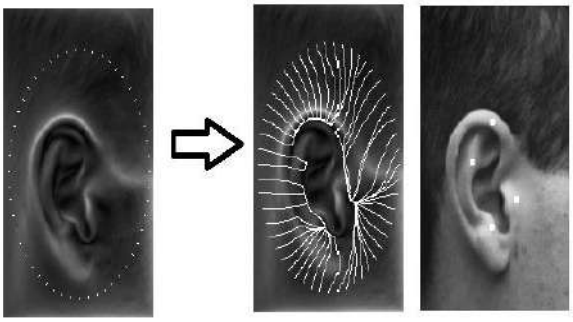
But despite the promising results they may have a job convincing people. In 1998 an ear print left on a window led to the conviction of Mark Dallagher for murdering a 94-year-old woman.

This conviction, however, was overturned in January 2004 because the evidence relating to the ear print was found to be flawed. But Nixon notes that the original evidence was not, strictly speaking, biometric - it relied on a subjective opinion of an ear expert.

EAR BIOMETRICS IDENTIFICATION OVERVIEW:

Human ears plays important role in the forensic science for many years. Ear prints found on the crime scene have been used as a proof in many cases. Human ear contains large amount of specific and unique features that allows for human identification. Ear images can be easily taken from a distance and without knowledge of the examined individual that's why it is suitable for security, surveillance, access control and monitoring applications.

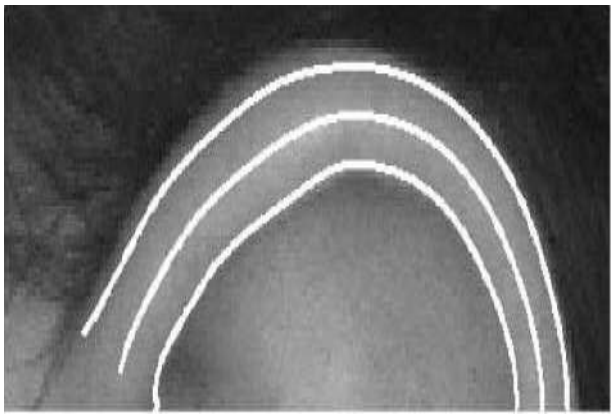
Ear Biometrics based on Force Field Transformation, the application of force field transformation finds energy lines, wells and channels as ear features. (See below snapshot)



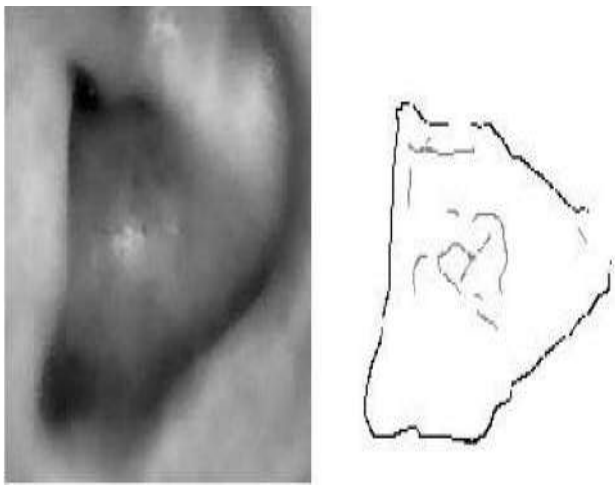
ERROR POSSIBILITIES IN EAR IDENTIFICATION

There are several error possibilities in ear identification. Basically the human ear shape is the same during the whole life and the growth is proportional. However, the gravity can cause ear stretching. The stretching is about five times greater from age of four months to age of eight years and again after about 70 years. The ear can be covered e.g. with hair or a hat. Also the lightning and pose variation can cause error situations.

In identification the idea is to check if the biometrics extracted from the picture sufficiently matches with the previously acquired ones. Because there are changes in the environment and the subject, some tolerance has to be accepted. This tolerance can be defined in terms of false reject rate (FRR) and the false acceptance rate (FAR), exhibited by the system. Usually one of the two is trying to be minimized depending on the required security level. Measuring the absolute measurements can decrease the FAR value. Burge and Burger[1] (1998) have found that the lengths of the art curves are not reliable because there are some small variations depending on the lightning. More reliable measurement is the width of an ear curve corresponding to the upper Helix rim (figure below). This can be reliably extracted and normalized against the height of the ear.



Improving the FRR with ear curve widths.



Removal of noise curves in the inner ear.

Burge and Burger[1] (1998) have found that most of the false curves in the graph model are caused by inner cavity (see previous figure). The main reason is that in the area there's oil and wax build ups, which cause misguiding shadows. The false curves are removed. This can break the remaining curves so we have to merge the neighbor curves.

The main problem with using ear biometrics is that they are not usable if the ear is covered e.g. with a hat or hair. In active identification systems the subject can take the hat of or pull their hair back for authentication. The main problem occurs in passive identification systems. One possibility is to use thermogram images, where the colors in the picture tell the temperature of the segment. In this idea Burge and Burger (1998) use the fact that the temperature of hair is lower that the temperature of the ear. However, the temperature in the outermost parts of the ear can be quite similar with the temperature of hair. In many cases by searching the high temperature parts it is possible to localize the ear.

CONCLUSIONS

In this paper we have given an overview about ear biometrics. We have compared ear biometrics with finger prints and face recognition. Burge and Burger (1998) think that ear biometrics is "viable and promising new passive approach to automated human identification". We think that there are many possibilities in identifying ears. The real life application challenge is to find out which kind circumstances should be arranged to ensure good enough identification rate. Also the research of using thermogram pictures should be continued to find out the possibilities identifying partially covered ears.

Currently another problem is that the images from surveillance cameras can be grainy and blurry. This causes the situation that people are difficult to be recognized even with no mask over the ear. The problems with video cameras should be solved before ear identification can be used in passive identification. We think that it could be possible to use ear identification in active identification, where the person shows his or her ear to the video camera.

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Dynamic Slicing of Object-Oriented Programs

Navreen Kaur Boparai
Department of Computer Science & Engineering
Guru Nanak Dev University
Amritsar, Punjab, India
Navreen.boparai@yahoo.in

Kawaljit Kaur
Department of Computer Science & Engineering
Guru Nanak Dev University
Amritsar, Punjab, India
Kaurkawal029@gmail.com

Abstract- This paper discusses dynamic program slicing as an effective technique for narrowing the errors to the relevant parts of a program when debugging an object-oriented program. Dynamic slicing technique emphasizes the dynamic aspects of the program execution, by considering the dependencies existing between executed program components. The paper focuses on computing dynamic slices in the presence of function overloading, virtual functions and inheritance . Slicing class hierarchies is also described to eliminate from the hierarchy unnecessary data members, member functions, classes, and inheritance relations.

Keywords **: Object Program Dependence Graphs, Control dependency graph, SI-TABLE, Slicing Class Hierarchies .**

I. INTRODUCTION

A slice of a program consists of those statements and predicates in that program that may affect, directly or indirectly, the values of certain variables at certain points in the program**.**Given a slicing criterion, the dynamic slice contains only those statements that actually affect the variables in the slicing criterion. Slicing algorithm can be classed according to whether they only use static information (static slicing) or dynamic execution information for a specific program input (dynamic slicing). "Dynamic program slicing" was first introduced by Korel and Laski.The application of debugging also motivated the introduction of dynamic slicing. The observation here was that slices were typically constructed once a program had produced a failure. In such a situation, the input to the program that caused the fault is available and can be used to narrow the search for the fault, by including only those statement which could have caused this fault to have occurred on the particular execution of interest. Such a slice is called a dynamic slice , because it is constructed with respect to the traditional static slicing criterion *together* with dynamic information (the input sequence supplied to the program, during some specific execution).

A dynamic slice is the executable subset of a program,for a variable at a specific execution position.A slicing criteria of program P executed on input x is a duple C=(x, y^q) where y^q is a variable at execution position q[6].

Dynamic slicing methods can be divided into : forward and backward slicing[4,6]. Dynamic backward slicing[6] requires the whole execution trace to be recorded, and then traditional program dependency analysis is applied to system dependency graph(SDG). Given a set of inputs, a program is executed and traces of execution (executed statements ,and used variable and defined variables in the corresponding statements) are recorded.For a variable v at a point of interest q, the dynamic backward algorithm traces back the recorded execution trace to derive the data dependence and control dependence that contribute to the computation of v at q.Prior recording of the whole execution trace involve space and time complexity problems; on the contrary, Dynamic forward slicing[6] computes dynamic slices at run-time without the need for any recording of execution traces.

Intra-procedural slicing[6] computes slices within one procedure. Calls to other procedures may be handled by dynamic inter-procedural[1] slicing, which can handle data dependence between actual and formal parameters using definition and use of memory locations.The dynamic approaches have the advantage of resolving some of the variable analysis(by value,by reference) by using run-time information.

Agrawal and Horgan presented the first algorithms for finding dynamic slices using dependence graphs [15]. A dynamic slice can also be created from execution history (list of statement occurrences) . To obtain this slice a Dynamic Dependence graph (DDG)[15] is produced from the execution history. A dynamic dependence graph has a vertex for each occurrence of a statement in the execution history and contains only executed edges.

Song proposes method to slice OOPs using dynamic object relationship diagram(DORD) [4,19].These methods compute the dynamic slices for each statement immediately after this statement is executed. After the last statement is executed, the dynamic slices of all statements executed have been obtained..One of the dynamic slicing algorithm uses Object program dependence graph (OPDG) and other static information to reduce the information to be traced during execution. Forward analysis can be combined with backward one. In the forward process, it marks information on the OPDG and computes dynamic slices at the necessary points during the program execution. In the backward process, it traverses the OPDG marked to obtain the final dynamic slices.

There are also methods for computing dynamic slices of a concurrent object oriented programs[9]. Mohapatra et al. proposed a marking based dynamic slicing (MBDS) algo-

rithm for dynamic slicing of concurrent Java programs without using trace files,which uses *concurrent controlflow graph* (CCFG) and *concurrent system dependence graph* (CSDG) as the intermediate representations. The MBDS algorithm is based on marking and unmarking the edges of the CSDG as and when the dependencies arise and cease during run-time.

The utility and power of Dynamic program slicing comes from the ability to assist in tedious and error prone tasks such as program debugging ,testing, parallelization ,integration,software safety,understanding ,software maintenance and software metrices.

The rest of the paper is organized as follows: Section 2 highlights the limitations of static slicing that leads to introduction of dynamic slicing, Section 3 discusses Program Dependence Graphs(OPDG) representation of OO program and corresponding computation of dynamic slices , Section 4 describes how to find dynamic slices in case of function overloading,Section 5 briefs the finding of dynamic slices for virtual functions , Section 6 presents an overview of slicing class hierarchies, Section 7 describes variations in dynamic slicing methods, Section 8 discusses applications .Conclusion are given in section 9.

II. NEED OF DYNAMIC SLICING

Dynamic Slicing was introduced as an extension to static slicing that tries to overcome the following limitations[6] of static slicing :

- Static slicing constructs large slices due to the assumption that all reachable nodes within the PDG or SDG[10,18] have to be included in the slice.In addition highly cohesive program might result in the whole program to be included in the slice.
- Static slicing lacks the support to dynamic language constructs ,e.g. dynamic binding, polymorphism ,etc.
- Due to lack of run time information ,the number of statements that have to be considered for the slice might be larger than necessary.

Dynamic slices are very attractive as an aid to debugging, and they are superior to static slices for this application[11]. The size of the slice can be considerably reduced , thus allowing an easier localization of the bugs.[12] Another advantage of dynamic slicing is the run-time handling of arrays and pointer variables. Dynamic slicing treats each element of an array individually, whereas static slicing considers each definition or use of any array element as a definition or use of the entire array . Similarly, dynamic slicing distinguishes which objects are pointed to by pointer variables during a program execution.

III. DYNAMIC SLICING BASED ON OPDG

The final representation of an OOP is called an **Object Program Dependence Graphs**(OPDG) [4,8] to represent OO features including class,inheritance and polymorphism. A dynamic slicing method for OO programs based on dependence analysis can be used . It computes dynamic slices by combining static dependence information and dynamic execution of the program. By analyzing the control flow graph, fewer breakpoints are inserted to trace the execution of the program. It is an approach combining forward analysis with backward one. In the forward process, it marks information on the object program dependence graph (OPDG) and computes dynamic slices (they are used to record dynamic execution information) at the necessary points during the program execution. In the backward process, it traverses the OPDG marked to obtain the final dynamic slices. Based on this model ,there are methods to dynamically slice methods, objects and classes.The dynamic slicing criterion is of the form <INPUT, i, j, FILENAME>, where INPUT denotes the actual input during an execution, i is the line-number of a statement, j is the loop number i, i.e. the jth occurrence of i. FILENAME is the name of file includes i.By default FILENAME is the current file. For slicing methods :Compute the OPDG first using static analysis, then mark the nodes and dependence edges that do occur during execution, finally transverse the marked OPDG and obtain the dynamic slice. To slice an object, we change the slicing criterion to <INPUT, i, j,Object>.Object slicing identifies the statements in the methods of the Object that might affect the computation of i in the slicing criterion <INPUT, i, j>.To slice a class, the slicing criterion is changed to <INPUT, i, j, Class>. The result of dynamic class slicing is a class including partial data members and statements in the methods of the Class, and these data members and statements might influence the variables defined at i in its jth execution.

IV.FINDING DYNAMIC SLICE FOR FUNCTION OVERLOADING

This section discusses one algorithm which is useful to find the slice of the object oriented program and it focuses on slicing in the presences of classes, objects, function Overloading. Control dependency graph [2,3] is used for intermediate representation of the program . The control dependence graph (CDG) G of an object oriented program P is a graph G=(N,E),where each node n ε N represents statement of the program P. For any pair of nodes x and y,(x,y) ε E if node x is control dependent on node y.The improved InterSlice Algorithm[2,3] also uses a collection of control dependence graphs as the intermediate program representation & computes precise dynamic slice. The space complexity of the improved Interslice algorithm is also $O(n^2)$.The time complexity of this algorithm is linear as no extra data structures are required for this enhancement .This algorithm does not require to store the past execution history.

V.FINDING DYNAMIC SLICE FOR VIRTUAL FUNCTION

For handling virtual functions, the concept of VTABLE[2] is used.The compiler places the address of the virtual functions for that particular class in the VTABLE

and vptr points to the appropriate VTABLE. If a class contains a
virtual function then when we create an object of that class the first two byte of the object will hold the address of the VTABLE.If that virtual function is not redefined in the derive class,the compiler uses the address of the base version in the derive class. When the object of the base class and derive class are created the compiler places a pointer called the Vpointer or Vptr which points to the VTABLE of the appropriate class. For finding the dynamic slice similarly the slicer maintains a table known as SI-TABLE (SlicerInformationTABLE)[2]. In that table, one extra bit is present known as RD bit(ReDefine bit) ,and other contents are same as the content of VTABLE.This bit indicates whether the function is redefined in the derive class or not. If the function is redefined in the derive class then this bit is set means 1 otherwise this bit is not set means 0.When a virtual function is called first this bit is checked for that class and if this bit is 1 then the derive version of the function is called otherwise the base class version of the function is called. By using these information the slicer will know which function to call and then proceed normally.

VI.SLICING CLASS HIERARCHIES

An algorithm for slicing class hierarchy (a collection of C++ classes and and the inheritance relations among them) [5] eliminates from the hierarchy those data members, member functions, classes, and inheritance relations that are unnecessary for ensuring that the semantics of the program is maintained. Consider now the example in Fig. 1(a), which shows a class hierarchy that uses both multiple inheritance and virtual inheritance. We are interested in determining the slice with respect to the final value of v in the main program. The value of v is equal to the value of data member x accessed via pointer b.By carefully examining the program we can observe that:

- The statements C* c = &d and c –>x = 71 in procedure main that manipulate the x are irrelevant for v's final value.
- Neither S::bar() nor S::foo() are called, so they are irrelevant to v's final value.
- Although S::foo() is not called, it cannot be eliminated, because the absence of a statically "visible" definition of foo() from the body of C::bar() would prevent B::foo() from being called.
- The inheritance relation between classes B and S, while "locally" superfluous, cannot be removed, since it affects the dominance relation between

```
class A {
public:
int x;
};
class S {
public:
virtual void foo();
void bar();
};
class B : public A, public virtual S {
public:
virtual void foo();
};
class C : public A, public virtual S {
public:
void bar();
};
class D : public B, public C { };
void S::foo(){  };
void S::bar(){ };
void B::foo(){ x++; };
void C::bar(){ this–>foo(); };
void main(){
D d;
B* b = &d; b–>x = 17;
C* c = &d; c–>x = 71;
d.bar();
int v = b–>x;
int w = c–>x;
}
```

(a)

```
class A {
public:
int x;
};
class S {
public:
virtual void foo();
[          ]
};
class B : public A, public virtual S {
public:
virtual void foo();
};
class C: [          ] public virtual S {
public:
void bar();
};
class D : public B, public C { };
void S::foo(){ };
[          ]
void B::foo(){  x++; };
void C::bar(){ this–>foo(); };
void main(){
D d;
B* b = &d; b–>x = 17;
[          ] [          ]
d.bar();
int v = b–>x;
[          ]
}
```

(b)

Fig. 1. **(a)** Example program. **(b)** Slice of the example program w.r.t. the final value of v; constructs irrelevant to the final value of v have been omitted and replaced by boxes.

B::foo() and S::foo().

- The inheritance relationship between C and A is not needed for determining the final value of v.

By considering the above mentioned points , statements irrelevant to the final value of v can be removed and the resulting slice is shown in Fig. 1(b).

The combination of statement slicing and class slicing[5] for C++ has two principal applications: First, class slicing can enhance statement slicing's utility in program debugging and understanding applications, by eliminating both executable *and* declarative program components irrelevant to the slicing criteria. Second, the combination of the two slicing algorithms can be used to decrease the space requirements of programs that do not use all the components of a class hierarchy.Constructs irrelevant to the final value of a variable are omitted .Such removal of unnecessary inheritance links results in more optimized program.

VII.VARIANTS OF DYNAMIC SLICING

A. Conditioned Slicing

The static and dynamic paradigms represent two extremes − either we say *nothing* about the input to the program (static slicing) or we say *everthing* (dynamic slicing). Conditioned slicing allows us to bridge the gap.Any slice constructed with respect to a particular condition may therefore omit irrelevant statements. This approach to slicing is called the 'conditioned approach' [7,11], because the slice is conditioned by knowledge about the condition in which the program is to be executed.By building up a collage of conditioned slices which isolate different aspects of the program's behaviour, we can quickly obtain a picture of how the program behaves under various conditions. Conditioned slicing is really a tool−assisted form of the familiar approach to program comprehension of divide and conquer.

B. Simultaneous dynamic slicing

A different form of slicing introduced by Hall [12] computes slices with respect to a set of program executions. This slicing method is called *simultaneous dynamic program slicing* because it extends dynamic slicing and simultaneously applies it to a set of test cases, rather than just one test case. Hall [12] proposed an iterative algorithm that, starting from an initial set of statements, incrementally builds the simultaneous dynamic slice, by computing at each iteration a larger dynamic slice. Simultaneous dynamic slicing has been used to locate functionality in code. The set of test cases can be seen as a kind of specification of the functionality to be identified.

C. Intermodular Program Slicing

The notion of *interprocedural* slicing can be extended to *intermodular* slicing[13]. Information that has been computed once is reused when slicing other modules that import previously sliced modules.Large programs can be split up into several modules which may be compiled separately, each module defining its interface by exporting or not exporting items (variables, constants, types, procedures etc.). This interface is then stored in a so-called "symbol file". Other modules can import already existing modules, and the compiler uses the symbol files for type checking the imported items across module boundaries.We extended this idea to provide for intermodular slicing in the following way: control flow and data flow information that is computed during slicing is stored in a repository and is reused when slicing dependent modules.

D. Executable and non-executable dynamic slicing

Two major types of dynamic slicing are : executable dynamic slicing and non-executable dynamic slicing[17] . Informally, an executable dynamic slice is a slice that can be executed and it preserves a value of a variable of interest. On the other hand, a non-executable slice is a subprogram that contains statements that "influence" the variable of interest and, in most cases, it cannot be executed.

VIII. APPLICATIONS

The following will introduce how to apply[4] dynamic slicing and dependence analysis to program debugging. A typical debugging process might include the following steps:

(1) Finding errors: Execute the program by a given input. If the result is not coincident with the respected result, we can determine that there are errors in the program. Suppose the result of variable V at statement i is error when we input INPUT.

(2) Localizing errors:The purpose is to narrow the errors to the program section before the breakpoint. The i in a slicing criterion <i, V> is a breakpoint in nature and V is the variable set interesting. But program slice only includes the statements that influence the V at i, not all the statements before i. Thus, the error codes are localized to a less program section.

(3) Modifying errors: Modify the program according to the specification.

(4) Analyzing ripple effort : Program is a system with interactions among statements. The modification of an error (statement) might cause other unexpected errors.Thus when a statement is modified we must check the statements affected by the modification and modify them if necessary. The process to analyze the affected statements is called ripple analysis .

Figure 2 depicts one of the debugging model. A prototype debugger, named SPYDER[20], combines dynamic slicing with backtracking for debugging. SPYDER can find dynamic slices for us automatically.It can also restore the program state at any desired location by *backtracking* the program execution without having to re-execute the program from the beginning.

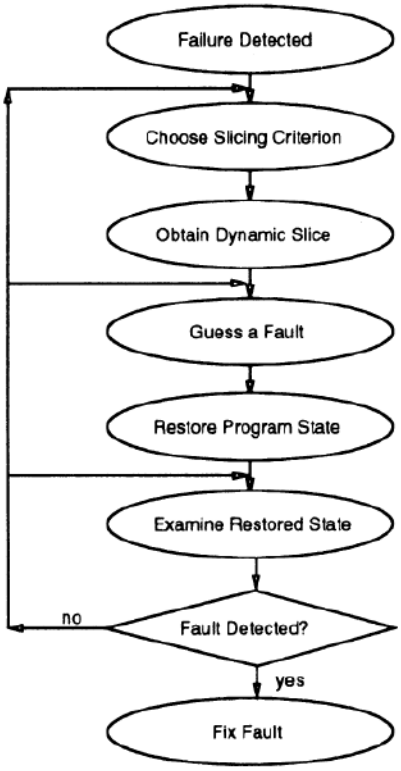

Fig. 2. A debugging model

Other applications are :

- Program Optimization[5] :Class Sicing helps in the removal of virtual inheritance links , resulting in the optimized program.
- Regression Testing[6] :Slicing solve problems encountered in regression testing. Several algorithms based on program slicing have been proposed to reduce the cost of regression testing.
- Maintenance[6]: It is used by maintainers for program understanding and maintenance ,e.g.coupling metric analysis. Dynamic slicing ease the problem associated with revalidation and reduces the resources required for maintenance activities. Independent and dependent statements[16] define a set of rules that maintainers must obey to make modifications without ripple effects and unexpected linkages.
- Tuning compilers[14]: Larus and Chandra present an approach for tuning of compilers where dynamic slicing is used to detect potential occurrences of redundant common subexpressions. Finding such a common subexpression is an indication of suboptimal code being generated.
- Differencing[15]:Dynamic slicing can be used to identify the semantic differences between two programs (old and a new version of a program).
- Parallelization [14]: Weiser describes how slicing can be used to *parallelize* the execution of a sequential program.Several slices of a program are executed in parallel, and the outputs of the slices are *spliced* together in such a way that the I/O behavior of the original program is preserved. In principle, the splicing process may take place in parallel with the execution of the slices.

IX.CONCLUSION

This paper discusses dynamic slicing of object oriented program. Dynamic slicing can be done in the presence of various oops features like classes, objects, function overloading, polymorphism, virtual functions , inheritance , etc. Dynamic slicing is superior to static slicing due to large size of slice in static slicing. A dynamic slicing method for OO programs has been discussed which uses dependence analysis and Object Program Dependence Graphs(OPDG) . It computes dynamic slices by combining static dependence information and dynamic execution of the program. Slicing class hierarchies removes irrelevant inheritance links which results in optimized program . Various variants of dynamic slicing like conditioned slicing, simultaneous slicing ,internodular slicing, etc. compute dynamic slices accordingly. Dynamic slicing finds its application in debugging, testing, maintenance, etc.

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A STUDY OF SPACE TIME BLOCK CODING FOR MIMO SYSTEM

Gundeep Singh
M.Tech, research scholar(ECE)
Amritsar College of Engineering & Technology
Punjab, India
er.gundeep17@gmail.com

Dr.V.K.Banga
Principal & Professor
Amritsar College of Engineering & Technology
Punjab, India
vijaykumar.banga@gmail.com

Abstract*—MIMO wireless technology has grown in the last few years. MIMO technology was mainly used for the analysis of channel capacity and also lead to the research for MIMO channel model, Space-Time coding. A signaling technique called Space-Time coding uses the MIMO structure to improve the robustness of communication link. Space–time block codes are designed to achieve the maximum diversity order for a given number of transmit and receive antennas subject to the constraint of having a simple decoding algorithm. This paper presents a study of diversity coding for MIMO systems.

Keywords **Alamouti Scheme, Transmit Diversity, Multiple-Input Multiple-Output (MIMO), Space-Time Block codes.**

I. INTRODUCTION

In a wireless communication system, the transmitter sends the signal to receiver through the wireless channel. Channel may consist of reflectors which will lead to multi path propagation means the multiple copies of transmitting signal arrives at receiver after reflecting from the objects present in the channel. It causes the constructive or destructive interference. To combat the effect of interference or fading MIMO System is used. MIMO stands for multiple-input multiple-output. A MIMO wireless system is a communication link for which we have multiple antennas at the transmitter as well as multiple antennas at the receiver. The principle goal of MIMO technology is to improve either the quality (BER) or the data rate of the communication by means of adequate signal processing techniques at both ends of the system. The capacity can increase linearly with the number of antennas when using MIMO system. MIMO can obtain both multiplexing gain and diversity gain thus significantly increasing the system capacity as well as improving the reliability of the wireless link. Having high spectral efficiency MIMO technology is developed for the new generation mobile cellular communication. The advantage of MIMO communication can be divided into three main categories: Spatial multiplexing for enhancing the data transmission rate, transmit diversity using space time coding for enhancing the robustness (E.g. bit error rate BER) of the transmission and beam forming for improving other users [3]. Because of the enormous capacity increase MIMO systems gained a lot of interest in mobile communication research [1], [2].One essential problem of the wireless channel is fading, which occurs as the signal follows multiple paths between the transmit and the receive antennas. Under certain, not uncommon conditions, the arriving signals will add up destructively, reducing the received power to zero (or very near to zero). In this case no reliable communication is possible. Fading can be mitigated by diversity, which means that the information is transmitted not only once but several times, hoping that at least one of the replicas will not undergo severe fading. Diversity makes use of an important property of wireless MIMO channels: different signal paths can be often modeled as a number of separate, independent fading channels. These channels can be distinct in frequency domain or in time domain.

Several transmission schemes have been proposed that utilize the MIMO channel in different ways, e.g., spatial multiplexing, space-time coding or beam forming.

II. OVERVIEW OF MIMO SYSTEMS

There are four types of Communication models[4] or multiple antenna systems – SISO, SIMO, MISO and MIMO

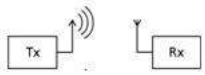
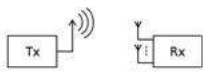
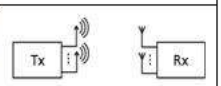
Multi-antenna types		
SISO	Single-input-single-output means that the transmitter and receiver of the radio system have only one antenna.	
SIMO	Single-input-multiple-output means that the receiver has multiple antennas while the transmitter has one antenna.	
MISO	Multiple-input-single-output means that the transmitter has multiple antennas while the receiver has one antenna.	
MIMO	Multiple-input-multiple-output means that the both the transmitter and receiver have multiple antennas.	

Table 2.1: multi-antenna types

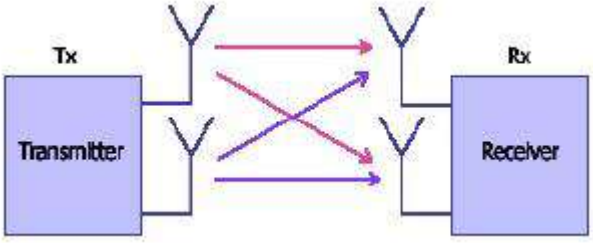


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Fig.2.1- Multi Input Multi Output (MIMO)- size2x2

To multiply throughput of a radio link, multiple antennas (and multiple RF chains accordingly) are put at both the transmitter and the receiver. This system is referred to as Multiple Input Multiple Output (MIMO). A MIMO system with similar count of antennas at both the transmitter and the receiver in a point-to-point (PTP) link is able to multiply the system throughput linearly with every additional antenna. For example, a 2x2 MIMO will double the throughput. Two antennas at both the transmitter and the receiver side uses transmit and receive diversity transmit and receive diversity.

III. SPACE-TIME CODING

Space-time coding (STC), introduced first by Tarokh at el. [5], [6] is a promising method where the number of the transmitted code symbols per time slot is equal to the number of transmit antennas. These code symbols are generated by the space-time encoder in such a way that diversity gain, coding gain, as well as high spectral efficiency are achieved. Space-time coding finds its application in cellular communications as well as in wireless local area networks.

There are various coding methods as space-time trellis codes (STTC), space-time block codes (STBC), space-time turbo trellis codes and layered space-time (LST) codes. A main issue in all these schemes is the exploitation of redundancy to achieve high reliability, high spectral efficiency and high performance gain [7]. The design of STC amounts to find code matrices that satisfy certain optimality criteria. In particular, STC schemes optimize a trade-off between the three conflicting goals of maintaining a simple decoding algorithm, obtaining low error probability, and maximizing the information rate.

3.1 SPACE-TIME BLOCK CODING

Space–Time Block Codes (STBCs) are the simplest type of spatial temporal codes that exploit the diversity offered in systems with several transmit antennas. In 1998, Alamouti designed a simple transmission diversity technique for systems having two transmit antennas [8]. This method provides full diversity and requires simple linear operations at both transmission and reception side. The encoding and decoding processes are performed with blocks of transmission symbols. Alamouti's simple transmit diversity scheme S was extended in [9] and [10], [11] thanks to the theory of orthogonal designs for larger numbers of transmit antennas. These codes are referred as Orthogonal Space–Time Block Codes (OSTBCs).

The transmit diversity technique proposed by Alamouti was the first STBC [6]. The encoding and decoding operation is carried out in sets of two modulated symbols. Hence, the information data bits are first modulated and mapped into their corresponding constellation points.

3.2 ALAMOUTI STBC WITH TWO RECEIVE ANTENNA

3.2.1 Alamouti Code

Historically, the Alamouti code is the first STBC that provides full diversity at full data rate for two transmit antennas [9]. A block diagram of the Alamouti space-time encoder is shown below

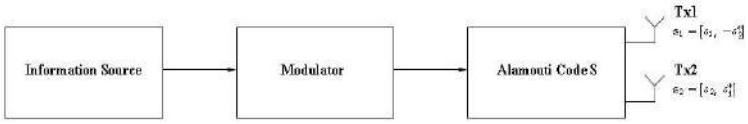

Fig 3.1: A block diagram of the Alamouti space-time encoder

The information bits are first modulated using an M-ary modulation scheme. The encoder takes the block of two modulated symbols s1 and s2 in each encoding operation and hands it to the transmit antennas according to the code matrix

$$\mathbf{S} = \begin{bmatrix} s_1 & s_2 \\ -s_2^* & s_1^* \end{bmatrix} \quad \ldots(1)$$

The first row represents the first transmission period and the second row the second transmission period. During the first transmission, the symbols s1 and s2 are transmitted simultaneously from antenna one and antenna two respectively. In the second transmission period, the symbol $-s_2^*$ is transmitted from antenna one and the symbol s_1^* from transmit antenna two.

The principle of space time block coding with 2 transmit antenna and one receive antenna is explained in the post on Alamouti STBC . With two receive antenna's the system canbe modeled as shown in the figure below.

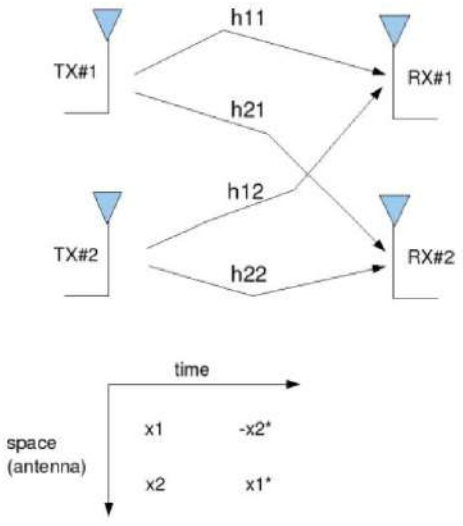

Fig 3.2: Transmit 2 Receive Alamouti STBC

The received signal in the first time slot is,

$$\begin{bmatrix} y_1^1 \\ y_2^1 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} n_1^1 \\ n_2^1 \end{bmatrix} \quad \ldots(2)$$

Assuming that the channel remains constant for the second time slot, the received signal is in the second time slot is,

$$\begin{bmatrix} y_1^2 \\ y_2^2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} -x_2^* \\ x_1^* \end{bmatrix} + \begin{bmatrix} n_1^2 \\ n_2^2 \end{bmatrix} \quad \ldots(3)$$

Where,

$\begin{bmatrix} y_1^1 \\ y_2^1 \end{bmatrix}$ are the received information at time slot 1 on receive antenna 1, 2 respectively,

$\begin{bmatrix} y_1^2 \\ y_2^2 \end{bmatrix}$ are the received information at time slot 2 on receive antenna 1, 2 respectively,

h_{ij} is the channel from i^{th} receive antenna to j^{th} transmit antenna,

x_1, x_2 are the transmitted symbols,

$\begin{bmatrix} n_1^1 \\ n_2^1 \end{bmatrix}$ are the noise at time slot 1 on receive antenna 1, 2 respectively and

$\begin{bmatrix} n_1^2 \\ n_2^2 \end{bmatrix}$ are the noise at time slot 2 on receive antenna 1, 2 respectively.

Combining the equations at time slot 1 and 2,

$$\begin{bmatrix} y_1^1 \\ y_2^1 \\ y_1^{2*} \\ y_2^{2*} \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \\ h_{12}^* & -h_{11}^* \\ h_{22}^* & -h_{21}^* \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} n_1^1 \\ n_2^1 \\ n_1^{2*} \\ n_2^{2*} \end{bmatrix} \quad \ldots(4)$$

Let us define H,

$$\boldsymbol{H} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \\ h_{12}^* & -h_{11}^* \\ h_{22}^* & -h_{21}^* \end{bmatrix} \quad \ldots(5)$$

To solve for $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$, we know that we need to find the inverse of $\boldsymbol{H}$.

We know, for a general m x n matrix, the pseudo inverse is defined as,

$$\boldsymbol{H}^+ = (H^H H)^{-1} H^H \quad \ldots(6)$$

The term,

$$(H^H H) = \begin{bmatrix} |h_{11}|^2+|h_{21}|^2+|h_{12}|^2+|h_{22}|^2 & 0 \\ 0 & |h_{11}|^2+|h_{21}|^2+|h_{12}|^2+|h_{22}|^2 \end{bmatrix} \quad ..(7)$$

Since this is a diagonal matrix, the inverse is just the inverse of the diagonal elements, i.e

$$(H^H H)^{-1} = \begin{bmatrix} \frac{1}{|h_{11}|^2+|h_{21}|^2+|h_{12}|^2+|h_{22}|^2} & 0 \\ 0 & \frac{1}{|h_{11}|^2+|h_{21}|^2+|h_{12}|^2+|h_{22}|^2} \end{bmatrix} \quad ..(8)$$

The estimate of the transmitted symbol is,

$$\begin{bmatrix} x_1 \\ x_2^* \end{bmatrix} = (H^H H)^{-1} H^H \begin{bmatrix} y_1^1 \\ y_2^1 \\ y_1^{2*} \\ y_2^{2*} \end{bmatrix} \quad \ldots(9)$$

3.3 Space Time Trellis Coding

Unlike STBC another MIMO technique Space Time Trellis Coding (STTC) that provides full diversity and coding gain [6]. STTC combines coding, where the coding gain is obtained but with the disadvantage of increased decoding complexity, modulation, transmit diversity, and optional receive diversity. STTC which was proposed for two transmit antennas has been extended to more transmit antennas [12], [13]. Figure 3.3 shows a block diagram of a STTC, with Nt which shows the number of transmit antennas and Nr which shows the number of receive antennas. As shown in figure 3, STTC encoder maps one symbol at a time to Nt x 1 vector output after coding the data. The channel code creates correlation between

codewords across time (between successive symbols) and space (between different transmit antennas).
Viterbi Algorithm is implemented at the receiver in STTC decoder. We get the advantage of improvement in BER performance by increasing the number of stages but this comes at the cost of additional decoding complexity.

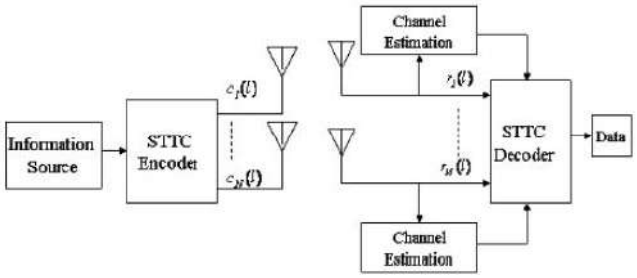

Fig 3.3 STTC block diagram

The branch metric at the receiver is given by [15]

$$\sum_{j=1}^{N_r} \left| r_t^j - \sum_{j=1}^{N_r} h_{j,i}\, q_t^i \right|^2 \quad \ldots.(10)$$

where at time t,

r_t^j = the received signal at the jth receive antenna,

hj,i = the channel path between trmansmit antenna i and receive antenna j, .

$q_{t1} q_{t2} \ldots q_{tn}$ = to the transition through the trellis.

IV. Comparison of STBC and STTC

Space-time block codes and space-time trellis codes are two very different transmit diversity schemes. Space-time block codes are constructed from known orthogonal designs [14], achieve full diversity, and are easily decodable by maximum likelihood decoding via linear processing at the receiver, but they suffer from a lack of coding gain. On the other hand, space-time trellis coders possess both diversity and coding gain, yet are complex to decode and arduous to design.

Since space time block codes possess diversity gain and the receiver design is less complex hence easy to decode the received signal. So space time block codes (STBC) are preferred over space time trelles codes (STTC) for the mimo system design.

V.Conclusion

This paper provides a basic overview of MIMO system. A basic introduction of Space-time coding was provided by presenting Almouti's scheme. The Alamouti scheme for 2 transmit and 2 receive antenna has been discussed. Further the STBC and STTC schemes are being studied. STBC possess only coding gain on the other hand STTC possess both diversity and coding gain but the receiver complexity of STTC is more than STBC so received signals are easily decoded with STBC. So STBC is preferred over STTC. The following table shows the advantages and requirements of space time coding schemes.

Space Time Coding schemes	Requirements				Advantages (achieved gains)
	Multi. Ant.	CSI	BW	Rx Complexity	
Alamouti's scheme	Tx (Rx optional)	Rx	N	low	diversity gain
Delay diversity	—	–	N	moderate/high	diversity gain
STTCs	—	–	N	high	diversity & coding gain
QOSTBCs	—	–	N	low	diversity gain
Super orthogonal STTCs	—	–	N	moderate/high	diversity & coding gain
SF/STF codes	----	–	W	varies	diversity (& coding gain)

Table 2. Space time coding schemes requirements and advantages.

In the table 2 Tx, Rx, CSI, BW, N, W indicates transmitter, receiver, channel state information, bandwidth, narrow (frequency flat fading), wide (frequency selective fading) respectively.In all the above space time coding schemes, multiple antennas are required at transmitter side and the antennas at the receiver side are optional. Channel state information is required only at receiver side.

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Various Aspects of Data Warehouse: A Review

Manisha Dhawan
M.Tech Research Scholar
Dept. of CSE
ACET, Amritsar
manishadhawan225@gmail.com

Er. Amarpreet Singh
Associate Professor
Dept. of CSE
ACET, Amritsar
amarmandeep@yahoo.com

Abstract-
A data warehouse is a collection of data from different sources. Data warehouse stores huge amount of data. Basically data warehouse is a crosswords i.e. (a point where a choice of data must be made) as data warehouse is a collection of information that provides an effective way for analysis. This paper throws the light on various aspects of Data Warehouse like Data Warehouse- Models, Design, Architecture and Applications.

Keywords: Data Warehouse design, Query Manager, Load Manager, DSS.

I. INTRODUCTION

Basically data warehouse is a decision Support system, which makes appropriate decision for solving online queries. As data warehouse design concern this paper indicates various models used i.e. logical model, conceptual model, and physical model. As in data warehouse the conceptual level provides a level of abstraction i.e. hiding the internal details of data and know the external view of data. Conceptual modeling is a basic building block of data. Data must be analysis first before implementing for design purpose. Data warehouse gives rise to the architecture of data, storing of data and solving complex queries. As in logical model, we have to describe the data in detailed manner. Various types of keys and relationship used in logical data model. Later, on make a short view on physical data model. This physical data model describes the diagrammatic view of data. As physical data model explain that the data will be filled appropriately as constraints will be applied to data and various primary and foreign key will be used. Physical model describe the physical view of data in a relation. This paper describes the physical structure of data as how data will be analyzed and then later on makes an appropriate design. This paper proposes and discusses the data warehouse architecture efficiently [1]. This paper highlights the modeling of data warehouse as well as its modeling along with their applications.

The architecture layer describes the structure of data warehouse. The architecture of data warehouse depends on the business process of any organization. Alight has been thrown on different types of architecture i.e.

- Process architecture
- Data model architecture
- Technology architecture
- Information architecture
- Resource architecture [2]

In data warehouse architecture a physical layout of data has been described in a database. This paper also discussed the applications of data warehouse. Data warehouses use a decision support system as it makes decision faster and more comprehensive. Decision support system provides information for users to analyze situations and make decisions. As this paper discussed the basic design and modeling of data warehouse with its applications below:

II. DATA WAREHOUSE DESIGNING

In planning part of Data Warehouse, this paper focuses on some services as discussed below: [3]

• Acquisition – It means as data will be obtained from operational environment to the data warehouse.

• Preparation –It means package of data used for many purposes. • Navigation –assist the consumers for finding and using data warehouse resources

• Access –With the help of tools it can interact data warehouse data directly.

• Delivery – Data will be delivered to the consumers appropriately.

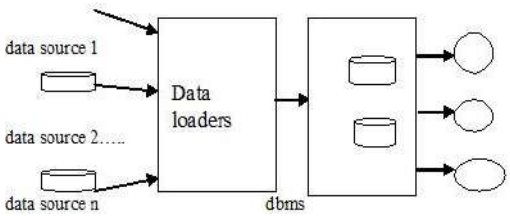


Fig.1. Design Of Data Warehouse

A. MODELS OF DATA WAREHOUSE WITH ITS INSTANCES

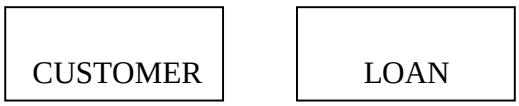
- *Conceptual Modeling*:

Conceptual modeling provides a high level of abstraction. As abstraction is a part of data encapsulation, encapsulation means wrapping of data in a single unit. Abstraction means hiding the internal details and knows the external details very well. In conceptual modeling, the data is well documented and fully satisfied the user requirement. In this the data is to be designed as well as managed properly. Conceptual modeling for DWs has two points of view.

Multidimensional Modeling. The existing approaches may be framed into three categories: extensions to the Entity-Relationship model, extensions to UML and ad hoc models. Multidimensional model represents the low possibility of defining advanced concepts such as irregular hierarchies, many-to-many associations. A conceptual data model identifies the highest-level relationships between the different entities. [5] Features of conceptual data model include:

1. Includes the important entities and the relationships among them.
2. No attribute is specified.
3. No primary key is specified.

Consider the example from the company environment, in which the customers pay repayments on their building loans each month. In this case the event is the repayment of the loans. Fig.2 shows a "repayment" as a fact set.



"Customer" and "loan" as entity sets in the mortgage company example.

Relationship set: represents a set of associations among entity sets or among entity sets and fact sets. Its cardinality can be many-to-many (N: M), many-to-one (M: 1) or one-to- many (1: M). The graphical representation of a relationship set, in both cases, is a diamond. Relationship sets among entity sets; Figure shows the example of these types together with their graphical representation

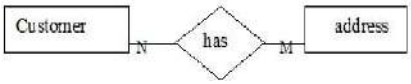


Fig.2. Shows The Relationship Set Between "Customer" and his/her "address".

- *Logical Data Model*: A logical data model describes the data in as much detail as possible, without regard to how they will be physical implemented in the database. Features of a logical data model include: They includes all entities and relationships among them. All attributes for each entity are specified.

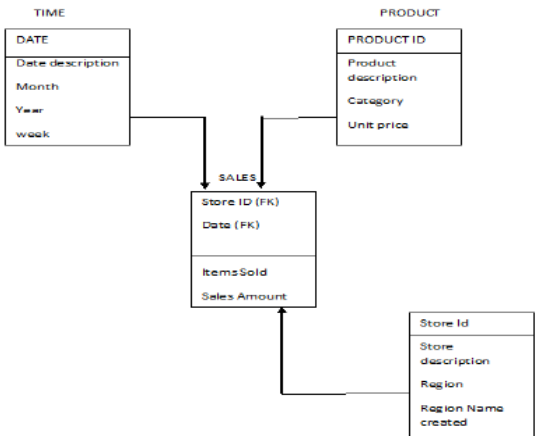


Fig.3. Example of Logical Data Model [6]

- *Physical Data Model*: Physical data model represents how the model will be built in the database. A physical database model shows all table structures, including column name, column data type, column constraints, primary key, foreign key, and relationships between tables. Features of a physical data model include: Specification of all tables and columns. Foreign keys are used to identify relationships between tables. Denormalization may occur. Physical

considerations may cause the physical data model to be quite different from the logical data model. [6]

The figure shows the example of physical data model.

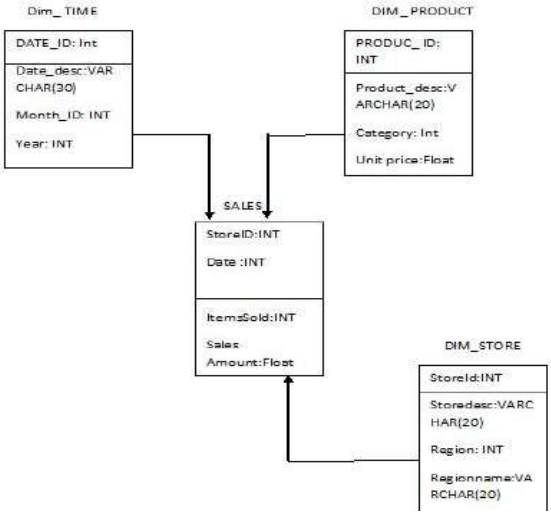


Fig.4. Example of Physical Data Model [6]

III. ARCHITECTURE OF DATA WAREHOUSE

A data warehouse is a gathering of data, collecting data from various sources and stored under a unified schema. 3 types of manager are used in this architecture: Load manager, Warehouse manager and Data access manager (query manager)

A. Load manager – load manager component of data warehouse is responsible for collection of data from operational system and converts them into usable form for the users. This component is responsible for importing and exporting data from operational system. This component includes all of the programs and applications interfaces that are responsible for pooling the data out of the operational system, preparing it, loading it into warehouse itself.

B. Warehouse manager- The warehouse manager is the center of data warehousing system and is the data warehouse itself. It is a large, physical database that holds a vast amount of information from a wide variety of sources. The data within the data warehouse is organized such that it becomes easy to find, use and update frequently from its sources.

C. Query manager- Query manager component provides the end users with access to the stored warehouse information through the use of specialized end-user tools. Data mining access tools have various categories such as query and reporting, online analytical processing, data discovery and graphical and geographical information system.

IV. APPLICATIONS OF DATA WAREHOUSE

This paper highlights applications of data warehouse as discussed below:

- Large amount of data store in data warehouse i.e. operational applications – In this the discussion is on the library system as it grows up to a terabyte of data which means that library stores a large amount of record of several departments [7].

- Data warehouse support a DSS- Data warehouse support a DSS as being a part of database community. The 'data warehouse' is a read-only analytical database that is used as the foundation of a decision support system. The purpose of a data warehouse is to ensure the appropriate data is available to the appropriate end user at the appropriate time. A data warehouse is a global repository that stores pre-processed queries on data, which reside in multiple, possibly heterogeneous, operational query base for making effective decisions. In a data warehouse, such queries find their answers in a central place, thus reducing the processing and management costs [8].

V. CONCLUSION

In this paper we have discussed the general concept of data warehouse. A good data warehouse model is a synthesis of assorted non-traditional factors. We also discusses the models of data warehouse i.e. logical model and physical model in which data is described in a detailed manner, physical model describes the diagrammatic view of data and conceptual model hides the internal view of data. This paper also highlights the general architecture of data warehouse.

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Implementation of Covert Channel for Secure Data Transfer in VANETs

Kimi Manchanda
M.Tech Research Scholar
Deptt. of CSE
ACET, Amritsar
kimimanchanda@ymail.com

Er. Amarpreet Singh
Associate Professor
Deptt. of CSE
ACET, Amritsar
amarmandeep@yahoo.com

Abstract- Moving into the VANET (Vehicular adhoc network) makes very beneficial for the vehicles to converse with each other and every node (vehicles) present in the VANET through Intelligent Transport System (ITS). In the normal scenario the communication between the nodes in VANET can also be easily intercepted by the third party which is a case of security lapse. But in many situations this lapse could result in huge destruction in one or the other way. So, to counter such problem, this paper proposes a new scheme that make use of Covert Channels to secure the data from third party which is also a part of that network.
Keywords: Covert Channel, VANET, ITS, Adhoc , Overt.

I. INTRODUCTION

In VANET, the communication is done through the Intelligent Transport System (ITS). All the communications between the vehicles are handled by On-Board Unit (OBU). To provide security in the VANET adhoc network, the implementing the security techniques for this purpose. There are many techniques to provide the security of sharing of undisclosed information from the third party.

A. Why do VANET need security

VANET networks need security of data between two nodes from the intimidation of leaking the secret information to the unauthorized party. This paper lights to what is the need of security in VANET with the help of an example:

Suppose in the VANET networks, there are vehicles or nodes which are categorised into three types according to their profile.

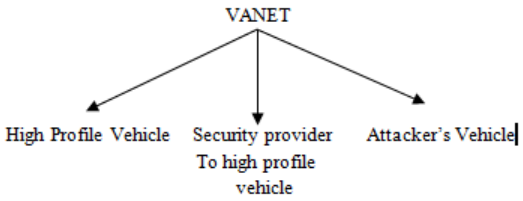

Fig.1.Classification Of Vehicles According To Their Rank

- High Profile

High profile vehicle within a VANET is one that carries some delegate/sensitive entity (suppose any Minister).

- Security provider

The vehicle of security provider (suppose security pilot) is that which is going in the same network for providing the security to High profile vehicle. This is also the part of same network.

- Invader

Invader's vehicle is that which a part of the same network is also.

B. Threat Scenario

When the high profile vehicle and the security provider vehicle communicates some sensitive information in the network then the third party or the attacker's vehicle can access that information which is transferred between high profile and security provider vehicle and can use this information as a tool to cause some dreadful destructive work.

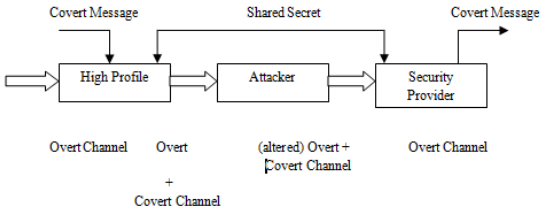

Fig.2. Covert Channel Communication

To prevail over from this problem, some security measures have to be implemented for ceasing the leakage of information between two parties.

II. TYPES OF SECURITY TECHNIQUES

There are various types of security techniques to overcome the problem of data sharing.

A. Encryption

Encryption is the technique used for security intention. In encryption, the data has to be sent is referred to as plain text and this type of text is encrypted using an encryption algorithm. Then that text is known as Cipher text. The receiver uses the decoding algorithm for decrypting the text. But the encryption technique doesn't prevent hacking. The efficient hacker can read the data without any problem.

B. Steganography

Steganography can be used to conceal the critical data and prevent them from illegal and direct access[1] by the invader. Steganography of data can be done in various ways:

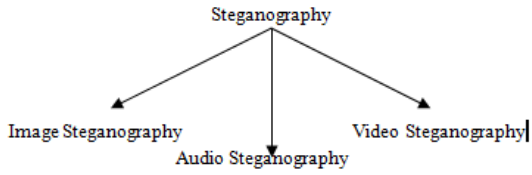

Fig.3. Ways Of Steganography Done on Data

C. Cryptography

In the cryptography technique, there is a division of users in two levels; Level 1 and Level 2. The users of Level 1 have access to their own private encrypted data and unclassified public data, whereas Level 2 users have access to their own private data and also classified data which is stored in an encrypted form.

D. Hashing

In Hashing, the variable length data is distorted into a fixed length data using hash functions which can't be access by the third party with all these security techniques.

Though above discussed techniques are useful to secure sensitive information but they have one or the other limitation. In the encryption technique, the data is easily hacked by the invaders by decrypt the code easily because in this technique data is encoded in some other language and the invader noticed that some data is transferred in some encoded form. With the help of man-in-the middle attack attacker attacks on the secret files and decrypt them. In case of steganography, the disadvantage is that the when the original images are altered to encrypted image then Message is hard to recover if image is subject to attack such as translation and rotation. In this technique it causes scratch to picture appearance. This can be easy to detect because Message easily lost if picture subject to compression such as JPEG. This paper throws light on another technique named as Covert Channel.

E. Covert Channels

A covert channel is a logical link between two authenticated systems through which they can secretly exchange information without being detected by the third party or attacker. This channel remains untraceable by the intermediators. Secret information is embedded in the legitimate channel packets by the sender and the receiver retrieves this information from the message packet. The third party is unable to detect this data transfer through the legal channel packets.

According to the Lampson in 1973[10], Covert Channels that was not intended for communication between the two processes. It was authoritative to communicate, but not the way they actually are.

According to Murdoch[11], a covert channel can be described as a communication in a mainframe system where the sender and the receiver plan to leak information over a channel which is not designed for that communication to take place, in violation of a required access control policy.

A covert channel is a double sword communication system because they have legal use also. At one time to a particular entity, in a communication it may acts as threat and on the other hand it can be used as subversive means of achieving privacy and overtly transfer the data between the two authorized parties. The communication can be done secretly without surveillance by the attacker that is present in the

entire network. It exchanges information, without changing any firewalls or invaders detectors on the network which provides an additional layer of security to that provided by the different layers of protocol stacks.

III. HOW COVERT CHANNEL CAN BE ESTABLISHED

Communication can be done steadily in the VANET network with the establishment of Covert channels between those nodes. If the covert channel is established in the VANET network, then the security is maintained between High profile vehicle and Security provider vehicle and can share secret data covertly with each other and the attacker or you can say that the other vehicles that are present in this network can't detect the covert channels. Covert channels can be established into two ways:

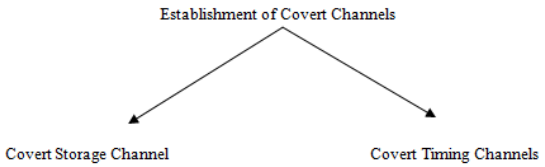

Fig.4. Ways For Establishing The Covert Channels

A. Covert Storage Channels

In the Covert Storage Channel, it involves the storage of data in any spot by one node present in the VANET and can be read by another node in the network. In the Storage Covert Channels, the data is stored in the form of objects[3]. Objects need memory location for the storage purpose. Storage channels mainly use two aspects for embedding the covert data.

- Object Attributes

The data that is to be embedded secretly which has properties about the files, files are used for storage channels.

- Resources which are sharable

The resources like blocks, physical memory, I/O buffers such as printers and plotters can be used as storage channels.

B. Timing Covert Channels

Timing channels involve the signalling information by adapt the use of resource over time such as the receiver can receive the information, monitor it and decipher this information.

Timing Channels can be classified into two categories:

- Active: Timing channels that need an supplementary connection to relocate covert data. The throughputs of active timing channel are very high compared to Passive.

- Passive**:** There is no need of an extra connection for transferring the covert data. It uses an existing connection. The data can't be detected easily when the data is embedded into it.

IV. HOW COVERT CHANNELS CA BE IMPLEMENTED IN THE VANET

VANET (Vehicular Adhoc network) is a technology which is based on the Wireless/ Cellular/ Adhoc network. In the VANET network Intelligent Transport System (ITS) is used. Communication is done by three ways Inter Vehicle Communication (IVC), Road Side to Vehicle Communication (RVC), Roadside to Roadside Communication (RRC).

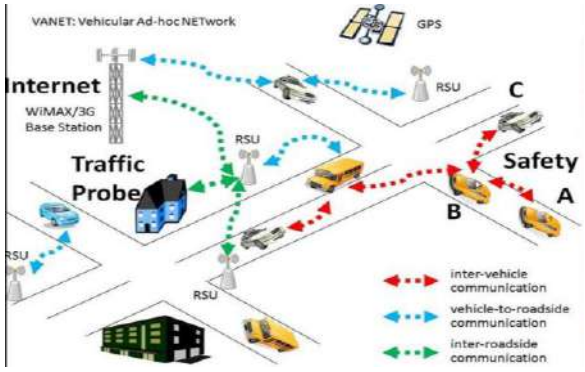

Fig.4.Communication In VANET [9]

The vehicles moving in this network working as "nodes". The nodes in the network are not fixed, they are moving in the network for the purpose of data transfer from one node to another node. When one node wants to transfer data to another node then it needs routing for this purpose. Routing needs routing protocols for to communicate with each other The communication between the two nodes can be easily detected by the third node because they all are the part of the same network.

As Vanet is a subclass of MANET and being Adhoc wireless network it distinguishes itself from its conventional wired counterparts by three exclusive features: mobility, lack of infrastructure and shared wireless channels. Hence covert channel can be very easily established in VANETs. Thus the sensitive data can very easily be entrenched into the optional headers/fields of adhoc network protocols for data transfer

during the routing process. The commonly used adhoc network protocols are AODV, DSR, FSDSR, ZRP, FSR and CBRP.

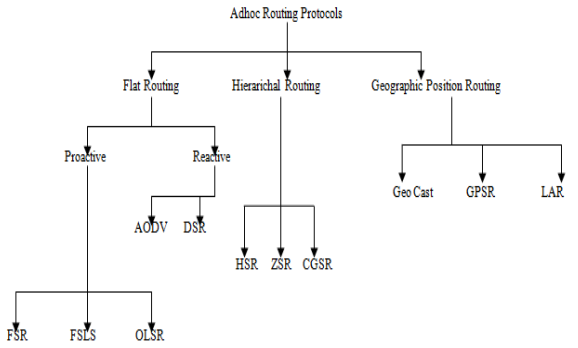

Fig.5. Types of Adhoc Network Protocols

These types of protocols are used for data transfer overtly. These protocols are more secured for communication in a secretly way for the reason that data can easily embed anywhere into it. There are no fixed parameters of these protocols. The parameters of the protocols changes time to time, the packet layout of adhoc protocols is shown below:

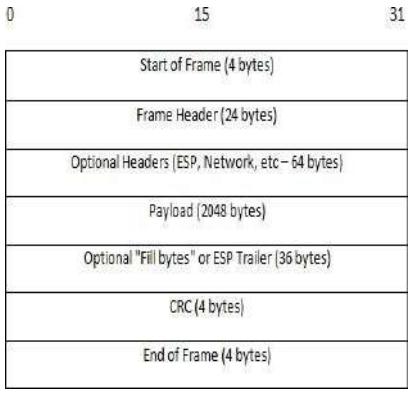

Fig.6. Packet Layout of adhoc protocols [8]

The data is rooted into the optional field of the adhoc protocols. The attacker in the VANET does not detect the communication between the high profile vehicle and security provider vehicle and they both can transfer the data by establishing the covert channel between them and after that data is embedded in to the packet format of the adhoc protocols. In this way high profile vehicle and the security provider transfer data but the attacker does not grasp that data.

V. CONCLUSION AND FUTURE SCOPE

In this paper, we presented an inkling of how covert channels can be implemented in the VANET. We have briefly discussed the ways for the establishment of covert channels and also explored the ways for the data transfer in the covert channels. The future scope of this paper is to look into the various detection mechanisms of the covert channel communication if being used as the counter attack.

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Implementation of Ant colony algorithm for generating the solution of Travelling salesman problem

[1]Geetinder Kaur
geetinder810@gmail.com

[2]Gulwatanpreet singh
singh_kpt@yahoo.co.in

[3]Sourabh Joshi
er.sourabhjoshi@gmail.com

[4]Geetika Mannan
geetika.mannan@yahoo.com

[1],[2],[3]CT Institue of Technology and Research
Greater Kailash, Jalandhar
Punjab

Abstract*-Ant Colony Optimization is heuristic algorithm which has been proven a successful technique applied on number of combinatorial optimization problems. Ant Colony Optimization is taken as one of the high performance computing methods for Travelling Salesman Problem. In this paper, we study a possibility of solving the well known Travelling Salesman Problem and offer a practical implementation of the method used for solving this problem. In this paper, we have taken a scenario of different cities of Punjab state in India. Through the experiments and the result graphics, this algorithm can effectively complete the search process and generates the optimal solution hence providing the shortest path.*

Keywords—Ant Colony Algorithmt; Travelling Salesman Problem; Pheromone; global and local trail update. Tabu list

I. INTRODUCTION

Travelling Salesman Problem is one of the well-known NP hard problems in discrete or combinatorial optimization which asks for finding the shortest route of minimal total cost visiting each given city exactly once. In recent years many of the famous algorithms are emerging for solving the problem such as Ant Colony Algorithm. As the name suggests Ant

Algorithms are greatly inspired from the behavior of real ant colonies by their foraging mode such as (wander mode, search mode, return mode, attracted mode, trace mode, carry mode). As Ant Colony Algorithm (ACA) is widely used because of the use of positive feedback mechanism, heuristic probability search, computing distributed numeric information and other characteristics. One of the main ideas of ACO is determining the interaction of colony of agents based on pheromone trails which is the kind of distributed numeric information. A technique for solving problems by using graphs for finding smallest paths.

In this paper, an Ant Colony Algorithm is discussed to solve the Travelling Salesman Problem. The TSP problem is constructed by taking the example of 8 cities of Punjab state and the distance between them. The whole paper is divided into 5 sections Section II describes the TSP problem model. Section III illustrates the background history of Ant Colony Optimization. Section III.1 illustrates proposed Ant System. Section III.2 describes the ACA in solving TSP. Section IV Experiments and Results are computed and finally Section V makes the conclusion together with some conceives about the future research.

II. TRAVELLING SALESMAN PROBLEM

Travelling salesman Problem is well-known and extensively studied problem which plays an important role in combinatorial optimization and in the context of ACO since the algorithm Ant System was initially applied on TSP and has later often been used as a benchmark to test a new idea. TSP was chosen for many reasons. (i) It is a problem to which the ant colony metaphor. (ii) Most studied NP hard problem. (iii) Easy to explain as it is not conceal by too many technicalities.
This is simply stated in following.

TSP is problem of Salesman who wants to find the shortest roundtrip starting from his hometown through a given set of cities and distances between each pair of them and return to its hometown by visiting each given city (node) exactly once. Formally, it can be represented by complete weighted Graph G=(R, S) can be used to represent TSP, where R, is the set of n cities and S, is the set of edges (paths) connecting all cities. Each edge is assigned a cost $d_{xy,}$ which is the length of edge(x, y) € S, which is the distance between cities x and y with (x,y) € R . The TSP problem consists of finding a minimal Hamiltonian cycle for a complete, weighted and undirected graph with n vertices. For Symmetric TSP, the distance between two cities does not depend on the direction taken. i.e. $d_{xy}=d_{xy}$ for every pair of nodes and formally Asymmetric TSP is $d_{xy} \neq d_{xy}$ [5].

III. ANT COLONY OPTIMIZATION

III.1 ANT SYSTEM

Ant system was first introduced and applied to TSP by Marco Dorigo (1991) [6]. Initially three different versions of AS were proposed. There were ant density, ant-quantity and ant-cycle. As pheromone was directly updated by the ants after a move from one city to another one in case of ant density and ant –quantity, while in case of ant – cycle the pheromone updated was only done after all ants had completed the tour. In AS no local search is applied.

III.2 ANT COLONY ALGORITHM IN SOVING TSP

This Algorithm is a reproduction of the real-life behavior of ants. As ants are quite smart in finding their way between their colony and their food source. A lot of worker "drones" are walking through the near environment and if they find some food, they lay down a pheromone trail (A chemical released by an insect that psychologically effects the behavior of other insects). Some of the other ants still searching for other ways , but the most of them are following the pheromone trail make this more attractive. But over time the pheromone trail is starting to decay, it is losing its attractiveness due to time component, pheromone density is very low on the long way, because the pheromone trail is evaporating along side. Thus a shorter way has higher density of pheromone and has more attractiveness to the workers leading into a kind of optimal path for our graph problem. Generally speaking about the algorithm there are four main parts to solve the TSP:

A. Tour Construction:
Initially for our TSP problem , we are dropping ants on random vertices in our graph. Each ant is going to evaluate best way for his next move to another vertex based on this formula:

$$\rho^{k}_{xy} = \begin{cases} \dfrac{[\tau_{xy}(t)]^{\alpha}[\eta_{xy}]^{\beta}}{\sum_{\mu \in J_k(x)} [\tau_{x\mu}(t)]^{\alpha}[\eta_{x\mu}]^{\beta}} & \text{if } y \in J_{k(x)} \\ 0 & \text{otherwise} \end{cases}$$

It's about the probability "ρ" for a worker(ant) called "k" to move to the vertex described by "xy". The variable called"τ" is the amount of pheromone deposited on the edge of the "xy" . It gets raised to the power of"α" which is a heuristic parameter describing how greedy the algorithm is in finding its path across the graph. This is going to be multiplied by apriori knowledge of how "good " the edge is . This is the case the inverted distance is: 1/distance (1/xy) between the city x and y. and the raised to the power of"β" is also a heuristic parameter describing how fast the ants are going to select their path and everything calculated until , now gets divided by

the summation of every possible solution.The record of cities from where the ant k passes is kept in the tabu list ($tabu_k$).

B. Pheromone Update

The next thing is updating the residual information after all the ants finish their each traversing means how much pheromone does a worker lay while traversing the edges. This is going to be described by the following formula:

$$\tau_{xy}(t+n) = (1-\rho)^{*} \tau_{xy}(t) + \Delta\tau_{xy}(t) \qquad (1)$$

where $\Delta\tau_{xy}(t) = \sum_{k=1}^{m} \Delta\tau_{xy}^{k}(t)$ (2)

"τ" is the absolute pheromone amount which gets deposited for worker(ant) "k" on the edge"xy". "ρ" refers to the pheromone volatization coefficent and (1-ρ) represents the decay of pheromone ranges between 0-1.

These get represented by the current amount of deposited pheromone and just add the new pheromone to it ($\Delta\tau_{xy}^{k}(t)$).
In the ant cycle model, $\Delta\tau_{xy}^{k}(t)$ is equitation to:

$$\Delta\tau_{xy}^{k} = \begin{cases} Q/L_k & \text{if ant k uses edge xy in its tour} \\ 0 & \text{otherwise} \end{cases}$$

"Q" is the pheromone strength and heuristic parameter as well, divided by the distance (L_k), the ant took to get to this edge. If this is negative, we just return 0.

C.Terminating Condition

If the terminating condition is satisfied i.e all the cities are visited and no city is repeated, the circulation will stop. Compare all the best solution previously updated in the tabu list ($tabu_{k)}$ in every iteration and find the optimal solution, otherwise empty the tabu list and continues the iteration.

IV. TEST AND RESULTS

While going for the implementation part, ten cities of Punjab state (In India) are chosen and the distance between these respective cities are calculated. This whole scenario of cities and their interrelated distance is formulated in the form of Travelling Salesman Problem and used for providing the input to the Ant Colony Optimization based algorithm. The figure 1 shows the best paths constructed by the Ant Colony Algorithm by visiting each node at least once and keeping in mind one thing that no city should gets repeated while visiting(by maintaining a tabu list). The best length is 671 and the visiting order in optimal solution is generated, is: (1,54,56,136,65,40,19,58,136,107).

TABLE 1 TABLE TYPE STYLES

Test	1	2	3	4	5
Result	671	825	973	1380	913
Test	6	7	8	9	10
Result	791	717	852	1418	1228

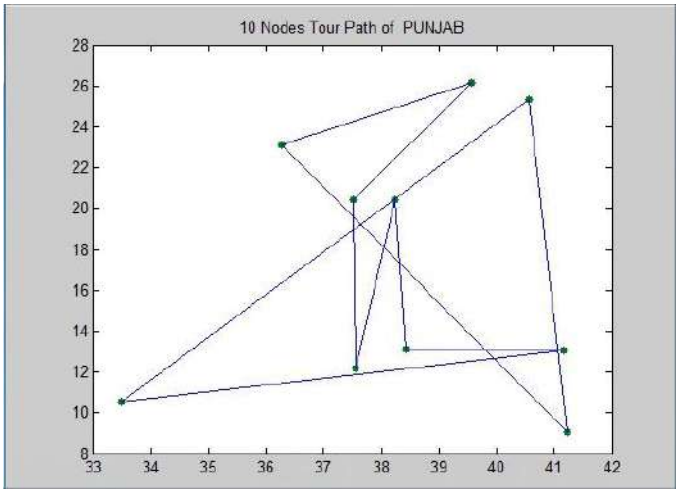

Fig:1 The optimal tour path generated by ACO for TSP

The Display coordinates of the nodes is also provided in the input in terms of which should gets displayed in the display data area.

V .CONCLUSION

This paper mainly presents an approach for solving the TSP based on Ant Colony Algorithm. The main contribution of this paper is study of key points in optimization process and illustrating the algorithm by an application program. The Experimental results showed that Travelling salesman Problem is able to solve with high performance and finally generates the optimal solution by using algorithm .As parameter adaptive adjustment are the

additional challenges which needs to be addressed in future scope.

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Enhancing the Quality of Software Product by Reusability

Navneet Kaur
M.Tech Scholar
Department of CSE
ACET Amritsar
navneetsethi2102@gmail.com

Amarpreet Singh
Associate Professor
Department of CSE
ACET Amritsar
amarmandeep@yahoo.com

Abstract*—Main characteristic of each and every software is quality since it engulfs all other characteristics. Quality is the foremost demand of every customer but there are constraints to achieve this quality and these constraints can be overcome by one of the important concept of Reusability which is discussed in this paper. The paper throws the light on how the high quality products at reasonable cost can be developed with the help of reusability in Object Oriented Systems.

Keywords*— Software Quality, Software Reusability, Object Oriented Systems

I. INTRODUCTION

High quality products at reasonable cost are the foremost demand of clients [1]. So when clients expect high quality products from enterprise, then it is the duty of enterprise to meet their requirements. But it is not always possible to develop desired products at reasonable cost because most of the times they may go out of budget. If developers develop such type of products that will work effectively but at high cost, then clients will not prefer to buy such products. It will lead to the failure of deal between clients and stakeholders. Though the desired products can be made but still the important factors that need to be considered in any case are: cost, effort and time. One possible way to reduce these factors is in terms of Reusability [8] which is discussed in this paper.

Section II discusses about the quality of software product. section III shows that what are expectations of customers from any enterprise and what type of products they want from an enterprise? Section IV shows that what is the solution in order to achieve high quality products at reasonable cost without any trade-off ? Sections V, VI, VII and VIII discusses about reusability.

II. SOFTWARE QUALITY

Traditionally, quality of product can be defined in terms of *fitness of purpose* [8]. That is, a product is said to have good quality if it works according to customer's requirements. Although fitness of purpose is a satisfactory definition of quality for many products like car, table fan etc. but fitness of purpose is not a wholly satisfactory definition of quality for software products. In order to prove this, consider a software product that is functionally correct i.e. it correctly performs all functions that have been specified in the SRS document. Even though it may be functionally correct, it cannot be considered as a quality product, if it has an almost unusable user interface. Another example is that of a product which does everything that the users wanted, but has an almost incomprehensible and unmaintainable code. Therefore, traditional concept of quality as fitness of purpose for software products is not wholly satisfactory [8].
The modern view of quality of software product includes several quality factors such as:

i. **Portability:** A software product is said to be portable, if it can be easily made to work in different hardware and operating system environments [8].
ii. **Usability:** A software product has good usability, if different categories of users can easily invoke the functions of the product [8].
iii. **Reusability:** A software product has good reusability, if different modules of the product can easily be reused to develop new products [8].
iv. **Correctness:** A software product is said to be correct, if all requirements specified in the SRS document have been correctly implemented [8].
v. **Maintainability:** A software product is maintainable, if errors can be easily corrected as and when they show up, new functions can be easily added to the product etc. [8].

III. DEMAND OF CUSTOMERS

Customers always desires high quality products at reasonable cost. And also products should meet their requirements. There are various features that customers want in their products.

These Features are:

- High Quality
- Reliability
- Flexible
- Maintainable
- Extendable
- Portable
- Secure
- Efficient

No doubt, developers can develop the desired products that will fulfill all the features which are expected by the customers but it is not always possible to develop desired products at reasonable cost. Therefore, there are 3constraints in developing the desired products and these constraints are:

i. Cost
ii. Effort
iii. Time

Since customers are demanding for high quality and reliable products from an enterprise and enterprise will be able to meet their requirements but some constraints(cost, effort and time) are there that are acting as obstacles in developing desired products.

High quality and reliability means that software products will require more effort and time so that they can work according to demands/requirements of the customers. So, customers need to pay more for desired products. Cost is one such factor that is influenced by effort and time. More effort and time means more cost. Hence, cost is directly proportional to effort and time.

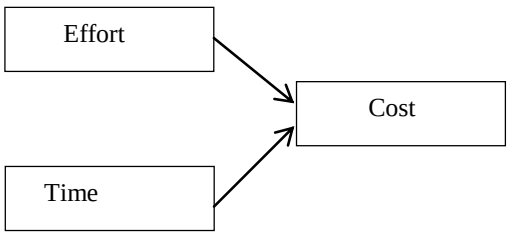

Fig1. Cost is influenced by effort and time.

One can also say that the whole concept is pivoted around 3Ms:

- Man
- Material
- Money

For developing high quality products there is a need of more manpower, more resources and more money. And it is clear that everything is required in large quantity, so sometimes customers need to compromise with their requirements in order to get the products at affordable cost. Thus, out of their demands and savings they have to choose one thing. If they want that their all requirements should be fulfilled then they have to pay more money for this. On the other hand, if they want products at reasonable cost they have to compromise with their requirements.

Now, it can be seen that cost is the main dealing factor because customers always think about money before purchasing anything. Moreover, recovery of 3Ms is in terms of cost only. If both the parties wish to make their deal a success on low cost then the general solution is *Trade-off.*

Trade-off means compromise with the requirements at the customers end and compromise with the cost at developers end. By trade-off, developers will be able to develop the products at reasonable cost and such products will be available in market and are liked by customers. But such type of products will not have desired quality. So, developers will not be doing full justice to the quality factor of the product though they will make their deal a success. Their ethics will not allow them to do so. Even they themselves will not be self satisfied as they know that they have played with the quality of a product.

IV. WHAT IS SOLUTION TO ABOVE SCENARIO

Developers always try to find the solution with the help of which they will deliver the products feasible with cost and quality. One solution in order to achieve satisfaction, quality of software product, cost reduction without compromising (trade-off) with requirements is in the form of Reusability in which already developed components will be reused to make desirable products. And with this approach (Reusability) high quality products can be developed at reasonable cost.

Reusability is an approach which is beneficial for both clients and developers. With using this approach clients will get what they want at affordable price and at the same time developers will develop the software from the pre-tested components thus saving the cost, effort and time. Therefore, we can say that reusability helps the developers to develop high quality software products at reasonable cost without compromising with the requirements. Moreover, reusing the same component also helps in the refinement of that component. Now the question arises what can be reused? Almost all artifacts associated with software development, including project plan, and test plan can be reused. However, eminent items that can be effectively reused are [8]:

- Requirements specification.
- Design
- Code
- Test cases
- Knowledge

V. ROLE OF REUSABILITY

Reusability is an idea of building and reusing the "software preferred parts" [1]. It has been an interested area since last decades. The objective of reuse is to make something once and to reuse it again and again [1] with slight or no modifications i.e. we can adapt or adopt the components according to the requirements. The goal of reuse can be achieved by recycling. Recycling and repetition not only reduce cost and save time but also help us to build a high quality of software as per desired. One possible way to reduce cost is to reuse the components from previously developed system [8]. However, in new products sometimes one has to compromise the requirements. By reusing the components from previously developed software we can also reduce bugs in the software because the reused component is

mostly bug free whereas if we have to develop new products from scratch there may be the chances of bugs. Reusability also helps in the refinement of products.

There are two principles for reusability: Hardware reusability and Software Reusability [7]. In Hardware reuse, same kind of product can be created by using the same tool at least once [7]. In software reuse we do something smart [7] rather than reinventing the products from scratch.

Large scale companies normally use various artifacts several times in building software products. Now the question is which artifacts/components are reusable [1]. It means that knowledge, design, source code, test cases all can be reused [1, 8]. Out of all above reuse of knowledge occurs automatically so it can be considered as an important component of reuse. Such reusable knowledge can be represented in tacit or explicit knowledge [3, 4]. It is the verbal and documented knowledge respectively [3, 4]. Now, the question is how a component and its knowledge can be considered for reuse or to be reusable and how far it contributes in our software making process. The verbal reuse of knowledge occurs when the stakeholders interact with each other and passes their views regarding the components that is reused or by conducting interviews or group discussions with the employees regarding the component. This verbal Knowledge is then documented in the form of writings. These writings represent the explicit nature of knowledge. Further this knowledge can be converted to tacit form and vice versa. All these provide the recycling of the knowledge. From the discussion it is clear that the tacit knowledge can be converted into explicit knowledge and back from explicit knowledge to the tacit knowledge.

Thus it can be concluded that reuse of knowledge enhances the quality of component. Now, there are mainly

Two types of components and these are White Box and Black Box components [1]. White box are the one that are changeable by the programmer i.e. we can adapt and black box are the components that cannot be directly changed by the programmer i.e. they are adoptable components. One must have thorough understanding of what can be adopted or adapted.

VI. REUSE PROCESS MODEL

If we look into depth we will notice that most of the projects in software engineering paradigm apply the concept of reusability explicitly or implicitly as it happens in our day to day life i.e. we, by one or the other way , intentionally or unintentionally practice the reusability . It is an informal sharing of techniques and products among people working on the same or similar projects [5]. Transforming reuse concepts informally into a technology of reuse would provide the basis for the future software factory, improving quality and increasing productivity as well as making productions more manageable. In order to achieve higher levels of reuse, there is a need to recognize the experience appropriate for reuse, package experience in a readily available way, formally integrate reuse into software development [5]. Fig 2 shows an organizational framework that separates project's reuse-packaging activities from the project- specific activities, with process models that support each activity.

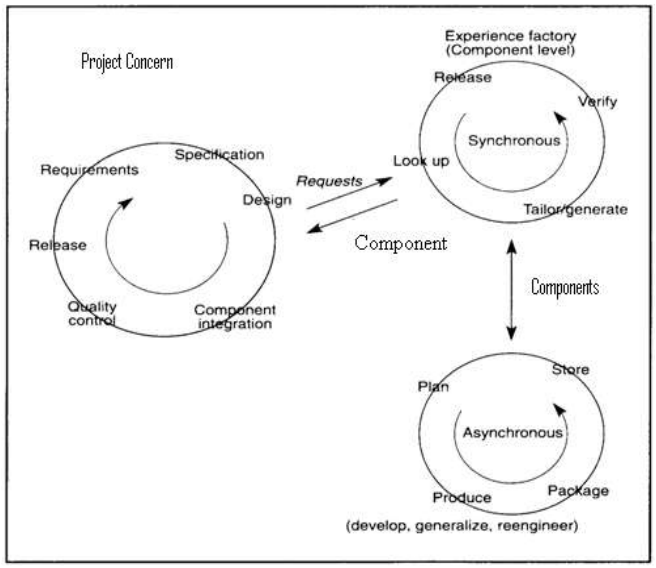

Fig2. Reuse process model [2, 5]

The organizational framework is divided into two separate organizations [2, 5]:

- Project organization.
- Experience factory.

The project organization builds the product, taking advantage of all forms of packaged experience from prior and current developments. In turn, project offers its own experiences to be packaged for other projects i.e. the developed project is acting as existing source for another new project [2, 5].

The experience factory stores the current aspects and existing packaging for use it again [2]. Studies into reuse have shown that [1, 2]:

- 40% to 60% of code is reusable from one application to another
- 60% of code and design are reusable in business applications
- 75% of program functions are common to more than one program
- Only 15% of code is unique
- 15% to 85% rates of actual and potential reuse.

VII. REUSABILITY IN OBJECT ORIENTED SYSTEMS

Firstly, the systems were not very large and not very complex [6]. So, it was easy to develop such systems [6]. Now-a-days as the customer's demands keep on changing day by day, their demands for large and complex system have also increased. Therefore it is desirable to meet them. Thus there must be techniques that make the software development customized. This leads to the concept of Object Oriented(OO). The concept of OO provides a support to the stakeholders to develop the products that are larger and complex. If we reuse the larger components in object oriented then it is known as Object Oriented framework. Object oriented systems are used in combination of object oriented programming languages to

provide more flexible components then the non-object oriented. They use objects which in themselves are reusable as objects are the instances of classes. Objects are the building blocks in the object oriented systems [8].

Properties like polymorphism, inheritance, encapsulation, abstraction etc. are present in object oriented systems. These are those features which are not present in the non-object oriented systems. Object oriented systems allow easy customization of products that are according to the users need. And the components that are developed through object oriented systems are more powerful since they are more generic in nature. For reusing the objects the developer should have complete and good knowledge regarding the object oriented concepts in order to enhance the quality in an appropriate manner.

VIII. OBJECT ORIENTED VERSUS NON OBJECT ORIENTED SYSTEMS

No doubt, reusability facility was also present in traditional functional oriented paradigm but they allow only code reusability and in object oriented each and everything can be reused like coding, design, test cases, etc. [6].

Object Oriented improves the Component Based Reuse as it supports inheritance, polymorphism, abstraction, and encapsulation. Components are the major source to be reused in reusability. Some components are used for large and complex system and some are used in simple and easy system. They may vary from Object oriented to non- Object Oriented. Object oriented and Non Object Oriented does not have the same level of the component reuse.

OO has the objects, member variable and the member function whereas the non OO the functions may not necessary belong to these three subdivisions there is another term that is hybrid functions also exist. In Non OO the components are not sent along with the connection where as in the OO the objects are passed to the other objects. All the techniques of OO are supported with the help of objects whereas the functions used in non OO allows all the connections for reusability [9].

There is a special tool used for the conversion of Non Object oriented to object oriented known as DROOP i.e. Detection of Reusable Object Oriented Programming. It is also used for the detection of reusable components [9].

IX. CONCLUSION

The aim of this paper is to understand how one can increase the quality by reusing the components of software or related artifacts. It is discussed and found that reuse of components or software is not an easy task. Moreover, to enhance the quality of software makes it more complex. The solution of above problem to some extent is in the form of object oriented paradigm. Object oriented paradigm consists of several objects that can be reused easily. All objects belong to some class. Same object can be used and reused for different purposes in different classes. In OO paradigm, reusability occurs at every step, so it makes the reusability task easier. And it is obvious that when we use the same component again and again bugs or errors associated with components begin to decrease as components are checked again for bugs in each use and after that there will be some stage when component will become totally error free which in turns further enhance the quality of product. In traditional reuse (without OO system) reuse identification is more difficult and most of the time we need to adopt or adapt while in OO system can create new object and related classes. However, in OO system we can also adapt to some extent.

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A Review on Power Preservation Techniques in MANETs

Gagandeep Kaur
M.Tech Research Scholar
Dept. of CSE
ACET, Amritsar
gdeepsandhu09@gmail.com

Amarpreet Singh
Associate Professor
Dept. of CSE
ACET, Amritsar
amarmandeep@yahoo.com

Abstract- ***Mobile means moving and ad hoc means temporary without any fixed infrastructure so the MANETS i.e Mobile Ad Hoc networks are a kind of temporary networks in which nodes are moving without any fixed infrastructure or centralized administration. The nodes in MANET themselves find other nodes to communicate. Mobile ad hoc networks are creating the curiosity and interest because of 3G and 4G activities Since each node in the MANET needs the power to operate if the power reduces then the communication in the network can be affected. This review paper mainly addresses the MANET architecture and power consumption and preservation of nodes within MANETs.***

Keywords – MANETs , LHM, SHM , SINR , Consumption modes.

I. INTRODUCTION

Mobile ad-hoc network is a kind of network consisting of mobile nodes that can communicate with each other with the help of radio waves. This type of network can work at anywhere and anytime as there is no fixed network infrastructure like base station or access points and no centralized administration is present. So they are like fully distributed network. The mobile nodes can act like Routers and Host. There are no dedicated routers. Each Node can operate as router and transmit the packets between source and destination. The Nodes can directly communicate if they are in the transmission range of each other but if they are not then they need the intermediate nodes to transmit the packets . Hence we can call them as Multi –Hop Network. All the nodes need to operate together. As the nodes are of mobile nature so the network topology may vary rapidly and un predictably over the time .Such a network may operate in the standalone fashion and may be connected to larger Internet[5]. There should be an inequality in the processing power of all the nodes. Figure 1 shows a simple ad-hoc network with 3 nodes. Node 1 and node 3 are not within range of each other, however the node 2 can be used to forward packets between node 1and node 2. The node 2 will act as a router and these three nodes together form an ad-hoc network[3]

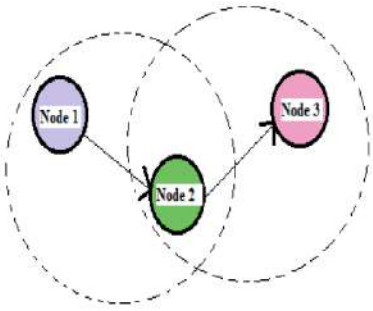

Fig 1. An example of Mobile ad hoc Network

II. ARCHITECTURE

In the MANET , According to the capabilities of the mobile nodes we can classify them into : SMH (Small Mobile Host) and LHM (Large Mobile Host)

A Client or a Small Mobile Host is a kind of the node having a compact storage ,reduced processing and communication and less power resources. The clients have the adequate resources to cache the database

portion as well as storing some DBMS query and processing modules.

On other side A Server or a Large Mobile Host is a Node having a large resource share . As a Server has larger capacity so it can contain the complete DBMS and it also helps in satisfying the client query.

Each Node has the area of influence like the LHM will initially have the large area of the influence . As there is a decrease in the power level ,the area of the influence of a node will get smaller because the power available to broadcast is reduced.
In order to facilitate the reduction in power , different modes are there

A) **Transmit Mode or Active Mode**: This mode allows the both receiving and transmitting of the messages .

B) **Receive Mode or Doze Mode** : In this mode CPU is capable of processing information and is also competent in receiving notification of messages from other nodes.

C) **Standby Mode or Sleep Mode** : As the name suggests ,in this mode the node is inactive neither the CPU has any role in the processing nor any node has ability to send and receive the messages. This mode allow the node to turn itself off for some short period of time without requiring power- up or re- initialization[6].

Any Node that is in Off state or any other node in which no power is left over , they are not the part of the network and also they cannot be accessible by any other node i.e they become disconnected from the entire network. If they move back in the range of other nodes , they become re-connected.

There are two approaches to provide network connectivity in the MANET :

A) **Hierarchical Network Architecture** :

This is a kind of approach which divide the whole network into the sub- network. Each of the sub-network then dynamically elects a node among themselves which act as a gateway to the other sub-network.

The advantage of this approach is

- Better Manageability is there.
- Easiness of mobility management procedure.

B) Flat – Routed Architecture

In this approach , the nodes are quite identical in the sense of responsibility and the concept of gateway is not there. The advantages of this approach are as follows:

- Better load balancing property.
- Routing is optimal
- Reliability is increased as there is a alternate route in the network and no single point failure is there[6].

III. ROUTING PROTOCOLS

The Protocols are the set of the rules .As the MANETs are having the dynamic nature so there must be some kind of Routing protocols to have an efficient end to end communication. These routing protocols define a set of rules which describes the passage of message packets from source to destination in a network. In MANET, there are different types of routing protocols each of them is applied according to the network circumstances[2].

A. **Proactive Routing Protocols**

The Proactive Routing protocols can also be known as Table Driven Routing Protocols. In this Protocol each and every node maintain the routing table in which the information about the network topology is present. As the network topology keeps on changing, the routing protocols gets updated sporadically. Thus all the time these protocols try and maintain valid routes to all communication mobile nodes[5]. These protocols always maintain the up –to –date information of routes from each and every node within the network. There are various proactive routing protocols. Example:

DSDV = Destination –Sequenced Distance –Vector
OLSR = Optimized Link state Protocol
WRP = Wireless Routing Protocols
FSR = Fish Eye Scope

B. Reactive Routing Protocols

The Reactive Protocol can also be known as On Demand Routing protocol because routes are discovered whenever there is a need. This protocol is based on the Query – Reply Topology .When need arises ,a reactive protocol invokes a procedure to find the route to the destination. The source node emits a request message for a route to the destination node. This message is relayed by all nodes in the network until it reaches the destination. The path which is followed by the request message is recorded in the message, and then returned to the sender by the destination, or by intermediate nodes with some kind of topological information in a reply message. Thus multiple reply messages may result, yielding multiple paths - of which the shortest is to be used[5]. Examples are as follows :

DSR = Dynamic Source Routing protocol
AODV= Ad Hoc On –demand Distance Vector Routing protocol
TORA= Temporally-Ordered Routing Algorithm.

C. Hybrid Routing Protocol

The Hybrid Protocol incorporates the behavior of both the above discussed protocols i.e Reactive and Proactive Protocols. This is the Combination of both the Proactive and Reactive Routing protocols. In order to avoid the latency and the Overhead problems in the network ,the On Demand mechanism of reactive protocol and the Table Maintenance mechanism of proactive protocol is used. It is suitable for large networks. In this, large network is divided into a set of zones where routing inside the zone is done by using proactive approach and outside the zone routing is done using reactive approach[1].

There are some hybrid routing protocols for MANETs like :
ZRP = Zone Routing Protocol
CEDAR = Core Extraction Distribution ad Hoc protocol
DDR and ZHLS.

IV. POWER CONSUMPTION MODES

There are different types of modes in which the power is consumed :

A. Transmission Mode

When the nodes send the data to the other node ,then the node is said to be in the transmission mode. The nodes require the Transmission energy which is dependent on the size of the data packets. The transmission energy can be formulated as :

$$Tx = (330*Plength)/2*10^{6}$$

And

$$P_{TE} = Tx / T_t$$

Where Tx is transmission Energy, P_{TE} is Transmission Power, T_t is time taken to transmit data packet and Plength is length of data packet in Bits.[7]

B. Reception Mode

When a node receives a data packet from other nodes then it is said to be in Reception Mode and the energy which is used to receive packet is called Reception Energy (R_x). The Reception Energy can be formulated as :

$$R_x = (230* Plength)/2*10^{6}$$

And

$$P_R = R_x / T_r$$

Where R_x is a Reception Energy, P_R is a Reception Power, T_r is a time taken to receive data packet, and Plength is length of data packet in Bits. [7]

C. Idle Mode

In this mode , the node is neither transmitting nor receiving any data packets. But this mode consumes power as the nodes have to pay attention to the wireless medium continuously in order to detect a packet that it should receive, so that the node can then switch into receive mode from idle mode. Idle energy can be eliminated or reduced as it is a kind of wasted energy .Then power consumed in Idle Mode is:

$$P_{IM} = P_{RM}$$

Where P_{IM} is power consumed in Idle Mode and P_{RM} is power consumed in Reception Mode.

D. Overhearing Mode

When a node receives data packets that are not destined for it, then it said to be in over-hearing mode and receiving such packets will cause energy consumption. Then power consumed in overhearing mode is:

$$P_{OM} = P_{RM}$$

Where P_{OM} is power consumed in Overhearing Mode and P_{RM} is power consumed in Reception Mode.

V. POWER PRESERVATION

A. At Mobile Nodes

- **Memory Allocation** : When the mobile nodes are in some modes then the memory is to be considered as the essential resource. Memory instructions consumes a lot of power . Some of the memory devices like Direct Rambus DRAM (RDRAM) have come out with a DRAM that allows the individual devices to be in different power states. These devices are in decreasing order of power states and increasing order of access times: Active, Standby, Nap and Power down[7].

- **Hard Disk Scheduling** : The operating system of a machine is responsible for using hardware efficiently for the disk drives, with this there is a fast access time and disk bandwidth. Seek time and Rotational latency are the two major components of Access time. Seek time is the time for the disk arc to move the heads to the cylinder containing the desired sector. Rotational latency is the additional time waiting for the disk to rotate the desired sector to the disk head. Disk bandwidth is the total number of bytes transferred, divided by the total time between the first request for service and the completion of the last transfer. One method of energy preservation in mobile devices is to spin down a disk in its idle time. The spin down delay is the amount of time the disk is idle before it spins down.[7]

- **CPU Scheduling**: For the efficient multiprogramming the Multi-programmed operating systems require CPU scheduling . If the CPU is switched among the various process then , the operating system can make the machine more useful. The power consumed by a processor is directly proportional to the supply voltage, the switching capacitance of the various devices and the frequency of the clock. The power required by the CPU is CV2F, where C is the total capacitance of the wires, V is the supply voltage and F is the operating frequency[7]. There are some algorithms projected for adjusting the clock frequency in idle time. There should be a balance of CPU usage between bursts of high utilization and idle times. This can be accomplished with the task or process scheduling . Nearly all processes have a deadline by which they need to be executed. There is some idle time when the processor is operating at the worst case, in scheduling the tasks. This idle time is called the slack which can be used for preserving the energy by slowing down the processor and reducing the voltage. These techniques can be acknowledged as static slowdown and voltage scaling. By reducing the amount of voltage to operate the processor such that, the process takes longer to finish but is completed before its deadline, the idle time can be reduce or eliminate.

B. By Controlling Transmission Power

The main aspire of power saving is to reduce the total power consumed in packet transmission and increase network lifetime by increasing the residual power of battery. In order to keep the network connected and to get the optimal performance of a network ,it is assumed that minimum transmission power is required. The network topology is being determined by the transmission power used by the mobile nodes and the topology also have a substantial impact on the throughput of the performance of the network . In such type of power preservation techniques , transmission power of mobile nodes is based on the distance between transmitter and receiver and it is put according to the signal-to-

interference-and-noise ratio (SINR) of the transmitting or receiving nodes .

C. **By Using Power Management Techniques**

When the mobile nodes are in inactive mode or idle mode then the main aspire of Power management technique is to allow the mobile nodes to the low-power mode i.e. to Sleeping Mode from high-power mode. In order to save the power, the mobile nodes can be allowed to sleep. Therefore in power management, For the successful communication between the mobile nodes ,all the mobile nodes are supposed to be in the active modes and for this the communication mobile nodes require distributed coordination between communicating mobile nodes. When the arrival pattern of communication events is not well- known and a mobile node is in sleeping mode and then a control message is required to notify a remote sleeping node to wake up for data packets transmissions.

The power management technique in mobile ad hoc networks is used to achieve the following decisions:

• Which set of nodes should execute power management.

• When an active-mode node moves to the low power state

• When an inactive-mode node moves from the low-power mode to the active mode.

VI. APPLICATIONS OF MANETs

MANETs offer many advantages to many organizations that need wireless roaming

A. **Military battlefield**- The MANETS are very beneficial and useful for the military battlefields. The military could take the advantage of network technology to retain an information networks among the soldiers , vehicles and military head quarters.

B. **Emergency Services-** The Manets are prove to be useful in emergency or recue operation for disaster like fire ,flood and earthquake**.** Emergency Rescue operations must take place where non-existing or damaged communications infrastructure and rapid deployment of a communication network is needed. Information is delivered from one rescue team member to another.[2]

C. **Local level**- The MANETs like network are used in local levels as well like at homes school, in conferences. Ad hoc networks can autonomously link an instant and temporary multimedia network using notebook computers or palmtop computers to spread and share information among participants at a conference. Another appropriate local level application might be in home networks where devices can communicate directly to exchange information[2]

D. **Personal Area Network (PAN)-** Personal Area Network can be define a short range localized network . The Short-range MANET such as Bluetooth can simplify the intercommunication between various mobile device such as a mobile phone, laptops[3]. Traditional wired cables are replaced with wireless connections.

E. **Collaborative Work in Business** - The MANETs are helpful to the business people where they need to have a outside meetings to cooperate and exchange some kind of information on the projects .

VII. CONCLUSION

There is a development in the field of wireless network day by day , so the MANETs (Mobile Ad Hoc Networks) have created a lot of interest in the various fields . In the architecture there are the different modes in which the nodes can behave .This paper address various methods of the preserving the energy, now the onus lies on the user to appropriately implement the energy preservation technique as require and optimizes the communication in the MANETs and increases the lifetime of the MANETs

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Equality of Data in Mobile Ad Hoc Networks by using different Disciplines and Set of Rules

Navpreet Singh
Assistant prof.
Amritsar college of Engg. & Tech.
navpreetsingh@acetedu.org

Rohit Kumar
Pursuing M.Tech
Amritsar college of Engg. & Tech.
Rohitkumar_asr89@yahoo.com

Abstract- An ad-hoc network consists of a set of mobile nodes which are connected with each other by using radio waves. Equality of Data is the process of improving the performance of a parallel. This network does not have any infrastructure or central administration, hence it is called infrastructure less network. As the nodes are mobile, it is very difficult to find the path between two end points. This paper presents a solution for finding path between nodes in mobile ad hoc network. For maintaining multiple routes between two endpoints on top of the Stream Control Transmission Protocol (SCTP), and the Dynamic Source Routing (DSR) protocol. A number of additional modifications are incorporated to the SCTP protocol in order to allow its smooth operation. Some of the parameters used to evaluate its performance are packet delays and throughput. The results of this algorithm shows better throughput as compared to existing algorithms.In this paper we present the performance analysis of various equality of data algorithms based on different parameters, considering two typical equality of data approaches static and dynamic. The analysis indicates that static and dynamic both types of algorithm can have advancements as well as weaknesses over each other. Deciding type of algorithm to be implemented will be based on type of parallel applications to solve. The main purpose of this paper is to help in design of new algorithms in future by studying the behavior of various existing algorithms.

Keywords— *Equality of Data (ED), SCTP, DSR, distributed systems, Static Equality of Data, Dynamic Equality of Data.*

I. INTRODUCTION

Mobile Ad hoc network is self configuring network of mobile hosts connected by wireless links, the union of which forms the topology of the network [1]. The advantages of ad hoc networks are the convenience (no central administration), mobility, productivity, deployment and expandability. As the nodes in the network are mobile, the topology of network changes unpredictably. Hence it is difficult to generate path between two nodes. This paper deals with the development of on-demand ad-hoc network routing which can achieve equality of data for packet switched network. The algorithm is adaptive, distributed and is inspired by swarm intelligence. Ant algorithms are the class of optimizing algorithms under swarm intelligence [SI] [2] [3]. Routing in ant algorithm [4] [5] is through interaction of network exploration agents called ants. According to this algorithm, a group of mobile agents builds path between pairs of nodes by exchanging information and updating routing tables.MANET networks have several usages. First these networks were devised to be used in military applications. MANET networks are mostly used in survey, helping and saving operations, tracing and operations, scientific conferences.

The problem of mobile ad-hoc network (MANET) can be summarized in the answer of this question: how to find the route between the communicating end-points. One of the main reasons is that routing in MANETs is a particularly challenging task due to the fact that the topology of the network changes constantly and paths which were initially efficient can quickly become inefficient or even infeasible. Moreover, control information in the network is very restricted. This is because the bandwidth of the wireless medium is very limited, and the medium is shared. It is therefore important to design algorithms that are adaptive, robust and self-healing. Moreover, they should work in a localized way, due to the lack of central control or infrastructure in the network [6, 8].

A major challenge this work faces is to provide an appropriate localization-free1 definition of the center of the network, using the topology information available at every node. Since the topology information may be exhaustive (proactive protocols) or partial (reactive protocols), we had to consider each case separately. The main goal is to distribute the jobs among processors to maximize throughput, maintain stability, resource utilization and should be fault tolerant in nature. Local scheduling performed by the operating system consists of the distribution of processes to the time-slices of the processor. On the other hand Global scheduling is the process of deciding where to execute a process in a multiprocessor system.

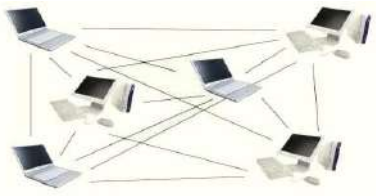

Figure1: MANETs

II. OVERVIEW OF PROTOCOLS

A simple**DSR** is a simple source routing protocol for MANETs, in which route caching is heavily used. If the route to the destination is not known, a route discovery process is initiated in order find a valid route. Route discovery is based in flooding the network with route request (RREQ) packets. Every mobile host that receives a RREQ packet checks the contents of its route cache, and if it is the destination or it has a route to the destination it replies to the RREQ with a route reply (RREP) packet that is routed back to the original source. In case none of the above holds, the host that received the RREQ re-broadcasts it to its neighborhood. In this way the RREQ message is propagated till the destination. Note that both RREQ and RREP packets are also source routed. The RREQ message maintains the path traversed across the network allowing thus the RREP message to route itself back to the source by traversing the recorded path backwards. The route carried back by the RREP packet is cached at the source for future use. If any link on a source route is broken, the source host is notified with a special route error (RERR) packet from intermediate nodes. When the source gets this packet removes any route using this link from its cache [9].

SCTP was recently adopted by IETF, and is a reliable transport protocol that operates on top of a connectionless packet based network such as IP. One of the most important new ideas that SCTP introduced is that of multi-homing. A single SCTP association (session), is able to use alternatively anyone of the available IP-addresses without disrupting an ongoing session. However, this feature is currently used by SCTP only as a backup mechanism that helps recovering from link failures.

SCTP maintains the status of each remote IP address by sending Heartbeat messages and it is thus able to detect a specific link failure and switch to another IP address. Another novel feature is that SCTP decouples reliable delivery from message ordering by introducing the idea of

Streams. The stream is an abstraction that allows Applications to preserve in order delivery within a stream but unordered delivery across streams. This feature avoids HOL blocking at the receiver

in case multiple independent data streams exist in the same SCTP session. Congestion control was defined similar to TCP, primarily for achieving TCP friendliness [10].

In this paper, we propose two methods to improve the Ad-Hoc On-Demand Distance-Vector (**AODV**) protocol. The main goal in the design of the protocol was to reduce the routing overhead, buffer overflow, end-to-end delay and

increase the performance. A multi-path routing protocol is proposed which is based on AODV and Ant Colony Optimization (ACO). This protocol is refereed to Multi-Route AODV Ant routing (MRAA). Also we propose a equality of data method that uses all discovered paths simultaneously for transmitting data. In this method, data packets are equally transferred over discovered paths and energy consumption is distributed across many nodes through network.

III. ALGORITHM

3.1 STATIC EQUALITY OF DATA

In this method the performance [11] [12] of the processors is determined at the beginning of execution. Then depending upon their performance the work is distributed in the start by the master processor. The slave processors calculate their allocated work and submit their result to the master. A task is always executed on the processor to which it is assigned that is static equality of data methods are non-preemptive. The goal of static equality of data method is to reduce the overall execution time of a concurrent program while minimizing the communication delays. A general disadvantage of all static schemes is that the final selection of a host for process allocation is made when the process is created and cannot be changed during process execution to make changes in the system load.

A. Round Robin and Randomized Algorithms

In the round robin [13] processes are divided evenly between all processors. Each new process is assigned to new process or in round robin order. The process allocation order is maintained on each processor locally independent of allocations from remote processors. With equal work round robin algorithm is expected to work well. Round Robin and Randomized schemes [12] work well with number of processes larger than number of processors. Advantage of Round Robin algorithm is that it does not require inter-process communication. Round Robin and Randomized algorithm both can attain the best performance among all equality of data algorithms for particular special purpose applications. In general Round Robin and Randomized are not expected to achieve good performance in general case.

3.2 DYNAMIC EQUALITY OF DATA

It differs from static algorithms in that the work is distributed among the processors at runtime. The master assigns new processes to the slaves based on the new information collected [15]. Unlike static algorithms, dynamic algorithms allocate processes dynamically when one of the processors becomes under loaded. Instead, they are buffered in the queue on the main host and allocated dynamically upon requests from remote hosts.

A. Central Queue Algorithm

Central Queue Algorithm [16] works on the principle of dynamic distribution. It stores new activities and unfulfilled requests as a cyclic FIFO queue on the main host. Each new activity arriving at the queue manager is inserted into the queue. Then, whenever a request for an activity is received by the queue manager, it removes the first activity from the queue and sends it to the requester. If there are no ready activities in the queue, the request is buffered, until a new activity is available. If a new activity arrives at the queue manager while there are unanswered requests in the queue, the first such request is removed from the queue and the new activity is

assigned to it. When a processor load falls under the threshold, the local load manager sends a request for a new activity to the central load manager. The central load manager answers the request immediately if a ready activity is found in the *process-request queue*, or queues the request until a new activity arrives.

B. *Local Queue Algorithm*

Main feature of this algorithm [16] is dynamic process migration support. The basic idea of the local queue algorithms static allocation of all new processes with process migration initiated by a host when its load falls under threshold limit, is a user-defined parameter of the algorithm. The parameter defines the minimal number of ready processes the load manager attempts to provide on each processor. Initially, new processes created on the *main* host are allocated on all under loaded hosts. The number of parallel activities created by the first
Parallel construct on the main host is usually sufficient for allocation on all remote hosts. From then on, all the processes created on the main host and all other hosts are allocated locally. When the host gets under loaded, the local load manager attempts to get several processes from remote hosts.
It randomly sends requests with the number of local ready processes to remote load managers. When a
Load manager receives such a request, it compares the local number of ready processes with the received number. If the former is greater than the latter, then some of the running processes are transferred to the requester and an affirmative confirmation with the number of processes transferred is returned.

PARAMETRIC COMPARISON OF ROUND ROBIN AND RANDOMIZED ALGORITHMS

Parameters	**Round Robin**	**Random**
Overload Rejection	No	No
Fault Tolerant	No	No
Forecasting Accuracy	More	More
Process Migration	No	No
Cooperative	No	No
Stability	Large	Large
Resource Utilization	Less	Less

TABLE- I

ARAMETRIC COMPARISON OF LOCAL QUEUE AND CENTRAL QUEUE ALGORITHMS

Parameters	**Local Queue**	**Central Queue**
Overload Rejection	Yes	Yes
Fault Tolerant	Yes	Yes
Forecasting Accuracy	Less	Less
Process Migration	Yes	No
Cooperative	Yes	Yes
Stability	Large	Small
Resource Utilization	More	Less

TABLE- II

IV. CONCLUSION

Equality of data algorithms and protocols work on the principle that in which situation work is assigned, during compile time or at runtime. The above comparison shows that static equality of data algorithms are more stable in compare to dynamic and it is also ease to predict the behavior of static, but at a same time dynamic distributed algorithms are always considered better than static algorithms.

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Knowledge Reuse during Technological advancement and Learning

O. K. Harsh and Col (Retd)Gurmukh Singh
Amritsar College of Engineering & Technology, Amritsar, India
Email id- oharsh@gmail.com and col_gurmukh@yahoo.com

Abstract*: *Role of knowledge reusability where new technologies have been growing to advance the Knowledge Management practices, by exploding the potential of knowledge management could lead to a useful application including learning. We observe that a three dimensional environment where reusability of knowledge plays crucial role with time can exploit vast potential including learning strategies in technological environment. A detailed discussion about tacit and explicit knowledge has also been taken into account.

Keywords: Knowledge Reuse, Learning Systems and Software

I. INTRODUCTION, SCOPE, INTENDED CONTRIBUTION

The term 'Knowledge Reuse and Learning' was first used twenty years earlier [Smith, Duffy, 2001]. However due to rapid advancement in web technologies, huge happenings have taken place. Discovery of web 2 and web 3 has provided new momentum to the growing web technologies and management which ultimately affected learning by web also. As a result it also transforms society and technological improvements.

Present research paper initiates the foundation for supporting usual 'knowledge reuse' (KR) application as considered in traditional Knowledge Management (KM) systems. The span of present investigation is to explore and aim at recognizing knowledge reuse and learning in application by considering a broader interdisciplinary background by including latest knowledge management tools and techniques.

To the author's knowledge at the time of writing, it is the first time that role of knowledge reuse in the technological advancement and learning is being accounted in a three dimensional environment based on the work of Harsh (2008, 2009) in relation to the time oriented framework. The classification of novel time oriented systems of knowledge reuse and the creation of consequent suggestions aspire to be the major role of present paper. Predictable conclusions of present research are developed perceptive of knowledge reuse dynamics and their affect in open associated knowledge exchanged settings. It also helps to direct the growth of appropriate applications, instruments and organizations.

II. PAPER OBJECTIVE

This work offers and argues knowledge reuse in relation to tacit and explicit dimensions in growing technological environments, argues knowledge reuse investigation in recent research in multiple directions which provides motivation for an interdisciplinary move towards existing knowledge reuse dilemma.

III. LITERATURE ANALYSIS

Nokana (1995) has submitted that the knowledge systems comprises the data, information, talents, experience, intellect, aptitude, and also involve issues such as insights, intuition and ambitions of individuals and resources which form the base of the foundation of knowledge system.

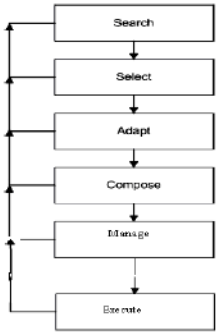


Figure 1: Description of Metadata (taken Garnemark [2002)] and extended by Harsh [2008, 2009].

A characteristic system of knowledge reuse can comprise as shown in the Figure 1 above where we can define a characteristic Knowledge reuse sequence in the form such as search, adapt, compose, manage and execute (Figure 1). Not only explicit while verbal form of knowledge that is 'tacit' knowledge also contributes to knowledge reuse [Harsh, 2008]. In the present research we consider both explicit and tacit knowledge reuse for the purpose of new emerging phenomena. Lynn [Lynn, 2001] described four separate typologies circumstances of knowledge reuse they are "shared work producers, who produce knowledge they later reuse; shared work practitioners, who reuse each other's knowledge contributions; expertise-seeking novices; and secondary knowledge miners bringing to light the importance of distinguishing 'context' to all aspects of KR". However, Carlile [2003] in his work argue that reuse is the part of 'knowledge transformation' procedure which abides a sequence. According to him there is an 'integrated framework' involving "syntactic, semantic, pragmatic dimensions of knowledge" alteration.

Sim and Duffy [Sim and Duffy, 2004] identified Knowledge converters because of a joining connection involving learning and creativity (Figure 2). Harsh [2008, 2009] has considered first time the involvement of time with knowledge reuse in a three dimensional environment. However, he did not consider some of the above ideas in his model. Thus one can consider the prospect of research in the lights of the some of the above mentioned facts involving the work of Harsh [2008, 2009].

Knowledge Transformers	Description of how knowledge is transformed
Abstraction/ Detailing	Abstraction generates a new version of the knowledge with less detail than the original through the use of representation of abstract concepts or operators. Detailing is the opposite, in which the new knowledge is generated with more details.
Association/ Disassociation	Association determines a dependency between given entities or descriptions based on some logical, causal or statistical relationships. The opposite is disassociation, which asserts a lack of dependency.
Derivations (Reformulation)/ Randomisation	Derivations are transformations that derive one knowledge from another piece of knowledge (based on some dependency between them). Randomisation transforms one knowledge segment into another by making random changes.
Explanation/ Discovery	Explanation derives additional knowledge based on domain knowledge. Discovery derives new knowledge without an underlying domain knowledge.
Group Rationalisation (or Clustering)/ Decomposition	Group rationalisation involves the grouping of past designs according to their similarities when considering particular perspective(s) or criteria. Decomposition removes the groupings.
Generalisation/ Specialisation	Generalisation generates a description that characterises all of the concept based on a conjunction of all the specialisations of that concept. Typically, the underlying inference is inductive. Specialisation increases the specificity of the description.
Similarity comparison/ Dissimilarity comparison	Similarity comparison derives new knowledge about a design on the basis of similarity between the design and similar past design(s). The similarity comparison is based on analogical inference. The opposite is dissimilarity comparison, which derives the new knowledge on the basis of lack of similarity between the two or more past designs.

Table-1

IV. AN INTERDISPLINARY APPROACH TO KNOWLEDGE REUSE

Knowledge reuse can be viewed from different disciplinary perspectives, for example:

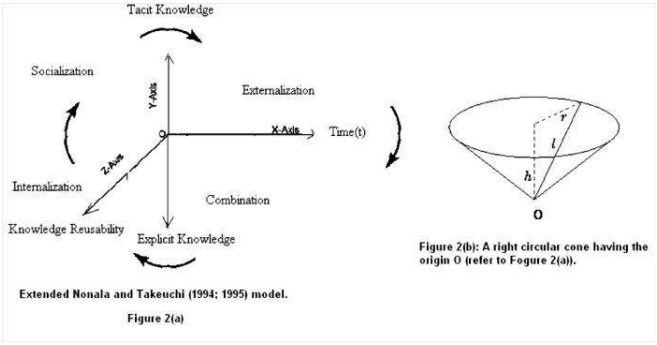
a) Reuse of tacit knowledge

b) Reuse of explicit knowledge

c) Reuse of components/artifacts during learning processes

Accounting above facts into consideration, knowledge reuse in distributed systems and multiple dimensions becomes far more intricate than originally thought of. For example we monitor more recurrent and more quick human to human communications, where the knowledge surges practically uncontrolled, and surges disorganized, while organizational configurations, hierarchies, administration, practices, rules may not favor such indicated knowledge flow.

In order for research to meaningfully examine the strength and affect of knowledge reuse in complex information systems environments, a rightfully multidimensional theoretical outline should be worked out which not only involve tacit and explicit knowledge while it should also be capable to understand the new phenomena as a result of growing technological development.



Extended Nonala and Takeuchi (1994; 1995) model.

Figure 2(a)

Figure 2(b): A right circular cone having the origin O (refer to Fogure 2(a)).

Harsh (2009) submitted a three dimensional model of knowledge reuse (Figure 2a and 2 (b)) which demonstrates the tacit and explicit knowledge as well as knowledge reusability with time. This model was in accordance with the knowledge changes or transformation processes in two dimension of well Known Nonaka (1995) model. Including the above work, an equivalent three dimensional model on Nonaka (1995) can be mentioned as shown in the Figure 2 (c) below (Harsh 2009). This model shows reusability in three dimensions as well as well- known processes like Socialization, Externalization, Internalization and Combination during the knowledge transformation. It shows that unlike Nonaka (1995) model, the locus of knowledge will be a solid cone in the three dimensional environment (not the spiral as per the work of Nonaka 1975) as a result of knowledge reusability.

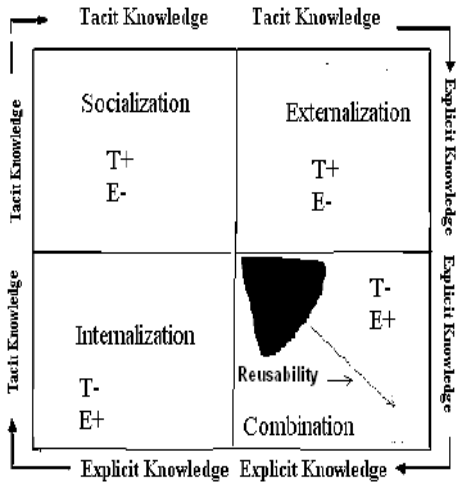


Figure 2(c): Revised Nonaka and Takeuchi Model

Using the above model we will try to explain the new phenomena arising due to technological advancements. We will demonstrate that as a result of knowledge reusability there is are optimum benefits in various areas including the learning environments.

Paola Di Maio [2009] suggested the knowledge reuse in a cloud which after modification in the three dimensional environment by the present authors is being shown in the Figure 3 below:

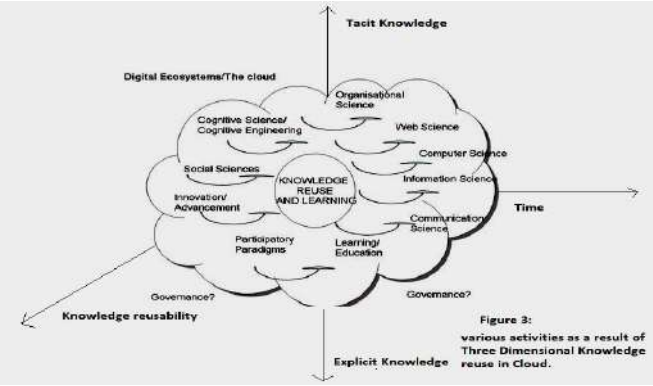


Figure 3: various activities as a result of Three Dimensional Knowledge reuse in Cloud.

Using the concept of Figure 1 and all the Figures 2, a refined new three dimensional model (Figure 3 above) demonstrates that all the activities of knowledge reuse will be extended to a new magnitudes by the virtue of not only the tacit and explicit knowledge but also due to time. Thus not only the variation of knowledge reusability with time while the respective tacit and explicit knowledge are also shown in the Figure 3 and accordingly the explanations of all the concerned activities of Figure 3 will be enhanced during Governance. For example we discuss some of the activities in the present research work as follows:

a. Learning Education
b. Social Sciences
c. Web Sciences
d. Innovative Advancement

First application of knowledge reuse is the area of Learning Education which will be affected because we are now able to create various reusable applications of knowledge reuse. As a result repetition of various processes involved in day to day activities will be optimized as well as application of tacit and explicit knowledge at a particularly time makes the learning processes more precise and well defined. It improves all the processes as mentioned in the Nonaka (1995) model in the Figure 2 (a). Thus the entire knowledge will be enhanced as per the Figure 2(c) means like a solid cone in the three dimensions. This not only represents the qualitative learning while learning with optimum resources.

The second process where the knowledge reuse is the Social Sciences where many components are now repetitive and well defined due to prevention of random distribution of tacit and explicit knowledge or in other words we can say that previous literature of social sciences learners was not optimally organized which resulted into chaos for the learners.
Next is the Web-Science where reusability (with time) of tacit and explicit knowledge not only helps in the designing of web learning issues but also useful in the learning by well defined web strategies because of precise role of tacit and explicit knowledge. Online and distance education becomes more accurate and useful.

Innovative Advancement is the next factor which will eventually affected most because of new strategies and optimization of knowledge components in the various areas of our lives for example big data, data visualization, data optimization and knowledge management. Factors like externalization, internalization, combination and socialization in the Nonaka (1975) becomes clearer in the real life which enhances the usefulness and the scope of data.

V.CONCLUSION

Present work could be valuable tool to understand the multidimensional applications of knowledge reuse particularly in the day to day activities of Governance and related processes. As a result we are not able to use and understand the role of tacit and explicit knowledge separately with time while we can refine our processes every-time we feel otherwise which eventually enhances the quality of our systems. Thus due to multiple applications of knowledge reuse in multidisciplinary environments we are highly benefited because of this fact that now we know better how to apply tacit and explicit knowledge with time which ultimately helps us in creating our desired system with optimal benefits.

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Reusability of Knowledge Management and its Techniques

Harpreet Kaur
Assistant Professor
Department of Computer Science and Engineering
Amritsar college of Engineering and Technology
Email id- harpreet71230@gmail.com

Sanjeev Saini
Assistant Professor
Department of Computer Science and Engineering
Hindu College Amritsar
Email id- harpreet71230@gmail.com

Ina Manchanda
Assistant Professor
Department of Computer Science and Engineering
Amritsar college of Engineering and Technology
Email id- ina.manchanda@gmail.com

***Abstract*— The knowledge management plays the important role in higher education, in which the people can consider the support knowledge, initiative knowledge, and maintain knowledge. This paper basically focus on reusability of knowledge like creation, validation, applications. In this mainly tacit and explicit knowledge has also been presented.**

Keywords: *knowledge management, reusable data, information, Types of knowledge, applying knowledge in education, Reusable techniques.*

I. INTRODUCTION

A. What is Knowledge Management

The Knowledge Management system is about to getting knowledge to a right person at a right time. The Knowledge management is not about the Knowledge for Knowledge Management .the overall focus on create, manage and share a right Knowledge to a particular field in specific area.

Figure-1

As Fahey and Prusak (1998) [5] suggest, knowledge does not exist independently of a Knower: it is shaped by one's needs as well as one's initial stock of knowledge.

Knowledge is the result of cognitive processing triggered by the inflow of new stimuli. Consistent with this view, we posit that knowledge is not a radically different concept from information. Information is converted to knowledge once it is processed in the mind of individuals and knowledge becomes information once it is articulated and presented in the form of text, graphics, words, or other symbolic forms.

II. LITERATURE STUDY

People typically do not create data, knowledge and information with the explicit intention to reuse them, although according to Jim High smith (2003) [4], "When we attack reuse as a knowledge management problem we begin to ask new questions, or at least look for different avenues for finding solutions to the problem. How do we go about finding the component we need? How do we gain confidence that the component does what we want it to do, and doesn't do strange things that we don't want? How should we go about testing this component? How easily will this component integrate into our environment?"

Harsh and Sajeev (2006) [3], extended the work of Hastings and Sajeev (2001) to three dimension to explicitly involve reusability by proposing a three dimensional model that accounts for reusability as a separate third dimension. Recently Harsh (2007a) [15] has proposed a three dimensional knowledge management model that is well known by name Nonaka and Takeuchi model (1995) [2], by involving independent knowledge reusability.

Earlier Harsh (2007b) [6], proposed a model on data, information and knowledge by studying the work of Gene Bellinger (2004) [1]. It can resolve many past issues of knowledge management.

III. DATA, INFORMATION AND KNOWLEDGE

The Bellinger (2004) [1] "Data is just a meaningless point in space and time, without reference to either space or time" It is like an event out of context, a letter out of context, a word out of context" The work of Marakas (1999**)** [7], suggests that **"***Knowledge is context dependent,* since 'meanings'' are interpreted. in reference to a particular paradigm (p. 264)**.**

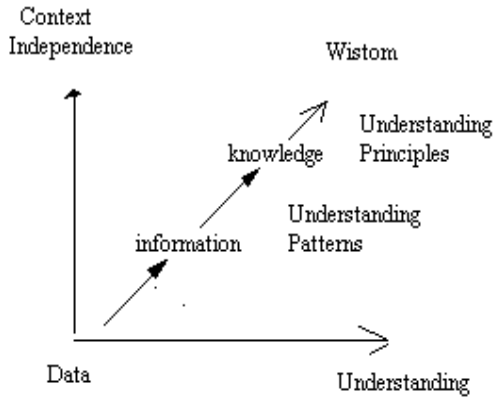

Figure 2: Representation of Data, Information, Knowledge and Wisdom (Bellinger, 2004)

IV. TYPES OF KNOWLEDGE MANAGEMENT

There are many types of knowledge but the literature knowledge is usually defined, namely **explicit** and **tacit** knowledge.

A. Tacit

Tacit knowledge is like a silent knowledge, it is difficult to write and visualize. For example: In any firm when an employee can leave the firm then knowledge can goes with the employee like: body language which is difficult to teach. Now the face to face interaction is defined, where quality of interactions make tacit knowledge. And this is also called social interaction.

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B. Explicit

Explicit knowledge can be changed, retrieve and discarded. Explicit knowledge is found in: databases, memos, notes, documents, etc. (Botha et al. 2008) the explicit knowledge is formal and easily Communicates and understandable and shared.
For Example: words, numbers, codes, mathematical.

Knowledge Types, Definitions, Examples

i. **Tacit** Knowledge is rooted in actions, experience, and involvement in specific context **for example** Best means of dealing with specific customer.
Cognitive Tacit: Means Mental Models
Technical Tacit: Means Know-how applicable to specific work.

ii. **Explicit** Means Articulated, generalized knowledge **for example** Knowledge of major customers in a region

iii. **Individual** Means Created by and inherent in the individual **for example** Insights gained from completed project

iv. **Social** Mean Created by and inherent in collective actions of a group **for example** Norms for inter-group communication

v. **Conscious** Means Explicit knowledge of an individual **for example** Syntax of a programming language

vi. **Automatic** Means Individual's tacit, subconscious knowledge **for example** Riding a bike

vii. **Objectified** Means Codified knowledge of a social system **for example** An operating manual

viii. **Collective** Means Tacit knowledge of a social system **for example** Organization culture

ix. **Declarative** Means Know-about **for example** What drug is appropriate for an illness

x. **Procedura**l Means Know-how **for example** How to administer a particular drug.

xi. **Causal** Means Know-why for example Understanding how the drug works.

xii. **Conditional** Means Know-when **For example** Understanding when to prescribe the drug

C. Reusable knowledge

The reusability of data means inheritance of data like we can use the knowledge again and again in many fields and represent in an organization etc.

Firstly we can create the knowledge after that validate and then present the knowledge to front of others so that the KM can reuse.

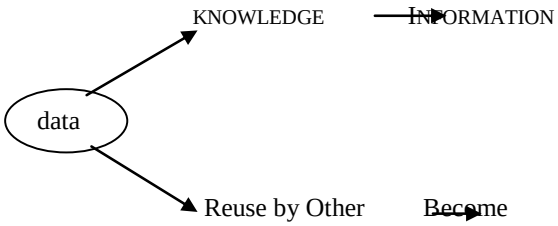

Figure-3

V. METADATA

According to (Garnemark, 2002)" [9]. Knowing when and by whom the data was created can make it easier to interpret the data at hand .metadata is data about data.

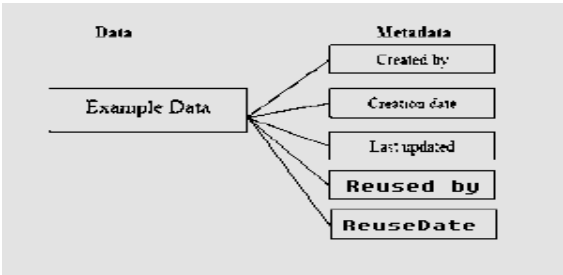

Figure-4 Description of Metadata - taken and extended from Garnemark (2002)

VI. TYPES OF REUSABLE KNOWLEDGE

The reusable knowledge is the interpreter in human mind which is based on the large number of factors and ideas . Ultimately management is done by people by using a sketch of old (past) events of successes .so according to this knowledge a person can maintain the project for future use.

Similar to the knowledge creation, validation, distribution and application processes in knowledge management, reusable knowledge also involve these steps (Harsh, 2007b) [6].

Now we can discuss some issues of reusable of knowledge:

1. Creation

As mentioned above, the data and information are created with a view to reuse in the future (Harsh, 2007b) [6]; therefore, we have to monitor each phase of the project over the time. The creation of reusable knowledge is varies over time in different phases. when we monitor each phase of the project and then use our knowledge so that the knowledge is created again and again by different persons in every time.

2. Validation

In creation every institute creates the knowledge with different ideas. The knowledge validation is the process in which we validate reuse knowledge with the requirement of our organization. We can use some existing knowledge for compromising and some for organization assets. So that we do again and again validation according to time and it's become a experience for us .

3. Presentation

Presentation means that how we present our knowledge to front of others. Because every organization has a department who can hire different people according to their work and style of present the knowledge. So that displaying the reuse knowledge is important**.** Finally the presentation of styles of all employees has to be unified in a single pattern so that we can integrate such reusable knowledge into our practices.

VII. KNOWLEDGE MANAGEMENT COMPONENT

A knowledge component is a self-contained, reusable object that can be used independently or assembled with other components to satisfy knowledge

management requirements". The Knowledge Repository comprises servers in which knowledge indices and, often knowledge artifacts (documents, presentations, databases, charts, graphs, plans, audio files, and/or video files) are potentially accessed According to Finneran (1999) [13].

VIII. Component-Based System Development Lifecycle

The component based SDLC is like waterfall model which can co-relate selecting and finding the components. In which the knowledge can show flow of data, information, knowledge, reusable knowledge and their presentation.

IX. Reusable Knowledge Components

Reusable Knowledge Component (RKC) or framework may be designed and implemented so that there is a balance between generalization and specialization. Here we can also say that (similar to authors (DENG-JYI CHEN et al., 2000), a reusable knowledge component may behave like a server while a client (application program) only requires the specification of a server only. Thus it does not need to know the details of the services provided by server. This implies that reusable components may be treated as tested one.

X. Why we applying KM principles in business school education

.

The main reasons for applying knowledge management in any management

- First we know that all institutes process a state of modern education in their institute according to the infrastructure
- They can share information and their knowledge with all faculty members, students and other employees
- Every institute want to share the knowledge with news papers, magazines for their good position and this is the main advantage for the institution.
- Each institute has a management and they can want internal documents every time according to requirement so that they can increase the internal and external demands present the dimensions of knowledge in management institutions. It is necessary to capture, store and analyze knowledge. (Chou and Tsai, 2004) [10], stress on the importance of organizational knowledge for creating activities rather than individual knowledge for creating activities.

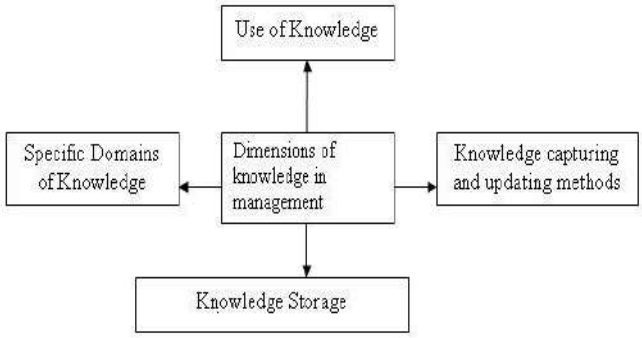

Figure-5

XI. Conclusion

The data, information and knowledge plays important role in any organization. When a person shares the knowledge with other person then knowledge can reuse in many areas by that person. So that it works like a waterfall model.

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ROLE OF JAVA DATA MINING AND ORACLE DATA MINING IN SOFTWARE DEVELOPMENT

Jaspreet Singh[1],Baljit Kaur[2]

[1]Associate Professor, Global College of Engineering and Technology,Kahnpur Khui

[2] Pursuing M.Tech in Computer Science Engineering, IET Bhaddal

Abstract: ***In this paper, we will discuss how data mining is helpful for software development. This paper is basically based on Stock Management Analyzer Software which mainly deals with automating the tasks of maintaining and transacting the goods. It provides the interface to users in a graphical way to manage the daily transactions as well as historical data. Also provides the management reports like monthly inwards, monthly deliveries and monthly returns. This application maintains the centralized database so that any changes done at a location reflects immediately. In this paper, we will analyze how to reduce the manual effort needed to manage the transactions.***

I. INTRODUCTION

As we all know ,Software development is directly related to customer need.Software is developed with systementic approach. This software mainly deals with the processes like Registration,Order of items, Sell items, Bill Report.The Administrator has the privilege to maintain different types of items in the warehouse .the main responsibilities are:

- Maintain the reports of suppliers.
- Responsible to add receipts when items delivered to the warehouse.
- Deal with adding of new items and generating reports on items, orders, receipts and stock etc.

This project will fulfill the desires of users to enhance the communication among different type of people such as administrator and sub location Incharge.

II. HOW TO RELATE DATA MINING WITH SOFTWARE DEVELOPMENT:

In this software client (admin) and server (cashier) both share the information. It provides comfortable and easy services to customer. It improves our programming skills. We precede our project in good way. It gives opportunity to work on good software.

Requirements:- Business requirements are gathered in this phase. This phase is the heart of the project managers. Meetings with managers, stake holders and users are held in order to determine the requirements.

Design:- The software system design is produced from the results of the requirements phase. This is where the details on how the system will work is produced.

Implementation:- This is the longest phase of the software development life cycle. For a developer, this is the main focus of the life cycle because this is where the code is produced.

Testing:- During testing, the implementation is tested against the requirements to make sure that the product is actually solving the needs addressed and gathered during the requirements phase. Unit tests and system/acceptance tests are done during this phase. Unit tests act on a specific component of the system, while system tests act on the system as a whole.

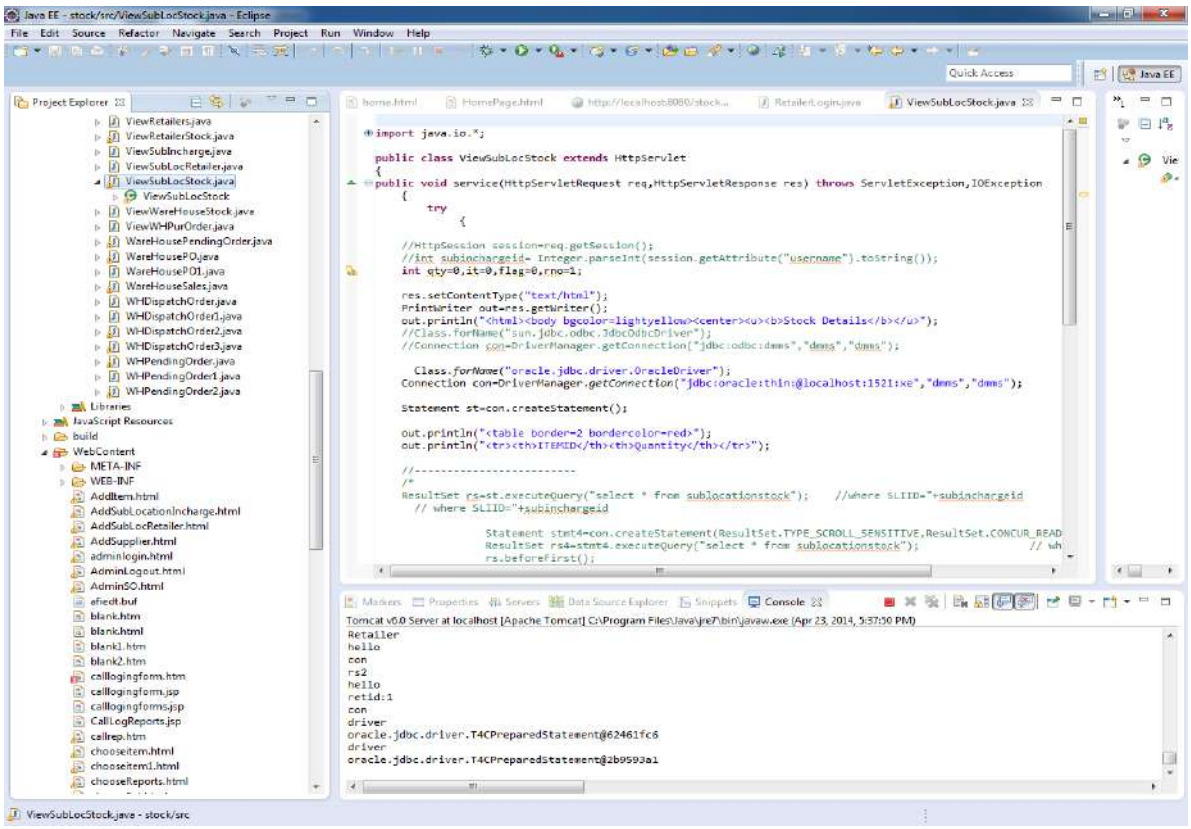

Fig:I Work on Eclipse

Data Mining (which is also known knowledge discovery).Knowledge discovery is the process of analyzing and summarizing data into useful information to understand common features. Data mining is beneficial in real world applications.

Java Data Mining (JDM) is a used for developing data mining applications and tools. JDM defines an object model and Java API for data mining objects and processes. JDM is helpful to integrate data mining technology for developing predictive analytics applications and tools.

Oracle Data Mining implements a variety of data mining functions inside the Oracle relational database. These implementations are integrated right into the Oracle database kernel, and operate natively on data stored in the relational database tables. This eliminates the need for extraction or transfer of data into standalone mining/analytic servers. The system is organized around a few generic operations providing a general unified interface for data mining functions. These operations include functions to create, apply, test, and manipulate data mining models. Sometimes we are saving as database after creating as model which acts as similar to tables, other objects and views for security purpose.

Oracle Data Mining is a graphical user interface that steps the user through the process of creating, testing, and applying models Application and tools developers can embed predictive and descriptive mining capabilities using PL/SQL or Java APIs.

II. WHAT IS QUALITY?

Up to now it has been exposed the common tools of the Development of Software in order to detect and erase the defects. External quality characteristics are those

where user can interface, where internal quality characteristics are those where user don't interface. This set of features is pointed as follows: Functionality, which covers the functions that a software product provides to satisfy user needs.

Reliability, which relates to the capability of software to maintain its level of performance.

Usability, which relates to the effort needed to use the software.

Efficiency, which relates to the physical resources used when the software is executed.

Maintainability, which relates to the effort, needed to the make changes to the software.

Portability, which relates to the ability of the software to be transferred to a different environment.

IV.ANALYSIS ACCORDING TO THE ATTRIBUTES

This present to analyze the multiple/typical problems in the stock. It has several interesting applications like: generate reports, maintain the recipient and bills. More standard and better process are introduced in software field. In this paper data mining technique describe that plays an important role in software development.

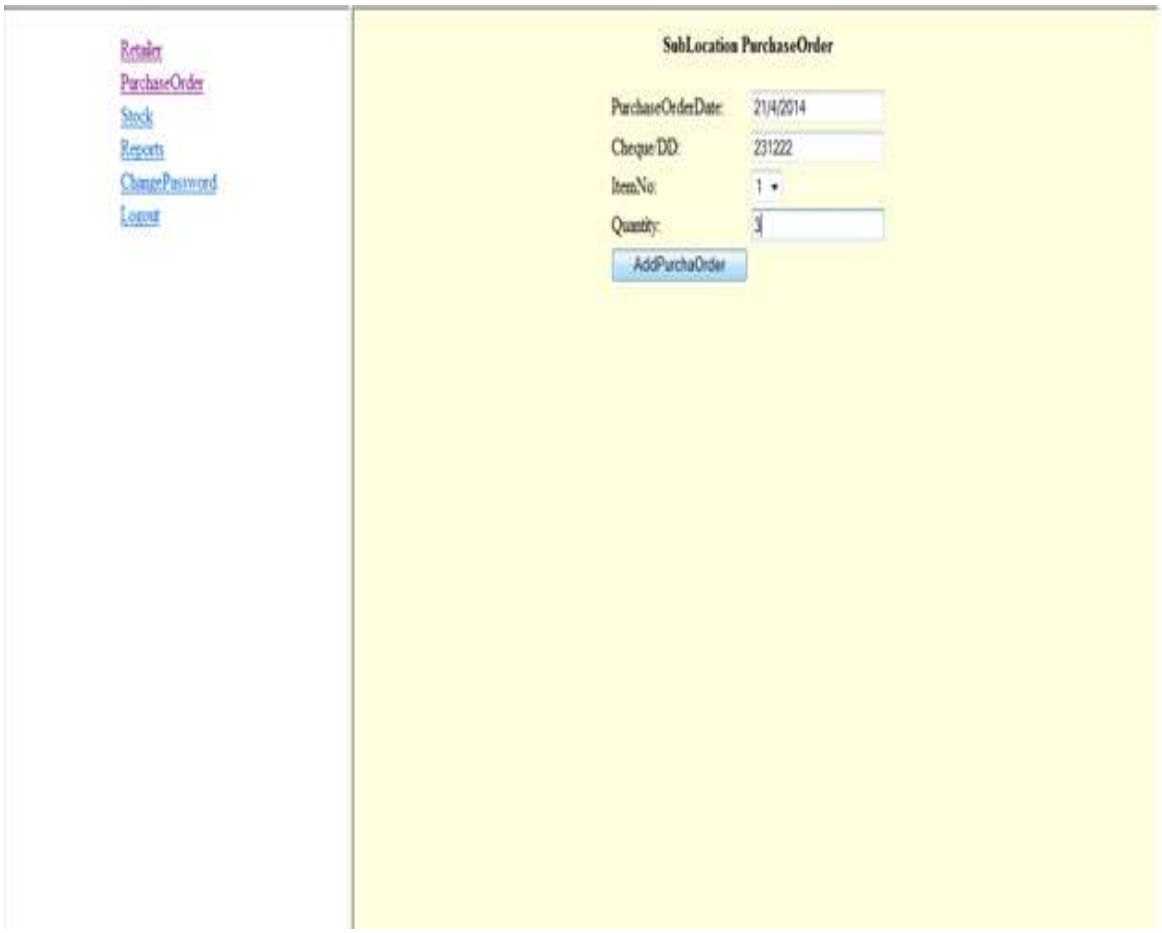

Fig II: Sub location Purchase Order Analysis

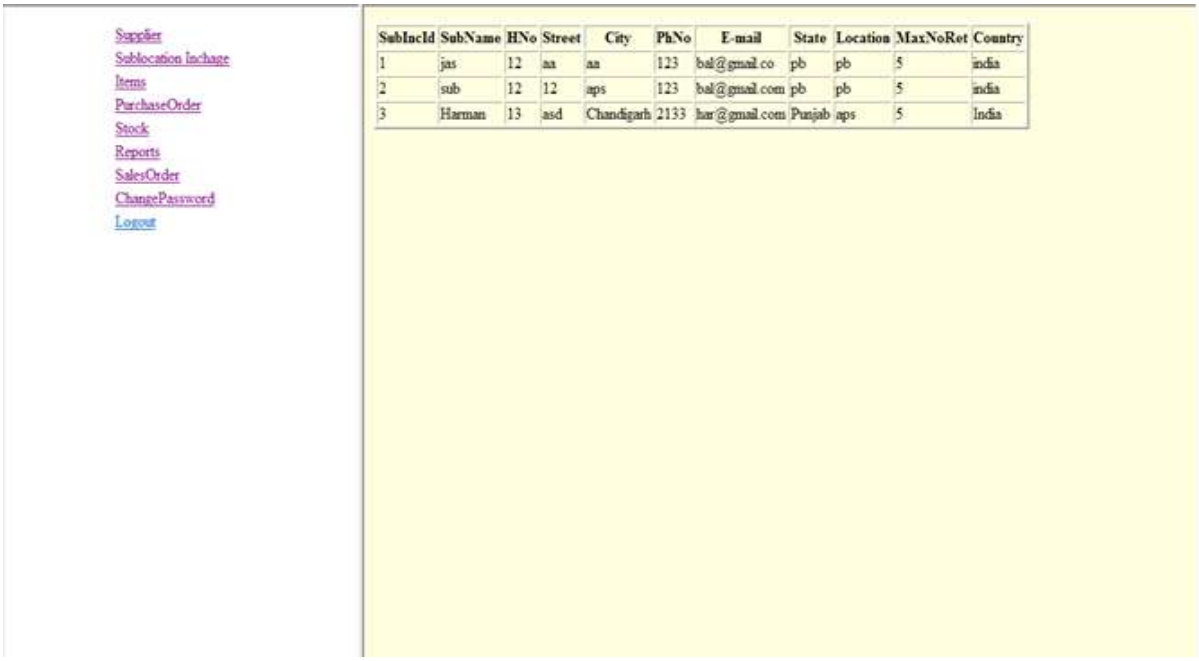

Fig: III To Analysis Sub location incharge Details

V. PERFORMANCE ANALYSIS

It provides the independency to each people that work in Organization. It also optimizes the security. It Provide Automatic functionality provide to customer and good's without any difficulty. To reduce the manually work it saves Time. Provide backup and recovery facility to user. This Software is providing the better attraction for the users on the system for better response.

- ✓ To make up to date detail about stock.
- ✓ To know statues of the warehouse system.
- ✓ Generate reports as per requirements.
- ✓ To provide maximum services to the customers.

CONCLUSION

In this paper, we discussed the advantage of Java Data Mining and Oracle Data Mining in software development. Since Java is open source software, It has various parameters like: improve quality, improve security and frequently work lead towards the great importance of open source software development. It serves a useful purpose in the supply chain. Possibility to joint management of receivable but it certain maters joint action. A computerized system is a good option for business dealing with many different types of stock. It Effect problems in supply chain this technique need to be implemented to prevent wasteful surpluses and to ensure proper stock. The advantage of this software is to improve the security of system and expand the quality. Software Development has Efficiency that will improve communication between administrator, sublocation incharge, retailer and customer.

FUTURE PLAN

This Software is working as Offline currently. This Project will be transfer online in future. This project will be applicable in various Malls to produce result in seconds.

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A Review of Different Routing Protocols versus Mobility Models in MANETs

Makul Mahajan
M.Tech Student, Dept. CSE
Amritsar College of Engineering & Technology
PTU, Jalandhar, Punjab
makul89@gmail.com

Manmeet Kaur
Assistant Professor, Dept. of CSE
Amritsar College of Engineering and Technology,
PTU, Jalandhar, Punjab
mink_manu@yahoo.co.in

ABSTRACT

Mobile ad hoc network consist of nodes that are mobile. The nodes are interconnected without any centralized control. The communication between the nodes is carried out by using the mobile nodes which are acting as routers. Routing in a mobile ad hoc network is very important issues. In this paper we have compared four routing protocols AODV, DSR, DYNMO and DSDV against different mobility models. The parameters to be compared are PDR and End to End delay. The simulation has been carried out using NS 2.33. Trace files has been analyzed for evaluation purpose.

General Terms—MANETs, Routing Protocol, Mobility Models

1. INTRODUCTION

A Mobile Ad-Hoc Network (MANET) is a set of Wireless mobile nodes which form a temporary network communicate with each other without using any existing infrastructure or central administration. The main characteristics of MANETs are the mobility of nodes, i.e. nodes can move in any direction and at any speed which leads to arbitrary topology and frequent partitioning of the network. This characteristic of the MANETs makes the routing a challenging task. Quick and easy deployment of ad-hoc network makes them feasible to use in military, search and rescue operation, meeting room and sensor networks. In MANET, nodes can move randomly thus, each node function as a router and forward packet. Due to high node mobility network topology changes frequently. Therefore, routing in ad-hoc network becomes a Challenging task. Many routing protocols have been proposed for ad-hoc networks such as FSR, AODV, DYMO LANMAR, LAR1, OLSR, DSR, TORA, ZRP, DSDV, STAR, RIP, etc. The aim of this paper is to perform comparative analysis of three routing protocols: Ad hoc on demand Distance Vector (AODV), Dynamic Source Routing (DSR), Distance Sequenced and distance vector (DSDV) in variable pause time for a constant number of nodes. [1] [4] [5] [6] [7].

2. ROUTING PROTOCOLS IN MANET

MANET routing protocols can be classified into two major categories:
A. Reactive Routing Protocol
These are the lazy type protocol in which nodes discover routes to destination only when it is needed. These protocols may use the lesser bandwidth but delay caused in route discovery may be large. These are also called on-demand routing protocols because route to the destination is always created on demand.

1) Ad hoc on Demand Routing Protocol: AODV is a routing protocol in which route is decided on demand i.e. route to the destination is created whenever it is required. In AODV first of all source node initiate a route discovery by broadcasting route request packet (RREQ) to all the neighboring nodes then again RREQ packet is transferred to all the other nodes in the network then the required destination uncast the route reply packet(RREP) to the source node in the reverse order. In this fashion route discovery is done by traversing the path saved. In AODV RREQ packet contain various information like IP address of node, sequence number, broadcast ID and most recent sequence number to destination node. Now there are cases when link fail in that case RERR packet is broadcasted to sender [1] [2] [3].

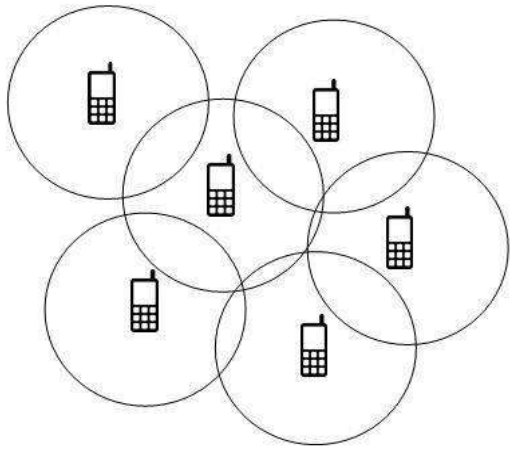

Figure 1: A Mobile Ad hoc Network consisting of 6 nodes.

2) Dynamic Source Routing: DSR is just like AODV which is based on dynamic, on demand routing. The route to the destination is established on demand. In this protocol first of the entire source node identifies the sequence of nodes in its neighbors and broadcast a route request packet to all the nodes in its neighbors. If discovery is completed and it is successful then a response packet is returned to the source node which initiated the route discovery. The response packet usually contains the list of nodes through which the discovery was made. The route request packet thus contains a record field, which accumulates the sequence of nodes visited during propagation of the query in the network [5] [6] [3].

3) Dynamic MANET on demand (DYNMO): DYMO operates using two mechanisms, route discovery and route maintenance. Route discovery is similar to that of AODV, e.g. broadcast of RREQ by DYMO routers in case of route non-availability, and sending of RREP by destination router in response to RREQ. Sequence numbers

are used to avoid routing loops and to obtain fresh information about routes. Route maintenance scheme has two components; (1) extension of route lifetime in case of successful delivery of packets,
(2) In case of non-availability of routes or link failures, RERR packet is sent to the source which deletes the relevant route. Another route discovery is later initiated if the source still requires sending packets for the destination DYMO router.

B. Proactive Routing Protocol [1] [4] [7].

4) Distance Sequenced Distance vector: DSDV is table driven protocol which is based upon the Bellman-ford algorithm. Sequence number is used to tag the entries in the routing table of DSDV which are originated by destination. This is the responsibility of node to update the old sequence number with new one whenever a new route is discovered. There are two ways in which updates are transmitted in DSDV either periodically or immediately whenever a topology change is identified. Updates can either be full dump where nodes transmit their routing table entries or incremental where nodes only forward newly updated entries. For route stability, settling time data is used and broken links are detected through layer-2 protocol [2] [6] [8].

3. Mobility Models

A Mobile Ad hoc network is characterized by moving nodes which is called mobility. Mobility is identified by speed and direction of mobile node. Various mobility models have been proposed depending upon the movement of nodes [3].

A. Random Waypoint Mobility Model

Random Waypoint Mobility Model is most widely used in the studies of mobile ad hoc network. According to this model a node chooses a destination randomly, called waypoint, and move in a straight line with a constant speed. The constant speed is usually determined from 0 to V_{max}. RWP is characterized by three things $<V_{max,}$ T, $V_i>$ where T is the pause time and V_i is the distant vector. After reaching a way point the node pauses for a time and then again repeats the same procedure [6] [7]. Mathematically if currently node is at location d(x-1, y-1) then the next location is given by

$$D(x,y)=d(x-1,y-1)+V_i$$

B. Reference Point Group Mobility Model(RPGM)

RPGM is a group mobility model in which nodes form group and then moves in a coordinated manner. RPGM consist of 5 things $<V_{max}$,T, R_{max}, $V_i>$ where V_{max} is the maximum speed , T is the pause time, R_{max} is the maximum allowable range within the group from group logical center. Vi is the advance direction vector. Each group has a logical center, group leader that determines the group motion/advance behavior. Initially, each member of the group is uniformly distributed in the neighborhood of the group leader. Subsequently, at each instant, every node has a speed and direction that is derived by randomly deviating it from the group leader's position. When nodes move (from time *t* to *t* + 1), their locations are updated according to the group logical center being *d* (*t* + 1) [3] [5] [6]. Using RPGM, the velocity of node *Ni* at time *t* is given as:

C. Column Mobility Model (CMM)

Column Mobility Model is derived from RPGM with the main difference being that groups in CMM move in columns and not in random fashion. The movement of tanks in an exercise area in military battle field scenario or movement of cars on roads, etc, can be realized through CMM [3] [4].

4. Simulation Results

Simulation has been performed using NS2 to determine the impact of mobility on different routing protocol. The protocols are to be compared are DSDV, AODV, DYNMO and DSR and mobility model against which protocols are compared are RWP, RPGM and CMM. The Parameters to be compared are

Packet Delivery Ratio *(PDR)* is defined as the ratio of data packets delivered successfully to destination nodes and the total number of data packets generated for those destinations. PDR characterizes the packet loss rate, which limits the throughput of the network. The higher the delivery ratio better is the performance of the routing protocol. PDR is determined as:

$$PDR = (Pr/Ps) \times 100$$

Where Pr is the total packets received and Ps is the total number of packet sent.

Average Delay indicates the time taken for a packet to travel from the source node to application layer of the destination node in a network scenario. It also includes the route discovery wait time that may be experienced by a node when a route is initially not available or when route breaks. The average delay is computed as:

$$D = (tr - ts) / Pt$$

Where ts is the packet send time and tr is the packet Receive time for the same packet at destination.

TABLE I

Parameter	Values
Area	1200 * 1200 m^2
Speed	30 m/sec
Pause	10s
Packet Size	512B
Simulation Time	300s
Number of Nodes	25,50,75,100

Table 1: Simulation Parameters

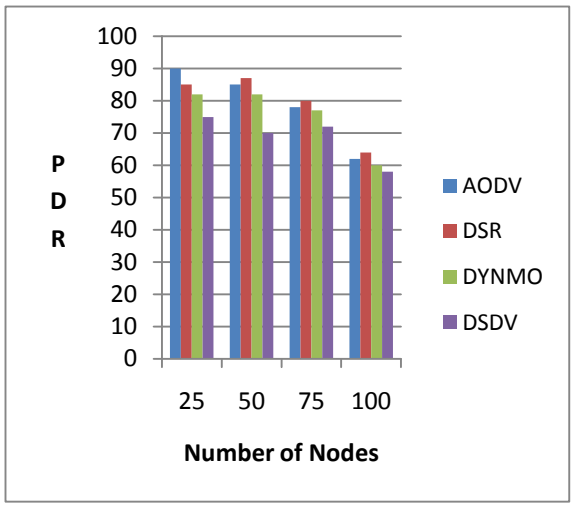

Figure 2: Packet Delivery Ratio for RPGM

In this diagram the routing protocols have been compared against RPGM, and it has been observed that all the routing protocol shows a very good performance when the network size was small. As the network size increases the DSR tends to show low performance than other protocols. The AODV shows the average performance as the network size increases on the other hand DSR protocol shows good performance in packet delivery fraction as the number of nodes in the network performance increases. DYNMO shows equal performance in all the network loads.

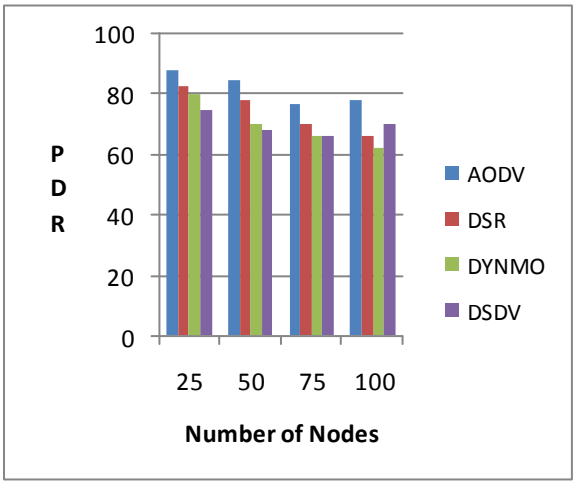

Figure 3: Packet Delivery ratio for CMM

In this diagram another group mobility model CMM have been compared against different routing protocol and it has been observed that 90% results have been achieved when the network size is small. As the number of nodes increases in the network PDR decreases.

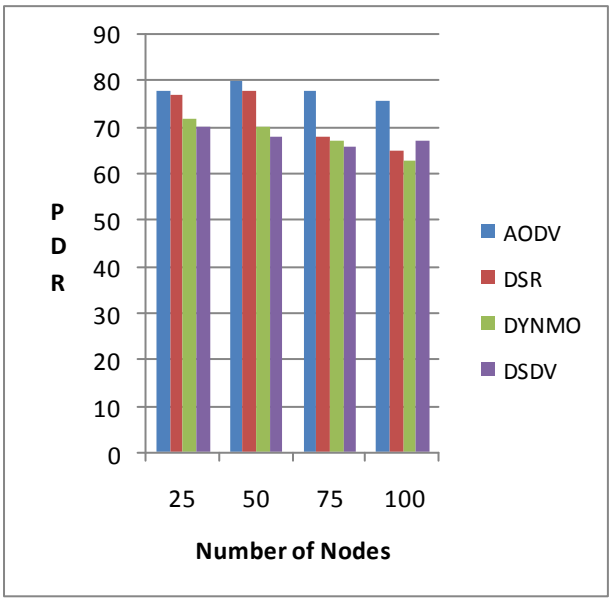

Figure 4: Packet Delivery Ratio for RWP

In this diagram the routing protocols have been compared against the RWP mobility model and it has been observed that all the routing protocol shows approx same performance in small size network but as the number of nodes in the network increases it shows a slight decrease in PDR of DSR.

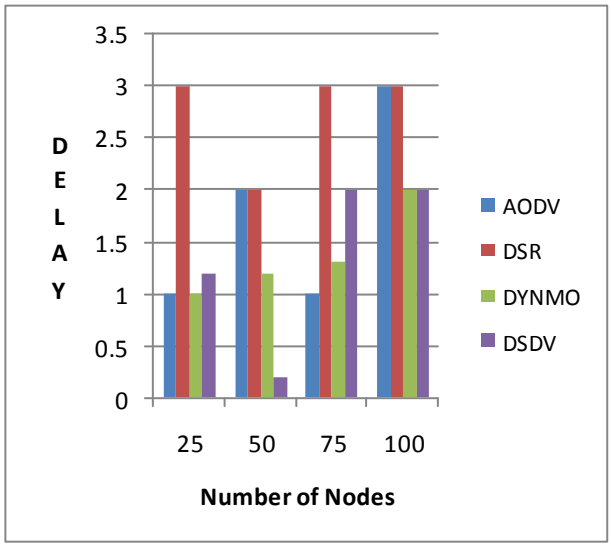

Figure 5: Delay for RPGM

In this diagram all the routing protocol have been compared for average delay against the RPGM mobility model and it has been observed that DSR outperform all the routing protocol when the network size is small but as the network size increases DSR shows higher delays than any other protocol. AODV, DSDV and DYNMO show similar behavior in the entire network scenario.

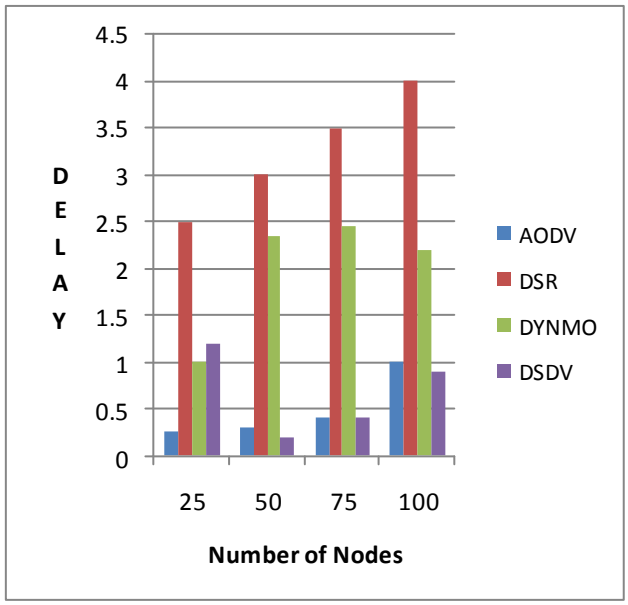

Figure 6: Delay for CMM

In this diagram the delay of the routing protocols have been compared against CMM mobility model. The results show that the DSR protocol gives more delay than all the routing protocol as the number of nodes in the network increases. This is due to various types of delays included in the network as the network size increases. The second number is of DYNMO shows the lesser delay than DSR. The DSDV outperform all the routing protocols and shows lesser delay.

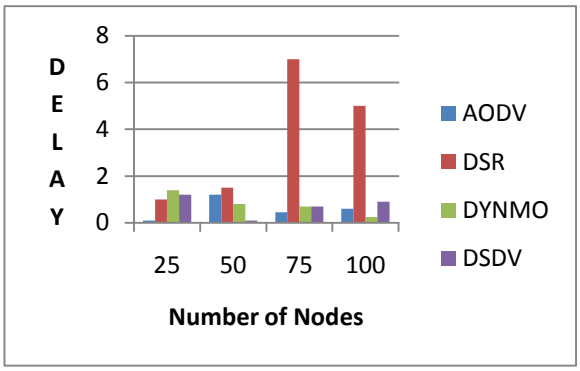

Figure 7: Delay for RWP

5. CONCLUSION

In this paper we have compared four routing protocols AODV, DSR, DYNMO and DSDV against the three different mobility models named random waypoint, CMM and group mobility model. The simulations have been performed and it has been concluded from results that the different protocol behave separately in different mobility model. The DSR shows good network performance when the number of nodes is more in all the mobility models. On the other hand DSDV shows good network performance when the number of nodes is less as the number of nodes in the network increases the performance degrades. The AODV protocol shows average performance as the number of nodes in the network increases.

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MULTIMODAL BIOMETRICS AUTHENTICATION TECHNIQUE FOR INTRUSION DETECTION SYSTEMS USING FACE AND VOICE

Girish Kumar[1] Samdeesh Menia [2] Simranjit Singh [3]
1, 2 & 3 Department of Computer Science & Engineering, ACET Amritsar, India
girishvansh@gmail.com ,samdeesh@ymail.com, simransandhu1203@gmail.com

Abstract— Identifying an attacker or intruder is a tedious task for people as well as security organizations. This task can be simplified to some extent by the use of biometric technology. By the use of simple biometrics like face recognition and/or voice recognition the subject can be identified as an intruder or not. Biometrics technology is simply the measurement and use of the unique characteristics of living humans to distinguish them from one another and it is more useful as compare to passwords and tokens as they can be lost or stolen so we have choose the technique biometric authentication. In this paper, we have briefly discussed the basic biometric techniques. Then we have provided the information regarding the intrusion detection system and finally we have proposed the application of multimodal biometrics to enhance the intrusion detection process.
Index Terms— Intrusion detection, Biometrics, Identification Authentication

1. INTRODUCTION

Biometric recognition builds up a strong bond between a person and his identity, as biometric traits cannot be easily shared, lost, or duplicated. Hence, biometric recognition is fundamentally superior to authentication and more resistant to social engineering attacks than the two conservative methods of recognition, namely, passwords and tokens. Since biometric recognition requires the user to be present at the time of authentication, it can also prevent users from making false refutation claims. [3] Moreover, only biometrics can provide negative identification functionality where the aim is to set up whether a certain individual is really enrolled in a system even if the individual might refuse it. Due to these characteristics, biometric recognition has been widely hailed as a natural, reliable, and exceptional component of any identity system. Computer systems are targeted by three kinds of attacks [6]: (1) user-level, when a genuine user uses his rights to steel information, (2) system-level, when an intruder uses system calls to assault the system, and (3) network-level, when an attacker uses data stream to execute the attack. During the last years, huge advances have been made in handling system and network-level attacks. However, user-level attacks were dealt with mostly in combination with system-level attacks. This kind of attack is measured as the most persistent forms of intrusions.[1] A classic example of a user-level attack is a masquerade attack, where scrawled user impersonates another comprehensible user in order to gain access to sensitive information is a major problem these days, since it serves as a precondition for most of the intrusions. The security services that contradict this threat are identification and authentication. Moreover, biometric recognition systems can operate in two modes [1]: identification mode, where the system identifies a person searching a large database of enrolled users for a counterpart; and authentication mode where the system verifies a person's claimed identity from his earlier enrolled pattern. [3]

2. BIOMETRICS

Biometrics makes the use of biological terms that deals with data statistically. It verifies a person's uniqueness by analyzing his physical features or behaviors (e.g. face, fingerprint, voice, signature, keystroke rhythms). The systems record data from the user and compare it each time the user is claimed. [4] A biometric system is a computer system that implements biometric recognition algorithms. A typical biometric system consists of sensing, feature extraction, and matching modules. [4]

We can classify the biometric techniques into two classes:

- Physiological based techniques include facial analysis, fingerprint, hand geometry, retinal analysis, DNA and measure the physiological characteristics of a person. [3][5]
- Behavior based techniques include signature, key stroke, voice, smell, sweat pores analysis and measure behavioral characteristics. [3][5]

Biometric recognition systems based on the above methods can work in two modes: identification mode, where the system identifies a person searching a large data base of enrolled for a match; and authentication mode where the system verifies a person's claimed identity from his earlier enrolled pattern. [3][5]

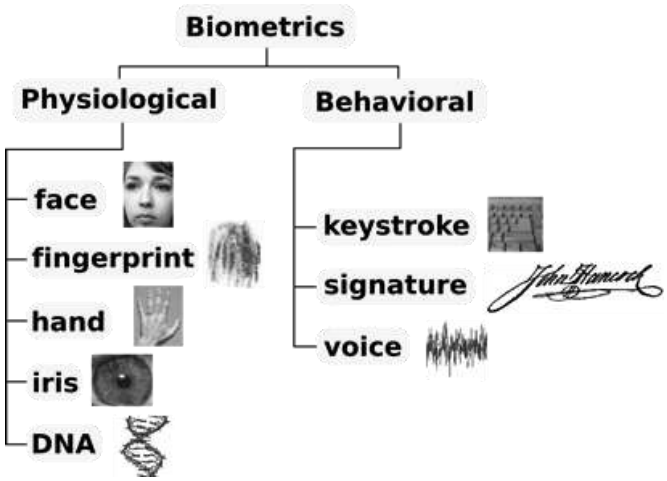

Figure 1 Categories of biometric

Types of Biometrics

Facial Recognition

The facial recognition systems differentiate between the background and the face. This is important when the system has to identify a face within a throng. The system then makes use of a person's facial features – its peaks and valleys and landmarks – and treats these as nodes that can be measured and compared against those that are stored in the system's database. There are around 80 nodes comprising the face print that the system makes use of and this includes the jaw line length, eye socket depth, and distance between the eyes, cheekbone shape, and the width of the nose.

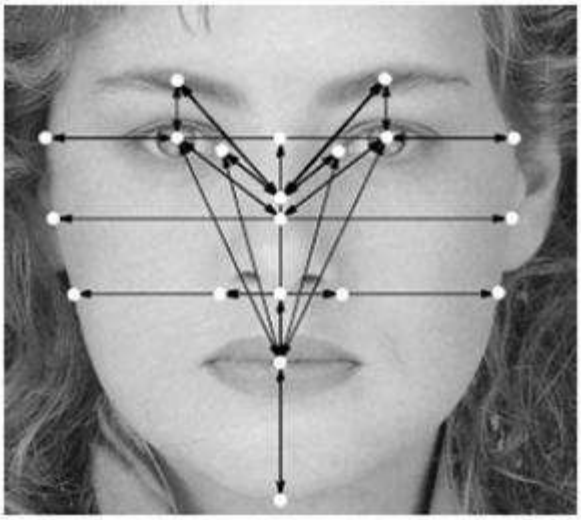
Figure 2 Facial recognition

Advantages:

- It is not intrusive.
- It is hands-free, and continuous.
- It can be done from a distance even without the user being aware they are being scanned.

Disadvantages:

- Many systems are less effective if facial expressions vary. Even a big smile can render the system less effective.
- Face recognition does not work well in case of significant glare on eyeglasses or wearing sunglasses, long hair obscuring the central part of the face and poor lighting that would cause the face to be over- or under-exposed.
- Lack of resolution (image was taken too far away) may also pose problems.
- Facial recognition system requires actual management of large databases.

Iris Recognition

Iris recognition is an automated method of biometric identification which uses mathematical pattern recognition techniques on video images of the irises of an individual's eyes, whose complex random patterns are unique and can be seen from some distance. Iris cameras perform recognition detection of a person's identity by analysis of the random patterns that are visible within the iris of an eye from several distances. It combines computer vision, pattern recognition, statistical inference and optics. The iris is the colored ring around the pupil of every human being and like a snowflake, no two are the same. Each one is unique in its own way, exhibiting a distinctive form. [6]

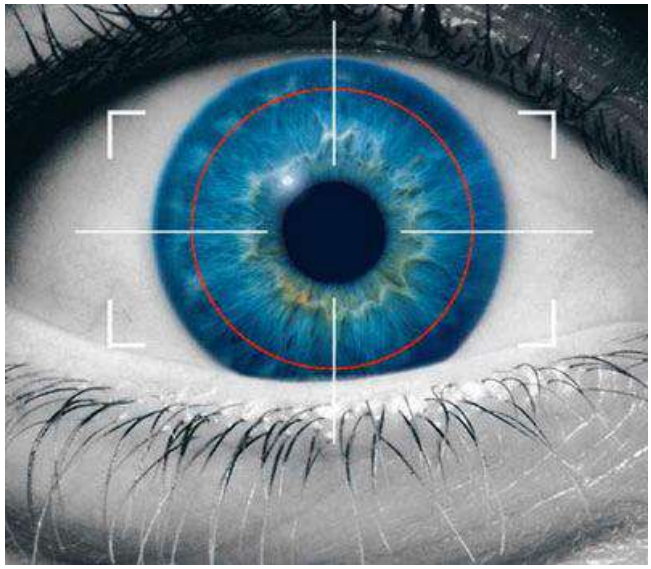
Figure 3 Iris Recognition

Advantages of Iris Recognition:

- Iris-scanning technology is not very intrusive as there is no direct contact between the subject and the camera technology.
- It is non-invasive, as it does not use any laser technology, just simple video technology.
- The accurateness of the scanning technology is a major benefit with error rates being very low, hence ensuing a highly reliable system for authentication.

Disadvantages of Iris Recognition:

- The iris is a very small organ to scan from a distance. It is a moving target and can be covered by objects such as the eyelid and eyelashes.

- Subjects who are blind or have cataracts can also cause a challenge to iris recognition, as there is difficulty in reading the iris.
- The camera used in the process needs to have the correct amount of illumination. Without this, it is very complicated to capture an accurate image of the iris.

Keystroke

The functionality of this biometric is to measure the dwell time (the length of time a key is held down) and flight time (the time to move from one key to another) for keyboard actions. Keystroke biometrics work on the basis of multiple feature extraction being used to create a profile of an individual. [3] This profile is used to identify or authenticate the user. Keystroke analysis is concerned with the frequency, accuracy, the pause between strokes and the length of time a key is depressed.

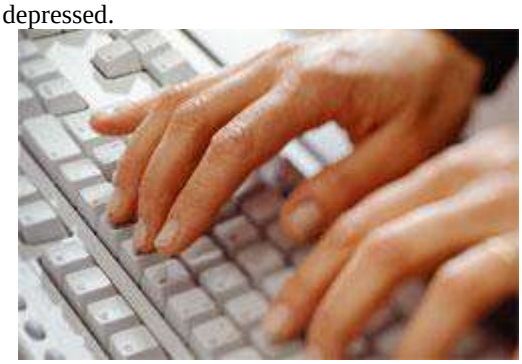

Figure 4 Keystroke

Advantages of Keystroke:

- Keystroke recognition system is simple to implement due to the fact that it does not require any specific hardware.
- It is relatively easy to learn.

Disadvantages of Keystroke:

- The performance of the keystroke is affected by various circumstances of the human users, such as a hand injury or fatigue of the legitimate user.
- Limited accuracy.
- The systems developed for this biometric method are costly since they use neurological methods and dedicated terminals.

Mouse Dynamics

Mouse dynamics can be described as the characteristics of the actions received from the mouse input device for a specific user while interacting with a specific graphical user interface. [3]A mouse action can be classified into one of the following categories:

- Mouse-Move (MM): general mouse movement,
- Drag-and-Drop (DD): the action starts with mouse button down, movement, and then mouse button up,
- Point-and-Click (PC): mouse movement followed by a click or a double click, and
- Silence: no movement.

The characteristics of mouse dynamics can be described by a set of factors generated as a result of analyzing the recorded mouse actions. These factors represent the components mouse dynamics signature for a specific user, which can be used in verifying the identity of the user.

Figure 5 Mouse dynamics

Advantages of mouse dynamics:

- Mouse dynamics does not required special hardware device for data collection.
- Low cost and low invasiveness.
- Disadvantages of mouse dynamics:
- The performance of the mouse dynamics is affected by various circumstances of the human users, such as a hand injury or fatigue of the legitimate user.
- Limited accuracy

Voice Recognition

Voice authentication or speaker recognition uses a microphone to record the voice of a person. The recorded voice is digitized and then used for authentication. The voice can be acquired from the user enunciating a known text (text dependent) or speaking (text independent). In the former case, the text can be fixed or prompted by the system. The text can also be read discretely or the entire text read out continuously. The captured voice is then enhanced and unique features extracted to form a voice template. There are two types of templates: stochastic templates and model templates. Stochastic templates require probabilistic matching techniques such as the popular Hidden Markov Model and results in a measure of likelihood of the observation given the template. For model templates, the matching techniques used are deterministic. The observation is assumed to be similar to the model, albeit some distortion. Matching result is obtained by measuring the minimum error distance when the observation is aligned to the model. The matching techniques popularly used for model templates include Dynamic Time Warping algorithm, Vector Quantization and Nearest Neighbors algorithm [2].

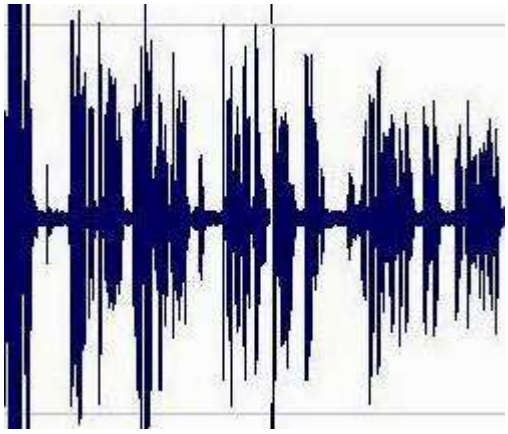

Figure 6 Voice recognition

Advantages of Voice Recognition

- Voice is a very natural way to interact, and it is not necessary to sit at a keyboard or work with a remote control.
- No training required for users!

Disadvantages of Voice Recognition

- Even the best voice recognition systems sometimes make errors. If there is noise or some other sound in the room (e.g. the television or a kettle boiling), the number of errors will increase.
- Voice Recognition works best if the microphone is close to the user (e.g. in a phone, or if the user is wearing a microphone). More distant microphones (e.g. on a table or wall) will tend to increase the number of errors.

3. INTRUSION DETECTION SYSTEM

3.1 What is intrusion detection system?

An intrusion detection system (IDS) inspects all inbound and outbound network activity and identifies apprehensive pattern that may specify a network or system attack from someone attempting to crack into or compromise a system. One facet of computer security will work to keep people from receiving unauthorized access by selecting good security passwords, using software to protect against known intrusions. The IDS examine the performance of the computer and then give some kind of alert when apprehensive activity is detected. [3][8]

For example, Gmail carries basic IDS. This enables users to make sure whether anyone has signed in to their account from a different location. In crate looking at the list and only see your home IP address and phone number, everything is likely to be okay. In the event that some capricious IP address from Tokyo, Mumbai or Berlin is on the list, someone has surely compromised your email account. Whilst Gmail requires users to monitor things manually, there are automated systems to ensign disputed activity and give warnings. The question is where the intrusion detection system fits in the design. To put it in simpler terms, an Intrusion detection system can be compared with a burglar alarm. For example, the lock system in a car protects the car from theft. But if somebody breaks the lock system and tries to steal the car, it is the burglar alarm that detects that the lock has been broken and alerts the owner by raising an alarm. The Intrusion detection system in a similar way complements the firewall security. The firewall protects an organization from cruel attacks from the Internet and the Intrusion detection system detects if someone tries to break in through the firewall or manages to break in the firewall security and tries to have access on any system in the trusted side and alerts the system administrator in case there is a break in security. Besides, Firewalls do a very good job of filtering incoming traffic from the Internet; however, there are ways to circumvent the firewall. For example, peripheral users can connect to the Intranet by dialing in through a modem installed in the private network of the organization. This kind of access would not be seen by the firewall. Therefore, an Intrusion detection system is a security system that monitors computer systems and network traffic and analyzes that traffic for probable aggressive attacks originate from outside the organization and also for system abuse or attacks originating from within the organization.[3][8]

3.2 Types of Intrusion Detection Systems

IDSs can be of three types which are as follows:

- Network-based intrusion detection, which runs at the gateway of a network and observe all arriving packets. And it has network-based sensor
- Router-based intrusion detection, which is installed on the routers to prevent intruders from entering the network.
- Host-based intrusion detection, which receives the necessary audit data from the host's operating system and analyzes the generated events to keep the local node secure.

4. PROPOSED SYSTEM

Multimodal biometric approaches are growing in importance for personal verification and identification, since they provide better recognition results and hence improve security compared to biometrics based on a single modality. In this paper, we present a multimodal biometric system that is based on the fusion of face and voice biometrics. Both face images and voice biometrics are chosen due to their complementary characteristics, physiology, and behavior. In multimodal systems, complementary input modalities provide the system with non-redundant information whereas redundant input modalities allow increasing both the accuracy of the fused information by reducing overall uncertainty and the reliability of the system in case of noisy information from a single modality. Information in one modality may be used to disambiguate information in the other ones. The enhancement of precision and reliability is the potential result of integrating modalities and/or measurements sensed by multiple sensors [10]

A. Face Recognition

To implement a face recognition system using the Principal Component Analysis (PCA) algorithm, automatic face recognition systems try to find the identity of a given face

image according to their memory. The memory of a face recognizer is generally simulated by a training set. Our training set consists of the features extracted from known face images of different persons. Thus, the task of the face recognizer is to find the most similar feature vector among the training set to the feature vector of a given test image. Here, we want to recognize the identity of a person where an image of that person (test image) is given to the system. We can use PCA as a feature extraction algorithm.

In the training phase, we should extract feature vectors for each image in the training set. Let Ω_A be a training image of person A which has a pixel resolution of $M \times N$ (M rows, N columns). In order to extract PCA features of Ω_A, we will first convert the image into a pixel vector φ_A by concatenating each of the M rows into a single vector. The length (or, dimensionality) of the vector φ_A will be $M \times N$. We use the PCA algorithm as a dimensionality reduction technique which transforms the vector φ_A to a vector ω_A which has a dimensionality d where d ¿ $M \times N$. For each training image Ω_i, we should calculate and store these feature vectors ω_i.

In the recognition phase (or, testing phase), we take a test image Ω_j of a known person. Let α_j be the identity (name) of this person. As in the training phase, we compute the feature vector of this person using PCA and obtain ω_j. In order to identify Ω_j, we compute the similarities between ω_j and all of the feature vectors ω_i's in the training set. The similarity between feature vectors can be computed using Euclidean distance. The identity of the most similar ω_i will be the output of our face recognizer. If $i = j$, it means that we have correctly identified the person j, otherwise if i 6= j, it means that we have misclassified the person j. Schematic diagram of the face recognition system that will be implemented is shown in Figure 7.

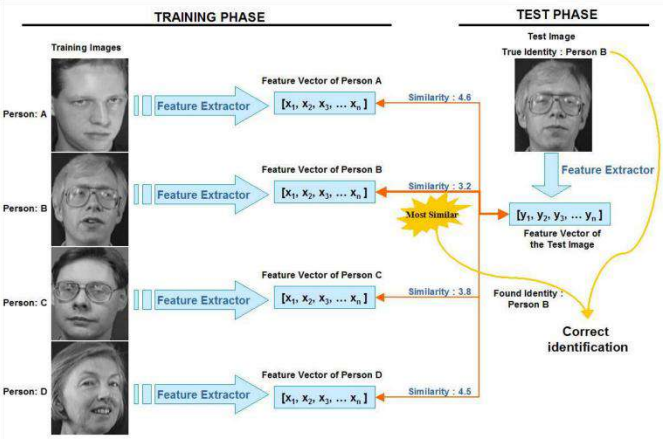

Figure 7. Schematic diagram of a face recognizer.

How to use PCA?

In this section, the use of PCA as a feature extractor is explained. Assume that we have p training images: Ω_i,i = 1,2,...,p. For each training image, we form pixel vectors φ_i where

$$\phi_i \in \Re^k, (k = M \times N).$$

Our aim is to compute feature vectors ω_i where

$$\omega_i \in \Re^d, (d \ll k).$$

In order to apply PCA to the training set, we first form a training data matrix A which contains p rows: at each row φ_i's are stored. Thus the dimensionality of A is $p \times k$. First, we compute the covariance matrix of A: C_A. Then the eigenvalues and their corresponding eigenvectors of C_A should be computed. There will be k eigenvalue and eigenvector pairs where each eigenvector e_i is of dimensionality k. Sort the eigenvalues in decreasing order, and select the biggest d eigenvalue and eigenvector pairs. Form the transformation matrix Ψ by simply putting the selected eigenvectors as columns of Ψ. We will use Ψ to compute ω_i's from φ_i's. The computation of ω_i is simply by:

$$\omega i = \Psi T \varphi T i \qquad (1)$$

where Ψ^T and $\varphi^T{}_i$ are the transposes of Ψ and φ_i, respectively. Note that each column of Ψ corresponds to an eigenvector which is of length k. This is equal to $M \times N$ which is the dimensionality (resolution) of input images. Thus, we can convert each eigenvector to an image by reversing the concatenation operation. These converted eigenvector images are called eigenfaces since they are similar to human faces. Figure 2 shows 20 eigenfaces that correspond to the largest 20 eigenvalues of the ORL face database.

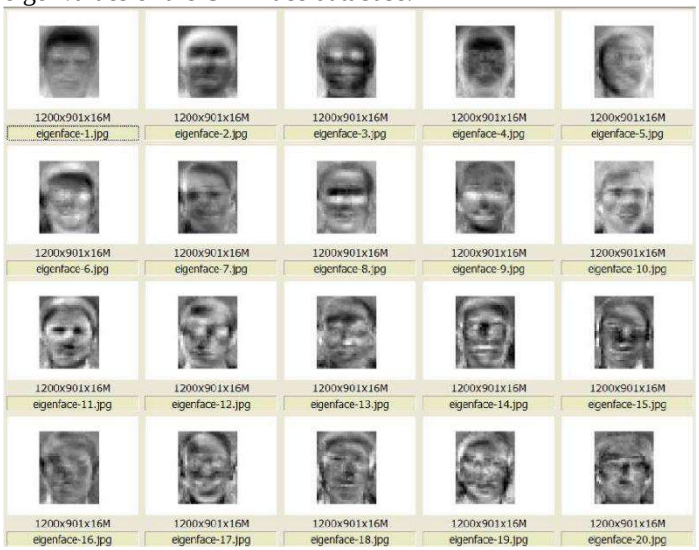

Figure 8. First 20 eigenfaces of the ORL face database

Once we obtain ω_i's using the largest d eigenvectors, we can reconstruct the image of person i. If we use all k eigenvectors instead of d when forming Ψ, the reconstructed image will the same as image Ω_i. However, since our aim is dimensionality reduction and d ¿ k, reconstructed image $\Omega\hat{}_i$ will be an approximation of the actual Ω_i. We can reconstruct $\Omega\hat{}_i$ by converting the pixel vector: $\varphi\hat{}_i = (\Psi\omega_i)^T$ to an image of resolution $M \times N$. Figure 3 shows the reconstructed images of two persons using different number of eigenvectors. Notice that if we use more eigenvectors, then the reconstructed image is more similar to the original face image.

Implementation Details

We are using the ORL face database which contains 10 different images of each of the 40 subjects. For each subject five images (instances) will be put into training set, and the rest of the images will be put into the test set. Training and test

set images will be under \train_images and \test_images directories, respectively. A sample MATLAB code will be provided to us which automatically reads the images under these directories.

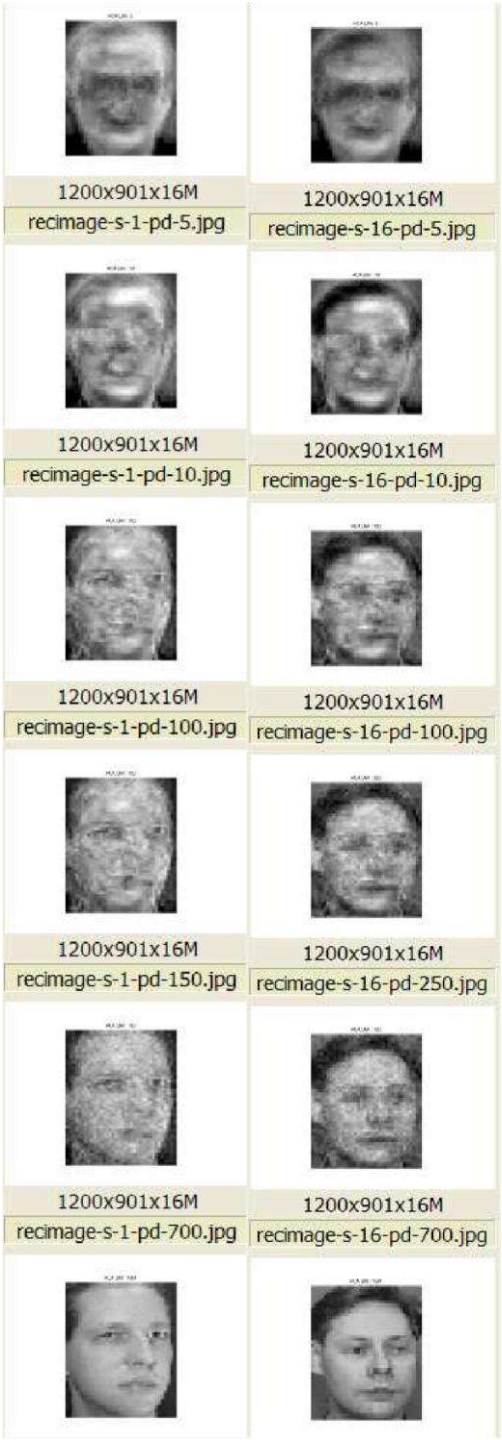

Fig. 9. PCA reconstructions of the two subjects. Starting from the first row, the most important 5, 10, 100, 150, 700, and 1584 eigenvectors are used to reconstruct a face image. The resolution of the original face images is 44 × 36 = 1584.

B. Voice Recognition

Speaker recognition is the identification of the person who is speaking by characteristics of their voices (voice biometrics), also called voice recognition.

There is a difference between speaker recognition (recognizing who is speaking) and speech recognition (recognizing what is being said). These two terms are frequently confused, and "voice recognition" can be used for both. In addition, there is a difference between the act of authentication (commonly referred to as speaker verification or speaker authentication) and identification. Finally, there is a difference between speaker recognition (recognizing who is speaking) and speaker diarisation (recognizing when the same speaker is speaking). Recognizing the speaker can simplify the task of translating speech in systems that have been trained on specific person's voices or it can be used to authenticate or verify the identity of a speaker as part of a security process.

Speaker verification. Speaker-verification systems authenticate that a person is who she or he claims to be. If, for example, the person speaking at the beginning of this article had shouted, “It’s Julie,” rather than, “It’s me!,” the intended hearer would have to perform speaker verification based on that identity claim.

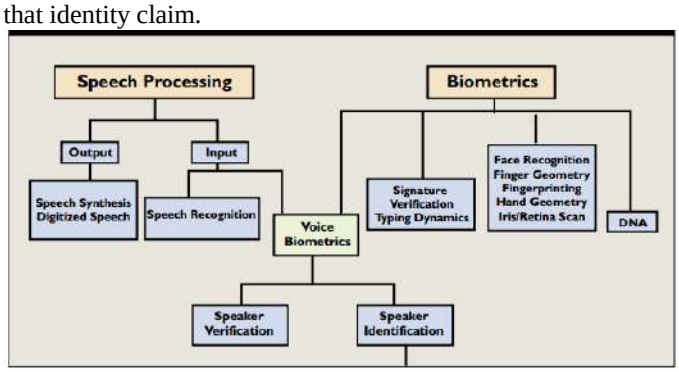

Figure 10 shows a typical speaker-verification process.

It begins with a claim of identity, such as entering a PIN or a password. Typically, a person enters the password manually using a keyboard. If the system uses speech recognition in conjunction with speaker verification, it may request verbal input of a PIN or ID code.

The system uses the ID to retrieve the reference voiceprint for the person authorized to use the ID, as in Figure 11. It then requests a sample of speech from the claimant. The newly input speech is converted into a voiceprint and compared to the reference voiceprint. The results of the comparison are quantified and compared to an acceptance/rejection threshold to determine whether the two voiceprints are similar enough for the system to accept the identity claim.

Most commercial systems are text-dependent. They request a password, account to the speaker’s mouth differs markedly from a signal captured even as close as a foot away from the speaker. Moreover, many commercial speaker-verification systems look for telltale auditory signals, distortions, exact matches, and other indications that a recording has been used. As a result, creating a recording that can fool application’s

ability to operate in the background gives text-independent technology the potential for being used without the subject's knowledge.

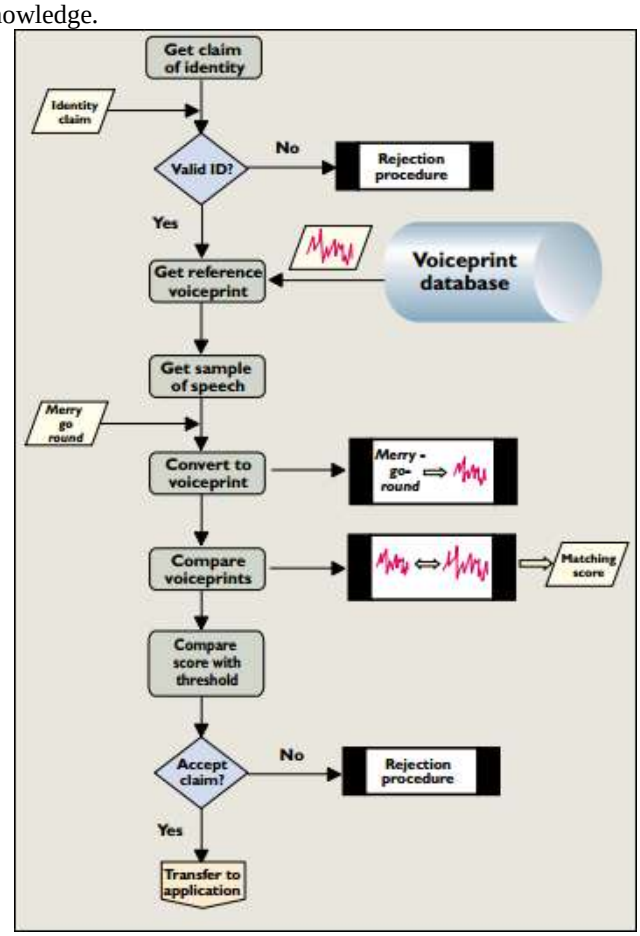

Figure 11. Speaker verification.

Speech recognition decodes the input, and speaker verification uses the same input as the biometric sample it compares to the reference voiceprint. Text-prompted systems ask the speaker to repeat a series of randomly selected digit strings, word sequences, or phrases. Text prompting requires longer enrollment than text-dependent technology, because the reference voiceprint it generates must contain all the components that will be used to construct challenge-response variants.

Text prompted verification is well-suited to high security and high-risk systems, such as those used to monitor felons in home-incarceration and community-release programs. Text prompting is also useful when there is legitimate concern about the use of sophisticated recordings of impostors, because the responses requested from the user are selected randomly, making it difficult to create and play a tape recording with the requested items in the proper sequence.

Relatively few applications require text prompting, because it's fairly difficult to defeat a good commercial speaker-verification system with a recording. The voice signal input into a microphone or telephone held close the claimant. The newly input speech is converted into a voiceprint and compared to the reference voiceprint. The results of the comparison are quantified and compared to an acceptance/rejection threshold to determine whether the two voiceprints are similar enough for the system to accept the identity claim.

5. CONCLUSIONS

The several attacks that try to negotiate a computer system using a variety of methods such as unauthorized access, could be reduced if an identification tool is used to complement already deployed intrusion detection system. The most reliable identification systems are based on biometrics. Until now, single biometric identification techniques have been used so far. In contrast, some researchers proved that these techniques are not very efficient, which was the motivation to design an identification system based on multi-modal identification technique. The paper has presented a human identification and authentication method by combined face and speech identification in order to improve the problems of single biometric authentication. It has presented a methodology for fusion of physiological and behavioral techniques by the use of multi-modal authentication.

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Review of Watermarking Relational Databases Algorithms GA and BFA

Gagandeep Singh
M.Tech Scholar,
Punjab Technical University
gagandeep.engineer@gmail.com

Sandeep Kad
Associate Prof., Dept. of Information Technology
ACET, Amritsar
sandeepkad@acetamritsar.org

Abstract— **Today's with the wide use and larger demand of internet applications data needs to be transmitted in a secure manner. Data transmission in public communication system is not secure because of interception and improper manipulation by eavesdropper. So the attractive solution for this problem is watermarking, which is an information hiding technique which is used to embed a mark within some host content. One of the main applications of watermarking is to prevent non-compliance of copyrighted works by embedding a copyright mark within the content to be protected. In this paper we have reviewed watermarking relational database using Genetic Algorithm and Bacterial Foraging Algorithm.**

***Index Terms*— Watermarking, Genetic Algorithm, Bacterial Foraging Algorithm, Wavelet Transformation.**

1. INTRODUCTION

Watermarking is an information hiding technique which is used to embed a mark within some host content. One of the main applications of watermarking is to prevent non-compliance of copyrighted works by embedding a copyright mark within the content to be protected.

The security of information has been a great concern since the expanded use of these data over the Internet. Because data allow unlimited number of copies of an "original" without any quality loss and can also be easily distributed and forged [1]. Hence, Digital watermarking for relational databases emerged as a candidate solution to provide copyright protection, tamper detection, traitor tracing and maintaining integrity of data.

Digital watermarks have been recently proposed for the authentication and copyright protection of audio, video and still images. In such applications, the watermark is embedded within a cover image, audio sequence or video frame such that subsequent alteration to the watermarked image can be detected with high probability. A digital watermark is a visible or invisible identification code that is permanently embedded in the data and remains present within the data even after any decryption process In other words, a digital watermark is a distinguishing piece of information that is adhered to the data that it is intended to protect which means that it should be difficult to extract or remove the watermark from the watermarked object. The data may be audio, image or video. If the data is copied, then the information is also carried in the copy. A particular signal may carry several different watermarks at the same time. Since watermarking can be applied to various types of data, the imperceptibility constraint will take different forms, depending on the properties of the recipient. In addition to imperceptibility, there are some desirable characteristics that a watermark should possess such as robustness. The watermark should be resistible to standard manipulations which may be intentional or unintentional and it should be statistically irremovable

The concept of digital watermarking is derived from steganography. Both steganography and watermarking describe techniques that are used to keep information by embedding it into the cover data. The methods used for steganography are usually not robust against modification of the data .Digital watermarking on the other hand should be robust against attempts to remove the hidden data. A popular application of watermarking is proof of ownership. As mentioned before, based on the host signal in which the watermark is embedded, watermarking may be classified as:

a. Digital image Watermark - Both visible as well as invisible watermarking is applicable in images.
b. Digital video Watermark - A video sequence consists of many frames that can be taken as images. Hence, the process of watermarking in images can be extended to videos also.
c. Digital audio Watermark - Only invisible watermarking is possible.
d. 3D Multimedia based Watermark.

Basic Characteristics of Digital Watermarking

The basic requirement of digital watermarking is closely related to its purpose of applications, different a application has different demand. In general, the characteristics of digital watermarking are as follows.

1) ***Robustness:*** Robustness refers to that the watermark embedded in data has the ability of surviving after a variety of processing operations and attacks. Then, the watermark must be robust for general signal processing operation, geometric transformation and malicious attack. The watermark for copyright protection does need strongest robustness and can resist malicious attacks, while fragile watermarking; annotation watermarking do not need resist malicious attacks.

2) ***Non-perceptibility:*** Watermark cannot be seen by human eye or not be heard by human ear, only be detected through special processing or dedicated circuits.

3) ***Verifiability***: Watermark should be able to provide full

and reliable evidence for the ownership of copyright-protected information products. It can be used to determine whether the object is to be protected and monitor the spread of the data being protected, identify the authenticity, and control illegal copying.

4) ***Security:*** Watermark information owns the unique correct sign to identify, only the authorized users can legally detect, extract and even modify the watermark, and thus be able to achieve the purpose of copyright protection .

5) ***Capacity:*** Image watermarking capacity is an evaluation of how much information can be hidden with in a digital image. Watermarking capacity is determined by the statistical model used for the host image, by the distortion constraints on the data hider and the attacker, and by the information available to the data hider, to the attacker, and to the decoder .

2. WAVELET ANALYSIS

Wavelet theory and its application are rapidly developing fields in applied mathematics and signal processing. The wavelet transform is a tool that divides up data, functions or operators into different frequency components and then studies each component with a resolution matched to its scale. Wavelet transforms (WT) is the mathematical theory associated with building a model for non-stationary signals using a family of wavelets, which are scaled and shifted version of wavelets. WT is inherently more appropriate for non-stationary and non-periodic wide-band signals. It helps in archiving the localization in frequency and time, and is able to focus on short-time intervals for high frequency components and long intervals for low frequency components, making it a well suited tool for analyzing high frequency transients in the presence of low frequency components [3, 5].

A. Continuous wavelet transform (CWT)

The WT of a continuous signal $x\ (t)$ is defined as

$$W\ T\ (\ a, b\ ) = \int_{\infty}^{-\infty} x\ (t)\Psi_{a,b}^{*}\ \mathrm{dt} \qquad (1)$$

$$\Psi_{a,b}^{*} = \frac{1}{\sqrt{a}}\ \Psi^{*}\ \left(\frac{t-b}{a}\right) \qquad (2)$$

Where, $\Psi\ (t)$is the base function or mother wavelet, '*' denotes a complex conjugate and a, b $\epsilon\ \Re$, a $\neq 0$, are the dilation and translation parameters, respectively. $\Re$ is the real number system.

B. Discrete wavelet transform (DWT)

To avoid generating redundant information, the base functions are generated discretely by selecting $a = a_0^m$ and $b = nb_0a_0^m$; the discrete wavelet transform (DWT) is defined as

$$DWT\ (m,n) = \ 2^{-m/2}\ \sum_m \sum_n\ x(n)\Psi^{*}\ \left(\frac{t-n2^m}{2^m}\right) \qquad (3)$$

where, the discretized mother wavelet becomes

$$\Psi_{m,n}\ (t) = \frac{1}{\sqrt{a_0^m}}\ \Psi\ \left(\frac{t-nb_0\ a_0^m}{a_0^m}\right) \qquad (4)$$

a ,b are fixed constants with $a_0\ > 1\ , b_0\ > 1$
$m, n\ \epsilon\ z$; where Z is the set of integers.

The DWT is easier to implement than CWT. CWT is computed by changing the scale of the analysis window, shifting the window in time, multiplying the signal and integrating over all times. In discrete case, filters of different cut-off frequencies are used to analyze the signal at different scales. The signal is passed through a series of high-pass filter (HPF) to analyze the high frequency components and it is passed through a series of low-pass filter (LPF) to analyze the low frequency. The wavelet decomposition results of a signal are called DWT coefficients.

C. Multi resolution analysis (MRA)

MRA allows the decomposition of signal into various resolution levels. The level with course resolution contains approximate information about low frequency components and retains the main features of the original signal. The level with finer resolution retains detailed information about the high frequency components.

This is an elegant technique in which a signal is decomposed into scales with different time and frequency resolutions, and can be efficiently implemented by using only two filters: one HPF and one LPF. The results are then down sampled by a factor of two and thus same two filters are applied to the output of LPF from the previous stage. The HPF is derived from the wavelet function (mother wavelet) and measures the details in a certain input. The LPF, on other hand, delivers a smooth version of input signal and this filter is derived from a scaling function, associated to the mother wavelet.

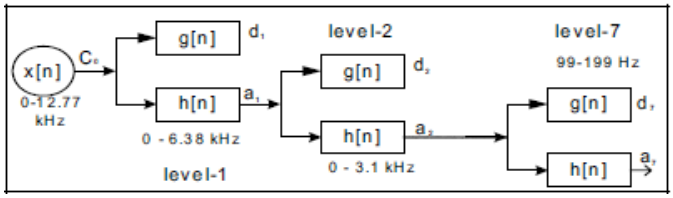

Fig.1. Wavelet Decomposition using MRA

For a recorded digitized time signal C_0 (n) which is a sampled copy of x(t) in (1) as shown in Fig. 1, the smoothed version (called the Approximation) a_1 (n) and the detailed d_1 (n) version after a first-scale decomposition are given by

$$a_1(n) = \ \sum_k\ h(k-2n)C_0(k) \qquad (5)$$

$$d_1\ (n) = \ \sum_k\ g(k-2n)C_0\ \ (k) \qquad (6)$$

where, h(n) has a low-pass filter response and g(n) has a high-pass filter response. The coefficients of the filters h(n) and g(n) are associated with the selected mother wavelet and a unique filter is defined for each. The next higher scale decomposition is based on a^1 (n) instead of C_0 (n) . At each scale, the number of the DWT coefficients of the resulting signals (e.g. a_1 (n) and d_1 (n)) is half of the decomposed signal (e.g. C_0 (n)).

3. GENETIC ALGORITHM

Genetic Algorithm is a search"s technique that simulates natural process [1, 2] and generates best solution for all possible combinations. In this context GA will find best solution for both perceptual transparency and robustness. As the watermark strength „α" is increased robustness of the algorithm is increased and vice versa.

The input image is first encoded through a binary string encoding scheme which is called as „chromosomes". These binary strings are maximized or minimized for the fitness function. The fitness function will be different for different applications. The main parts of any genetic algorithm are:

3.1 Selection

There are many different techniques which a genetic algorithm can use to select the individuals to be copied over into the next generation.

Elitist selection: The fittest members of each generation are guaranteed to be selected.

Fitness-proportionate selection: More fit individuals are more likely, but not certain, to be selected.

Roulette-wheel selection: A form of fitness-proportionate selection in which the chance of an individual's being selected is proportional to the amount by which its fitness is greater or less than its competitors' fitness

Scaling selection: As the average fitness of the population increases, the strength of the selective pressure also increases and the fitness function becomes more discriminating. This method can be helpful in making the best selection later on when all individuals have relatively high fitness and only small differences in fitness distinguish one from another.

Tournament selection: Subgroups of individuals are chosen from the larger population, and members of each subgroup compete against each other. Only one individual from each subgroup is chosen to reproduce.

3.2 Crossover

Once the individuals have been selected the next thing is to produce the offspring. [2] The most common solution for this is something called crossover, and while there are many different kinds of crossover, the most common type is single point crossover. In single point crossover, chooses a locus at which you swap the remaining alleles from one parent to the other. This is complex and is best understood visually.

The children take one section of the chromosome from each parent. The point at which the chromosome is broken depends on the randomly selected crossover point. This particular method is called single point crossover because only one crossover point exists. Sometimes only child 1 or child 2 is created, but oftentimes both offspring are created and put into the new population. Crossover does not always occur, however. Sometimes, based on a set probability, no crossover occurs and the parents are copied directly to the new population. The probability of crossover occurring is usually 60% to 70%.

3.3 Mutation

After selection and crossover, we get new population full of individuals. Some are directly copied, and others are produced by crossover. In order to ensure that the individuals are not all exactly the same, you allow for a small chance of mutation. You loop through all the alleles of all the individuals, and if that allele is selected for mutation, you can either change it by a small amount or replace it with a new value [3]. The probability of mutation is usually between 1 and 2 tenths of a percent. A visual for mutation is shown below.

Mutation is fairly simple. We just change the selected alleles based on what you feel is necessary and move on. Mutation is, however, vital to ensuring genetic diversity within the population.

4. BACTERIAL FORAGING ALGORITHM

BFA is evolutionary algorithm proposed by Passino [18] in 2002 inspired by the group foraging behavior of bacteria such as E.coli. BFA mimics the four principal mechanisms observed in a real bacterial system: chemotaxis, swarming, reproduction, and elimination dispersal to solve the non-gradient optimization problem framed in this paper. We define Nb as total population of bacteria, θ i(j,k,l) is position of ith bacteria at jth chemotactic step, kth reproduction step and lth elimination-dispersal step. The E.coli cells when stimulated by a high level of succinct, release an attractant called aspirate, which helps them to aggregate into groups and thus move as concentric patterns of swarms with high bacterial density. In the present application, swarming step does not play any major role. Therefore, we ignore the swarming step for our optimization problem and explain the rest of the steps as follows:

A. Chemotaxis: The process, in which a bacterium moves by taking small steps while searching for nutrients, is called

chemotaxis. It decides the direction in which the bacterium should move. Depending upon the rotation of the flagella, each bacterium decides whether it should swim (move in same direction) or tumble (change in direction). Change in direction (tumble) of ith bacteria at (j + 1)th chemotactic step is given as

$$\theta_i\,(j+1,k,l) = \theta_i\,(j,k,l) + C(i)\,.\,\phi(j) \qquad (1)$$

Where, initial value of position for all bacteria is application dependent. It must be initialized such that it lies randomly within the solution domain. $\theta_i(j,k,l)$ is position of i^{th} bacteria at j^{th} chemotactic step, k^{th} reproduction step and l^{th} elimination-dispersal step i.e. previous step. C(i) is basic chemotactic step size and $\theta(j)$ is unit length random direction for tumble and is defined as

$$\theta(j) = \frac{\Delta(i)}{\sqrt{\Delta^T(i)\Delta(i)}} \qquad (2)$$

Δ (i) is random number between [−1,1].

An objective function is defined as the effort or a cost incurred by the bacteria in search of food. Cost of the ith bacteria at $(j + 1)^{th}$ chemotactic step, k^{th} reproduction step and l^{th} elimination-dispersal step is denoted as J(i,j + 1,k,l). This hiding function value is compared with value of hiding function before tumble J(i,j,k,l) i.e. at j^{th} chemotactic step. If tumble has produced minimum valued hiding function for minimization problem then we make bacteria to swim in same direction N_s times else will move to next bacteria. N_s define number of steps bacteria takes in the same direction after a tumble.

B. Reproduction: The cumulative health of each bacterium during its entire life time is calculated and each of the healthier bacteria will reproduce and split into two bacteria, which are placed in the same location as their parents. If the bacterium reaches a nutrient rich area easily, it will imply that it is indeed easy for the bacterium to survive; hence it will be healthier. Half of the population is eliminated in this step while new healthy ones are added. For the given k and l, and for each i=1, 2, ., N_b, where N_b, is the total population of bacteria. Let health of i^{th} bacteria be

$$J^{i}_{\text{Health}} = \sum_{j=1}^{N_c+1} J(i,j,k,l) \qquad (3)$$

Where N_c represents total number of chemotactic steps. It measures how many nutrients bacterium got over its lifetime and how successful it was to avoiding noxious substances.

C. Elimination and Dispersal: There may be instances when entire population of bacteria get destroyed or dispersed to new region. To simulate this, in BFA some bacteria are liquidated at random with a very small probability while the new replacements are randomly initialized over the search space. Thus, each bacterium produces a solution iteratively for a set of optimal values of parameters. Gradually, all the bacteria converge to the global optimum. The information processing strategy of the algorithm is to allow cells to stochastically and collectively swarm towards optima. Algorithm followed in bacterial foraging for calculating optimal value of hiding function for minimization problem is shown in fig 1.

BFA is widely used in various applications for solving different optimization problems. The BFA is implemented successfully in edge detection, color image enhancement, harmonic estimation, design of unified power flow controllers, transmission loss reduction etc. We have applied the BFA for optimizing the attribute values depending on watermarking bits. As, bringing the watermarked data close to usability vicinity limits will make the watermarked database fragile to any attack.

5. CONCLUSION

This paper provides a comprehensive review about the digital watermarking. It also explains the basic of Genetic Algorithm and Bacterial Foraging Optimization Algorithm used for watermarking. Along with that we have also studied some of the wavelet transformation techniques.

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Gathering of Energy in Datacenter Networks

*Sarabpreet Singh **Baljit Kaur
*Assistant Professor ACET, Amritsar
E-mail: srbpreet@yahoo.co.in
**Assistant Professor LLRIET, Moga
Department of Computer Science and Engineering

Abstract- ***Numerous studies have shown that datacenter networks typically see loads of between 5% – 25% but the energy draw of these networks is equal to operating them at maximum load. In this paper, we propose a novel way to make these networks more energy proportional – that is, the energy draw scales with the network load. We propose the idea of traffic aggregation, in which low traffic from N links is combined together to create H < N streams of high traffic. These streams are fed to H switch interfaces which run at maximum rate while the remaining interfaces are switched to the lowest possible one. We show that this merging can be accomplished with minimal latency and energy costs (less than 0.1W) while simultaneously allowing us a deterministic way of switching link rates between maximum and minimum. Using simulations based on previously developed traffic models, we show that 49% energy savings are obtained for 5% of the load while we get an energy savings of 22% for a 50% load. Hence, for as much as the packet losses are statistically insignificant, the results show that energy-proportional datacenter networks are indeed possible.***

Keywords**:** Gathering of energy in datacenter networks, flattened butterfly, topology

I. INTRODUCTION

The electricity consumption of datacenters has become a significant factor in the overall cost of these centers. As a result, there have been several recent studies that aim to reduce the energy consumption profile of servers and datacenter networks. Since the cooling costs scale as 1.3 x of the total energy consumption of the datacenter hardware, reducing the energy consumption of the hardware will simultaneously lead to a linear decrease in cooling costs, as well. Today, the servers account for around 90% of the total energy costs, regardless of loading. However, since typical CPU utilization of server clusters is around 10 - 50% [1], there are several efforts to scale the energy consumption of the servers with load. Indeed, it is expected that in the near future sophisticated algorithms will enable us to scale the energy consumption of the servers with load. When this happens, as noted in [1], the energy cost of the network will become a dominant factor. Hence, there is significant interest in reducing the energy consumption of the datacenter networks, as well.

Previous studies attempt to reduce network-wide energy consumption by dynamically adapting the rate and the speed of links, routers and switches as well as by selecting routes in a way that reduces the total cost [3], [4]. In this respect, these green networking approaches have been based on numerous energy-related criteria applied to network equipment and component interfaces [3], [4]. These ideas tackle the minimization of the network power consumption by setting the link capacity to the actual traffic load.

In this paper, we present an innovative approach to adapt the energy consumption to load for datacenter networks. The key idea is to merge traffic from multiple links prior to feeding it to the switch. This simple strategy allows more switch interfaces to remain in a low power mode1 while having a minimal impact on latency. We have explored the idea of traffic merging in depth in the context of enterprise networks in [5], [6], [7]; where we show that savings in excess of 60-70% are obtained with no affect on traffic. Indeed, the big advantage of the merge network is that, unlike most other approaches, it works in the analog domain, so it does not introduce delays for the store-and-forward Layer 2 (L2) frames, rather it redirects such frames on-the-fly at Layer 1 (L1) between external and internal links of the merge network itself. In addition, the merge network allows reducing frequent link speed transitions due to the use of the low power mode. In our approach, such transitions happen only infrequently thus allowing us to minimize the delay due to the negotiation of the new link rate and the additional energy required for the rate transition.

In this paper, we apply the merge network concept to a datacenter network topology called Flattened Butterfly [1], [8]. Using extensive simulations we show that up to 22% - 49% energy savings are possible for loads between 50% and 5%, respectively. The choice to use the FBFLY topology is motivated by the fact that it is the best type of datacenter topology in terms of the energy consumption and we use it in our simulations. However, it is possible to consider other types of datacenter topologies, such as hypercube, torus, folded-Clos, etc. [9].

The rest of the paper is organized as follows. The next section describes the flattened butterfly network and in Section III we describe the traffic aggregation introducing the merge network. In Section IV we explain how the merge network is combined with the flattened butterfly topology. The subsequent section discusses evaluation and results. Our conclusions are presented in Section VI.

II. FLATTENED BUTTERFLY TOPOLOGY

As outlined in [1], the flattened butterfly (FBFLY) topology is inherently more power efficient than other commonly proposed topologies for high-performance datacenter networks. It is proposed as a cornerstone for energy-proportional communication
in large-scale clusters with 10,000 servers or more. In
[1], the authors show why the topology, by itself, is lower in power than a comparable folded-Clos one (i.e. fat trees) [10].

The FBFLY k-ary n-flat topology [8] exploits high port count switches [11] to create a scalable low-diameter network, in order to reduce latency and network costs [12]. This is achieved using fewer physical links compared to a folded- Clos at the expense of increased routing complexity to load balance the available links. Indeed, unlike the simple routing in folded-Clos, the FBFLY topology requires a global-adaptive routing to load balance arbitrary traffic patterns. However, a folded-Clos has a cost that is nearly double that of a FBFLY with equal capacity. The reason for this higher cost is due to the presence of a double number of long cables in the network, which approximately doubles the cost. The FBFLY topology exploits high-radix switches to realize lower cost than a Clos on load balanced traffic, and provide better performance than a conventional butterfly.

A FBFLY topology is a multi-dimensional direct network like a torus (k-ary n-cube) [9]. Every switch in the network is connected to hosts as well as other switches. Unlike the torus, where each dimension is connected as a ring, in the FBFLY each dimension is fully connected. Hence, within a FBFLY dimension, all switches connect to all others.

An example of interconnection is shown in Fig. 1. It is a 2-dimensional FBFLY (8-ary 2-flat) with 8 × 8 = 64 nodes2 and eight 7 + 8 = 15-port switches (7 ports connected with the other switches and 8 ones connected with the nodes). The concentration c refers to the number of switch ports connected with the nodes.

Scaling the number of dimensions in a FBFLY consists, essentially, of taking this single 8-switch group, replicating it 8 times, and interconnecting each switch with its peer in the other 7 groups (i.e. the upper-left switch connects to the 7 upper-left switches in the other 7 groups). In this way, you have an 8-ary 3-flat with $8^2 = 64$ switches and $8 \times 8^2 = 512$ We use node and host interchangeably in this paper.

So, the total number of switches for the FBFLY is given by:

$$S(n, k) = k^{n-1} \quad (1)$$

Instead, the number of ports for switch can be written as:

$$P(n, k) = c + (k - 1) \times (n - 1) \quad (2)$$

and the total number of nodes can be expressed as follows:

$$N(n, k) = c \times k^{n-1} \quad (3)$$

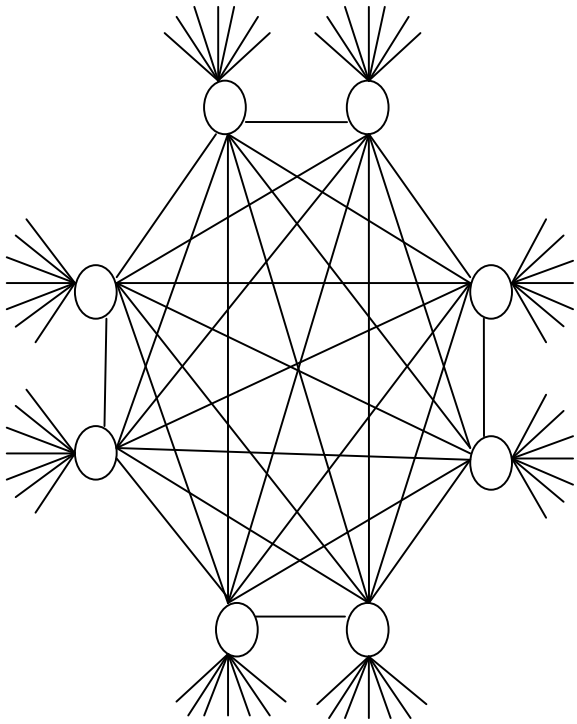

Fig-1 Logical diagram of an 8-ary 2-flat flattened butterfly topology

III. TRAFFIC AGGREGATION

In this paper, we propose the merge network [5] for energy efficient datacenters. The merge network is based on the assumption of a low utilization of most ports in a switch. Hence, the approach is to merge traffic from multiple links and feeding the merged streams to a smaller set of active switch ports. The traffic to/from N links are merged and fed to N interfaces. Setting the parameter H, according to the incoming traffic load, it is possible to reduce the number of active interfaces exactly to H.

For example, if the average traffic load on 8 links coming in to a switch (as in Fig. 1) is 10%, we could merge all the traffic onto one link and feed it to one switch port running at maximum rate, thus allowing the remaining ports to enter low power mode. This solution is different from the approach in [1], where each link individually makes a decision of which rate to use every 10 - 100 µs resulting in high latency and losses. Indeed, our approach results in almost optimal energy savings with minimal increase in latency (primarily due to the merge network).

However, before evaluating the impact of merging on datacenter network traffic, we need to develop a better understanding of the merge network itself.

A generic N ×K (with K ≤ N) merge is defined with the property that if at most K packets arrive on the N uplinks (i.e. from N links into the switch) then the K packets are sent on to K sequential ports (using some arbitrary numbering system). For example, we consider a 4×4 merge network. The incoming links from the hosts are identified with a – d and the switch ports with 1 – 4. The traffic coming in from these links is merged such that the traffic is first sent to interface 1 but, if that is busy, it is sent to interface 2, and so on. In other words, we load the interfaces sequentially. This packing of packets ensures that many of the higher numbered interfaces will see no traffic at all, thus allowing them to go to the lowest rate all the time.

The key hardware component needed to implement this type of network is called a selector. There are 2 incoming links and 2 outgoing links. If a packet arrives only at one of the two incoming links, then it is always forwarded to the top outgoing link.

However, if packets arrive along both incoming links, then the earlier arriving packet is sent out along the top outgoing link and the latter packet along the other one. The hardware implementation, described in [5], is done entirely in the analog domain. Thus, a packet is not received and transmitted in the digital sense; rather it is switched along different selectors in the network much as a train is switched on the railroad. This ensures that the latency seen by a packet through the merge is minimal and the energy consumption is very small, as well.

An important measure of the merge network is the complexity. We can define the complexity with two numbers: the depth of the network and the total number of selectors. The minimum depth of an N × K merge network is log2 N + K = 1 with the number of selectors needed equal to $\sum^{k}_{i=1} N - i$.

On the downlink (i.e. from the switch to the N links) the merge network has to be able to forward up to N packets simultaneously from any of the switch ports (connected to the K outputs of an N × K merge network) to any of the N downlinks. This network uses a simple implementation that consists of multiplexers. However, in order for this part to work correctly, we need to embed the control logic inside the switch because the packet header has to be parsed to determine which of the N links they must be send out [5].

Finally, the merge network requires a special software layer called port virtualization. The modern day switches support a large number of protocols. For instance, switches today support QoS (Quality of Service) and VLANs (IEEE 802.1P, 802.1H), port-based access control (IEEE 802.1X), and many other protocols. Hence, the solution is to build this software coming on the uplink to one of the N virtual ports. Instead, on the downlink it schedules packets for transmission over one of the physical ports to appropriate downstream links. This mapping is needed to ensure that security protocols like 802.1X and VLANs work unchanged.

IV. MERGE NETWORK + FLATTENED BUTTERFLY

We propose adding the merge network to the FBLY datacenter network of [1] in order to maximize energy savings. The manner in which we introduce the merge network into the FBLY is simple – we interpose the merge network between connections from the hosts to the switches. However, the connections between the switches are unchanged. We introduce eight 8 × 8 merge networks that are connected to the eight switches. Thus, the eight hosts that connect to a switch have their traffic routed through a merge network.

In order to save energy using the merge network, we need to run some number of switch interfaces at full rate while dropping the rate of the rest to the lowest possible. As noted in [1], a 40 Gbps interface can operate at 16 different rates with the lowest rate equal to 1.25 Gbps. The challenge is to run most of the links into the switch at the lowest rate (which consumes less than 40% of the power of the maximum rate link for InfiniBand switches [1], [13]), minimizing, at the same time, loss and latency. Since the merge network has the unique property of loading links sequentially, we know that, if link i is the highest numbered active link, then in the event of an increase in load (from a host) the next link that will need to run at full rate will be link i+1. This determinism in link loading gives us the key to maximizing energy savings. Specifically, the algorithm we use for changing link rates at switches is as follows:

1) If interfaces 1 to H are active (at full rate), then we increase the rate of the H + 1th one to the full rate, as well. This is done to offset packet loss in the event of a burst of packets;
2) If at most H - 2 interfaces of the H ones operating at the full rate are active, then we reduce the rate of the H^{th} interface to the lowest rate (after it goes idle).

This simple algorithm does not require any traffic prediction and ensures very low packet loss assuming that the time to change link rates is 1 - 10 μs as in 1.

V. EVALUATION

In order to demonstrate the usefulness and the effectiveness of the traffic aggregation inside a high-performance datacenter, we evaluate the merge network using the OMNeT++ discrete event- driven network simulator. OMNeT++ is an open-source (and free for research and educational purposes) sophisticated system used for modeling communication networks, queuing networks, hardware architectures, and manufacturing and business processes [14].

We model an 8-ary 2-flat FBFLY (with a concentration c = 8 and 64 nodes) with no over-subscription, so that every host can inject and receive at full line rate. Links have a maximum bandwidth of 40 Gbps. Switches are both input and output buffered. We model the merge traffic network and port virtualization in software using parameters from our prototype in [5]. For our simulations we use 8 * 8 merge networks.

In order to model the traffic in the network, we rely on several previous studies. The authors examine the characteristics of the packet-level communications inside different real datacenters including commercial cloud, private enterprise, and university campus datacenters. They note that the packet arrivals exhibit an ON/OFF pattern. The distribution of the packet inter-arrival time fits the Lognormal

distribution during the OFF period. However, during the ON period, the distribution varies in different datacenters due to the various types of running applications. For example, MapReduce [15] will display different inter-switch traffic characteristics than typical university datacenters. Furthermore, traffic between nodes and switches displays patterns quite different from the
inter-switch traffic [16], [17], [18]. The different traffic patterns fit typically one of Lognormal, Weibull and Exponential. We can consider the exponential distribution as the most restrictive one among the various identified distributions and we use
it to represent the general distribution of the packet interarrival times. In order to obtain a comprehensive view of the benefits and challenges of using the merge network, we use different average traffic loads on each link. The values we use are: 5%, 10%, 20%, 30%, and 50% of the maximum link capacity of 40Gbps. The duration of each simulation is 24 hours. In addition, each run is repeated 10 times and the average performance values have been calculated and plotted.

A. Results

Table 1 plots the average number of active interfaces as a function of the average load. It is interesting to note that, even for a load of 50%, we see that an average of only 4 interfaces is active. We note that the packet losses are very small (statistically insignificant) and only occur during the time that an interface is being woken up.

Let us now consider the energy savings obtained by using the merge network. As noted above, the maximum latency introduced by the merge network is 3 µs, which is far below that one reported in [1]. As described in [5], the energy consumption of the merge network is derived by simply extrapolating the energy cost of the selectors and multiplying that with the number of selectors needed plus a 10% increment
to account for the cost of the control logic

TABLE I. ENERGY SAVINGS USING A MERGE NETWORK.

Load	5%	10%	20%	30%	50%
Savings (ρes - %)	49%	47%	41%	34%	22%

Therefore, we can effectively ignore the cost of the merge network in the overall energy calculation.

In order to compute the energy efficiency of our scheme, we rely on the energy analysis of [1]. As described there, a 40 Gbps InfiniBand link can operate at several lower rates as low as 1.25 Gbps. This is accomplished by exploiting the underlying hardware. Each link is composed of four lanes with
its own chipset for transmitting and receiving. The chipset can be clocked at four different rates and thus we have 16 different possible rates on any link [1], [13]. The energy consumption of the lowest rate is 40% that of the maximum. In our system, the links are either operating at the maximum rate (the packets are being forwarded by the merge network to those ones) or at the minimum. Thus, we can very easily calculate the energy savings relative to the baseline, which is the case when all links operate at the maximum rate.

Using the data from Table 1, we obtain the energy savings for different loading patterns. Recall that when H interfaces are active, H + 1 interfaces are running at maximum rate while the remaining N - H - 1 are operating at the lowest rate. Table I provides the average energy savings calculated as:

$$\rho_{es}=1-\frac{(H+1)+0{:}4(N\ H\ 1)}{N} \quad (4)$$

These energy savings are greater than those obtained in [1] with only a minimal latency cost.

VI. CONCLUSION

This paper discusses the idea of merging traffic inside an energy-efficient datacenter. We consider the FBFLY topology because it is inherently more power efficient than other commonly proposed topologies for high-performance datacenter networks. Simulations with different configurations of traffic load are used to characterize and understand the effectiveness of the traffic aggregation. The results of these simulations show that it is possible to merge traffic inside a datacenter network in order to obtain 22 - 49% energy savings. An important implication of this work is that the datacenters can be made very lean by using merge networks. Given the fact that the size of large-scale clusters is of the order of 10.000 nodes or more, this degree of energy savings has enormous global impact. In addition, in our current work, we are using the merge network architecture to replace high port density switches with lower port density switches, thus yielding even greater energy savings. Despite the positive results concerning energy saving, the proposed merge network solution is not proven to be optimal but we are studying that problem as part of future work. In addition, it would be interesting to test the merge network in other datacenters than the FBFLY and with real traffic traces.

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REVIEW: Artificial Neural Network and Back Propagation Algorithm

Kirti Makkar[1]
MTech Student[1],
LCET, Katani K alan, Ludhiana [1]
kirtimakkar@gmail.com [1]

Suman Thapar[2]
Asst. Professor[2],
LCET, Katani Kalan, Ludhiana[2]
er.suman.thapar@gmail.com [2]

Abstract: **This paper is an introduction to Artificial Neural Networks. The various types of neural networks are explained and demonstrated, some applications of neural networks are described. The connection between the artificial and the real thing is also explained. Finally, the back propagation algorithm is presented and demonstrated.**

Keywords **: Neuron, Axon, Synapses, Dendrite, Cell**

I.INTRODUCTION

An Artificial Neural Network (ANN), is a mathematical model or computational model that is inspired by the structure and functional aspects of biological neural networks. A neural network consists of an interconnected group of artificial neurons, and it processes information using computation.

Neural Networks performs useful computations through a process of *learning*. Artificial Neural Networks is an adaptive system that changes its structure based on external or internal information that flows through the network during the learning phase.

They are usually used to model complex relationships between inputs and outputs or to find patterns in data. A developing neuron is synonymous with a plastic brain, In brain, plasticity may be accounted for by two mechanisms:

1. The creation of new synaptic connections between neurons, and

2. The modification of existing synapses.

Axons act as transmission lines, and dendrites represent receptive zones. Neurons come in a wide variety of shapes and sizes in different parts of the brain. A pyramidal cell can receive 10,000 or more synaptic contacts and it can project onto thousands of target cells.

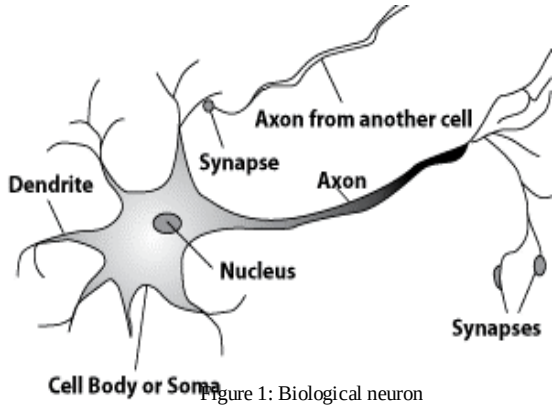

Figure 1: Biological neuron

II. THE HUMAN BRAIN

ANN can be viewed as a black box. The human brain is a highly complicated system which is capable to solve very complex problems. The brain consists of many different elements, but one of its most important building blocks is the neuron. These neurons are connected by around 1015 connections, creating a huge neural network. Neurons send impulses to each other through the connections and these impulses make the brain work. The neural network also receives impulses from the five senses and sends out impulses to muscles to achieve motion or speech. The individual neuron can be seen as an input output machine which waits for impulses from the surrounding neurons and, when it has received enough impulses, it sends out an impulse to other neurons.

III. ARCHITECTURE OF NEURAL NETWORKS

A. Feed-forward networks

Feed-forward ANNs allow signals to travel one way only;

from input to output. There is no feedback (loops) i.e. the output of any layer does not affect that same layer. Feed-forward ANNs tend to be straight forward networks that associate inputs with outputs. They are extensively used in pattern recognition. This type of organization is also referred to as bottom-up or top-down.

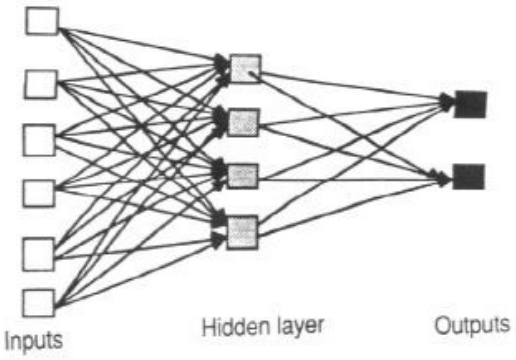

Figure 2: Simple Feed forward Network

B. Feedback Networks

Feedback networks can have signals travelling in both directions by introducing loops in the network. Feedback networks are very powerful and can get extremely complicated. Feedback networks are dynamic; their 'state' is changing continuously until they reach an equilibrium point.

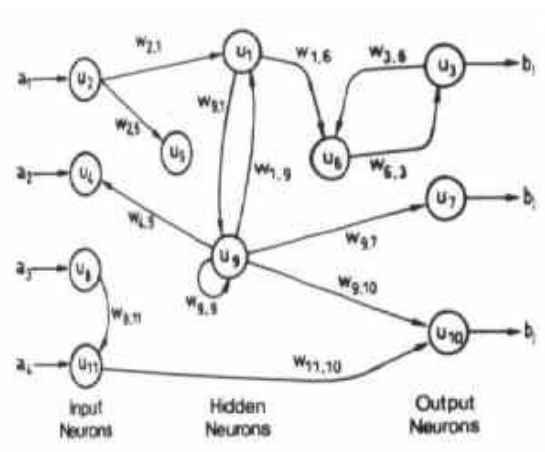

Figure 3: Simple Feedback Network

C. Firing Rules

The firing rule is an important concept in neural networks for their high flexibility. A firing rule determines how one calculates whether a neuron should fire for any input pattern. It relates to all the input patterns, not only

Take a collection of training patterns for a node, some of which cause it to fire (the 1-taught set of patterns) and others which prevent it from doing so (the 0-taught set). Then the patterns not in the collection cause the node to fire if, on comparison, they have more input elements in common with the 'nearest' pattern in the 1-taught set than with the 'nearest' pattern in the 0-taught set. If there is a tie, then the pattern remains in the undefined state. For example, a 3-input neuron is taught to output 1 when the input (X1, X2 and X3) is 111 or 101 and to output 0 when the input is 000 or 001. Then, before applying the firing rule, the truth table is :

Table 1
TRUTH TABLE FOR FIRING RULE

X1	0	0	0	0	1	1	1	1
X2	0	0	1	1	0	0	1	1
X3	0	1	0	1	0	1	0	1
OUT	0	0	0/1	0/1	0/1	1	0/1	1

As an example of the way the firing rule is applied, take the pattern 010. It differs from 000 in 1 element, from 001 in 2 elements, from 101 in 3 elements and from 111 in 2 elements. Therefore, the 'nearest' pattern is 000 which belongs in the 0-taught set. Thus the firing rule requires that the neuron should not fire when the input is 001. On the other hand, 011 is equally distant from two taught patterns that have different outputs and thus the output stays undefined (0/1).By applying the firing in every column the following truth table is obtained :

Table 2
OUTPUT TRUTH TABLE

X1:	0	0	0	0	1	1	1	1
X2:	0	0	1	1	0	0	1	1
X3:	0	1	0	1	0	1	0	1
OUT:	0	0	0	0/1	0/1	1	1	1

the ones on which the node was trained. A simple firing rule can be implemented by using Hamming distance technique as follows:

'sensibly' to patterns not seen during training.

IV. THE BACK PROPAGATION ALGORITHM

Back propagation is a common method of teaching artificial neural networks how to perform a given task. It is a supervised learning method, and is a generalization of the delta rule. It requires a teacher that knows, or can calculate, the desired output for any input in the training set. It is most useful for feed-forward networks connections.

1) HOW THE ALGORITHM WORKS:

In order to train a neural network to perform some task, we must adjust the weights of each unit in such a way that the error between the desired output and the actual output is reduced. This process requires that the neural network calculate how the error changes as each weight is increased or decreased slightly. The back propagation algorithm is the most widely used method for determining the **EW** (error derivative of the weights).

The back-propagation algorithm is easiest to understand if all the units in the network are linear. The algorithm computes each **EW** by first computing the **EA**, the rate at which the error changes as the activity level of a unit is changed. For output units, the **EA** is simply the difference between the actual and the desired output. To compute the **EA** for a hidden unit in the layer just before the output layer, we first identify all the weights between that hidden unit and the output units to which it is connected. We then multiply those weights by the **EA**s of those output units and add the products. This sum equals the **EA** for the chosen hidden unit. After calculating all the **EA**s in the hidden layer just before the output layer, we can compute in like fashion the **EA**s for other layers, moving from layer to layer in a direction opposite to the way activities propagate through the network. This is what gives back propagation its name. Once the **EA** has been computed for a unit, it is straight forward to compute the **EW** for each incoming connection of the unit. The **EW** is the product of the EA and the activity through the incoming connection.

The back propagation learning algorithm can be divided into two phases:

Phase 1: Propagation

The difference between the two truth tables is called the *generalization of the neuron*. Therefore the firing rule gives the neuron a sense of similarity and enables it to respond

Each propagation involves the following steps:

1. Forward propagation of a training pattern's input through the neural network in order to generate the propagation's output activations.
2. Backward propagation of the propagation's output activations through the neural network using the training pattern's target in order to generate the deltas of all output and hidden neurons

Phase 2: Weight update

For each weight-synapse:

1. Multiply its output delta and input activation to get the gradient of the weight.
2. Bring the weight in the opposite direction of the gradient by subtracting a ratio of it from the weight. This ratio influences the speed and quality of learning; it is called the *learning rate*. The sign of the gradient of a weight indicates where the error is increasing, this is why the weight must be updated in the opposite direction.

Repeat the phase 1 and 2 until the performance of the network is good enough.

TABLE 2
ALGORITHM FOR A 3-LAYER NETWORK (ONLY ONE HIDDEN LAYER):

Initialize the weights in the network (often randomly)
Do
For each example e in the training set
O = neural-net-output(network, e) ; forward pass
T = teacher output for e
Calculate error (T - O) at the output units
Compute delta_wh for all weights from hidden layer to output layer ; backward pass
Compute delta_wi for all weights from input layer to hidden layer ; backward pass continued
Update the weights in the network
Until all examples classified correctly or stopping criterion satisfied
Return the network

be reapplied during the training session, usually in a different order. Thus the network learns from the samples by constructing an input-output mapping for the problem at hand.

3.Adaptivity: Neural networks have a built-in capability to adapt their synaptic weights to changes in the surrounding environment. The natural architecture of a neural network for pattern classification, signal processing, and control applications, coupled with the adaptive capability of the network, makes it an ideal tool for use in adaptive pattern classification, adaptive

As the algorithm's name implies, the errors propagate backwards from the output nodes to the inner nodes. Technically speaking, back propagation calculates the gradient of the error of the network regarding the network's modifiable weights.

V. BENEFITS OF NEURAL NETWORKS:

1.Nonlinearity: A neuron is basically a nonlinear device. Moreover, the nonlinearity is of a special kind in the sense that it is distributed throughout the network.

2.Input-output mapping: A popular paradigm of learning called *supervised learning* involves the modification of the synaptic weights of a neural network by applying a set of training samples. Each sample consists of a unique input signal and the corresponding desired response. The network is presented a sample picked at random from the set, and the synaptic weights (free parameters) of the network are modified so as to minimize the difference between the desired response and the actual response of the network produced by the input signal in accordance with an appropriate criterion. The training of the network is repeated for many samples in the set until
6.Uniformity of analysis and design: Neurons, in one form or another, represent an ingredient common to all neural networks. This commonality makes it possible to share theories and learning algorithms in different applications of neural networks.

7.Neurobiological analogy: The design of a neural network is motivated by analogy with the brain, which is that fault-tolerant parallel processing is not only physically possible but also fast and powerful. Neurobiologists use artificial neural networks as a research tool for the interpretation of neurobiological phenomena.

signal processing, and adaptive control.

4.Fault tolerance: A neural network, implemented in hardware form, has the potential to be inherently fault tolerant in the sense that its performance is degraded gracefully under adverse operating

5. VLSI implementability: The massively parallel nature of a neural network makes it potentially fast for the computation of certain tasks. This same feature makes a neural network ideally suited for implementation using very-large-scale-integrated (VLS1) technology

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Comparative Study on Various Watermarking Techniques: A Review

Navjot Kaur
M.Tech Scholar
Department of CSE
Amritsar College of Engineering and Technology
Email Id: kaur.navjot30590@gmail.com

Navneet Bawa
Associate Professor of Department
Dept of CSE
Amritsar College of Engineering and Technology
Email Id: bawa.navneet@gmail.com

Shubika Mehra
Assistant Professor
Dept of CSE
Amritsar College of Engineering and Technology

Abstract— In the recent era with the increasing use internet, large amount of multimedia data are been copied, stored and distributed. So, it is important to protect multimedia during copyright, from piracy and from malicious manipulations and to secure multimedia data. Digital watermarking aims at copyright protection. Digital watermarking technique basically means to embed some information in digital images so that it cannot be misused or owned by the others. It is primarily used to hide information. This technique helps in identifying media ownership, and media legal user. In this the existence of information is secret. Watermarking is used in large number of application areas such as audio, video, digital media, quality assessment, temper proofing, security, ownership declaration.

Watermarking technique provides a way to write hidden messages in such a way that no one except the intended recipient knows about the message. Our review is based on the comparative study of conventional watermarking, visual secret sharing and the wavelet transform technique. Conventional system involves embedding the information and detecting it. Wavelet transform involves embedding the watermark in third band of the DWT of an image. Visual secret sharing is based on cryptography technique. They all meet the robustness and imperceptibility of the digital contents,

Keywords- Digital data, visual secret sharing, watermarking technique, wavelet Transform

I. INTRODUCTION

Rapid demand of Internet technology and related services has enhanced the access of digital information through web, leading to the problem of associated copyright. This problem of rightful ownership has directed us to the digital watermarking as a solution [6]. Internet is considered as the root cause for providing large amount digital media data. This digital media data can be in the text, digital audio, digital images, video, software. However it is important to protect this kind of data. Many techniques have been Developed for this purpose such as encryption, authentication, timestamp. Digital Watermarking technique is one such technique that provides a way for protecting such data. It improves ones claim of ownership for the image [1]. Watermarking was originated as an open network to protect copyright of multimedia data. It identifies the owner of the product [2].

Figure1: (a) Without watermark (b) With watermark [5]

The left side of the picture is a simple image without a watermark and the right side of the image contains a watermark. Now let us consider an example to understand it: Suppose a person X compose an image. He then embeds a watermark in it. Later on Mr.Y access this image and modifies it and claim its ownership. Later Mr. x detects the image by extracting the watermark and reclaim its ownership again. This shows watermarking of an image.
There are certain questions that come in the mind of the while taking about watermarking. These are as follow:
What is watermarking?
Can it be embedded and detected?
Why and when is it necessary?
Why is it used?
Where all it can be used?

In this review paper we are going to discuss about watermarking technique, visual sharing system and the wavelet transform.

II. SOME BASIC CHARACTERSTICS OF DIGITAL WATERMARKING

- Transparency: Watermark is not detectable by the outside attacks.
- Robustness: robustness issue is very important

It refers to a variety of accidental or intentional by the power of the signal processing, the digital watermark can still be able to maintain the integrity or accurate identification.[2]

- Complexity: The amount of time required to encode or decode i.e, to embed and detect the digital image.

- Security: Watermark information is hidden in digital image.

III DIGITAL WATERMARKING TYPES

Watermarking has various types.

- According to domain: It can be divided into spatial domain and frequency domain. Spatial means the values can be modified based on the watermark. It is simple and requires less computation. In frequency domain a distributed sequence is inserted into perceptually most significant frequency domain [5].

- According to document: It can be divided into image, audio, video and text.[1]

- According to human perception: It can be visible or invisible [1]. Visible means that the watermark is viewed. And invisible means that the watermark is hidden behind the digital image.

- According to application: can be source based or destination based . This kind of application is used to check the authentication, identification for the ownership of the owner

IV: CONVENTIONAL WATERMARKING TECHNIQUE

Watermarking is a technique that embeds the data called the watermark or in the form of digital signature into the multimedia image. It is used to hide the watermark in the image. The process of embedding the watermark in an image is known as encoding [1]. Several applications have been described by cox at all in [7] and Katzenbeisser and Petitcolas in [8]. Many of the research community and industry has shown interest in developing and implementing digital watermarking technique [9]

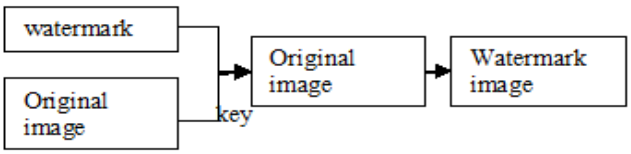

Figure2: Watermark Encoding [1]

If in case that embedded image is being accessed by some outer attack. Then that image can be detected. The process of extracting the embedded image is known as decoding. The detection of the image is shown as follow:

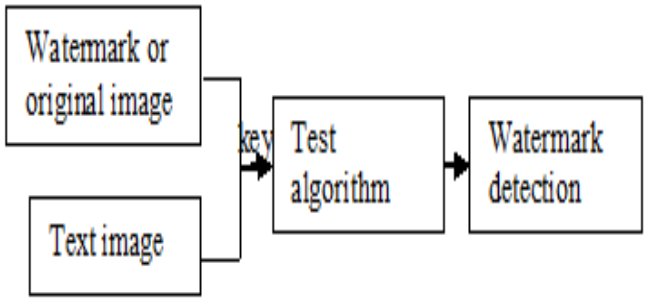

Figure3: Watermark decoding[1]

Each watermarking technique consist of three parts

- Watermark
- Encoder(insertion algorithm)
- Decoder(extraction and detection)[1]

Each and every encoder has a unique watermark. It should be noted that watermark extraction can improve ownership whereas the watermark detection verifies ownership. In general way we can say that watermark is a code embedded within an image. It plays the role of the digital signature [3]. Watermark major focus is on the copyright protection. With the help of the watermark some of the attacks can also be prevented such as cropping, scaling, lossy compression [3]. The other two sections contain watermarking techniques.

V. VISUAL SECRET SHARING TECHNIQUE

VSS is a digital watermarking technique in which is based on image processing and visual cryptography. It involves decryption of the secret message without any computation. As already stated that the watermarking technique is primarily used for copyright protection and for information hiding .This visual secret sharing technique provides improvement to the conventional watermarking technique .However it also provide protection against various kinds of attacks such as cropping attack, noise insertion, jpeg compression [4].

With the increasing use of internet, a large amount of digital data needs to be stored, exchanged and copyright. However it has resulted in many new business applications such as electronic networking, visual shopping and some others. Namely the major issues that it faces is security and copyright [1,4] .Digital watermarking is just an answer to such issues.

In 1994, Noar and Shamir proposed a new technique called visual cryptography [4]. VSS technique improves the security of the conventional watermark. According to this concept, each pixel of the image is replaced by 2x2 pixel .Where a secret image with N by N can be divided into two sharing images with 2N by 2N pixels. In addition, the secret image can be recovered by stacking the two sharing images. In Fig. 4(a) shows the secret image, while

Fig. 4(b) shows the two corresponding shares of the secret message. The secret can then become visible to the human eye after these two shares are stacked. On the other hand, Fig. 4(c) presents the stacked results [4].

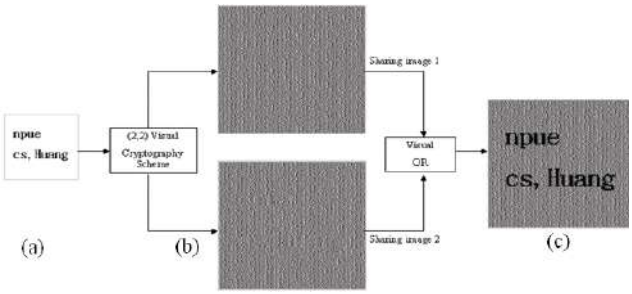

Figure4: Visual cryptography technique [4]

This conventional watermark based technique use to embed public watermark into an image signal and to reserve the secret watermark for the copyright holder. It has been proved that the public watermark can be used to recover the image even after the noise adding, cropping, JPEG compression, blurring and sharpening [4]. Similar to conventional watermarking it also has three parts:

- Watermark generation
- Watermark embedding
- Watermark extraction

VI. WAVLET TRANSFORM TECHNIQUE

A wavelet domain approach that is based upon the conventional watermarking technique is the wavelet transform. Watermark is embedded in the third band of the discrete wavelet transform of the image. It is based on the localized decompositi3on of the image. It is used to improve the watermarking technique. It also enhances the robustness and keeps the watermarking technique imperceptible [3].

Ahmed Salama at all[3] experimentally proved that LL2 is the best level where we can embed the watermark. This proposed technique has been tested against the following attacks i.e, sharpness, inverse, and compress .So, as to prove its robustness and imperceptibility. Also the proposed technique is tested for all the bands i.e, horizontally, vertically and diagonally [3].

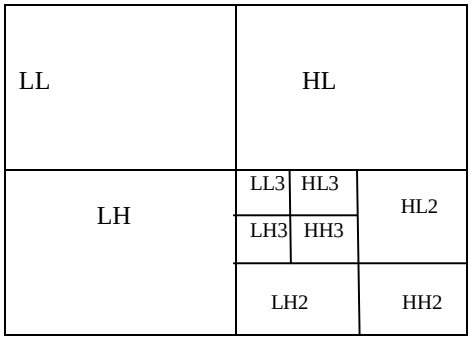

Figure5: 3-level wavelet decomposed image representation in HH in LL2 in LH3 & HL3 [3]

The given figure shows the wavelet decomposition of the image in third band of the discrete wavelet transform.

Based on the watermarking technique human perception can be visible and invisible. This new technique is used for embedded the dual digital watermarking. Dual watermarking consist of the visible and invisible watermark. The wavelet transform technique comprises of both the embedding and extraction process. It uses the Haar filter. Embedding of information is usually done by the key. The key involved is a simple binary.

The process of embedding the information in an image is shown as follow:

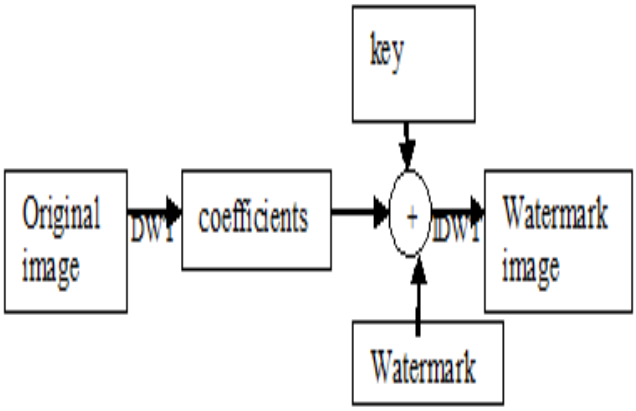

Figure 6: Encoding process for wavelet transform [3]

The given figure shows that how embedding and extraction process occurs in wavelet transform. A watermark is embedded using the key and the coefficients of the original image in a discrete wavelet transform .However we know that the watermark itself help against the outside attacks to the image such as from malicious manipulations and copyright. Therefore the original image can be extracted by applying inverse discrete wavelet transform. In this way it helps to improve the robustness and imperceptibility.

Wavelet decomposition depends upon the localized decomposition of the image. The third level decomposition is the result of the first and the second level decomposition of the band [3].

The use of the binary key in both the band regions makes it more secure, robust. Extraction scheme in it helps to detect the hidden watermark so as to improve its authenticity [3].The results of the various attacks in it has improved its robustness and authenticity which is similar to that of the conventional watermark technique and visual secret sharing technique [4].

VII. COMPARASION BETWEEN CONVENTIONAL WATERMARK, VISUAL SECRET SHARING AND WAVELET TRANSFORM

PARAMETERS	CONVENTIONAL WATERMARK	VISUAL SECERET SHARING	WAVELET TRANSFORM
1.BASED ON TECHNIQUE	Itself	Cryptography technique	Wavelet domain Technique
2.BASED ON HUMAN PERCEPTION	Visible, invisible, dual	visible	dual
3.BASED ON DECOMPOSITION	No	No	Decomposition in the third band of wavelet transform
4.BASED ON EMBED AND EXTRACT	Watermark is embedded and extracted	Embed the public watermark and recover it	Watermark is embedded along with the key and coefficients of the host image

SIMILARITY BASED PARAMETER	CONVENTIONAL WATERMARKING	VISUAL SECERET SHARING	WAVELET TRANSFORM
1.ENHANCES	Robustness and imperceptibility	Robustness and imperceptibility	Robustness and imperceptibility
2.PROTECTS	Outer attacks	Outer attacks	Outer attacks
3.DEPENDS	Itself	Conventional watermarking	Conventional watermarking

VIII. CONCLUSION

Watermarking technique is used to hide the information for digital media data. The watermark is embedded in the host image and this can be detected by extracting the watermark for determining the ownership of the owner. It protects the image from any kind of outer attack such as the copyright, cropping, sharpness, blurring, and compression. Thus it improves the robustness and imperceptibility. The other two techniques that is visual secret sharing and the wavelet transform improves the conventional watermarking technique .However it is much similar to that of the original watermarking still there is some difference between them.

Visual secret sharing technique is a watermarking technique based on the cryptography technique. It contains both the secret watermark and the public watermark. The secret watermark is reserved for copyright holder and the information is embedded in the public watermark. This embedded information can be recovered while extracting the watermark. It also improve the robustness even after the outer attacks as already mentioned.

Wavelet transform is another watermarking technique used in wavelet domain. It uses the third band of the discrete wavelet transform to embed the watermark. This embedded watermark can be recovered by applying inverse discrete wavelet transform. However it uses binary key in the two region to make the region more secure and robust. Therefore we can conclude that watermarking technique is used to protect the owner data without informing the outer attacks that the data they are accessing is secured and protected. Therefore in our paper we consider that conventional watermarking technique is better as it can be considered as the base model for various watermarking techniques

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Optimization in Proactive Routing Protocol in MANET

Ramandeep Kaur Gill
Research Scholar
Department of CSE
RIMT-IET, Mandi Gobindgarh
Fatehgarh Sahib, Punjab, India.
gillramandeep17@ymail.com

Rupinder Kaur Gurm
Assistant Professor
Department of CSE
RIMT-IET, Mandi Gobindgarh
Fatehgarh Sahib, Punjab, India.
rupindergurm@gmail.com

Abstract*— With wireless networks, the set of mobile nodes at arbitrarily locations can be interconnected through routing protocols. A large number of routing protocols have been proposed to support the communications in MANET. MANET (Mobile Ad hoc NETwork) is a self-configured infrastructure less network of wireless mobile devices. Many protocols and techniques were developed to create new routing protocols to achieve the user and the network requirements. However, until now there has been no optimal protocol(s) that is expected to produce good performance in all network contexts, as each protocol was developed based on particular assumptions. In this paper we are going to present a survey on optimisation techniques that have been implemented in Ad hoc routing protocols. Optimization over routing protocols affects the overall performance and QoS (Quality of Service) of the network. The intent of this paper is to explore two optimization techniques, Genetic Algorithm (GA) and Particle Swarm Optimization (PSO) in detail.

Keywords*— MANETs, OLSR, Optimization, GA, PSO.

I. INTRODUCTION

MANETs stand for Mobile Ad hoc Networks. Mobile implies "mobility". Ad hoc is a Latin word and it means "for this only". MANET's routing is one of the key research areas for researchers. MANET is Mobile Ad Hoc Network referred to infrastructure less network, which consist of mobile devices where exchange of messages between nodes not relies on any pre-deployed infrastructure. Mobile nodes can enter and leave network freely at any time, the nodes break constantly due to movement of the users. Each node may be capable of acting as a router, and have its own routing table to another node in the network. The degree of randomness of nodes is unpredictable and is dynamic routing protocols. Thus path routing and protocol selection are the key strategies behind the design of any wireless network. MANET is an autonomous, infrastructure less, self-healing and self-configurable network of mobile routers or nodes that communicate over wireless links. Each and every routing protocol of MANET has its own characteristics and performance level. So, it is very important to identify the key routing protocol to be adopted for selected scenario for better performance. As the nodes are mobile, the structure of the network changes dynamically and unpredictably over time. The MANET routing protocols have a numerous properties, but one of the most important of all is the possibility of QoS (Quality of Service) support. [2] [4] [6] [7] [9]

The first goal of this paper is to briefly described MANET routing protocols (Section II). The section III provides introduction to the OLSR protocol with working of the protocol. Section IV explores the optimization techniques, Genetic Algorithm and Particle Swarm Optimization. Section V shows the comparison of optimization techniques previously explained in the form of table. Then in the section VI conclusion and future scope is given.

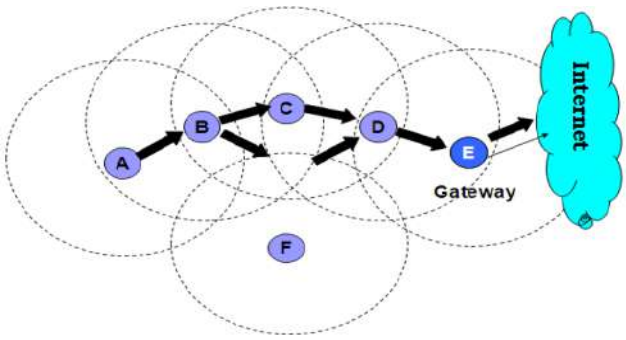

Fig 1: A typical MANET scenario

II. Overview Of Routing Protocol

Routing protocol in MANET can be classified into several ways depending upon their network structure, communication model, routing strategy, and state information and so on but most of these are done depending on routing strategy and network structure. Based on the Routing strategy the routing protocols can be classified into two parts: 1. Table driven and 2. Source initiated (on demand) while depending on the network structure these are classified as flat routing, hierarchical routing and geographic position assisted routing. Flat routing covers both routing protocols based on routing strategy. These are as follow [2] [7] [8]:

A. Reactive (On-demand) Protocols: In this protocol, routes are created only when needed. Protocols having higher latency since the routes have to be discovered when source node initiates a route request and lower overhead since routes are maintained only on demand basis. Example: AODV, DSR, TORA, ABR.

B. Proactive (Table driven) Protocols: In this protocol, when packet needed to be forwarded, route is already known. This protocol has low latency due to maintenance of routes all times and higher overhead due to frequent route updates. Example: DSDV, OLSR, DVRP, WRP.

C. Hybrid Protocols: Hybrid protocols are the combination of reactive as well as proactive protocols. Example: ZRP.

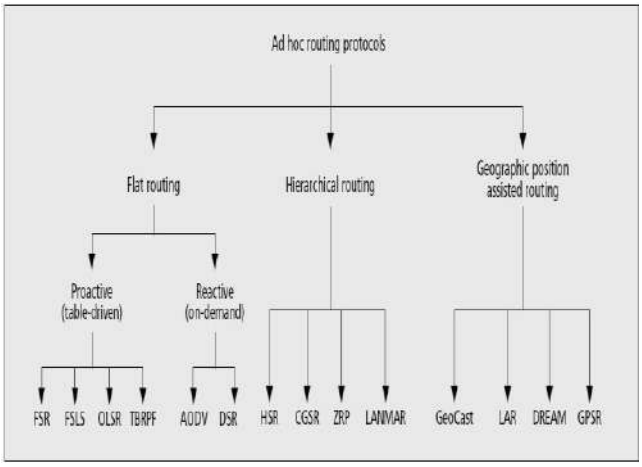

Fig 2: Classification of MANET routing protocols

III. Working of OLSR Protocol

OLSR (Optimized Link State Routing) routing protocol is a table-driven or proactive protocol based on the traditional link state algorithm. The point to point OLSR routing protocol is a non-uniform proactive protocol. It is important to understand that OLSR does not route traffic. It is not responsible for the process of routing traffic. It could be described as a *route maintenance protocol* and responsible for maintain the routing table used for routing packages. OLSR protocol, have four steps for find the route from source to destination: neighbour sensing, MPR selection, MPR Information Declaration, routing table calculation. OLSR protocol is the enhanced version of pure link state routing protocol that chooses the optimal path during a flooding process for route setup and route maintenance. Under the OLSR routing protocol strategy, nodes in the network exchange periodical topology information with each other and select a set of neighbouring nodes called Multipoint Relays (MPRS) to retransmit their packets. OLSR uses MPR technique as an optimization for control traffic flooding and minimizes the size of control messages and the number of rebroadcast node during a route update. All the nodes are informed about the subset of all the available links and the link between MPR and MPR selectors. In OLSR, link state information is generated by nodes chosen by MPR's. [1][2]

OLSR uses three kinds of the control messages: Hello, Topology control (TC) and Multiple Interface Declaration (MID). These are as under:

A. Hello – Hello messages are transmitted to all neighbours. These messages are used for neighbour sensing and MPR calculation.

B. TC – Topology Control messages are the link state signalling done by OLSR and is optimized using MPRs.

C. MID – Multiple Interface Declaration messages are transmitted by nodes running OLSR on more than one interface and list all IP addresses used by node.

Hello messages are used for finding the information about the link status and the host's neighbours. With the hello message, the MPR selector set is constructed which describes which neighbours has chosen this host to act as MPR and from this info the host can calculate its own set of the MPRs. The hello messages

are sent only one hop away but the TC messages are broadcasted throughout the entire network, TC messages are used for broadcasting information about own advertised neighbour which includes at least the MPR selector list. The TC messages are broadcasted periodically and only the MPR hosts can forward the TC message. MID messages are transmitted by nodes running OLSR on more than one interface. These messages list all IP addresses used by a node. [6]

A. *Functions of OLSR protocol:*

1) *Node addressing:* OLSR uses are IP address as the unique identification of nodes in the n/w. energy node choose one IP address that is set to be its main address. The size of the IP address transmitted in control messages, the minimum size of messages and the address to use as destination for control traffic.
2) *Information repositories:* OLSR maintains state by keeping a variety of databases of information. Which are updated upon processing received control messages and the information stored is used when generating such messages.
3) *Control traffic*: All OLSR traffic is sent in OLSR packets. These packets consist of an OLSR packet header and a body which is shown in fig 3:

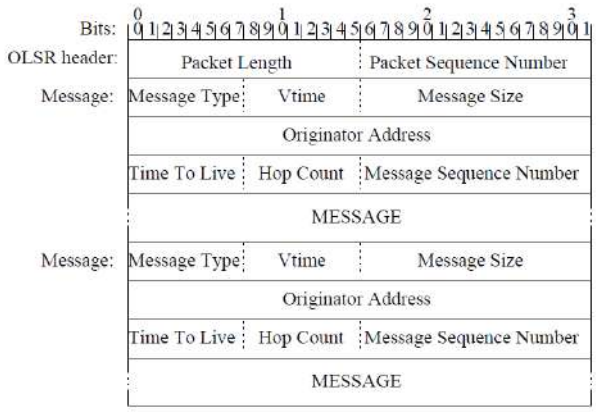

Fig 3: The generic OLSR packet

4) *MPR*: Multipoint relay concept is used for the reduction of routing overhead. Each node selects the set of nodes during the process of topology update to rebroadcast its control messages. Only the selected MPR nodes can rebroadcast the control packets. Conceptual view of MPR is illustrated in figure 4. All the 2-hop nodes are reachable from the MPR nodes and routing overheads are minimized.

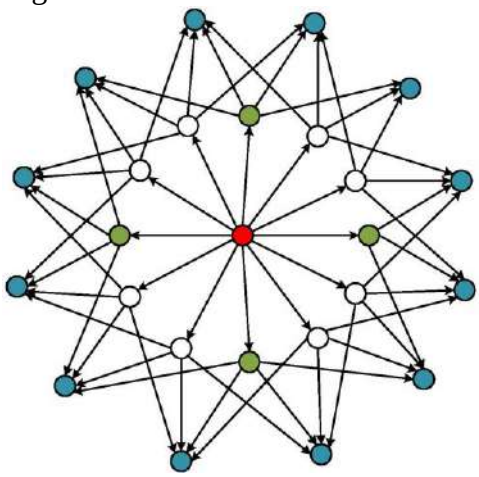

Fig 4: MPR in OLSR

5) *Neighbour Discovery*: OLSR detects neighbours using HELLO messages. All nodes in the network send HELLO messages to their neighbours. These messages are sent at the predetermined route in OLSR to determine the link structure. Hello message contains all neighbour information. This enables the mobile nodes to have a table in which it has information about all its multiple hop neighbours. To keep up-to-date information on what links exist between a node and its neighbours, the link set is maintained. In Hello messages a node emits all information about the links to neighbours from the interface on which the HELLO is transmitted. When declaring links, IP addresses of interfaces making up the link is used.

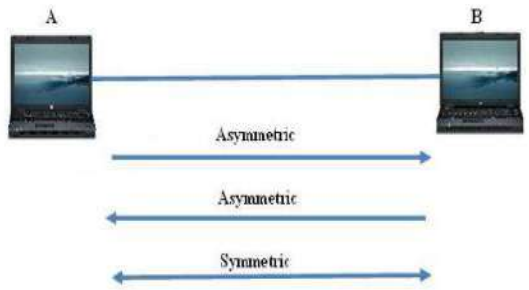

Fig 5: Hello Messages in MANET using OLSR.

6) *Link State Declaration*: Link state routing protocols are based on nodes flooding the network with information about local links. In classic link state scheme all nodes flood the network with link state information. In OLSR two optimizations are used: 1. Only MPR selectors are declared in link state messages. 2. Minimizes the set of nodes emitting link state messages.

OLSR uses host based flat routing, so the link state emitting describes links to neighbour nodes. This is done using TC messages.

B. *OLSR Strengths:*

1) OLSR is well suited for dense networks as all neighbours become MPR nodes. OLSR becomes a pure link state protocol and must operate as the original link state algorithm, such that each node propagates its link state information to all other nodes in the network.
2) Using the MPR technique minimizes the number of control messages and reduces the message flooding overhead. OLSR reduces number of nodes rebroadcasting link state information. When a node broadcasts a message, all its neighbours will receive the message and only the MPR sets will have to forward the link state information.

C. *OLSR Weaknesses:*

1) OLSR is a table-driven protocol that requires periodic hello message exchange to update the network information. These messages will produce an overhead and load the network. The load will increase if the number of nodes in the network increases. The OLSR routing protocol is unlike On Demand routing protocol, which do not depend on the periodic message exchange in route discovery techniques. This means that OLSR overhead will grow in a network with high mobility because of the protocols frequent topology table update.

IV. Optimization Techniques

Optimization is to improve the Quality of Service of the network and to minimize the number of control messages in the network. Today's network demands for the kind attention of the researchers to optimize MANET for better service. Optimization means to find out the optimal route in terms of performance metrics. The principle behind optimizing MANET route is to control the flows in the network such that the flows must be better. Here we are exploring two optimization techniques, GA (Genetic Algorithm) and PSO (Particle Swarm Optimization), which are as follow.

A. *Genetic Algorithm:*

Genetic Algorithm (GA) [5] is a search and optimization technique which works on the principle "*Select the best and Discard the rest*". It is an iterative procedure maintaining a population of solutions that are candidate solutions to specific domain challenges. At the beginning in case of MANET there are number of nodes. Some of the nodes are at better position and can be considered as best nodes to reach the destination. We start with the population of randomly generated solution and determine how fit it is. If solution is good, we stop, if not we optimize for a better. Now, as resources are limited, every node has to compete to another for resources. Ultimately only the strongest or fittest node survives and rest are discarded. Then this best node will be selected for further process. GA has parameters: Selection, Encoding, Recombination, Crossover and Mutation.

The flowchart of Genetic Algorithm is shown below in fig 6:

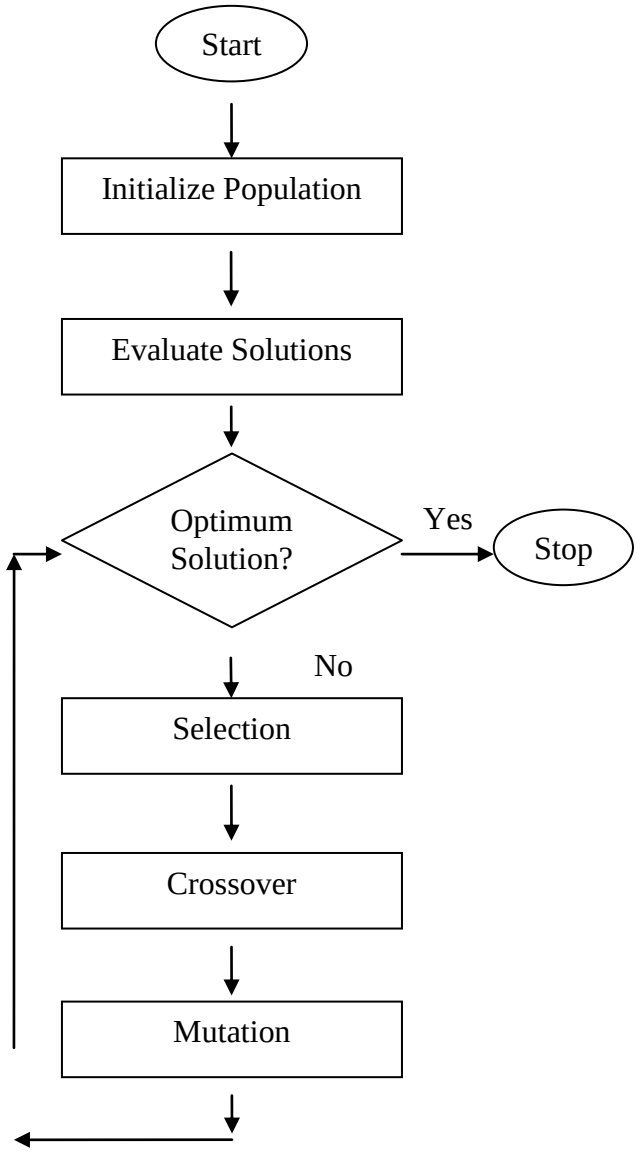

Fig 6: Flow chart of Genetic Algorithm

1) The GA procedure includes the following steps:

a. *Population Initialization*: It starts with the population of randomly generated possible candidate solutions, with each representing a different solution to the problem. The population in each generation is determined by the number of chromosomes.

b. *Encoding*: Encoding means to represent solution in the form of strings. In this, the problem is encoded into a set of strings (chromosomes) and each individual encoded into binary string that contains a number of bits.

c. *Evaluation*: This step is used to determine the fitness function. A fitness value is assigned to determine how *good* each string is. The higher the fitness value of string, higher chances of survival.

d. *Ranking*: The fittest individual is ranked accordingly to their evaluation level. This is how we find the "survival of the fittest". Fitter solution survives and used for the further process in the next generation and week one is discarded.

e. *Selection*: This step decides which chromosome will be forwarded for further processing or the crossover.

f. *Crossover*: In order to create a better population than the initial one, strings are combined and produces new one. Here, a mating process is carried out among the fittest individuals in the previous generation. Hence, the selected individuals are randomly combined in pairs to produce two offspring's by crossing over parts of the chromosomes at a randomly chosen position of the string. These newly generated off springs are supposed to present a better solution to the problem.

g. *Mutation*: In this step we are making small change in solution that is strings are inverted (0's to 1's and 1's to 0's).

In MANET, GA has been involved in solving route problems by selecting the shortest path and developing optimized routing protocols.

2) *Merits of GA*: GA is used to implement the survival of fittest solution among the nodes. Its parameters selection, encoding, recombination, crossover and mutation help in covering the local optima of the problem.

3) *Demerits of GA*: GA has no memory and trouble in finding an exact solution to the problem. It does not cover the global optimum of the problem.

B. Particle Swarm Optimization:

Particle Swarm Optimization (PSO) [3] optimizes a problem by iteratively trying to improve a candidate solution with regard to a given measure of quality. In this algorithm group of particles are moving in search space to find path and their tendency is to remain in centre in the group of particles and tries to attain secured and efficient position in the search space. So they try to move towards the particle which is close to the solution and after some time all particles stop to particular solution which is the optimal solution for the problem. [5]

PSO is a global optimization technique that combines self-experience of particle with social experience of particle to find the best solution for the problem, presented as a point and a velocity. Based on certain metrics, each particle assigns a value to the position it has and also remembers the best position it has seen during search. The particle then communicates the best position to other particles in search space. Therefore the particles will adjust their own positions as well as velocity based on the information. Every particle have a

a. Current position- position of particle existence in current time.
b. Personal best position- best position travel by each particle till now.
c. Global best position- best position of any particle among all particles in search space.
d. Velocity- personal velocity of each particle.

1) *Merits of PSO*: PSO is efficient in global search and conceptually simple. It is easy to perform over a problem because it needs only few parameters to adjust. It can be implemented in few lines of code and have memory. Here the collaborative group interactions enhance the search for an optimal solution. PSO moves towards better global optimal solution by taking into considerations the local solution of a particle and all its particles kept as members of the population through the course of the run.

2) *Demerits of PSO*: PSO is a slow process and week local search ability. It has no operators like in GA and it wastes resources on a poor individual that is stuck in poor region of the search space. PSO may not be flexible enough when the problem to be tackled is complicated.

The flowchart of Particle Swarm Optimization is shown in fig 7:

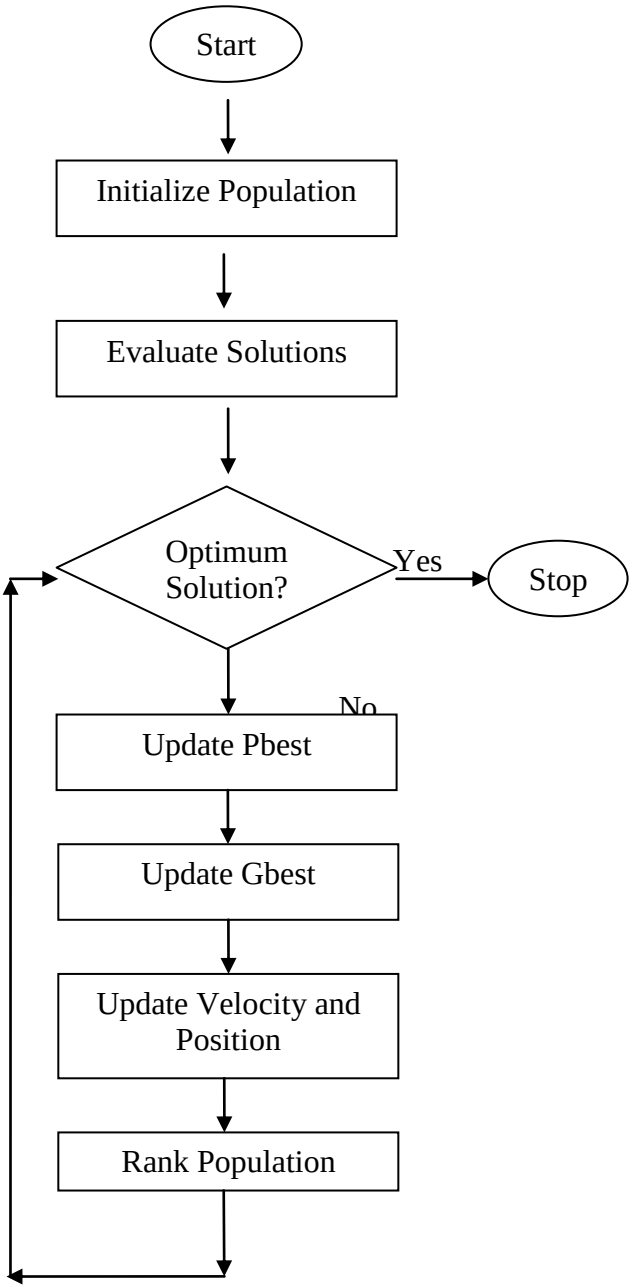

Fig 7: Flow chart of Particle Swarm Optimization

V. Comparison Of Optimization Techniques

In this section the main differences between the two optimization techniques will be presented in the form of table as below.

Table 1: Comparison between GA and PSO

S. No	GA	PSO
1.	Have no memory.	Have memory.
2.	Trouble in finding an exact solution and are best at reaching a global region.	Group interaction enhances the search for an optimal solution.
3.	Has tendency to cover local optima rather than global optimum of the problem.	Moves towards better global optimal solution by taking into consideration the local solution of the particles.
4.	Implements the survival of fittest.	All particles are kept as members of the population trough the course of the run.
5.	Have selection.	Has no selection process.
6.	Has crossover process.	Adjustment of pbest and gbest value is done.
7.	Has mutation algorithm.	Balance is achieved through the inertial weight factor or velocity update.

VI. Conclusion

In this paper, we have reviewed the proactive routing protocol in MANET as well as AI optimization techniques. First, a detailed study of OLSR routing protocol with complete working is presented. Secondly, optimization techniques, GA and PSO are studied and explored with proper flowcharts and process. Thirdly, we explored with a brief comparison of two optimization algorithms which help in better understanding. The overall aim of this paper is to explore the idea of optimization techniques in MANET to find out the optimal solution for a given network problem that results in better performance.

Acknowledgement

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Nanotechnology: See the World through Tiny Eyes: A Review

Rupinderjit Singh

M.Tech(CSE) SEMESTER-II

Amritsar College of Engineering and Technology, Manawala, Amritsar

rjmathroo@gmail.com

Abstract- *"Nanotechnology"is the study of the controlling of matter on an atomic and molecular scale. Generally nanotechnology deals with structures sized between 1 to 100 nanometer in at least one dimension, and involves developing or modifying materials or devices within that size. The purpose of this paper is to look into the present aspects of "Nanotechnology". This paper gives a brief description of what Nanotechnology is?? And its application in various fields viz. information technology, Energy and Environment, Aerospace, computing, medicine, food technology, Robotics, Solar cells etc. It also deals with the future perspectives of Nanotechnology, risks in advanced nanotechnology.*

Key Terms: Nanotechnology, Nanofilms, Nanoelectronics, Nanomedicines, Green Nanotechnology, bionanotechnology

I. INTRODUCTION

Nanotechnology is the manipulation of matter on an atomic, molecular, and supramolecular scale. A more generalized description of nanotechnology was subsequently established by the National Nanotechnology Initiative, which defines nanotechnology as the manipulation of matter with at least one dimension sized from 1 to 100 nanometers. Nanotechnology as defined by size is naturally very broad, including fields of science as diverse as surface science, organic chemistry, molecular biology, semiconductor physics, microfabrication, etc[1]. Nanotechnology is sometimes referred to as a general purpose technology because in its advanced version it will have significant impact on almost all industries and all areas of society[2].

II. BRIEF HISTORY OF NANOTECHNOLOGY

The idea of nanotechnology was first proposed by a physicist named Richard Feynman in 1959. Feynman never technically used the term "nanotechnology" or "nanite" but he gave a speech called "There's Plenty of Room At the Bottom" in which he talked about how we would one day be able to manipulate atoms and molecules and actually craft them into whatever we wanted them to be. He then went on to discuss the possibility of us, in the distant future, creating extremely small machines that would serve as tiny tools. This idea was considered completely radical at the time but as the years rolled by, we now see nanotechnology as a very real and potential technology in the near future.

Nanotechnology wasn't seen as a considerable concept until the 1980s when Eric Drexler began doing research into nanotechnology, including the observation of Feynman's

speech. Drexler spent countless years perfecting the concept and getting many different scientists involved with actually producing nanotechnology. [3][4]

III. HOW IT EFFECT US?

While there is much excitement over the potential for nanotechnology to provide solutions to some of the global challenges we face, there are also a number of perceived risks. While some of these risks may be dismissed or managed through future research and development, there are many gaps in our knowledge about the potentially harmful effects of nano-materials on human health and the environment for example, which cannot be ignored. The following is a summary of the main benefits and risks identified during the Nanologue project.

ENVIRONMENTAL ISSUES:

The application of nanotechnology may provide solutions to a number of environmental challenges such as energy conservation, pollution prevention and remediation. At present there is a strong belief that there will be environmental benefits from the introduction of nanotechnology and improvements could be delivered in the overall environmental performance of products through: efficiency gains in production due to miniaturisation effects, eg cleaner manufacture with less emissions and less waste efficiency gains in use from the ability to build devices from the bottom up and improve efficiency and operation [5]

Human Health

Effects on human health are a major concern for most stakeholders. Nanotechnology is widely recognised as a great opportunity for disease prevention, early disease detection (eg sensors for cancer detection) or medical treatment (eg controlled drug delivery by nanocapsules). [6]

Privacy

Because of the expected advances in medical diagnostics, the collection of increasingly sensitive data is likely to raise serious questions about information provenance and distribution. Convergence with information and

communication technology (ICT) is also likely to cause the concern, with possible threats to civil liberties from increasingly advanced surveillance capabilities, enabled by nanotechnologies [7].

Access

However, at the early stages of development there is concern that the technology will remain prohibitively expensive, limiting access to those who could benefit the most. There is concern that the development of this technology could just widen the divide between the industrialised and the developing world. It is also possible that highend medical applications, for example, might also be restricted to those that can afford it within the industrialised world.

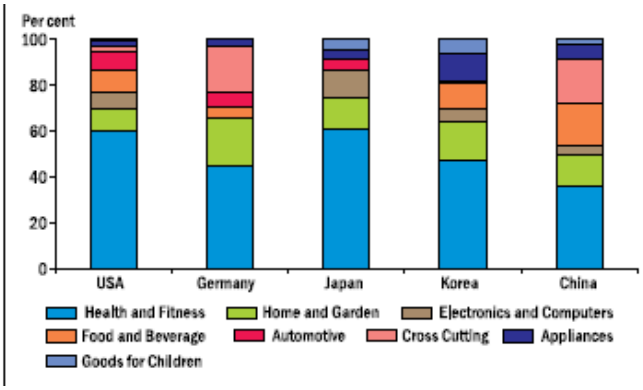
Acceptance

As with all major technological breakthroughs, nanotechnology has stirred the imagination of the general public, reaching the news headlines and modern day fiction. However, the vast majority of people still have little or no idea of what nanotechnology is or its possible implications[8]. Despite this, members of the public have already expressed similar concerns to those associated with genetic modification (GM) and nuclear power, particularly around governance structures and corporate transparency.

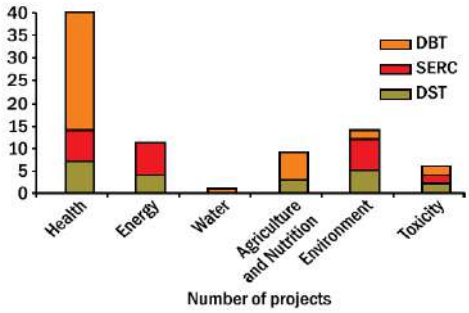
Regulation and control

With a technology as potentially disruptive as nanotechnology there is a fundamental question over the need for new regulation. The immediate issue is whether existing regulatory regimes are robust enough to deal with any special qualities that nano-structured materials may have, or whether new regulation is required. On the one hand there is a possible risk that nanotechnology develops outside established regulatory bodies because of a wait-and-see attitude in government. There is an obvious trade-off between the various laws, regulations, and treaties that govern the relationship between the public good and the protection offered by patents. [8]

V. NANOTECHNOLOGY APPLICATIONS:



Percentage shares of different categories of nanotechnology products by country October 2009



Sectorwise distribution of projects sponsored by DCT, DBT and SERC-2006-08

Nanotechnology today is regarded as a revolutionary technology. Worldwide, there has been an increasing interest in nanotechnology as evident from the rising trends in investment and policy initiatives directed towards this end.

Drug-Delivery Technique:

Dendrimers are a type of nanostructure that can be recisely designed and manufactured for a wide variety of applications, including the treatment of cancer and other diseases. [9].

Nano films

Different nanoscale materials can be used in thin films to make them water repellent, anti reflective, self-cleaning, Ultraviolet or infrared-resistant, anti-fog, anti-microbial, Scratchresistant, or electrically conductive. Nano films are used now on eyeglasses, computer display and cameras to protect or treat the surfaces [9].

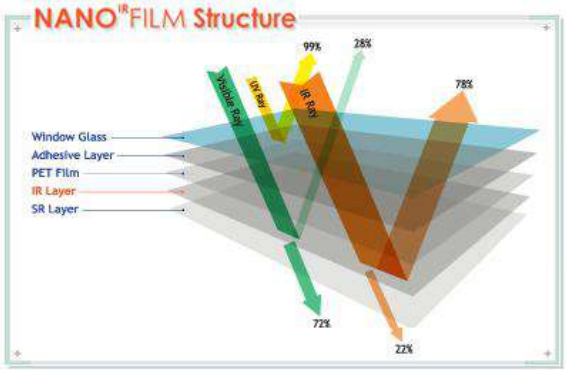


Figure: Nano Film Structure[9]

Water Filtration technique

Researchers are experimenting with carbon nanotubes based membranes for water desalination and nanoscale sensors to identify contaminants in water system. Other nanoscale

materials that have great potential to filter and purify water include nanoscale titanium dioxide, which is used in sunscreen and which has been shown to neutralize bacteria [9].

Nano Tubes

Carbon nanotubes (CNTs) are allotropes of carbon with a cylindrical nanostructure. These cylindrical carbon molecules have novel properties that make them potentially useful in many applications in nanotechnology, electronics, optics and other fields of materials science, as well as potential uses in architectural fields[9].

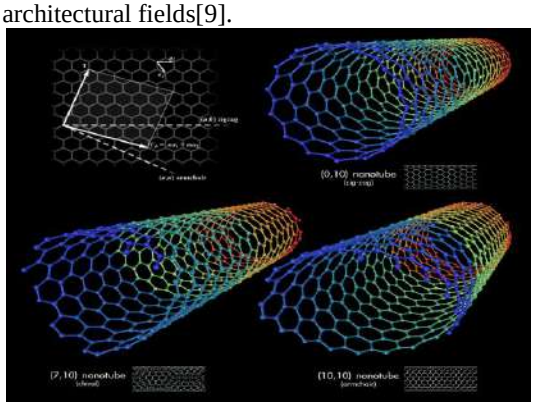


Figure: NanoTubes[9]

Nanoscale Transistors

Transistors are electronic switching devices where a small amount of electricity is used like a gate to control the flow of larger amount of electricity. Transistors sizes have been decreasing, so computer have become more powerful [9].

Nanorobot Development for Defense

The defense industry should remarkably benefit from achievements and trends on current nanobiotechnology systems integration. Such trends on technology have also resulted in a recent growing interest from the international scientific community, including medical and pharmaceutical sectors, towards the research and development of molecular machines.

Medical Nanorobots

The research and development of nanorobots with embedded nanobiosensors and actuators is considered a new possibility to provide new medical devices for doctors [10].

VI. APPLICATIONS UNDER DEVELOPMENT

Researchers are looking into the following applications of nanotechnology in space:

a. Using carbon nanotubes to make the cable needed for the space elevator, a system which could significantly reduce the cost of sending material into orbit.

b. Employing materials made from carbon nanotubes to reduce the weight of spaceships while retaining or even increasing the structural strength.

c. Producing thrusters for spacecraft that use MEMS devices to accelerate nanoparticles. This should reduce the weight and complexity of thruster systems used for interplanetary missions.

d. Using carbon nanotubes to build lightweight solar sails that use pressure of light from the sun reflecting on the mirror-like solar cell to propel a spacecraft.

e. Deploying a network of nanosensors to search large areas of planets such as Mars for traces of water or other chemicals [11].

f. Using nanosized magnetic rings to make Magnetoresistive Random Access Memory (MRAM) which research has indicated may allow memory density of 400 GB per square inch.

Nanotechnology and Space

Nanotechnology may hold the key to making space-flight more practical. Advancements in nanomaterials make lightweight solar sails and a cable for the space elevator possible. By significantly reducing the amount of rocket fuel required, these advances could lower the cost of reaching orbit and travelling in space[11].

Nanotechnology in Electronics: Nanoelectronics

Nanoelectronics holds some answers for how we might increase the capabilities of electronics devices while we reduce their weight and power consumption. Some of the nanoelectronics areas under development include:

a. Improving display screens on electronics devices. This involves reducing power consumption while decreasing the weight and thickness of the screens.

b. Increasing the density of memory chips. Researchers are developing a type of memory chip with a projected density of one terabyte of memory per square inch or greater.

c. Reducing the size of transistors used in integrated circuits. [12].

Nanotechnology in Medicine

Applications of nanotechnology in medicine currently being developed involve employing nano-particles to deliver drugs, heat, light or other substances to specific cells in the human body. Engineering particles to be used in this way allows detection and/or treatment of diseases or injuries within the targeted cells, thereby minimizing the damage to healthy cells in the body [13].

VII. CURRENT APPLICATIONS

While most applications of nanotechnology in medicine are still under development. Nanocrystalline silver is already being used as a antimicrobial agent in the treatment of wounds [13]. Following applications also will be released very soon:

a. Qdots that identify the location of cancer cells in the body.

b. Nanoparticles deliver chemotherapy drugs directly to cancer cells to minimize damage to healthy cells.

c. Nanoshells that concentrate the heat from infrared light to destroy cancer cells with minimal damage to surrounding healthy cells.

d. Nanotubes used in broken bones to provide a structure for new bone material to grow.
e. Nanoparticles that can attach to cells infected with various diseases and allow a doctor to identify, in a blood sample, the particular disease [13].

VIII. CHALLENGES TO TECHNOLOGY

1. Producing the nanomaterials in large enough volumes, with consistent quality, at acceptable costs.
2. Supplying the nanomaterials in a form (such as proper particle size, surface chemistry, dispersion capability, compatibility with various media, etc.) that would allow integration into the process.
3. Engineering and customizing the nano-based system to local requirements.
4. Addressing environmental, health and safety Concerns in the use and disposal of nano products.
5. One of the biggest challenges has been in terms of the interdisciplinary nature of nanotechnology and the scope of its applications. This has lead to significant overlaps in the areas for R&D support identified by different agencies.
6. The gap between basic research and application is another challenge in nanotechnology, like several other technologies. There is poor lab-firm integration which is compounded by the paucity of skilled manpower that could provide linkages between the technology and commercial domains.
7. Being cost and risk intensive, and being dependent upon sophisticated and complex equipment, technical know-how and capacity, financial constraints often act as an impediment in this regard.
8. The main challenges faced by regulatory institutions currently relate to the regulatory capacity, information asymmetry and absence of interagency coordination.
9. Venture capital mechanisms are nearly non-existent. This made taking research forward to technology development in this arena sluggish. Given that nanotechnology is comprehensive in its reach and interdisciplinary in nature, ensuring the accountability of actors involved in its application and regulation is essential. Its socially embedded nature entails that its credibility depends on fostering partnerships among the various stakeholders. This would ensure that scientific research does not overwhelm public perception and the social analysis of technology, an approach that would be particularly relevant in the case of nanotechnology governance. [14]

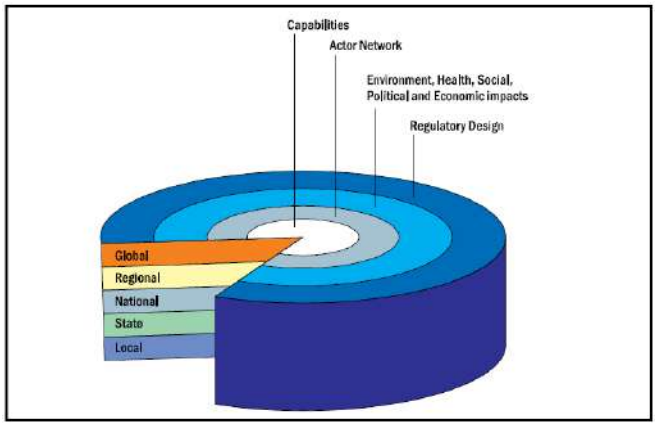


Figure: Multiple Governance Framework for nanotechnology[14]

IX. RISKS OF NANOTECHNOLOGY

These days it seems you need the prefix "nano" for products or applications if you want to be either very trendy or incredibly scary. Molecular manufacturing operations could be carried out with failure rates less than one in quadrillion. As soon as molecular manufacturing was proposed risks associated with it began to be identified. If it were capable of surviving outdoors, and using biomass as raw material, it could severely damage the environment [15]. Another important aspect of the nanoscale is that the smaller a nanoparticle gets, the larger its relative surface area becomes. Its electronic structure changes dramatically, too. Both effects lead to greatly improved catalytic activity but can also lead to aggressive chemical reactivity. There are tremendous differences in particle number concentration and particle surface area [16].

X. ISSUES

Environmental issue

In free form nanoparticles can be released in the air or water during production or as waste byproduct of production, and ultimately accumulate in the soil, water or plant life. In fixed form, where they are part of a manufactured substance or product, they will ultimately have to be recycled or disposed of as waste. The figure shows how nanotechnology effects the environment [17].

Health issue

Health and environmental issues combine in the workplace of companies engaged in producing or using nanomaterials and in the laboratories engaged in nanoscience and nanotechnology research. To properly assess the health hazards of engineered nano-particles the whole life cycle of these particles needs to be evaluated, including their fabrication, storage and distribution, application and potential abuse, and disposal[17].

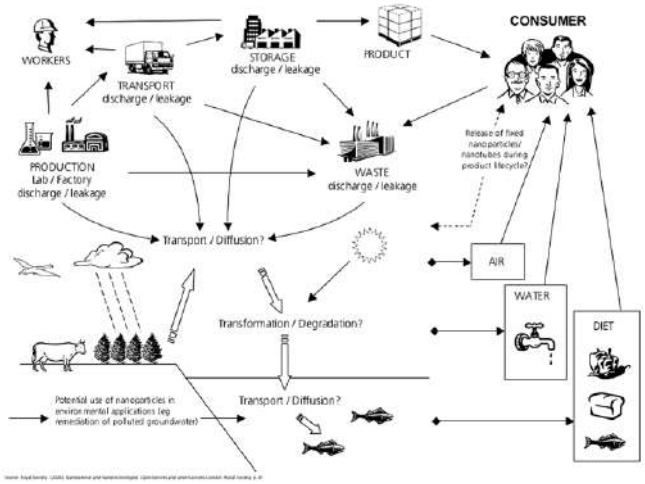


Figure: Issues in Nanotechnology[16]

XI. PROBLEMS WITH NANOTECHNOLOGY

There's many problems and dangers involved with nanotechnology, as with everything else, but scientists are working hard to correct these problems before they are ever an issue. Some of these problems are:

Warfare
Nanotechnology will definitely be used in warfare. With nanotechnology, countries will be able to wage war against each other without ever letting the enemy know who's attacking them[18].

Destabilization of the economy
If nanotechnology was suddenly released to the public as a finished project then no one would ever have to buy clothes, medicines, or many other products again because nanotechnology will present no use for such things. With such a large amount of product readily available so cheap, companies will have to adjust the ways they do business and they will have to market to people in a different way or face bankruptcy.

Black Market Nanobots
Nanites will no doubt be sold on the black market as much, if not more, then on the open market [18].

Nanotech Arms Race
A nanotech arms race will involve many different countries racing to see who can not only have nanites first but also who has better nanites. An arms race alone could potentially cause war to break out over superiority, although these types of races often trigger human ingenuity and inspires people to come up with some simply amazing forms of technology and explorations of science[18].

XII. FUTURE CONCEPTS OF NANOTECHNOLOGY

Nanotechnology is a revolutionary technology which is growing day by day at a high pace. Scientist are coming up with new ideas and concepts that helps to improve humans lives. Some of these Concepts that are in developing level are:

GREEN NANOTECHNOLOGY

Green nanotechnology refers to the use of the products of nanotechnology to enhance sustainability. It includes making green nano-products and using nano-products in support of sustainability[19].
Green nanotechnology has two goals: producing nanomaterials and products without harming the environment or human health, and producing nano-products that provide solutions to environmental problems. Green nanotechnology also means using nanotechnology to make current manufacturing processes for non-nano materials and products more environmentally friendly[20].

Solar cells
One major project that is being worked on is the development of nanotechnology in solar cells[21].
Nanotechnology is already used to provide improved performance coatings for photovoltaic (PV) and solar thermal panels[22].

Water treatment
Due to their unique activity toward recalcitrant contaminants many nanomaterials are under active research and development for use in the treatment of water[23].

NANOBIOTECHNOLOGY

Bionanotechnology, **nanobiotechnology**, and **nanobiology** are terms that refer to the intersection of nanotechnology and biology[24].
Nano-biotechnology is often used to describe the overlapping multidisciplinary activities associated with biosensors, particularly where photonics, chemistry, biology, biophysics, nano-medicine, and engineering converge. Measurement in biology using wave guide techniques, such as dual polarization interferometry, are another example[25].

NANOBIOMECHANICS

Nanobiomechanics is an emerging field in nanoscience and biomechanics that combines the powerful tools of nanomechanics to explore fundamental science of biomaterials and biomechanics.
Most of the biological materials have different hierarchical levels, and the smallest ones refer to the nanoscale. Therefore, being able to probe properties at this small scales provides a great opportunity for better understanding the fundamental properties of these materials. [26].

XIII. CONCLUSION

Today, many of our nation's most creative scientists and engineers are finding new ways to use nanotechnology to improve the world in which we live. These researchers envision a world in which new materials, designed at the atomic and molecular level, provide realistic, cost-effective methods for harnessing renewable energy sources and keeping our environment clean. They see doctors detecting disease at its earliest stages and treating illness such as cancer, heart disease, and diabetes with more effective and safer medicines. They picture new technologies for protecting both our military forces and civilians from conventional, biological, and chemical weapons. Although there are many research challenges ahead, nanotechnology already is producing a wide range of beneficial materials and pointing to breakthrough in many fields. It has opened scientific Inquiry to the level of molecules-and a world of new opportunities.

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VALUE ADDED CLASS ROOM TEACHING: NEED AND STRATEGIES

Rajni Kansra,
Research Scholar, Department of Education,
Punjabi University Patiala

Abstract-Effective teaching is required at all levels of education elementary, secondary or higher education. Nowadays concentration power or time span of the students have been fallen. If a teacher applies same teaching pedagogy again and again the students will become less attentive. For effective teaching a teacher should brought some changes in his classroom. The techniques that a teacher can apply include in his/her teaching can be incorporation of seminars, workshops, case studies, panel discussion, simulation, drill, field trips, conferences, team teaching etc. there is no magic bullet, no single solution to the challenge of enhancing teachers' expertise. All mentioned methods helps to achieve the improvement in the education system and hence ensures the quality in education too. By applying all these methods the practical aspects of the subject can be taught in the class and these methods helps students to meet the domestic and global requirements by transforming the education system.

Keywords: Effective, Technology, Methods, Engagement in learning, Simulation.

SECTION: I

I. INTRODUCTION

Education keeps the social order moving with its own two fold function of conservation and progression. Education is a meaningful activity. It is undertaken by educator and educand for the sake of clear-cut and well defined aims and objectives. It has become unanimous demand of time, as it is an important social activity planned and shared by parents, teachers, school and members of community. Education is the main conduit for economic and social progress. Apart from industrialization and urbanization, education has been one of the important agents of social change. As the economy develops, demand for skilled workers increases.

A classroom is place where teaching or learning activities takes place. Various kinds of classrooms are found in educational institutions .Classroom attempts to provide a place where learning can take place uninterrupted by other distractions. Most classrooms have large writing surface known as blackboard where the teacher or students can share notes with other members of the class. Nowadays classrooms are replaced by whiteboards and interactive whiteboards. Manyclassroomhave TVs, maps, charts, Pencils, books, mono graphs and LCD projectors for presenting information and images from a computer.

The structure and layout of the classroom have a significant impact on the quality of education. The emergence of technologies into classrooms is being promoted and supported around the world. Underlying the promotion and support are claims that successful integration will lead to enhanced learning. In the present era there is need to shift the focus of the education from the teacher and delivery of course content to the student and active engagement with the material. Through active learning techniques and modelling by the teacher, students shed the traditional role as passive receptors and learn and practice how to apprehend knowledge and skills and use them meaningfully. When students recognize that your course involves active learning, they will also recognize that they must be active if they are to succeed in the course.

Accordingly, the present study an attempt had been made identify the strategies that can transform class room teaching and can generate productive results. For the above objective the present paper has been divided into five sections. Section I, introduces about education system, in Section II, need to transform education was explained, Section III deals with strategies that can shape future classroom teaching. Whereas the Section IV, concludes the discussion along with policy implications.

SECTION: II

II. NEED TO TRANSFORM EDUCATION

Indian education system has evolved very few structural changes in the system and even fewer changes in the syllabus. Generations of Indians have been following the same pattern and this same syllabus. The Indian education system is extremely theoretical in nature as compared to global education system. Except maybe in pure sciences, no other subject is taught in a practical manner. So the students do not find the subjects as practical one lose their interest in these subjects. In the present era there is need to transform the present education system through shaping the classroom teaching that will enhance the skill of the students and make them employable.

SECTION: III

III. STRATERGIES TO TRASFORM EDUCATION IN INDIA

A good education system helps to transform the society and achieve prosperity in the country.

Still in some colleges and universities old

methods of teaching are being used, this is not bad but if you want to make attentive class or students with analytical skills then more of new techniques and tools need to incorporate in teaching. More advanced technologies should be used in this sector in order to compete with other countries.

Demonstrations

Demonstrations should be frequently used in the class room teaching. They help us to focus on steps and procedures involved in executing various manual operations in various performing arts, in science or engineering and for numerous other purposes.

Workshop Technique

Workshop is defined as assembled group persons who share a common interest or problem. They meet together to improve their individual and skill of a subject through intensive study, research, practice and discussion. It develops the feelings of cooperation and group or team work. it provides the situation to study the vocational problems.

Project Based Learning

In the project based teaching (PBL) students will get projects related to real life problems. PBL is a way to make learning meaningful and real. Instead of "learning" material out of textbooks, students work in teams to tackle real-world problems. Often, students will collaborate with peers across the world on global projects, forge meaningful relationships and build virtual communities of learners in the process.

Panel Discussion

With panel discussions a small group of persons who have some expertness in the subject talk about the problem before the class. No one makes a speech. Rather there is interplay back and forth among the panel members. A panel chairperson keeps the discussion to the point, invites non participants to talk or give an occasional summary to suggest how the discussion has progressed.

Seminar

The seminar is an instructional technique of higher learning which involves paper reading on a theme and followed by the group discussion to clarify the complex aspects of the theme. It enhances simulation of thinking through interaction. Seminar has great instructional value as it makes the instruction learner centred and provides for learning through enquiry which is based on a very natural characteristics of inquisitiveness in students.

Nominal Group Technique

In the Nominal Group Technique the steps included are setting the stage, generation of ideas in writing, recording of ideas, serial discussions and vote on higher priority ideas.

Debate

Debate should be frequently included as a part of teaching. It encourages students to speak in front of others and increases their confidence. With this, however two or more speakers usually take definite points of view, present their opinions and facts and participate later by responding to questions from others in the class.

Symposium

If problem is easily divided into sub-problems, a symposium may be arranged. This consists of a series of talks by guest speakers invited to the seminar. Presentations follow a predetermined order. There is no direct interaction between the speakers or between speakers and the audience.

Role Playing

It consists of providing spontaneous, unrehearsed, life-like representation of experiences for various teaching and learning objectives. It has been found useful for helping students see ways of applying principles studied in the abstract, for enabling them to understand motivations of other persons by acting out those persons role for heightening their awareness of psychological and social problems

Brainstorming

In brainstorming the students are encouraged to generate ideas on the topic as possible without judgment or critique when they are made, can be used in many learning contexts, whether solving a problem, generating questions to ask about a visual presentation, or summarizing the key points of a lecture. The operant word in the definition of brainstorming is generating. Students can use this session as an opportunity to make connections, free associate, and recognize that they have been engaging with the topic in ways they may not have been aware.

Collaborative Learning

Recent research suggests that individuals in small groups learn better than they do on their own or in isolation. In light of the research on active learning, this is not surprising, as a small group initiates collaborative learning and its resulting activities, students generate questions, discuss and arrive at conclusions, turn thought into written or oral language, etc. Any size class can benefit from collaborative learning. With some modifications, groups can be successful even in very large lecture classrooms.

Community Trips

Field trips to community should be encouraged in curriculum which enrich instructions by introducing practical aspects of the subject as applications of classroom theory. They permit students to analyse problems in fairly unstructured ways; in the process they are expected to exercise judgement and evolve conclusions about meaning or results of their study.

Case Studies

Gleaned from real life, cases can help students explore the use of theory in practice. Students will learn to analyze, articulate their point of view, listen to others, bring about consensus, summarize, and then present their findings in several formats. Cases must be found or written that relate to your learning objectives. After being assigned for students to read, cases can be used in several ways.

Team Teaching

Team teaching is a strategy of teaching in which several teachers, at least more than one participates in the teaching programme. It is a collaborative arrangement of experts and specialist deliberately made for doing quality teaching. In this process more than one teacher work together. They together plan for teaching, carry out teaching and evaluate the progress of the students.

Simulation

While simulations can be used simply to provide examples to reinforce memorisation, most simulations involve the learner in problem solving. Students have the opportunity to live out roles and find solution to often-complex problems. With the help of simulations real life solutions can be identified. It also enhances the analytical skill of the students.

Heuristic Method

Heuristic is a method of solving problems by inductive reasoning, by evaluating past experiences and moving, by try and error, to a solution. The chief characteristics of this method were to make their disciples answer the questions asked by the teacher which they would not be able to answer easily. Then, they would themselves put questions to the teacher; this interaction would go on till the disciples themselves would arrive at the solution.

SECTION: IV

IV. CONCLUSION

At college or university level teaching, lecture method is most commonly used which does not encouraged the higher learning. Our teaching confines to memory level from primary level to university level. The purpose of the higher learning is to develop the abilities of criticism, appreciation to respect the ideas and feelings of others, to present own ideas and seek clarification. The learner should be able to present his own view on a theme. The potentialities can only be developed by employing higher techniques of teaching and instructions at college and university level. In the present article the role of conference technique, workshop, role play, heuristic method, simulation, drill and practice, field trips, demonstration, case studies, team teaching etc have been highlighted to improve the teaching at higher level. If all these techniques are frequently used in the higher education then the theoretical nature of the education can be transformed to a practical and knowledgeable one. Above mentioned methods have their own advantages and disadvantages. Before application of any one of these methods we have to check the suitability of each of one. Above initiatives are effective when they insist on expanding teachers' repertoires of research-based strategies, developing teacher's ability to adapt strategies to meet specific needs and design meaningful lessons and units and building collaborative support structures that allow teachers to learn together, analyze and refine their practices, and use student work to set instructional priorities.

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A Review of Cloud Computing & its Various Tools.

Pavitar Singh[1], Manoj Agnihotri[2], Ina Manchanda[3]

Assistant Professor-Department of Computer Science & Engineering,

Amritsar College of Engineering & Technology-Amritsar.

***Abstract**: Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).A cloud can be Private, Public, Hybrid & Community. This paper describes basic tools & various tools used for the monitoring & management of Cloud Computing services. It helps in achieving efficiency & improves performance in cloud environment.*

I. Introduction

Cloud computing has recently emerged and is a new technology for hosting and delivering services over the Internet. Cloud computing is capturing the attention of business owners, as it removes the requirement for users to plan ahead for provisioning, and allows enterprises to start from the small and increase resources only when there is a rise in service demand. Currently there are no standards and a well-defined definition for the cloud.

Definition:

There are several definitions for the cloud. The definition of cloud computing provided by "The National Institute of Standards and Technology" (NIST)

NIST definition of cloud computing *Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources* (*e.g., networks, servers, storage, applications, and services*) *that can be rapidly provisioned and released with minimal management effort or service provider interaction*.[3]

Another Definition

Cloud Computing is "*a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of Configurable computing resources that can be rapidly provisioned and released with minimal management effort or Service provider interaction*" [1]

Characteristics of Cloud Computing:

- On Demand Self-Service
- Broad Network Access
- Resource Pooling
- Rapid Elasticity
- Measured Service

Service Models

Most of the current clouds are built on top of modern data centers. The cloud offers 3 different service models. These service models are:

a) Infrastructure as a Service (IaaS)

Built on top of data centers layer, IaaS layer virtualizes computing power, storage and network connectivity of the data centers, and offers it as provisioned services to consumers. Amazon EC2, Microsoft Azure Platform [4]

b) Platform as a Service (PaaS)

PaaS, often referred as cloudware, provides a development platform with a set of services to assist application design, development, testing, deployment, monitoring, hosting on the cloud. Examples are Google App Engine[12], Microsoft Azure [4]

c) Software as a Service (SaaS)

In SaaS, Software is presented to the end users as services on demand, usually in a browser. Examples are salesforce.com[5], google apps[12].

These services are provided like utilities and the end users are billed by how much they used.

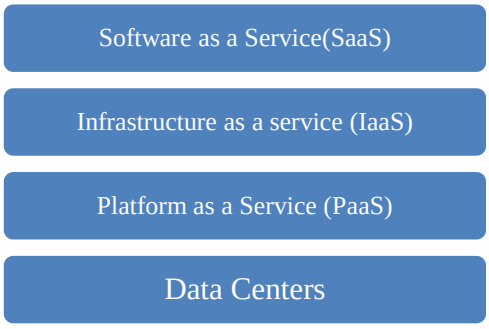

Fig: 1 Hierarchical View of Cloud Computing

Data Centers: This is the base of cloud computing which provides the hardware on which the clouds run. Data centers are built preferably in less populated areas with cheaper energy rate and lower probability of natural disasters. Modern data centers usually consist of thousands of inter-connected servers. These servers are usually heterogeneous. The main components of datacenters are: data storage, servers and local area networks. The data center connects to the rest of network through a gateway router [2]

Deployment Models

Cloud deployment models can be classified as private, public, community, and hybrid cloud.

- **A Private cloud** is owned or rented by an organization. The whole cloud resource is dedicated to that organization for its private use. An example of this model is a cloud built by an enterprise to serve their business critical applications.

- **A Public cloud** is owned by a service provider and its resources are sold to the public. End-users can rent parts of the resources and can typically scale their resource consumption up (or down) to their requirements. Amazon, Google, Rackspace, Sales force[5], and Microsoft are examples of public cloud providers.

- **A Community cloud** is similar to a private cloud, but where the cloud resource is shared among members of a closed community with similar interests. An example of a community cloud is the Media Cloud set up by Siemens IT Solutions and Services for the media industry. A community cloud may be operated by a third party (as in the Siemens case), or may be controlled and operated in a collaborative fashion as in the Grid Computing paradigm

- **A Hybrid cloud** is the combination of two or more cloud infrastructures; these can be private, public, or community clouds. The main purpose of a hybrid cloud is usually to provide extra resources in cases of high demand, for instance enabling migration of some computation tasks from a private cloud to a public cloud. This capability enables hybrid clouds to employ cloud bursting for scaling across clouds**.**

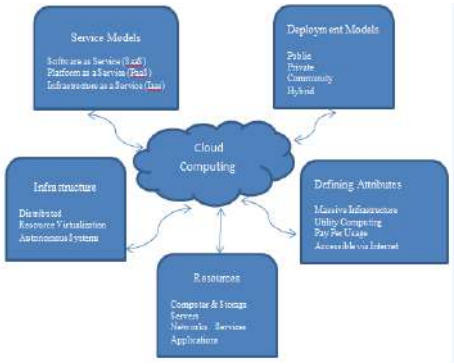

Fig 2 Cloud Computing-Delivery models, deployment models, defining attributes, resources & organization of infrastructure

Cloud Computing Architecture

The architecture of a cloud computing environment can be divided into 4 layers: the hardware /datacenter layer, the infrastructure layer, the platform layer and the application layer, as shown in Fig 3.

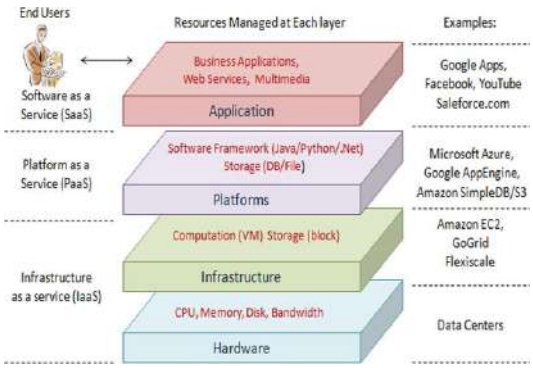

Fig 3. Cloud Computing Architecture

The Hardware layer: This layer is responsible for managing the physical resources of the cloud, including physical servers, routers, switches, power and cooling systems.

The Infrastructure layer: Also known as the virtualization layer, the infrastructure layer creates a pool of storage and computing resources by partitioning the physical resources using virtualization technologies such as Xen, VMware[10]

The Platform layer: Built on top of the infrastructure layer, the platform layer consists of operating systems and application frameworks.

The Application layer: At the highest level of the hierarchy, the application layer consists of the actual cloud applications.

II. Basic Tools used for Cloud Computing

1.Cloudyn[6]: It offers several tools exclusively focused on Amazon Web Services (AWS) cloud but will soon include Microsoft Azure, GoGrid[13] and Rackspace. The tools help corporate IT gain financial intelligence in cloud investments while improving performance.

The average user saves approximately 40% of cloud-related costs. Use the Reserved Instance Navigator to purchase EC2 (Elastic Compute Cloud) and RDS (Rightsizing) instances, reduce spending, manage RI inventory and simulate RI costs. Use the S3 Tracker to analyze how your storage is used so you can better your efficiency. In addition to these tools, four other tools are available to help save you money and enhance your business.

2.Enstratius[6]: Whether your business has a public, private or a hybrid cloud, **Enstratius** can help. The tool can be aligned with the governance and security requirements of a business. With Enstratius, you can easily manage each enterprise-class application in an effective manner.

There are many features make this one of the best cross-platform cloud management tools. "*Features include self-service provision/de-provisioning; multi-currency cost/chargeback tracking; and customizable role-based access control.*"

3.RightScale: It has many other tools beat in experience. It's been around **since 2006** and has helped launch millions of servers. There are four main parts of RightScale[6]. The first is a cloud management environment. You'll also find a multi-cloud engine as well as an adaptable automation engine. Last, RightScale offers a cloud-ready Server Template and Best Practice Deployment Library.

The cloud workload management service has a popular tool, PlanForCloud, that uses statistics to estimate cloud spending and to help companies save. Best of all, there is a free edition of RightScale[6] that includes a web-based dashboard and can aid with configuration and management.

4.Puppet Enterprise: This IT automation software allows for the ultimate management experiences in the cloud or on-premises. **Puppet Enterprise** "*gives system administrators the power to easily automate repetitive tasks, quickly deploy critical applications, and proactively manage infrastructure.*"[6]

It allows users to discover cloud nodes, to reuse previously-used configuration modules, deploy updates across multiple servers at once and even more.

5.AtomSphere:It is Cloud Integration Tool. AtomSphere is a cloud-based software Platform as a Service used by customers that want to integrate their various cloud-based applications with each other and with on-premise applications. New functionality provided as part of an upgrade last summer allows usage of multiple data sources and reservation of cloud resources for real-time data transfer in integration processes [7]

6.CloudSim: A Toolkit for Modeling and Simulation of Cloud Computing Environments and Evaluation of Resource Provisioning Algorithms. CloudSim[8] goal is to provide a generalized and extensible simulation framework that enables modeling, simulation, and experimentation of emerging Cloud computing infrastructures and application services, allowing its users to focus on specific system design issues that they want to investigate, without getting concerned about the low level details related to Cloud-based infrastructures and services.

7**.Greencloud**: It is a sophisticated packet-level simulator for energy-aware cloud computing data centers with a focus on cloud communications**.** It offers a detailed fine-grained modeling of the energy consumed by the data center IT equipment, such as computing servers, network switches, and communication links.

GreenCloud[11] can be used to develop novel solutions in monitoring, resource allocation, workload scheduling as well as optimization of communication protocols and network infrastructures. It is released under the General Public License Agreement and is an extension of the well-known NS2 network simulator[11]

III. Cloud Monitoring & Management Tools:

Cloud monitoring and cloud service management tools allow cloud providers to ensure optimal performance, continuity and efficiency in virtualized, on-demand environments. Cloud monitoring tools, specifically, enable cloud providers to track the performance, continuity and security of all of the components that support service delivery: the hardware, software and services in the data center and throughout the network infrastructure.[14]

1.**AppDynamics**: Focused on application monitoring in the cloud. Founded in 2008 by CEO Jyoti Bansal, a Wily veteran.[9] Key features:
It monitors & manage critical cloud based applications. Analyze existing application dependencies. Manage business performance in real time .Optimize development, operations and infrastructure resources [14]

2. **Aternity**: Aternity monitors any application on any physical, virtual, or mobile device, providing a user-centric vantage point that closes the visibility gap existing with network- and server-centric application performance management tools. Aternity takes a comprehensive view toward end user service level management, measuring three components: application performance, device performance and end user productivity. [16]

3.**Boundary**: Former Nimsoft CEO Gary Read is running this startup. The company has been providing early warnings about cloud problems and outages over at Amazon Web Services and Windows Azure. Customers are impressed and rivals are taking note. The secret sauce: Boundary looks at aggregate cloud data from multiple customers, then determines if there are any red alerts in the data. [9]

4. **CA Nimsoft Monitor**: Nimsoft cut its teeth offering on-premises monitoring solutions for midsize MSPs. More recently, under CA's ownership, the platform allows customers and cloud services providers to monitor application instances in Amazon, Rackspace, Salesforce.com and other public clouds.[9]

5. **Compuware Gomez**: Compuware Gomez is the software as a service (SaaS) suite of solutions in the Compuware APM platform. It is used to optimize the performance and availability of your web, mobile, streaming and cloud applications. Gomez is the only SaaS APM solution that integrates real-user and synthetic monitoring, providing unparalleled insight into end-user experience. [15]

6.**LogicMonitor**: MSPs in particular should keep close tabs on this company. I've heard rumors about a major growth curve. CEO Kevin McGibben rolled out the business case to me during the IT Nation conference in November 2012. I was impressed with the conversation.[9]

7.**Monitis**: Keep a close eye on this company, which is owned by GFI Software. GFI has been building out a suite of SaaS products that allow MSPs to proactively manage and monitor customer environments, while also blending in storage and security solutions. Monitis brings cloud and web systems monitoring into that conversation.[9]

8. **NetEnrich**: Better known for its NOC (network operations center) services, NetEnrich offers closet-to-cloud services that include cloud monitoring and management for VARs and MSPs that need third-party assistance. [9]

9.**New Relic**: Well known for its end user experience monitoring but also an expert on application monitoring and server monitoring.[9]

10.**Cloudability:** Cloudability is a financial management tool for monitoring and analyzing all cloud expenses across an organization. It aggregates expenditures into reports, helps identify opportunities for reducing costs, offers budget alerts and recommendations via SMS and email, and provides APIs for connecting cloud billing and usage data to any business or financial system.[7]

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Evaluating the performance of failover cloud in heterogeneous nodes

Jasjit Kaur
Computer Science Department
Guru Nanak Dev University
Amritsar, India

Amandeep Kaur
Computer Science Department
Guru Nanak Dev University
Amritsar, India

Abstract— This paper presents an approach for achieving high availability to the loads of the web clients. In order to improve in response time of web services during topmost hour's dynamic allocation of host nodes is done. As web users are very challenging: they assume web services to be quickly reachable from the world 24*7. Fast response time clues to great accessibility of web services, while slow response time worsens the presentation of web services. As the internet is widely used everywhere, it becomes an important part of life. People use internet foe various activities such as studies, business, shopping and many more things. To achieve this objective MATLAB is used. The proposed strategy will act as middle layer and deliver highly availability to the web clients. The waiting time and the response time is evaluated which is then compared with the homogenous environment.

Index Terms— Failover, dynamic allocation, host service provider, High availability, Web Services.

I. INTRODUCTION

The Internet and World Wide Web (WWW) have caught the world's mind. Internet is characterized in network as a cloud. Cloud computing is where application and files are held on a cloud consisting of large number of computers and servers, all connected together and available via internet. Any web service or application offered via cloud computing is called a cloud service. With this simple but prevailing interface, a consumer can download a file after retrieving any web service from another computer with a single click of the mouse. Moreover, developments in knowledge continue to spread the functionality of the Internet. As Web services becomes progressively popular, network congestion and server overloading have becoming noteworthy problems.

In this paper for providing high availability to the requests of web clients a new environment is developed which is heterogeneous environment. In order to improve in response time of web services during topmost hour's dynamic allocation of host nodes is done. As web users are very challenging: they assume web services to be quickly reachable from the world 24*7. Fast response time clues to great accessibility of web services, while slow response time worsens the presentation of web services. As the internet is widely used everywhere, it becomes an important part of life. People use internet foe various activities such as studies, business, shopping and many more things.
To attain this objective MATLAB Technology.

II. RESEARCH MOTIVATION

The existing technique consider the homogeneous nodes for attaining high availability to the demands of the web clients. The heterogeneity of the nodes is neglected. This research work focus on providing high availability in cloud environment by using fail-over strategies for cloud data centers in case of heterogeneous nodes. Main emphasis is to use the methods which achieve high availability of failover cloud in the heterogeneous nodes. The heterogeneous nodes are used because in the existing scenario the servers are having their own capacity so based on this assumption the servers are considered as the heterogeneous. This work has been conducted in this paper.

III. Scope of this research

The existing method has considered the homogeneous environment for the evaluation of the nodes. But the real world scenario is different as the capacity of the servers is different. So based on this assumption the servers are considered as heterogeneous.
The scope of the research is defined by the following:

1. This dissertation deals with high availability for cloud computing environment.
2. This dissertation does not deal with management and security issue of cloud computing environment.
3. Since it is not feasible to run the proposed strategy on large web hosting, small web sites are developed which will simulate the proposed strategy.
4. Different type of tests will be implemented using MATLAB to test various aspects of web services.

5. Visualization of the experimental results and drawing appropriate performance analysis.
6. Appropriate conclusion will be made based upon performance analysis.
7. For future work suitable future directions will be drawn considering limitations of the exiting work.

IV. PROBLEM DEFINITION

The existing technique consider the homogeneous nodes for attaining high availability to the demands of the web clients. The heterogeneity of the nodes is neglected. This research work focus on providing high availability in cloud environment by using fail-over strategies for cloud data centers in case of heterogeneous nodes. Main emphasis is to use the methods which achieve high availability of failover cloud in the heterogeneous nodes. The heterogeneous nodes are used because in the existing scenario the servers are having their own capacity so based on this assumption the servers are considered as the heterogeneous. This work has been conducted in this paper.

V. LITERATURE REVIEW

Web services (WS) [1] [2] [3] are self-contained software modules available in a network, such as the internet, which completes tasks, solves problems, or conducts transactions on behalf of a user or application. It is trajectory of communicating between two electronic devices over the web. WS interact with the sources of the information, changing the state of systems and causing real world processes to occur. As a WS network grows, its existence and performance becomes crucial to the business's core activities. So the management of WS is important for providing seamless access of the service to the user.

Web server (WSer) [setting up a web server by simon Collins [5][6][7] delivers web services to the clients. Web server is connected to the web and can be accessed to the users. It is possible that user can setup its own web server. Web server can be connected to internet or it can be a private Intranet. Both require similar software, only Intranet works in a private network and internet connected to public internet. As the traffic on web server increases, congestion will increased which may results in low response time. So to reduce these problem concept of redirection is used.

Redirection (RD) [8][9] is the process of selecting the best server that can serve user request. Web server can redirect the browser to go elsewhere to proceed the user request. Redirection happens at client side. A client is redirected only after its request has reached the home server. When user request arrives, if there is congestion, the server can redirect the client to the other web page where same request to be processed.
Redirection of a client towards a given replica of a Web service is performed after the client's request has reached the Web server storing the requested service. To improve the overall systems throughout, redirection takes place. This one of the most common use is to route traffic while migrating a web page from one server to another.

Proxy Server (PS) [10][11][12]function is to forward traffic between clients and server. High availability (HA) [13], [14] also known as failover. The key to HA be redundancy is the most common approach to increase availability. If the primary fails, one of the back-ups is promoted into that role. HA ensures automated recovery in case of failure with two different approach 1+1 and 1:1. Over the time, the file management systems and registered data became complex, and database management systems were increasingly used to store metadata. It is often said that this generation of web services got it start from LAMP. LAMP is a stack of simple web technologies, powerful web technologies that power a lot of popular. LAMP is a popular open source solution used to run servers in which PHP is configured to run on Apache web server, using the MySQL database on Linux operating system. It is popular because of its open source nature, low cost, and its packages are easy to install and convenient to use[15] [16] [17][18].

Availability [19], [20], [21] is a reoccurring and a growing concern in software intensive systems. Cloud systems services can be turned off-line due to conservation, power outages or possible denial of service invasions. Fundamentally, its role is to determine the time that the system is up and running correctly; the length of time between failures and the length of time needed to resume operation after a failure. Availability needs to be analysed through the use of presence information, forecasting usage patterns and dynamic resource scaling.

Kaur, K. et al. [22] has presented a methodology for attaining high availability to the demands of the web clients. In order to improve in response time of web services during peak hour's dynamic allocation of host nodes had been used. As web users are very demanding: they expect web services to be quickly accessible from the world 24*7. Fast response time leads to high availability of web services, while slow response time degrades the performance of web services. With the increasing trend of internet, it becomes a part of life. People use internet to help in their studies, business, shopping and many more things. To achieve this objective LAMP platform is used which are Linux, Apache, MySQL, and PHP. LAMP is used to increase the quality of product by using open source software. This strategy works as middle layer and provide highly availability to the web clients. And this is the base paper for my dissertation work.

A.Chhabra et al [23] presented a methodology for providing high availability to the demands of cloud's clients. To attain this objective, failover stratagems for cloud computing using integrated checkpointing algorithms has been proposed. Purposed strategy integrate checkpointing feature

with load balancing algorithms and also make multilevel checkpoint to decrease checkpointing overheads. For implementation of purposed failover strategies, a cloud simulation environment is developed, which has the ability to provide high availability to clients in case of failure/recovery of service nodes. The primary objective of this is to improve the checkpoint efficiency and prevent checkpointing from becoming the bottleneck of cloud data centers. In order to find an efficient checkpoint interval, checkpointing overheads has also considered. The purposed failover strategy works on application layer and provide highly availability for Platform as a Service (PaaS) feature of cloud computing.

VI. EXPERIMENTAL SET-UP

In order to implement the fail-over strategy a suitable experimental set-up has been made as shown in Fig. 1. Fig. 1 take following steps to execute the jobs of the clients:

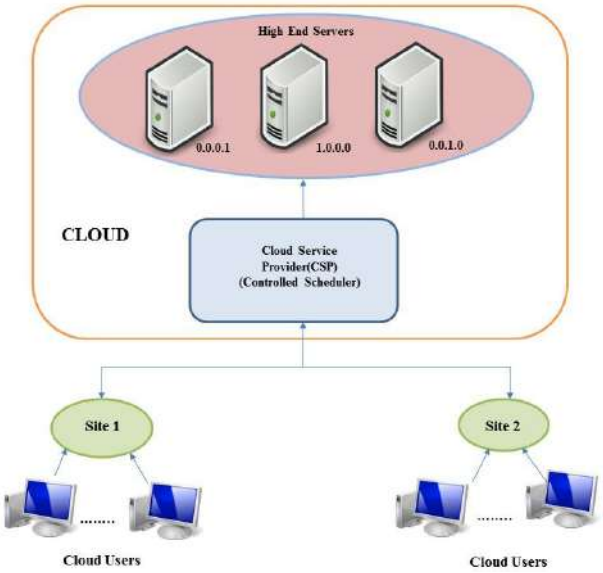

Figure1: Experimental Setup

In Figure following steps are performed:
Step 1: Initially all the high end servers are initiated depending upon their capacity.
Step 2: The priorities are assigned to the high end servers depending upon their capacities.
Step 3: The cloud users send the request to their respective sites.
Step 4: The Cloud service Provider (CSP) select the server having high priority to handle the client's request.
Step 5: Policies are implemented in such a way that the client's requests are automatically redirected to the other servers.
Step 6: Client's request is fulfilled with high availability with low response time.

VIII. PERFORMANCE ANALYSIS

In order to do performance analysis, two comparisons table has been made in this research work. This section first give the performance comparison of developed simulator with existing methods (in which homogeneous nodes are considered) and later on comparison of different approaches is made using different performance metrics.

A. Comparison with existing methods

Table 1 is showing the comparison of existing and developed technique. Table 1 has shown that the developed simulator will give better results than the existing methods. As the existing method do not provide feature of the heterogeneity, therefore different nodes having different capacity cannot be considered in the existing method. But the feature of heterogeneity improves the availability of the nodes in the real scenario.

Table 1: Feature's Comparison with existing method

Features	**Existing Method**	**Heterogeneous Method**
Log files	Yes	No
Failover	Yes	Yes
Load Balancing	Yes	Yes
Race Condition	No	No
Dynamic Allocation	Yes	Yes
Architecture	3 Tier	3 Tier
Utilization of host nodes	Maximum	Maximum
Average response time	Low	Low
Waiting jobs	Minimum	Minimum
Heterogeneity	No	Yes

B. Comparison using the waiting time

Waiting time is the time for which the process has been waiting in the ready queue, i.e. waiting for the turn to get it processes. Table 2 gives the waiting time in seconds and gives the comparison of the homogeneous system with the heterogeneous nodes.

Table 2: Waiting time comparison with existing method

Interval	Homogeneous System(time in Sec)	Heterogeneous System(time in Sec)
50	40	35
100	85	93
150	130	127
200	179	172
250	218	214

The figure 2 gives the graphical representation of the waiting time of both the methods.

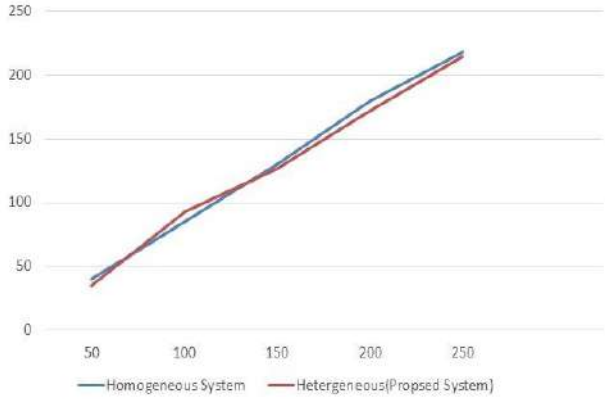

Figure2: Waiting time comparison

C. Response time

Response time is the amount of time it takes to get its first response after the job has been submitted.
Table 3 gives the response time in seconds and gives the comparison of the homogeneous system with the heterogeneous nodes.

Table 3: Response time comparison with existing method

Interval	Homogeneous System(time in sec)	Heterogeneous System(time in sec)
50	0.0773	0.1250
100	0.0738	0.0699
150	0.0722	0.0692
200	0.0839	0.0089
250	0.0224	0.0105
300	0.0986	0.0656

The figure 3 gives the graphical representation of the response time of both the methods.

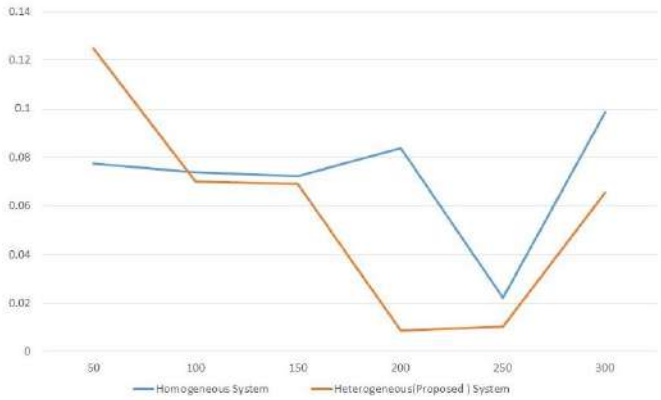

Figure 3: Response time comparison

IX. CONCLUSION AND FUTURE DIRECTIONS

In this paper, a new environment has been developed that implement the proposed method. Performance comparison of existing methods has been made with the proposed method. It has been concluded with the help of performance metric's comparison that the proposed strategy gives good results than existing methods in case of response time. However in case of waiting time, the results of homogeneous environment are better than the heterogeneous in some of the intervals.
In future work, the transmission cost from the various sites can be evaluated and the methods can be proposed for the reduction of the cost.

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The Age of Intelligent Machine with the Science of Arts

Rakhi Mahaja
Assistant Professor
DAV College, Amritsar.

Monika Mahajan
Student MCA
GNDU, Amritsar

Abstract- The computer technology is now having major impact in all fields, including creative arts. While the visual arts are just beginning to feel the impact of advances in computer graphics and imaging technologies. AI and Arts emphasize its prime goal concerning symbolic representation and explanation of the world. This opens up an interdisciplinary research area to analyze how they can learn from each other. Intelligent machines are expected to boost the artist's range of possible techniques and insights. However it is no easy task, to imitate the creative process and have acceptance of the humankind alongside. Despite of their differences, we can observe some significant similarities which offer the potential of bringing together diverse fields.

Keywords - AI and Arts, Music, Digital Art, Theatre and Drama, Automatic Poetry, Cybernetic Sculptures, Fashion design.

I. INTRODUCTION

AI can be described as branch of computer science dealing with the simulation of machine exhibiting intelligent behavior .A machines that learn new concepts, machines that can reason, machines that perceive or interpret the world around us, and machines which perform several other types of tasks that require human-like intellect.Human behavior is affected both by genetic inheritance and by experience. Humanity is constantly influenced by literature, culture, drama, social roles, gender, philosophy, beliefs and values, and many other disciplines identified by social experts and artists worldwide. As we speculate, AI is an area of study into the nature of being human and of intelligence in the biological world. This simply implies, confining it in merely technical boundaries is unjustified and shall prove to be underutilized. Art encompasses a diverse range of activities, creations, and modes of expression, including music, literature, film, sculpture, paintings or building of any other tangible representations of some facet of the humankind. The simulation of human information processing outside of narrow realms, and the creation of machine partners which interest and satisfy humans, will depend on sophisticated artistic and psychological design choices as well [1]. Artificial intelligence methods open up new possibilities in art and entertainment, enabling rich and deeply interactive experiences [2]. Given remarkable advancement in hardware and software tools, and our improved understanding of Homo sapiens, we are on the threshold of witnessing an altogether new horizon of exciting aesthetic innovations.

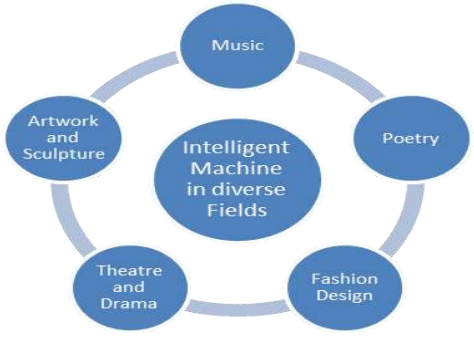

Figure 1: Intelligent Machines in diverse fields

Technology and its allied cultural framework are prime factors that shape the today's world. Also artists of contemporary times aspire to get along

with the emerging technologies to showcase their ingenuity, vision and to nurture their passion. In fact they consider it inevitable to progress in arts and humanities. Ahead is the study of some of such disciplines.

II.MUSIC

Composers have started borrowing system of organization and automation from disciplines outside the musical realm. AI seeks ways to embody knowledge in machines. There are musical based expert systems who intend to emulate the approach of human practitioners. Creative ideas for a composition can be provided by a musician and subsequently allow the computer to do the rest of the work using intelligent systems with enormous knowledge database about the music composition process.

CHORAL, an expert system has been designed by Kemal Ebcioglu for harmonization of four-part chorales in the style of J.S. Bach [3] The system contains about 350 rules in a form of first order predicate calculus. The rules represent musical knowledge from multiple viewpoints of the chorale, such as chord skeleton, the melodic lines of the individual parts, and alike. The program harmonizes chorale melodies using a generate- and-test method with intelligent backtracking. A substantial number of heuristics are used for biasing the search toward musical solutions.

Mathis Lothe [4] in his paper has presented the process of composition which consists of the subtasks planning of macrostructure, construction of melody and rhythm, variation of melodic motives, and addition of bass and middle voices. A knowledge-based approach with strategies and results for note by note construction of melody and methods for melody variation has been used. Cybernetic Composer[5], developed by Charles Ames and Michael Domino is a program that composes entire pieces automatically. For example, once the melody and rhythm is written by musician and software can generate the harmonic progression, the drum accompaniment, the walking bass line etc.

A generic model for musical based intelligent support system can be depicted as below.

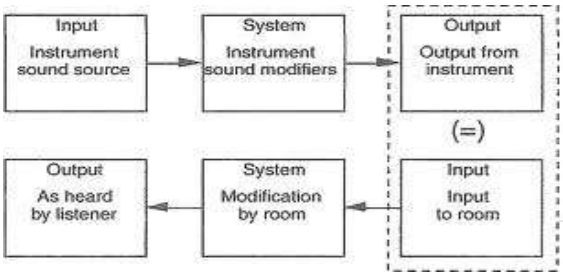

Figure 2: Model of musical based system

III. THEATRE AND DRAMA

Theatre is a branch of the performing arts where live performers dramatize an act within predetermined context and story. How can artificial intelligence be used in the theater and drama? In this field, computers are given the power to sense, reason, and control what is happening on the stage so as to construct substantial feedback through media. The space that holds the performance becomes an environment generated from behaviors of the computer, responding to and shaped by performers, designers, and technicians. These computer behaviors are created through speech and movement, light and sound, music and visuals [6].

Traditional user interface design begins with task analysis in which the designers anticipate all the tasks

that a user will need to accomplish within a specific context [7]. Computer's factual database must include the structure of a performance, real world knowledge of production techniques and contextual responses. Additionally for many plots (e.g. domestic dramas in which the plot centers around relationships, trust, betrayal, infidelity, and self-deception), language is necessary to communicate the plot. In order to convey the formal constraints provided by the plot, the characters must have a rich repertoire of dialog available[2].

A dynamic field of research 'Intelligent Stage' undertaken at the Institute for Studies in the Arts (ISA) is an inspiring example of AI in arts. It is a performance space that responds to the actions of artists as they move or speak, allowing them to

control theatrical elements such as sound, lighting, robotics, graphics, and video through cameras, microphones, photo electric detectors, switches and other types of sensors.

Facade[2] is an AI-based art piece, an interactive drama which is an interesting virtual world inhabited by computer-controlled characters, within which the player experiences a story from a first person perspective. The function of interactive characters is primarily to communicate material and formal constraints. That is, the player should be able to understand why characters take the actions they do, and how these actions relate to the plot. Such kinds of smart real time environments will enhance the expressive aptitude of conventional theater in various ways. They can be utilized to control the equipments backstage, enact with live-performers on stage, assist in production and script writing and alike.

IV. POETRY

Automated poetry generation has called upon itself a certain amount of attention in recent years. Artificial programs can indeed generate texts that are asserted poetic. The driving principle behind this task is to take the human process of poetry writing as a reference from which to extract the insights that drive the creativity. In order to model completely the human creative process of poem composition two issues would have to be tackled: generation or selection of a message (or concept) for the poem, and the production of a specific aesthetically pleasing form for that message[8]. Automatic Spanish Poetry Expert and Rewriting Application (ASPERA), a forward reasoning rule-based system is a prose-to-poetry semiautomatic translator. By ingenious use of well accepted AI techniques (NLP, case based reasoning, knowledge based systems), the application obtains from the user a prose description of the intended message and a rough description of the type of poem required (length, mood, topic); selects appropriate metric structure and stanza (by resorting to a knowledge base on literary style), generates a draft of the poem (by applying CBR techniques to a database of previous poems); requests modification or validation by the user; and updates its own database of information[9].

Raymond Kurzweil, a name synonymous with the potential of machine intelligence, also designed a program that reads selection of poems, analyzed them, creates a language model, and then applies them to create its own original poetry of similar style. The Ray Kurzweil Cybernetic Poet (RKCP) uses algorithms similar to neural networks to review poetry of a specific form or multiple styles and compose its own original poems. New poems are based on word structures, sequence patterns, rhythms, and the overall poem structure. If a given set of constraints fail to create the one, it eases the constraints and recursively write the section of poem again.

A general algorithm for Prose-to-poetry generation can be described as under.

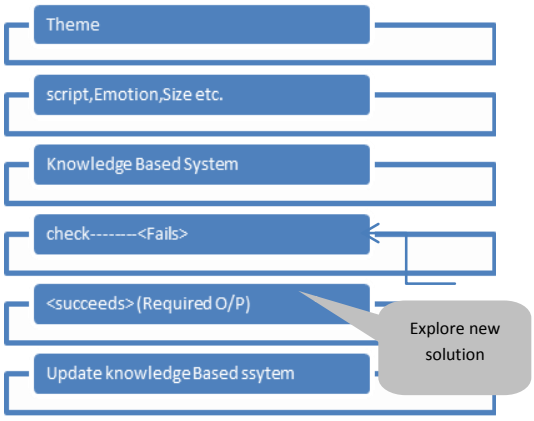

Figure 3: A generic Prose-to-Poetry generation algoriothm

V. ARTWORK

AI systems as symbolic manipulators are attractive contenders for producing and analyzing artworks. Art making and viewing are processes where typically rational and mechanical aspects interact with aesthetic and cognitive criteria[10]. Digital art intends to get members of the traditional arts community into making contact with Interactive Art and discover their views on the new platform. Computer may serve the artist as a creative partner to facilitate divergent

visual solutions and realize the products of imagination — and hence to function as an extension of the artist's mind[11]. To enhance an artist's capabilities for engaging in the creative process, intelligent programs are used that function as artist's mirror of the self.

Aaron, the first robot artist that creates original paintings is the brainchild of Harold Cohen, the British painter and computer scientist. Aaron is capable of generating virtually unlimited supply of unique pieces of art, derived from the factual knowledge and experience of its human counterpart. The program draws autonomously, relying on its own knowledge, using a branching structure of rules (about picture making) and feedback paths that guide it how to proceed. Aaron guides and leads the computer automatically to generate images with a plotter onto paper without the need for human intervention. Robot makes line drawings, blends colors, executes painting strokes, and even wipes the brushes. It is undoubtedly a creative partner that enhances artists' physical and imaginative capabilities.

VI. CYBERNETIC SCULPTURES

With the ceaseless evolution of aesthetic relationship between humans and their computer counterparts, the job of an artist is not any more just the creation of a piece, but the creation of creation. Manufacturing companies into sculpture making are now enthusiastically employing robots programmed with specialized software solutions, powered by reverse engineering packages and tool path generation schemes. This non- trivial job of art-making is now accomplished in a tiny proportion of the time and cost which earlier would have required an army of designers and sculptors' months of manual handicraft. The intelligent machine can accept data from a computer-generated file or from an actual model, offering a drastically low production cost all along.

Moreover until now, a fine art entity has been a self-contained and limited resource of information: once the art-piece is crafted, it can only convey its own presence. Cybernetic Sculptures, quite unusual of the traditional art, interact with their environment and can change behaviors based on feedback from infrared sensors, the presence of the participant/viewers in the exhibition and the communication between each separate sculpture. *Autopoiesis*[12] installation at the Kiasma Museum in Helsinki Finland is a best known works of Ken Renaldo in this field. A series of robotic sculptures talk with each other through a computer network and audible telephone tones, which are a musical language for the group. The interactivity engages the viewer/participant who in turn, effects the system's evolution and emergence. This creates a system evolution as well as an overall group sculptural aesthetic.

VII. FASHION DESIGN

Fashion and textile design is presumed to be a matter of inspiration, depending mostly upon designer's skill and creativity. At present times, fashion retailing business has been quite revolutionized and even more competitive. The field is fairly influenced by intelligent support systems that allow the designers to turn their typically incomplete, inconsistent and inaccurate specification of designs into a correct representation of their ideas, thus reducing the interpretation by technicians as well as the design time. This can be achieved by automatically creating design solution suggestions based on the designers' customary specifications[13].

In this customer oriented industry, focus on customers' sensibilities and preferences is an important marketing strategy. Smart user interface tools exist to suggest textile designs according to the clients' needs. Feedback of the recommended design is also included that matches the user's inclination by using visual fine- tuning tools. Various models exist that analyze the process of human psychological perceptions of clothing-related sensations and comfort to develop an intellectual understanding of and methodology for predicting clothing comfort performance from fabric physical properties. By combining the strengths of statistics (data reduction and information summation), a neural network (self-learning ability), and fuzzy logic (fuzzy reasoning ability), hybrid models are developed to simulate different stages of the perception process[14].

AI based systems carry great potential in providing customized design structures to set up fashion E-retail and decision support systems. It can be positively employed for product design, accessories selection, inspecting clothing comfort, quality control and promotion of fashion products.

VIII. CHALLENGES

Present-day intelligent machines have achieved some level of success in tricking human judges in its artistic
capabilities. Yet there is a long way to go. Future research in AI needs to devise patterns that go beyond technical precision by conveying human texture in interactions such as sentiments, personality, temperament, wit, growth, style, warmth and alike. Evaluating creativity is another domain of research to deal with the artifacts' inherent complex nature and the type of input knowledge required. It is challenging to design creative content and entertaining experiences by artificial machines. Artists can train themselves and play a part in the core task, than mere being spectators. Nevertheless, it is equally likely that the mainstream art world will refrain from approving new technologies. The arguments behind are fear of ease of replication, question of artists' own ingenuity, lack of appreciation and deviation from host culture. Despite causalities, Art reinvented from all these perspectives will continue to coexist (not to compete) and flourish.

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Software Reusability w.r.t Object oriented Technology in Critical Systems

Nisha
Assistant Professor
Department of Computer Science and Engineering
Amritsar college of Engineering and Technology
Email id- Nisha.csegndu@gmail.com

Harpreet Kaur Singhera
Assistant Professor
Department of Computer Science and Engineering
Amritsar college of Engineering and Technology
Email id- preetsanghera9@gmail.com

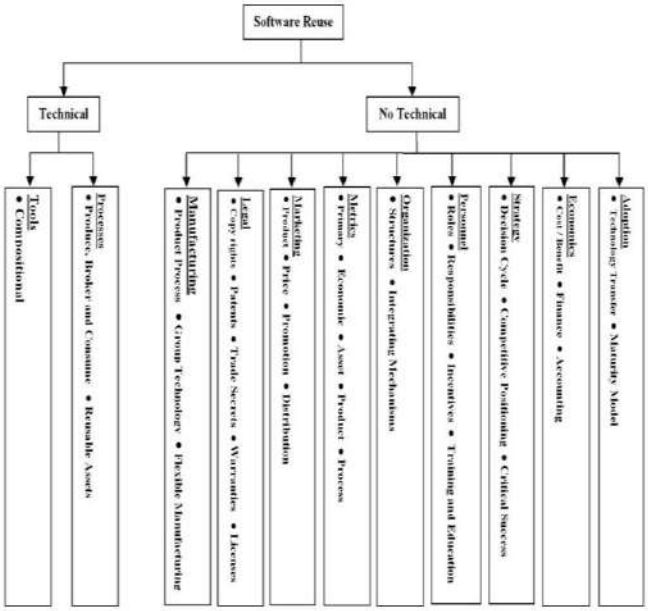
Harpreet Kaur
Assistant Professor
Department of Computer Science and Engineering
Amritsar college of Engineering and Technology
Email Id-harpreet71230@gmail.com

Abstract--:
Software reuse has been touted as a potential solution for reducing the complexity, cost, and time of software development. In recent years, large sectors of the software development industry have moved from the procedural style of software development to an object-oriented style. Safety-critical software developers have largely resisted this trend because of concerns about verifiability of object-oriented systems. However, there are several concerns with the reuse of software in safety-critical systems. This paper will explore some of the key reuse topics and identify safety concerns.

KEYWARDS *- Software reuse, Software salvaging, OOT, OOD, OOP, OOT/V*

1. INTRODUCTION

A safety-critical system is a computer, electronic, or electromechanical system whose failure may cause injury or Loss of human life. In a safety-critical system, a "failure" may include the failure of a system to perform its intended function, a failure to warn the operator of an unsafe condition, or a failure to display correct data [1]. Examples of safety-critical systems include aircraft control systems, medical equipment, and nuclear power station control systems.
The use of computers in safety-critical systems is increasing at a rapid rate [1, 2].
Development of software in safety-critical systems can be both costly and time consuming. Not only is effective software management needed to reduce time and cost, but also available software technologies should be investigated. Software reuse is one technical approach that many believe can reduce software development time and cost [3]. However, experience makes it clear that reuse is not always entirely safe.



2. SAFETY CRITICAL SYSTEMS AND SOFTWARE

"A system where human safety is dependent on the correct operation of the system."

Those types of software's are known as safety critical software. In a similar theme and considering software specifically, states that safety critical Software's are those "software that relates to the safety critical function or system, i.e. Software of the highest safety integrity level, the failure of which could cause the highest risk to human life" [22]. Points out though that safety must always be considered with respect to the whole system (i.e. Safety is a system issue). Thus in addition to the software, the computer hardware, other electronic and electrical hardware, mechanical hardware, developers, operators and users must also be considered [22].

While on the topic of definitions, it is also worth considering the terms safety and reliability. Points out that safety are not reliability. A reliable system does not fail very often, but if it

does fail it makes no guarantees about what will happen. On the other hand, a safe system can fail frequently, even though this is probably undesirable, but provided that it fails in a safe way, the system is still safe.

When developing systems that have a potential to impact upon safety, software or otherwise, describes a number of questions that should be addressed through the development of the system. The answers to these questions should be documented as part of the safety case for the system [22].

These are as follows.

- Can it present hazards to safety?
- What can be done to reduce the hazards to an acceptable level?
- How can it be verified that the developed system is safe?

3. APPROACHES OF SOFTWARE REUSE IN SAFETY-CRITICAL SYSTEM

Many discussions and forums are being read for getting approaches. Here we are concluding all the discussions.
"If you ask five programmers what reuse is, you'll get eight answers". He points out that software reuse and software salvaging are different. "Software reuse is software that was designed to be reused" and software salvaging is "using software that was not designed to be reused" [3].

One of the major purposes of developing software components is to develop a component library. The library stores reusable assets and serves as a primary reuse distribution mechanism. The library should be selected because it provides applications engineers with the following minimum set of user-oriented capabilities [4].

Even though the concept of software reuse seems simple in theory, implementing that concept into reality is quite complex. The discipline of software reuse is evolving and is still quite immature. While reuse promises many benefits, it is difficult to actually implement. These approaches and research efforts provide a toolbox from which software developers can plan their reuse effort. Each software organization will have to decide which approaches most appropriately meet their needs. Software organization will have to decide which approaches most appropriately meet their needs [5]. The following approaches and concepts will be discussed in this section:

- Plan for Reuse
- Domain Engineering
- Software Components
- Object-Oriented Technology (OOT)
- Portability
- Product Service History

4. VERIFICATION AND VALIDATION OF SAFETY CRITICAL SOFTWARE

This fact has inherently wider implications that may seem obvious and as such it is worth dedicating this section to discussing support tools and their roles. Firstly though, a couple of definitions.

Static analysis: is the analysis of source code before it is executed. Techniques include control flow Analysis, data flow analysis, symbolic execution, and checking the source code against a formal Mathematical specification. [22] Suggests that by using a combination of static analysis techniques, a variety of properties can be guaranteed about a program. An example of a well-known tool that performs such analysis is the SPARK Examiner (for Ada).

Dynamic testing: involves the execution of the source code against numerous test cases at various levels of integration (ie. from the smallest routine, up to the system as a whole). Because software is complex, it is impossible to be able to execute test cases for all possible inputs and outputs. Thus techniques such as equivalence partitioning, boundary value analysis and structural testing are applied to give specified levels of dynamic test coverage. An example of a tool that supports dynamic testing and coverage analysis is Cantata++ (for C++).

5. OBJECT-ORIENTED TECHNOLOGY IN SAFETY-CRITICAL SYSTEMS

OOT is appealing because of the number of available tools, the emphasis on reuse, and the appeal to software designers. It is touted as a technology that saves money, improves quality, and saves time [6].

However, to date, few safety-critical computer systems have implemented OOT. Safety-critical designers tend to use proven technologies and, as a result lag, a few years behind the mainstream designers of non-safety software. Since

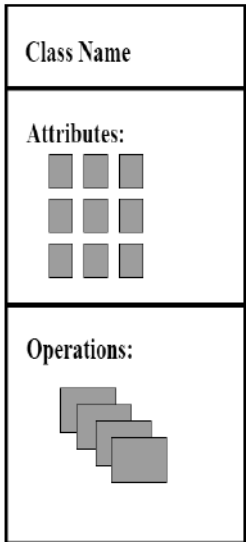


Fig – II Object oriented class

OOT has proven to be cost-effective and technically sound for many projects, manufacturers of safety-critical systems are now considering its use [7].

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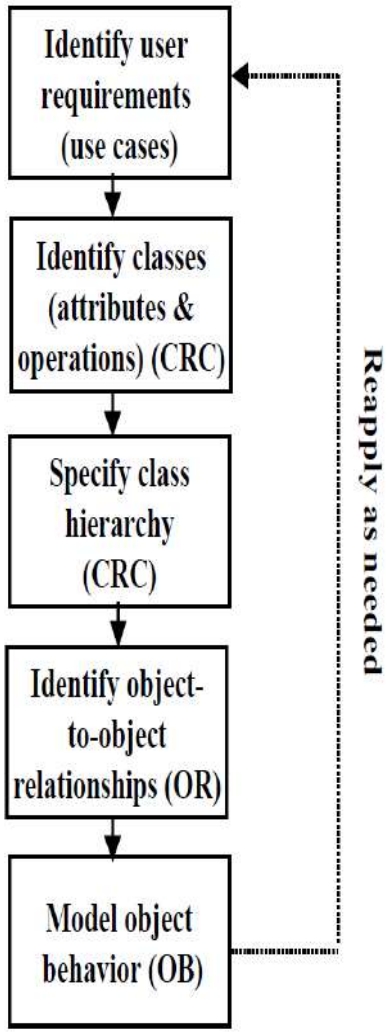


5.1 OBJECT ORIENTED TECHNOLOGY (OOT) METHODOLOGY

OOT methodology works in four phases and these phases are:-

- OOA
- OOD
- OOP
- OOV/T

OOA Stands for object oriented analysis; this is the process of defining all classes that are relevant to solve the problem and the relationships and behavior associated with them [8].

OOD Stands for object oriented design; this transforms the OOA into a blueprint for software construction. Four layers of design are usually defined: subsystem layer, class and object layer, message layer, and responsibilities layer [9].

Fig-III OOA Tasks

OOP Stands for object oriented programming; this is the coding phase of the design project, using an object-oriented (OO) language. There are dozens of OO languages. Three of the most well known are C++, Smalltalk, and Java.

OOV/T Stands for object oriented verification/testing; this is the process of detecting errors and verifying correctness of the OOA, OOD, and OOP. OOV/T includes reviews, analyses, and tests of the software design and implementation. OOV/T requires slightly different strategies and tactics than the traditional structured approach [10].

6. AN OBJECT ORIENTED EXAMPLE IN CRITICAL SYSTEMS

While, we have heard it claiming that object oriented technology is not useful in most safety-critical software. While there may be some systems for which object technology has little to offer, there are many others could benefit from object technology provided that safety concerns can be addressed[23].

As a working example for the purposes of this paper, consider a glass-cockpit flight instrument display with the following requirements:

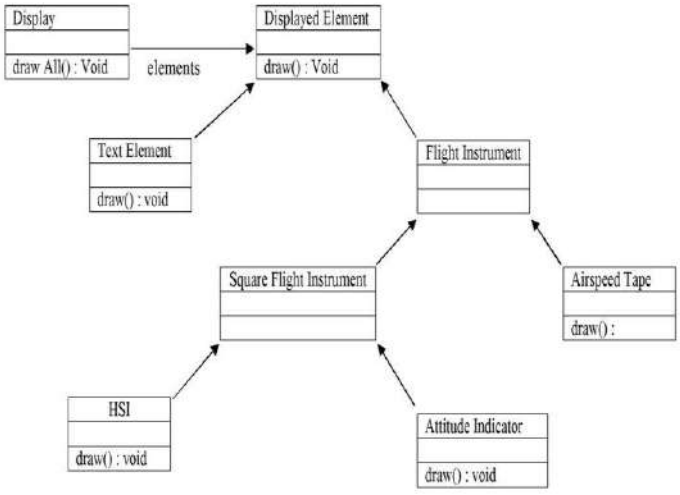
- A number of flight instruments (e.g. Airspeed indicator, altimeter, horizontal situation indicator) are to be displayed on a single screen.
- The details of which instrument is displayed in which position should not be fixed in the software but should be easy to change. This will allow a family of systems to use the same software and also provide for a limited amount of installation-time or in-flight customization (e.g. a choice of presentation, or a choice between two

different instruments that convey the same information).

- There may be other information (textual information, alarms etc.) To be displayed on the screen.

To the object-oriented design engineer, there is a natural inheritance hierarchy in this description. At the root is an abstract class representing any self-contained displayed entity, which we will name *DisplayedElement*. Inheriting from this we might have a concrete class *TextElement* and another class *FlightInstrument*.Concrete classes such as *AirspeedIndicator* will be derived from *FlightInstrument*.

The complete glass-cockpit display can be represented by another class *Display* whose data comprises a collection of objects derived from *DisplayedElement*, each associated with the corresponding screen coordinates. To initialize the screen, we provide a method *drawAll* that iterates through the collection, drawing each object. The architecture described above provides the flexibility we need in that any sort of *DisplayedElement* can occur at any position in the collection. Furthermore, if we wish to add a completely new type of flight instrument to this design, we need only define a corresponding class derived from *FlightInstrument* and provide a means to store an instance of this class in the collection. This example provides several opportunities for re-use. The application framework (comprising the class representing the collection of instruments and associated scheduling of draw operations) can be re-used for different displays with widely differing selections of flight instruments. The flight instrument classes could likewise be re-used with a different framework [23].



system

7. C++ & SAFETY

A lot of forums you can see when you search for C++ and security. Some of discussions from those forums has attracted the world wide object oriented languages users to comments on and review [11].

A web-site discussion entitled "Moderated Discussion on C++ and Safety" led by Brian Wichmann generated a lot of discussion on this topic. This discussion attracted world-wide input about C++ applicability to safety-critical projects [13]. The discussion demonstrated how controversial the use of C++ is for safety-critical applications [11].

Wichmann began the discussion with this thought: "Although the major problem with safety-critical software is getting the requirements correct, the impact of the language is significant. The main problems I see with C++ arise from its 'high-level' nature [13]. For instance, it is hard to show that there is no storage leak or bound the storage requirements statically. Another problem is that in several cases, the order in which an execution is performed is not defined, making it effectively impossible to guarantee predictable execution". The discussion to Wichmann's question goes on for eight pages [13]. Some of the more enlightening and relevant discussions are included below in order to illustrate the controversy of this subject.

Peter Fenelon stated the following regarding sub-sets of C++: I'd be highly reluctant to see C++ in any safety-related or critical environment. By the time "unsafe" or "difficult" features are ruled out -- I'm referring particularly to exception handling, the use of templates and Standard Template Library (STL), multiple inheritance, and so on -- what's left isn't much more than ANSI C (a language I have far fewer quibbles with, if sensible guidelines are followed)"[11,12].

Additional concerns regarding the use of C++ in safety-critical systems are listed below:

- Built-in functions
- Run-time bugs
- Constructors and destructors
- Hidden fields.
- Overloading function names
- Multiple inheritances

8. OOT and REUSE

One of the main reasons for the industry's move to OOT has been reuse in depth. The OOA and OOD process helps designers break complex software systems into manageable pieces (i.e. classes and objects) this makes the design process less complex and more manageable which makes designers process less complex and more manageable where there pieces are clearly defined they are easy to be implemented and which are more likely to be used for future times. For example, code generators can be developed from OO models, making the generation of code more accurate and more easily reused [14].

9. USE OF OOT IN SAFETY-CRITICAL SOFTWARES

When we are talking about OOT and safety critical software we have to consider these issues [15]

- Planning

- Traceability.
- Target Compatibility
- Structural Coverage
- Dead/Deactivated Code.
- Verification/Testing
- Overuse of Inheritance
- Ambiguity
- Coding Issues
- Library Dependence

10. CONCLUSION

Software is becoming more dominant in safety-critical systems. In order to reduce the complexity, cost, and time of software development, many manufacturers are looking for ways to reuse software.
This paper has taken a big picture look at software in safety-critical systems and identified some areas of concern. Software components and object-oriented technology in safety-critical systems was explored in some detail to determine issues with such approaches.

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A Review of Vehicular Ad Hoc Networks (VANETs), Applications, Challenges, Attacks and Security Measures

Harpreet Singh
Student, Dept. of CSE
Amritsar College of Engineering and Technology,
PTU, Jalandhar, Punjab
harpreetmoda@ymail.com

Govind Sood
Student, Dept. of CSE
Amritsar College of Engineering and Technology,
PTU, Jalandhar, Punjab
aryanprincesood@gmail.com

Dr. Tanu Preet Singh
Professor and HOD, Dept. of ECE
Amritsar College of Engineering and Technology,
PTU, Jalandhar, Punjab
tanupreet.singh@gmail.com

ABSTRACT *-**There has been noteworthy progress in the field of vehicular ad hoc networks over the last several existences. VANETs consist of vehicle to vehicle and vehicle to infrastructure communications based on wireless local area network technology. VANET is an emerging new technology integrating Ad Hoc network wireless LAN and cellular technology to achieve intelligent inter vehicle communication and perk up road traffic safety and efficiency. VANETS are distinguished from other kinds of Ad Hoc networks by their hybrid network architectures node movement characteristics and new application scenarios. This paper gives an overview of the field providing applications and their requirements, goals and challenges, various kinds of attacks and the security measures.***

General Terms—VANETs, Authentication, Repudiation.

1. Introduction

Vehicular Ad Hoc networks are emerging new technologies to integrate the capability of new generation wireless networks to vehicles. The idea is to provide:

- Connectivity on the road to mobile users
- Efficient vehicle to vehicle communications that enable the intelligent transportation system (ITS).

Therefore vehicular Ad Hoc networks are also called inter vehicle communications (IVC) or vehicle to vehicle communications (V2V).

In the last few years we have seen a large increase in research and development in this area. Several factors have led to this development including the utilization of IEEE 802.11 [1] technologies, manufacturing of vehicles to address the safety, environmental and comfort issues of their vehicles. Although cellular networks enable convenient voice communication and simple infotainment services to drivers and passengers, they are not well suited for certain direct vehicle to vehicle and vehicle to infrastructure communications. However, vehicular Ad Hoc networks which offers direct communications between vehicles and to and from roadside units (RSU's) can send and receive hazard warnings and information on the current traffic situations with minimal delay.

The main goals of inter vehicular communication are to increase road safety and transportation efficiency as well as to decrease the impact of transportation on the environment. Due to the importance of these goals for both the individual and the nation, various projects are underway or recently were completed and several consortia were setup to explore the potential of VANETs.

In this paper we present the overview on the communication and networking aspects of vehicular Ad Hoc networks. We first look more closely at the applications and their requirements with respect to communication platform then we present the specific challenges in designing of vehicular Ad Hoc networks. After the section on challenges and the various requirements we concentrate on the assets to meet the challenges, various kinds of attacks and the security measures that needs to be taken for security in VANETs.

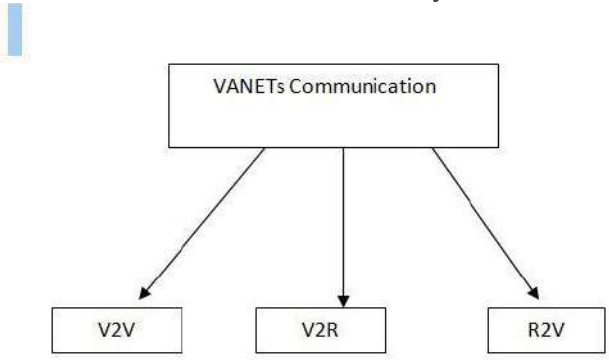

Fig.1 VANETs Classification

2. VANETs Applications And Their Requirements

Extensive list of potential applications were compiled by the various projects and consortia. Typically, applications are

categorized as safety applications and non safety applications, transport efficiency and information/ entertainment applications. Examples for each category are:

- Cooperative forward collision warning to avoid rear end collisions.
- Traffic light optimal speed advisory for assisting the driver to drive during a green phase.
- Road navigation and mobile infotainment.
- Traffic information.

Application were analyzed as to whether their requirements can be satisfied and whether they will provide the beneficial impact on the requirement side a prominent factor is the required penetration rate i.e. the percentage of vehicles having VANETs technology compared to the vehicle population. Applications are also assessed with respect to the levels they increased safety or transport efficiency or serve desired information.

For safety related applications, the vehicle safety communications (VSC) consortium identified eight high potential applications [2]:

- Traffic signal violation warning.
- Curve speed warning.
- Emergency electronic brake light.
- Pre crash sensing.
- Cooperative forward collision warning.
- Left turn assistant.
- Lane change warning.
- Stop sign movement assistant.

The technical requirements show the importance of one hop broadcast communication which means a vehicle simply transmit the package and every vehicle that is able to get the data is directly considered a one hop neighbor. One hop broadcast communication is further of two types: Event driven and periodic. Event driven messages are sent when a hazardous situation is detected. Periodic messages inform neighboring vehicles about the status, for example the position of sending vehicle. The VSC suggests that periodic one-hop broadcasts that are required, for example, with forward collision warning, require a frequency of 10 messages per second, with a maximum latency of 100 ms and a minimum range of 150 meters. In the meantime, studies show that in dense vehicular traffic scenarios, these periodic messages can overload the available radio channel. Thus, adaptive transmit power and rate control mechanisms are required as discussed below. For transportation efficiency applications, the Car-to-Car Communication Consortium [3] analyzed exemplarily enhanced route guidance and navigation, green light optimal speed advisory, and lane merging assistants. Whereas for the first two applications, roadside infrastructure is considered a prerequisite, the lane merging assistant is assumed to be based on vehicle-to-vehicle communication.

ITS is the major application of VANETs. ITS includes a variety of applications such as co-operative traffic monitoring, control of traffic flows, blind crossing, prevention of collisions, nearby information services, and real-time detour routes computation. Another important application for VANETs is providing Internet connectivity to vehicular nodes while on the move, so the users can download music, send emails, or play back-seat passenger games.

3. MAIN CHALLENGES OF VANETS

- **Distributed control:**

A central challenge of VANETs is that no communication coordinator can be assumed. Although some applications likely will involve infrastructure (e.g., traffic signal violation warning, toll collection), several applications will be expected to function reliably using decentralized communications. Because no central coordination or handshaking protocol can be assumed, and given that many applications will be broadcasting information of interest to many surrounding cars, the necessity of a single, shared control channel can be derived (even when multiple channels are available using one or more transceivers, at least one shared control channel is required). This one-channel paradigm, together with the requirement for distributed control, leads to some of the key challenges of VANET design.

- **Cost consideration and availability of network:**

Cost needs to be considered while designing of the VANETs and it requires to be minimal. The availability of network is an important issue that needs to be present at each and every norm of the communication.

- **Bandwidth requirement:**

The bandwidth of the frequency channels currently assigned or foreseen for VANET applications ranges from 10 to 20 MHz with a high vehicular traffic density, those channels easily could suffer from channel congestion.

- **Dynamic network topology:**

It is based on the mobility of the vehicles as communication is between the mobile vehicles that are interrelated with the network communication.

- **Message confidentiality:**

The confidentiality of the transmitted messages in VANETs depends on the message encryption mechanism. This is related to the PKC-based pseudonym generation for vehicle anonymity, as well as the encryption/decryption.

- **Time constraint:**

Because of the high mobility of a vehicular movement, strict time constraint is required for VANETs, which means that the lower the delay overhead, the more efficient and timely the communication.

4. CLASSIFICATION OF ATTACKS IN VANETS

Concerning security in VANETs, there are many attacks which threaten the V2R, R2V and V2V communications on the road. Here, we investigate these attacks specifically on

authentication, privacy preservation and non repudiation, and explain how they are triggered and the potential consequences.

Attacks on the authentication: There are two kinds of attacks related to authentication in VANETs and are given as follows [5]:

Impersonation Attack: The attacker pretends to be another entity. The impersonation attack can be performed by stealing other vehicular entities' credentials for authentication. As a consequence, some warnings sent to a specific entity would be sent to an undesired one.

Sybil Attack: The attacker uses different identities at the same time. In this way, e.g., a single attacker could pretend vehicles to report the existence of a false bottleneck in traffic.

Attacks on the privacy: Attacks on privacy over VANETs are related to illegally gathering sensitive information about vehicles (e.g., eavesdropping). As there is a relation between a vehicle and its driver, the disclosure of a vehicle's secret/sensitive information could affect its driver privacy [5].

Identity Revealing Attack: Getting the owner's identity of a given vehicle could put its privacy at risk. Usually, a vehicle's owner is also its driver, so it would simplify getting personal data about that person.

Location Tracking Attack: The location of a vehicle in a given moment, or the path followed during a period of time is considered as personal data. It allows the attacker to build the vehicle's profile and, therefore, tracking its driver.

Attacks on the non-repudiation: In VANETs, the non-repudiation is related to a fact that a vehicle cannot deny a specific message if it has sent that message. Conventionally, by producing a signature for the message in VANETs, the vehicle cannot later deny the sent messages. The attack on the message non-repudiation is explained as follows [6]:

Repudiation Attack: Repudiation refers to a denial of participation in all or part of communications in VANETs. For example, a selfish driver could deny conducting an operation on a credit card purchase, or malicious vehicles could abuse anonymous authentication techniques to achieve malicious goals or escape from their liabilities.

5. SECURITY IN VANETS

In order to secure VANETs, the following security requirements should be met [4]:

- **Authentication:** Entity authentication is required to ensure that the communicating entities are legitimate. In addition, data authentication is also a concern to ensure that the contents of the received data is neither altered nor replayed.
- **Non-repudiation:** Non-repudiation is necessary to prevent legitimate users from denying the transmission or contents of their messages.
- **Privacy:** Preserving users' privacy is mainly related to preventing disclosure of their real identities and location information.
- **Access control:** Access control is necessary to define the operations that each entity in the network can perform. In addition, any misbehaving entity should be revoke from the network to protect the safety of other legitimate entities in the network. Moreover, any actions taken by that misbehaving entity should be repealed.
- **Availability:** Users may be frustrated if VANET services become temporarily unavailable due to attacks such as DOS attacks. In this section, we argue that PKI is the most viable mechanism for securing VANETs as it can meet most VANET security requirements.

6. CONCLUSION:

To summarize the VANETS the feasibility of vehicle to vehicle and vehicle to infrastructure communication based on wireless local area networking technologies was proven. The security requirements, various kinds of attacks and applications have been analyzed. Although meeting the security requirements and challenges is a tough task but once these challenges are met it can lead to a very beneficial network that can help the future generations in various kinds of communications from safety perspective that can be made between vehicles.

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Green Marketing: A Look on Indian Companies

Saloni Raheja
Research Scholar, Department of Commerce,
Lovely Professional University,
Phagwara, Punjab, India.
She has participated in five National and International Conferences. She has eight International Publications.
E-mail: saloni.rahejaa@gmail.com

***Abstract* - In this modern era of globalization, it has become a challenge to keep the customers as well as consumers in fold and even keep our natural environment safe and that is the biggest need of the time. Green marketing is an organisation's efforts at designing, promoting, pricing and distributing the products that will not harm the environment. Now these days, more and more companies are using green marketing strategies to gain a competitive edge over others and in order to build up their good image. Basically, this paper explores the initiatives taken by the various companies in India for green marketing. It provides valuable information to the companies and marketers regarding the development and reputation.**

***Key Words*: Green Marketing, Indian Companies, Initiatives.**

I. INTRODUCTION

Rapidly changing environment is now a major concern for the people throughout world, making them more and more concerned about the environment. The quote "save the planet, not shave the planet" is now need of the time. To have a sustainable, pollution free environment, it is paramount to implement the concept of green marketing, so that people are educated in this regards as much as possible. According to the scientists, the world is moving towards a environmental turmoil. For this cause economists have also been doing their parts. There is growing interest among the consumers all over the world regarding the protection of the environment. Worldwide evidence indicates people are concerned about the environment and are changing their behavior. As a result of this, green marketing has emerged which speaks for the growing market for sustainable and socially responsible products and services. Thus, Green marketing is marketing with an ecological conscience so as to minimize environmental pollution, reduce the usage of non-replenish able natural resources. In recent times, more and more companies are adopting green marketing practices, thereby minimizing wastage and integrating their activities with the environment.

II. LITERATURE REVIEW

Welling and Chavan (2010) analysed the feasibility of green marketing in small & medium scale manufacturers and suggested the measures to enhance the practice of green marketing. Hemantha (2011) attempted to understand awareness of consumers towards green marketing and green branding in Bangalore and explored the concept of green marketing. Mohanasundaram (2012) discussed the marketing mix of green marketing and also studied the various golden rules of green marketing. Shrikanth and Raju (2012) discussed the need of green marketing. They also studied the challenges faced in green marketing and the current scenario of green marketing in India. They found that being both green and consumer friendly was the only mantra for long term success. Singh (2013) studied the evolution and practice of green marketing by various companies in India. Manian and Nithish (2014) examined the present trends of green marketing and discussed on challenges of green marketing and found that green marketing is something that will continuously grow in practice.

III. IMPORTANCE OF GREEN MARKETING

- It produces new environment friendly customers.
- It increase in sales and profits of an organization.
- It leads to growth and development of business.
- It also leads to good public image of the organization.
- It saves money in the long run though initially the cost is more.
- It helps in accessing the new market and enjoying competitive advantage.
- It helps companies market their products and services keeping the environment aspects in mind.
- Green marketing helps to protect the ozone and whole the environment.

IV. GREEN MARKETING IN INDIA

Green marketing is on the rise of all over the world in India also. India has a long history of close business environment in social clauses for national development. the various

companies are taking initiative in the area of green marketing as a part of their corporate social responsibility. Green business trends is a great way to ensure that your business stays fresh, flexible, and creative in the face of new challenges and opportunities. The following are the brief study of various companies in India:

A. ACC Ltd

India's leading cement manufacturer, ACC, recently launched its new brand of cement, Concrete+. According to the company, this technologically advanced cement has been specially formulated for concreting to ensure high durability and resistance of structures under extreme climate. It is made by inter-grinding high strength cement clinker with high-quality processed fly ash (a hazardous industrial waste), resulting in an environment-friendly product.

B. Amul

has been rated as the Top Indian Green Brand by Global Green Brands survey. The International Dairy federation has also awarded AMUL Green movement as the best Environment Initiative in the ―Sustainability Category in 2010.It also has been awarded Srishtiǁs good green Governance award for four consecutive years since 2011.

C. Dell

Dell is a vendor who focus on producing green IT products. They have a strategy called "Go green with Dell" to sell these products in the market. It also comes in an eco-friendly packaging with a system recycling kit bundled along. Dell is also actively pursuing green innovations and use of eco-friendly materials for everything.

D. Fevicol

Fevicol has introduced an environment-friendly synthetic resin adhesive.This water-based adhesive is meant to have exceptional bonding strength and spreads smoothly at room temperature without emitting any toxic fumes. It is used for all residential and industrial projects.

E. Going Green: Tata's New Mantra

Tata Motors has set up an eco-friendly showroom by using natural building material for its flooring and energy efficient lights. The Indian Hotels Company, which runs the Taj chain, is in the process of creating Eco rooms which will have energy efficient mini bars, organic bed linen and napkins made from recycled paper.

F. Haier Group

The Chinese multinational consumer electronics and home appliances company has launched its green initiative with the Eco-Life series, as a part of its global rebranding exercise. The initiative is aimed at designing smart products that not only meet customer needs but also adhere to environmental norms. The company's eco-friendly products include refrigerators, split and windows air conditioners, a wide range of LED and LCD TV, semi and fully automatic washing machines and the Spa range of water heaters.

G. HCL

HCL is considered as the icon of Indian green initiatives. HCL made a cleaner air, fresher water and fertile soil. HCL Info-systems are up with an initiative drive to train the customers and general public about the threats of e-waste. E-waste, is nothing but electronics-no-longer-usable. It has also made bunch of non-working CDs, earphones, mobile-phones, DVDs, cassette-players, power guzzling CRT monitors in store-room, and what not! Now is the time to dispose-off all this e-waste lying at your house, or office-cabin! All these things are properly managed by HCL.

H. Hero Honda Motors

Hero Moto Corp is one of the largest two-wheeler manufacturers in India and an equally responsible top green firm in India. The company's philosophy of continuous innovation in green products and solutions has played a key role in striking the right balance between business, mankind and nature.

I. IBM

IBM launched Project Big Green to help clients around the world improve the efficiency of IT. IBM has software and services technologies to help businesses reduce data center energy consumption and cut energy costs by more than 40 percent.

J. IDEA Cellular

IDEA paints India green with its national 'Use Mobile, Save Paper' and save the trees campaign. The company had organized Green Pledge campaigns and pledged to save paper and trees and to protect the environment. IDEA has also made up some bus shelters with potted plants and tendril climbers in order to convey the green message in Mumbai.

K. Indusind Bank

Green banking has been catching up as among the top Indian green initiatives ever since IndusInd had opened the country's first solar-powered ATM and they pioneered an eco-savy change in the Indian banking sector. They are still planning for initiatives so that they can bring change.

L. ITC Limited

ITC first time in India introduced 'Ozone-treated elemental chlorine free' bleaching technology has strengthened their commitment to green technologies. It has also manufactured eco-friendly business using paper crafs. ITC also provide an opportunity to consumers to be a partner in efforts to mitigate the adverse impact of climate change and create positive environmental footprints. It has also made environment friendly 'Classmate' notebooks. They produced different top green products and solutions.

M. Lead Free Paints from Kansai Nerolac

Kansai Nerolac Paints Ltd. has done alot for the welfare of society and environment and as a responsible corporate has always taken initiative in the areas of health, education, community development and environment preservation. Kansai Nerolac has worked on removing hazardous heavy metals like lead, mercury, chromium, arsenic and antimony can have adverse effects on humans from their paints.

N. LG Electronics

The South Korean multinational consumer electronics and home appliances company recently introduced the LG LED E60 and E90 series of monitors in the Indian market with eco-friendly features and consume 40 per cent less energy. Also, the use of hazardous materials such as halogen and mercury has been kept to a minimum. Globally, LG has launched a range of eco-friendly products such as the platinum-coated two-door refrigerator and washing machines with steam technology.

O. Mahindra Group

Mahindra Group had launched project Mahindra Hariyali in which 1 million trees would be planted nation-wide by Mahindra employees and other stakeholders including customers, vendors and dealers.

P. Nike

Nike is the first among the shoe companies to market itself as green. It has marketed Air Jordan shoes as environment-friendly which reduced the usage of harmful glue adhesives.

Q. Nokia

The Finnish multinational communications and information technology corporation has taken several eco-friendly initiatives. Nokia India has launched a campaign to recycle electronic waste. Consumers are encouraged to dump old mobile phones and accessories, irrespective of brand, at any of the 1,300 green recycling bins at Nokia Priority dealers and Nokia care centres.

R. ONGC

India's largest oil producer ONGC has all set to lead the list of top 10 green Indian companies with energy efficient, green crematoriums which will soon replace the traditional wooden pyre across the country. ONGC's Mokshada Green Cremation initiative will save 60% to 70% of wood and fourth of the burning time per cremation.

S. Panasonic

The Japanese multinational electronics major company has introduced ECONAVI, a range of its home appliances, which include air conditioners, refrigerators and washing machines, to produce energy-saving consumer durables by using a combination of sensor technology and programme control software. For instance, four sensors door-opening, light, room temperature and internal temperature allow the ECONAVI refrigerator to analyze the time periods when the family typically does not use the appliance when they are sleeping or away from home and go into the Night Eco Mode, which automatically reduce the cooling power and optimizes energy use. It lays a lot of emphasis on eco-friendly products.

T. Samsung Electronics

The South Korean multinational electronics company and a leading brand in display products, is continuing to evolve its LED monitor technology. Its latest offerings include the environment-friendly 30 and 50 series of LED monitors. These monitors have a backlight and consume about 40 per cent less energy. Moreover, Samsung's Touch of Color technology does not use paints, sprays or glues ensuring that the monitors contain no volatile organic compounds and making recycling simpler and safer. Samsung has also launched its advanced range of split ACs which save up to 60 per cent energy.

U. Suzlon Energy

The world's fourth largest wind turbine maker is the greenest and best companies in India. They are saving coal, uranium with production of electricity by using huge number of wind-mills. They had worked for clean and green energy. The concept of a Inspiring place to work is deep rooted in the mission of 'powering a greener tomorrow, today' begins by translating these very words into action by creating an environment that is powered by renewable energy. Suzlon One Earth has unique features. They built its factory in Pondicherry to run entirely on wind power.

V. Tamil Nadu Newsprint and Papers Ltd. (TNPL)

TNPL's vision is to be the market leader in manufacture of world-class eco-friendly paper adopting innovative technologies for sustainable development. TNPL was awarded the green business leadership award in pulp and paper sectors in 2009-10. TNPL makes paper primarily from Bagasse, namely sugarcane waste by using as little wood as Possible. The Company uses renewable raw materials with minimum impact on the environment. TNPL's Chemical Recovery Boiler No 3 have been awarded as "Most Innovative Environmental Project" in the Confederation of Indian Industry (CII) - Environmental Best Practices Award 2012.

W. Tata Metaliks Limited(TML)

TML is one of the top green firms in India. The companies policy to discourage working on Saturdays at the corporate office is the main aim. Lights are also switched off during the day with the entire office depending on sunlight.

X. Voltas

Among India's leading companies, Voltas launched its Green range of air-conditioners in 2007. Subsequently, the Indian government made it mandatory for home appliances to have energy star ratings. Energy star is an international

standard for energy-efficient consumer products that originated in the United States. The devices which carry the star logo such as computer products and peripherals, kitchen appliances and other consumer products, use about 20–30 per cent less energy than the set standards.

Y. Wipro Green Machine

Wipro has done to reduce costs, reduce carbon footprints and become more efficient. Wipro Infotech was India's first company to launch environment friendly computer peripherals. Wipro has launched a new range of desktops and laptops called Wipro Greenware. These products are RoHS (Restriction of Hazardous Substances) compliant thus reducing e-waste in the environment.

From the above discussion, we found that more and more companies are using green marketing strategies to gain a competitive edge over others and in order to build up their good image. The Indian government has also done many things in promoting green marketing by way of banning plastic bags from daily use and help its automotive industry to develop greener vehicles by supporting hybrid and electric vehicles. The government took the initiative by promoting green buildings construction and usage of alternate sources of energy by companies. Governmental bodies are forcing firms to become more responsible. In most cases, the government forces the firm to adopt policy which protect the interests of the consumers by reducing production of harmful products.

V. CONCLUSION

In today's era, the environmental problems in India are growing rapidly. Environmental pollution is one of the most serious problems facing humanity and other life forms on our planet today. So, it is the right time to implement the Green Marketing in India. Green Marketing makes drastic change in the business not even in India but save the world from pollution So, the corporates should create the awareness among the consumers, what are the benefits of green as compared to non green ones. Although the government and many private companies have been making an effort to bring about a green mindset among the people and promote green products, a lot still need to be done to make green products truly viable and workable in India.

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REDEFINING MARKET BY CREATING A BLUE OCEANS

Ms. JASPREET KAUR RAI
Assistant Professor
Marketing Management
Email-Id: jessirai12@yahoo.com

Dr. SURESH SETH
Principal/Director
Rayat Institute of Management Studies
Rayat Bahra Institute, Ropar
Railmazra- Ropar
Email-Id- sureshseth9@gmail.com

ABSTRACT-The purpose of this research is to determine how companies can utilize innovation strategies to add value to their products and create new business markets beyond their core. The theoretical framework was established by outlining competitive strategies suitable for adoption by companies. Formulating an effective blue ocean strategy is one challenge but executing that strategy well is an altogether different kind of challenge. This is empirical and secondary research along with qualitative approcah. The Objective of the research is study the basic approach and fundamentals behind Blue Oceans strategy. This study also helps in determining the various companies which successfully implementing blue ocean strategies. There are several driving forces behind a rising imperative to create blue oceans. Likewise, Accelerated technological advances have substantially improved industrial productivity and have allowed suppliers to produce an unprecedented array of products and services. The trend toward globalization compounds the situation. There are common characteristics across blue ocean creations. In sharp contrast to companies playing by traditional rules, the creators of blue oceans never used the competition as their benchmark. Instead they made it irrelevant by creating a leap in value for both buyers and the company itself. Moreover, The key aim of blue ocean strategy is to create value innovation – driving costs down while simultaneously driving value up for buyers. Value innovation is the cornerstone of blue ocean strategy. Value innovation is achievable only when a company's utility, price and cost structures are properly aligned. This whole system approach makes the creation of blue oceans sustainable because it integrates all the firm's functional and operational activities.

Keywords: Blue Ocean Strategy, Innovation, Competition

1. INTRODUCTION TO BLUE OCEAN STRATEGY

Blue Ocean Strategy (BOS) is a management strategy tool well recognized in the 21 century. The founders Kim and Mauborgne are awarded to the second position of HBR-Thinkers 50 list – 2011. Imagine a market universe composed of two sorts of oceans: red oceans and blue oceans. Red oceans represent all the industries in existence today. This is the known market space. Blue oceans denote all the industries not in existence today. This is the unknown market space Blue oceans, in contrast, are defined by untapped market space, demand creation, and the opportunity for highly profitable growth. Although some blue oceans are created well beyond existing industry boundaries, most are created from within red oceans by expanding existing industry boundaries. In blue oceans, competition is irrelevant because the rules of the game are waiting to be set. The term "blue ocean" is an analogy to describe the wider potential of market space that is vast, deep, and not yet explored.

1.2 CHARACTERSTICS OF BOS

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The three characteristics of focus, divergence and a compelling tagline together can guide companies in carrying out the process of reconstruction to arrive at a breakthrough in value both for buyers and for themselves.

- With a strong 'focus' , a company chooses to invest only on a few selected factors while making its value offering, rather than diffusing its efforts across all key factors of competition.
- A strategy that is 'divergent' depicts a company's profile that is differentiated from the industry's average profile and thus confirms uniqueness..
- A strong and authentic 'compelling tagline' delivers a clear message about the exceptional cost-value offering and generates interest among the buyers.

Blue oceans denote all the industries in existence today—the unknown market space, untainted by competition. In blue oceans, demand is created rather than fought over. There is ample opportunity for growth that is both profitable and rapid. There are two ways to create blue oceans. In a few cases, companies can give rise to completely new industries, as eBay did with the online auction industry. But in most cases, a blue ocean is created from within a red ocean when a company alters the boundaries of an existing industry.

1.3 SOME OF THE REASONS TO DEVELOP A BLUE OCEAN STRATEGY ARE:

1. Supply exceeds demand in lot of industries.
2. Globalization
3. Price wars
4. Low profit margins
5.Niche markets disappearance
6. Norms and regulations

7. Brands are more and more similar so the selection is based on the price
8. Commoditization of products and services

2. REVIEW OF LITERATURE

Düsseldorf & Wubben (2013) stated that Based on identified strengths and weaknesses, recommendations were identified to enable the usage of BOS in FMCG Markets. We brought the tools, strategic canvas, six searching paths framework, four actions framework (FAF) and the sequence of the BOS, in a logical and practical order, making it efficient to applys.. *Mohamed Alidin (2013)* expressed that As the BOS framework do go into details on how they are to be implemented, the data that were shared were confined only to the ERRC Grid component. It has to be assumed that they all practiced and implement with full understanding of the principles as proposed by BOS. But it was noted that nobody in the study has got any recognized BOS certified recognition. Therefore their level of understanding needs to be verified. In fact during the discussion there was difference in the understanding of the principles as all had gain the knowledge through reading of Kim's book. *Daniel Vester (2012)* concluded in his research that The Blue Ocean Strategy was also selected due to its focus on creating new uncontested markets, capturing new demand, and gaining competitive advantage by simultaneously pursuing differentiation and low cost. *As per Machaiah (Business Standard , 2009*) expressed that If we look at the current Indian information technology industry, the pure outsourcing or offshore development centre business models are not able to deliver sustained growth. It is time for companies in the sector to look into value innovation — the cornerstone of Blue Ocean Strategy. *Gilad (2006)* that Its basic argument is that companies who find themselves in hotly contested markets ("red oceans") should look for uncontested markets ("blue oceans"). It looks at successful products and service offerings, and in retrospect identifies the characteristics that made them succeed (at least revenue wise, there is no real financial analysis in this book). *Shivapriya (2008)* stated in her study that In a blue ocean, companies realize both differentiation and low cost. In other words, returns from investments in blue oceans are substantially higher. *Kim & Mauborgne (2005)* founded in their study that the key aim of blue ocean strategy is to create value innovation – driving costs down while simultaneously driving value up for buyers. Value innovation is the cornerstone of blue ocean strategy. Value innovation is achievable only when a company's utility, price and cost structures are properly aligned. This whole system approach makes the creation of blue oceans sustainable because it integrates all the firm's functional and operational activities. *According to Wengel et al (2010)* "The objective of The Blue Ocean Strategy is to develop a number of guidelines for the creation of new markets. In order to do this, start by dividing the business universe into two oceans: Blue and Red Oceans. The red oceans are the markets for existing products. The market space is known and the industry or sector boundaries are clearly defined and generally accepted. In the red oceans firms compete head on and one company's market gain represents another's market loss. Also, with a clear market delimitation the possibilities for growth and increased profits are largely restricted".

3. RESEARCH OBJECTIVES

- To study the framework for creating Blue Oceans.
- To highlight the leading companies which successfully managed to create Blue Oceans.
- To understand the Framework behind selecting Blue Ocean Strategy.

RESEARCH METHODOLOGY

- Research Design : Empirical Research

Research Approach : Qualitative Research

4. FINDINGS AND DISCUSSION

4. 1 FRAMEWOK FOR CREATING AND CAPTURING " BLUE OCEANS"

To help find the elusive "blue ocean," Kim and Mauborgne argue that businesses and entrepreneurs must consider what they call the "Four Actions Framework." According to the authors, the "Four Actions Framework" is used to reconstruct buyer value elements in crafting a new value curve. To break the trade-off between differentiation and low cost and to create a new value curve, the framework poses four key questions:

- *Raise*: What factors should be raised well above the industry's standard?
- *Eliminate*: Which factors that the industry has long competed on should be eliminated?
- *Reduce*: Which factors should be reduced well below the industry's standard?
- *Create*: Which factors should be created that the industry has never offered?

4.2 COMPANIES & THEIR STRATEGIC MOVES

1. "*Create a blue ocean for the Murugappa Group*: The fertilizer business is a tough one — subsidy-driven, no reward for innovation and no incentive to invest in technology. He decided to implement the concept in Coromandel International after discussions with the business heads concerned, Vellayan said. The company Created a retail chain of 500 full-service centers that sell products and services to farmers; Diversified its product base to include production of 250,000 tones of compost from municipal waste; and Set up two soluble fertilizer units, a non-subsidy source of revenue. In the process, the company has grown closer to the farmers. It has also expanded globally, with a phosphoric acid business and consultancy. By 2015, the company plans to step up its compost production to one million tones.

*2. REVA By Bajaj Motors***:** Then there is India's success story in the electric vehicle industry where Reva has created a blue ocean for itself as an 'idea and knowledge company'. Instead of competing against the traditional automobile manufacturer's product, a red ocean, Reva has focused on the electric vehicle, thereby creating a blue ocean for itself.

3. IPL: The success of the Indian Premier League is yet another example of how a successful blue ocean has been created by reducing spectator time, reducing the emphasis on classic batting and bowling techniques, raising the pace of the game and emphasis on athleticism, increasing the entertainment quotient with Bollywood and cheer leaders. It overall created a unique entertainment experience coupled with loyalty to the city.

4. SONY: Take Sony, which launched the Walkman and created a market for a personal stereo, which was so far non-existent - again, a blue ocean. But since then Sony has done many right and wrong things.

5. ING: In this scenario, ING Direct came up with a blue ocean, a value proposition, which was to offer fewer products and four times higher savings rate with no minimum or maximum deposit. It realized the vast number of products in the market was creating more confusion than choice to the customer.

6. AAP: Aam Aadmi Party, an Indian political party, set out a goal "to make the existing political parties irrelevant" by creating a new political space. According to the article, AAP used blue ocean strategy and targeted people who valued inclusion, secularism (minus corruption), and pro-development (minus divisiveness). AAP's value offering resonated with Delhi's new new emergent demographic, and the AAP was able to make its competition irrelevant.

7. Ford: Ford introduced the assembly line, which replaced skilled craftsmen with ordinary unskilled laborers, who worked one small task faster and more efficiently, cutting the time to make a Model T from twenty-one days to four days and cutting labor hours by 60 percent.

8. Kingfisher Airlines: They have used the whole experience as their USP. They have created a blue ocean within a red one. Kingfisher redefined the travel experience for business and first-class travelers. This is also what Virgin used. According to Virgin, it's not just getting from one airport to another, but the experience you have from when you leave your home to when you arrive. So it includes ground transportation, and options like taking a shower on arrival instead of going to a hotel.

9. Himalaya Drugs: They created an entirely new market of consumers who prefer medically proven herbal medicine. Following their lead, all FMCG majors came out with their own little herbal range!

10. Samsung Galaxy Note Series: Samsung Galaxy Note Series of phablets highlights the Blue Ocean Strategy of Samsung that created an uncontested phablet market and dominates it with its Galaxy Note II and Galaxy Note III with Galaxy Gear smart watch. Market Research Firm IHS reported that 25.6 million phablet devices were sold in 2012 and estimated that these figures would grow to 60.4 million in 2013, and 146 million by 2016.

4.3 FACTORS TO BE CONSIDERED WHILE CREATING BLUE OCEANS

- *Look across alternative industries*

Alternative industries represent products or services that have different forms, but the same general functionality, objective or utility. For example, cars and busses have different forms and exist in different Indus tries, but both cars and busses provide the same core purpose, getting from one place to another. Alternative industries must not necessarily have the same core functions.

- *Look across strategic groups within industries*

Strategic groups within industries refer to a group of companies within an industry that pursue a similar strategy. Companies most commonly focus on improving their competitive position within these strategic groups. Take for example Mercedes, BMW and Jaguar who all focus on competing against each other in the luxury car segment, thus allowing for economic car companies to compete within their own segment (Kim & Mauborgne, 2005). When creating a new market, companies should look across strategic groups within their industries, and determine what the different offerings between these groups are.

- *Look across the chain of buyers*

The chain of buyers refers to the various parties involved during a buying decision. Most commonly these are separated into three groups. purchasers, users and influencers (John Pruitt, 2006). For example, a child would be the user of a gaming console, the gaming shop would be the influencer, and the purchaser could be the parent of the child. Most commonly an industry converges on a single buyer group. The gaming industry, for example, focuses heavily on children, i.e. the users. By challenging the conventional definition of the buyer chain and shifting the focus to another buyer group, companies can unlock new value and as a result reconstruct the market boundary.

Look across complementary product and service offerings

Complementary products and services complement one another by in directly impacting the value a user receives. For example, a company selling vacuum cleaners is likely to complement the cleaners by also selling vacuum bags. Complementary products and services do not necessarily have to complement each other based on necessity, but also from the standpoint of the buyer experience.

Look across the functional or emotional appeal to buyers.

Functional appeal refers to the functional value that buyers receive from a product or service. This is most commonly based on the function price trade-off. Emotional appeal to buyers refers to the emotional value that is gained by using a product or service. Companies tend to converge to either push the emotional or the functional appeal of an offering. What companies need to do is question their current focus in relation to the focus of their industry. For example, emotionally oriented industries offer many extra emotional values that heavily increase the price and do little to provide more function. By removing these utilities, you may result in a fundamentally simpler and cheaper offering that customers would welcome. On the contrary, functional oriented companies can infuse their products or services with more value by adding emotional appeal, and as a result stimulate new demand.

- *Look across time*

All industries are subject to ever-evolving external trends that heavily influence business over time. Think of the rapid technological evolution that has taken place over the last decade and how it has influenced and shaped the electronic music industry. By looking at these trends with the right perspective, companies can open blue ocean opportunities.

5.CONCLUSION

Blue oceans denote all the industries in existence today—the unknown market space, untainted by competition. In blue oceans, demand is created rather than fought over. There is ample opportunity for growth that is both profitable and rapid. There are two ways to create blue oceans. In a few cases, companies can give rise to completely new industries, as eBay did with the online auction industry. But in most cases, a blue ocean is created from within a red ocean when a company alters the boundaries of an existing industry. For innovation to truly happen, your entire team has to participate in creating the changes you are envisioning, and in so doing, metamorphose from Red Ocean dippers into Blue Ocean swimmers."

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Users Information Seeking Behavior in this age of Internet

H.S.Sarkaria
Librarian & Head,
Amritsar College of Engineering & Technology,
Amritsar.,

Mandeep kaur
Library Assistant,
Amritsar College of Engineering & Technology,
Amritsar.,

Abstract:The paper is an attempt to report the findings of a survey based on questionnaire method. We approached to 140 faculty members and students to know their information seeking behaviour while using the Internet, out of which 120 responded to our questionnaire. We found that 55% of the respondents learnt Internet by Trial & Error method, 74% of the respondents use it on daily basis, 74% do not find any problem while using it, 58% visit the Digital Library to access the e-journals and very less of the respondents use the DELNET services in the Digital Library. We have analyzed that most of the respondents use the Internet for educational purposes and books are still considered the main source of Information. Most of the faculty and students i.e. 75% believe that Internet can never replace the library services where 12% think perhaps it can happen and 13% could not answer this question.

Keywords: *Information seeking behaviour, Internet, Digital Library.*

I.INTRODUCTION

Information is playing an important role for thousands of years to cater all kinds of needs of the users for different purposes. The methods or ways and behavior of users to seek such information kept changing from time to time.

According to T.D. Wilson[1] (2000) Information seeking behavior is "the totality of human behavior in relation to sources and channels of information including active and passive information seeking. In the quest for information, different kinds of behavior are manifested as students have different reasons for wanting information, different levels of search skill and preference for some types of information bearing materials."

In simple way we can say that Information seeking behavior is, the way people search and utilize the information. But now-a-days user information seeking behavior has been changed drastically where no school or college or any work place is expected without the Internet accessibility. We are surrounded by the various tools of the Information Technology and leading the life expeditiously in this bright & sparking world. Our thought process and approaches towards our living has become extraordinary and for this change "Information is everything". Now the question arises what is the information seeking behavior of the users to access the information and how they consume it, particularly through Internet? Keeping the same in mind we thought of a survey which we conducted at Amritsar College of Engineering & Technology (ACET). The College was started as the First Engineering College in the region in the year 2002. The College started with four departments and today it has ten departments, including MBA & MCA, with a number of well-equipped laboratories of Science & Technology.

II.OBJECTIVES:

The objectives of this paper are;

1. To know the methods & actions used for seeking the information through Internet.
2. To know the purposes for seeking the information by the academic community in ACET.
3. To know the problems while seeking or searching the information on Internet.
4. To know the satisfaction level of the academicians while using the Internet services.
5. To know the future prospects of the Library services.

Statement of the Problem

Many people think the role of librarians is decreasing in this age of Information technology. But reality is opposite to this. Rather the librarians are working harder to provide the precise and accurate information to the users. Today, the users are mainly depending on the Internet to get the information for various purposes. Librarians keep trying to know the various problems of the users to provide the quality library services.

In this study the librarians need to know that:

1. What type of information is required by the users?
2. What is the purpose of seeking such information?
3. And what are the problems encountered while information seeking through Internet?

This awareness will definitely help largely to the librarians and the users of Internet for the fruitful search and results. Keeping the same phenomenon in mind, the present study investigates the user information seeking behavior, through Internet, of the Faculty & Students of Amritsar College of Engineering & Technology.

Literature Review

Sambasivan, K.[2] (2002) described the importance of information and ICT. The paper discussed that information will occupy a center stage position in the society and how it will put impact through ICT on social, economic and political activities.

Arora, Sumita[3] (2003) has covered various aspects of computer programming and information technology. Part- A covers the basics of computer science and Part- B includes programming and the introduction of information technology. We also found the detailed information regarding internet and its applications in the part- B of the book.

Chowdhury, G. G.[4] (2004) expressed that information seeking and user interface forms an important component of an information retrieval system since it connects the users to the organized information resources. An information seeking and user interface means by which information is transferred between the user and the computer and vice- versa.

Stallings, Stevens[5] (2004) focused on the detailed understanding of the Networking, Data Transmission and other Computer communications. While review this book we mainly emphasized on the Chapters of Internet, Wide Area Networks and Local Area Network.

Biradar, B.S. and B.T. Samapth Kumar[6] (2006) evaluated six search engines viz., Google, Yahoo, Altavista, Lycos, Excite and Hotbot. In the relevancy of search engines majority of relevant sites were found in case of Google (28%) followed by Yahoo (26%) and Altavista (20%) in this study. The authors have rated Google, Yahoo and Altavista as better search engines for retrieval on the Internet.

Khare, Shashi Kant, Neelam Thapa and K.C. Sahoo[7] (2007) have conducted a survey of Ph. D. scholars at Dr. H.S. Gaur University, Sagar, MP to study the pattern of Internet use to know the satisfaction with the search results and the Internet services. The paper shows that the rate of Internet use is more in research scholars of Science, Life Sciences, Engineering, Technology and Management faculities as compare to the faculties of Arts, Social Sciences, Law, Education and Commerce. Among the non users of Internet, the number of female research scholars is more as compared to male.

Sarasvathy,P. and D. Giddaiah[8] (2007) emphasized on the services & tools of the Internet which are highly helpful to get the required information. A number of e-journals, e-books and a tremendous amount of information can be accessed through the internet from anywhere in the world. The paper described Internet as a reference tool for the academic community.

Ansari, M. M. A. and Devendra Kumar[9] (2010) analyzed the data collected from 25 engineering colleges or institutes of Utter Pradesh based on a structured questionnaire. The paper analyzed the types of information sources used by the faculty members, their preferred information formats, the use of various formal & informal electronic information sources and the importance of and reasons for using such specific information sources.

Jawadekar, Waman S.[10] (2010) focused on MIS in a digital firm needs to shift from 'just in time information' to 'just in time information where action is eminent.' The book is aimed at giving exposure to the students to a digital firm and its information needs, to run the business efficiently and effectively.

Leon, Fazaz Ahmad[11] (2011) surveyed that students of computer science make use of internet most of all the subjects followed by studends of business & commerce, general science, social sciences and humanities respectively.

Research Methodology

A detailed survey was conducted to obtain the required information. The survey was conducted on the basis of questionnaire to collect the data for the present study. The Random sampling method has been used for sample population. 140 questionnaires were distributed among the Faculty and Students of Amritsar College of Engineering & Technology, out of which 120 have responded. Collected data was processed in Microsoft Excel and analyzed by using descriptive analysis comprising percentage analysis and average methods.

Analysis of Data:

1 Frequency of the internet usage:

The table1.1 represents the majority of respondents under this study i. e. 74% use internet on daily basis where as 20% use internet weekly basis, 4% occasionally and 2% respondents monthly use the internet.

1.1 Frequency of the internet usage:

Frequency	No. of respondents	Percentage
Daily	74	74%
Weekly	24	20%
Monthly	2	2%
Occasionally	5	4%
Never	-	-

II.Purposes of internet usage:

Through survey, we found our respondents use the internet for the different purposes. This question is evaluated at likert scale. We found different average scores for the different purposes of the internet usage i.e. for E- mail, average score is 4.58 which is on positive side on the likert scale. For official usage, we found average score as 4.16 which is again on the higher side of the likert scale. For research purposes, we got average value as 3.08 which is positive response from the respondents and the average scores of the internet use for educational purposes is 4.66 which is again on higher side of the likert scale.

2.1 Purposes of internet usage

Purposes	Average Score
For Email	4.58
For official usage	4.16
For research	3.08
For educational purposes	4.66

III. Methods of learning internet skills:

Table 3.1 represents different methods being adopted by respondents to get internet skills. Majority of the respondents i. e. 55% take risk to acquire the internet skills through trial and error method, 25% respondents got training from colleagues and friends, 13% got training from college and 7% from external sources.

3.1 Methods of learning internet skills

Method	No. of respondents	Percentage
Trial & Error method	66	55%
Guidance from Colleagues and Friends	30	25%
Training from college	16	13%
External Sources	8	7%
Any other	-	-

IV. Problems while using internet:

Table 4.1 represents majority of respondents i. e. 74% do not face any problem while using internet where as 17% respondents face problem due to the lack of time, 5% respondents do not use internet because of lack of knowledge to use and only 4% respondents do not use internet because of lack of sufficient internet nodes in the college.

4.1 Problems while using internet

Problem	No. of respondents	Percentage
Lack of knowledge to use	6	5%
Lack of sufficient internet nodes in the college	5	4%
Lack of time	20	17%
No problems	89	74%
Any other	-	-

V. Opinion regarding the information retrieval system of internet:

Table 5.1 expresses that the maximum number of respondents i. e. 69% satisfied, 15% partially satisfied, 13% strongly satisfied and only 3% respondents could not answer to their opinion regarding the information retrieval system of internet.

5.1 Opinion regarding the information retrieval system of internet

Opinion	No. of respondents	Percentage
SS	16	13%
S	82	69%
PS	18	15%
NS	-	-
CS	4	3%

SS- Strongly Satisfied S- Satisfied PS- Partially Satisfied
NS- Not Satisfied CS- Can't Say

VI. Services using in the digital library through internet:

Table 6.1 shows that majority of the respondents (58%) use the e- Journals, 20% respondents visit to access e- Books, 7% use self learning websites and 15% use all these mentioned services including DELNET services in the digital library.

6 .1 Services using in the digital library through internet

Services	No. of respondents	Percentage
E- Books	24	20%
E- Journals	70	58%
DELNET Services	-	-
Self Learning Websites	8	7%
All of the above	18	15%

VII. Sources of information collection:

The respondents are asked to indicate their preference for different information sources to support their information needs. It is found that books and Internet resources are preferred mode of information sources and average score is found 4.66 and 4.62 respectively which is higher side on the likert scale. For other print resources including Journals/Periodicals average score is found 2.66 which is lower side on the likert scale and for Newspapers average score is 3.83 which is higher side on the likert scale.

7.1 Sources of information collection

Sources	Averages Score
Books	4.66
Journals/ Periodicals	2.66
Newspapers	3.83
Internet	4.62

VIII.Opinion to the statement, "The internet plays an important role in dissemination of information"

Table 8.1 expresses that the maximum number of respondents 58% agree and 42% respondents are strongly agree that the internet plays an important role in dissemination of information. This question is again evaluated at likert scale and average score is found 4.41 which is higher side on the likert scale.

8.1 The internet plays an important role in dissemination of information

Opinion	No. of respondents	Percentage
SA	50	42%
A	70	58%
DA	-	-
SDA	-	-
CS	-	-

SA- Strongly Agree A- Agree DA- Disagree
SDA- Strongly Disagree CS- Can't Say

XI. Opinion about internet can replace the library services:

Through the survey we come to know the opinion of the respondents about the above statement and found that majority of the respondents i.e. 75% said internet cannot replace the library services , 12% respondents believe internet probably replace the library services where as 13% respondents are neutral about the statement.

9.1 Internet can replace the library services

Opinion	No. of respondents	Percentage
Can't Say	16	13%
Probably	14	12%
No	90	75%
Yes	-	-

X.CONCLUSION

Finally, we can conclude that the academicians are using the Internet services very appropriately and a few things, like less used DELNET services, they have left which we need to focus in the future. The majority of the academic community uses the Internet daily and that too without any problem. We have come to know from this survey that todays the users are highly depending on the Internet for collecting the information. So it has become very important for the colleges and universities to provide the better Internet facilities like ACET is providing for its academic community. The librarians need to know the overall information seeking behaviour of the users to manage the Internet services and to train the users accordingly to use the Internet more effectively.

RECOMMENDATIONS

From the data collected through this survey and analysis of the same, we have given some recommendations as below:

1. All the Libraries with Digital Libraries must conduct a training programme to make the users aware about the different services available.
2. The colleges and universities must conduct the Internet training programme on regular basis to reduce the training through trial and error method.
3. We have noticed that though very few i.e. 4%, think there is lack of nodes, so each department must have an Internet lab for the easy accessibility.

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MUTUAL FUNDS IN INDIA : STATUS, FUTURE OUTLOOK AND CHALLANGES

Sidhartha Sharma

Assistant Professor of Commerce in D.A.V College,

Jalandhar city, Punjab

Contact detail: sid_rocks333@yahoo.com, Cell no. 9464463537

Abstract - Indian mutual fund industry has been witnessing a transformation in last few years. On one side it has witnessed a large number of regulatory developments to facilitate the overall working and efficiency. On the other hand, the overall economy is just recovering from the global crises of 2008 compounded by good election results in the favor of the market. Financial experts and security analyst are waiting to see how Indian mutual fund industry adapts to these changes , while try to maintain its pace of growth as well as how it overcomes the major challenges like lack of investor awareness , low penetration levels , high dependence on corporate sector and spiraling cost of operations. The present paper examines the present status of mutual funds, future outlook and challenges faced by mutual funds in India.

KEYWORDS- Mutual Funds, Present status, Future Outlook, challenges.

I.INTRODUCTION

In investment world, fascination of funds is not everyone's cup of tea as we are well aware of the fact that investment is not confined to mathematics. It is science as well as an art which requires high skills, intelligence & experience to invest in stock market. Mutual fund is the most suitable investment for the common investor who lacks in in-depth knowledge and sources in context to stock market. It offers an opportunity to invest in diversified portfolio to strike a golden mean between risk–return i.e. minimization of the risk and maximization of the return through diversification of the portfolio. A mutual fund is a company that pools money from many investors and invests the money in stocks, bonds, short-term money-market instruments, other securities or assets, or some combination of these investments.

II. REVIEW OF LITERATURE

The objectives of this study is to explore present condition of mutual funds in India , future outlook as well as various challenges related with mutual funds in India. Research literature reveals the following findings about mutual fund industry in India.

PRESENT STATUS AND FUTURE OUTLOOK OF INDAIN MUTUAL FUND INDUSTRY

Murlidhar duna (2012) found that The Indian mutual fund industry is one of the fastest growing sectors in the Indian financial market. The Indian mutual fund industry has seen drastic reforms in quantity as well as quality of product and service offerings in recent years.

Prof. Rajesh Chakrabarti, Dr. Sarat Malik, Shri Sudhakar Khairnar and Shri Aadhaar Verma (2013) conclude that The Indian mutual fund industry is one of the fastest growing and most competitive segments of the financial sector. As of August 2013, the total AUM stood at Rs. 7.66 trillion. However, growth rates of AMCs have come down from the peak levels seen in the early 2000s. One of the biggest reasons behind this is the lack of healthy participation from a large part of the country.

KPMG STUDY (2013) found that The Indian mutual fund industry has shown relatively slow growth in the period FY 2010-2013 due to global economic slowdown and risk averse investors. This

research paper also highlighted the current industry assessment of Indian mutual fund industry, future potentials of Indian mutual funds industry and upcoming trends in Indian mutual fund industry.

MAJOR CHALLENGES OF INDIAN MUTUAL FUND INDUSTRY

Murlidhar duna (2012) found that lack of investor education , diminishing talent pool , the technological backbone and competition etc factors will lead to pressure on margins as well as they may make it difficult for the small players to survive.

KPMG (2013) observed that lack of financial education, limited distribution network, and distribution cost, cultural bias towards physical assets and technology etc factors are the key challenges for mutual fund industry in India.
Study also laid emphasis on investor education, technological improvements and effective strategy implementations to overcome these challenges.

WORLD BANK GLOBAL INDEX (2012*)* found that only 35.23% of respondents in India have an account (either self or together with someone else) at a bank or some other formal financial institution. The study has cited low financial literacy and extreme risk aversion of investors for under penetration of mutual funds in India.

III.OBJECTIVES OF THE STUDY

The present paper is concerned with fulfilling the following objectives:-

(1) To explore the Present status of mutual funds in India
(2) To anticipate the Future outlook of mutual funds in India
(3) To find out the key challenges related with mutual funds in India.

IV.RESEARCH METHODOLOGY

The present paper laid emphasis on the various aspects related with mutual funds in India as well as upcoming trends compounded with major problems of mutual funds in India. This research paper is based on secondary data and by reviewing various authentic research papers from online databases of peer reviewed, official websites of mutual funds and investment management, in-depth studies conducted by specialized agencies as well as their views and vision on status, future outlook and challenges of mutual funds in India FINDINGS OF THE STUDY
Mutual fund is a financial service organization which possesses financial experts or security analyst who pools the savings of large number of investors having similar financial goals in diversified portfolio in such a way that overall risk is minimized and overall return is maximized. Following are the findings in relation to the objectives of the research paper.

STATUS OF MUTUAL FUNDS INDUSTRY IN INDIA

Research literature reveals the following facts about status of mutual funds in India:-

- GROWTH OF AUM IN INDIA
  Research literature reveals the fact that The AUM have grown at a rapid speed over the past few years, at a CAGR of 35 percent for the five-year period from 31 March 2005 to 31 March 2009. Over the 10-year period from 1999 to 2009 encompassing varied economic cycles, the industry grew at 22 percent CAGR. This growth was despite two falls in the AUM - the first being after the year 2001 due to the dotcom bubble burst, and the second in 2008 consequent to the global economic crisis. Afterwards the Indian mutual fund industry has shown relatively slow growth from 2010 to 2013, growing at a CAGR of approximately 3.2 per cent due to inflation and lack of investor confidence in the market. Average AUM stood at INR 8,140 billion as of September 2013. However, AUM increased to INR 8,800 billion as of December 2013. Despite the relatively low penetration of mutual funds in India, the market is highly concentrated. Though, there are 44 AMCs operating in the sector, approximately 80 per cent of the AUM is concentrated with 8 of the leading players in the market.

- AUM BASE IN INDIA AND GROWTH RELATIVE TO THE GLOBAL INDUSTRY

  Research literature reveals the fact that India has been amongst the fastest growing and emerging markets for mutual funds since 2004; in the five-year period from 2004 to 2008. The Indian mutual fund industry grew

at 29 percent CAGR as against the global average of 4 percent which is quite phenomenal. Over this period, the mutual fund industry in mature markets like the US and France grew at 4 percent, while some of the emerging markets viz. China and Brazil exceeded the growth witnessed in the Indian market. However, despite clocking growth rates that are amongst the highest in the world, the Indian mutual fund industry continues to be a very small market; comprising 0.32 percent share of the global AUM of USD 18.97 trillion as of December 2008. In 2013, India's AUM penetration as a per cent of GDP is between 5-6 per cent approximately while it is around 77 per cent for the U.S., 40 per cent for Brazil and 31 per cent for South Africa. Financial experts are anticipating healthy AUM base in future.

- AUM TO GDP RATIO IN INDIA

Research literature reveals that AUM TO GDP RATIO is one of the key indicators for mutual funds penetration in India. According to recent research report, India's key mutual fund penetration indicator or AUM/GDP ratio stood at 7%, above of China's AUM/GDP ratio which stood at 5% in 2013, but India lags behind many countries like USA, Brazil, UK, Bangladesh and Japan in terms of AUM/GDP ratio. USA had the highest AUM/GDP ratio of 83% followed by Brazil 45% and European Union 41%. The AUM/GDP ratio of the world stood at around 38% in FY 2013. Financial experts are anticipating increase in AUM/GDP ratio of Indian mutual fund industry in future.

- AUM COMPOSITION BY INVESTOR SEGMENT IN INDIA

Research literature reveals the interesting fact about industry composition of AUM. Table 01 shows that Banks and financial institutions attains the top slot with AUM composition of around 49 % followed by high net worth investors and retail investors with AUM composition of 28 % and 20 %. Financial experts are anticipating the rise of AUM composition in case of net worth investors and retail investors in future looking to the favorable market conditions ahead.

- MARKET SHARE OF LEADING MUTUAL FUNDS IN INDIA

Research literature reveals the fact that there are various public and private mutual funds which are providing a large number of mutual funds services in India. ***Table 02*** shows that HDFC mutual fund attains the top slot with the market share of 13 % followed by RELIANCE mutual fund with a market share of 12 % and ICICI mutual fund with a market share of 10 %. According to market experts HDFC mutual funds, ICICI mutual funds and BIRLA sun life may lead the market in future.

- MUTUAL FUNDS PRODUCTS AND INVESTOR CHOICES IN INDIA

Research literature reveals the fact that Indian stock market has been witnessing inconsistent returns after 2008-09 due to global economic slowdown. Higher inflation and inconsistent economic growth has worried the retail investor who is now more concerned about fixed returns. In such a scenario, the investor would shift their funds from the equity market to liquid/money market and debt funds. Corporate investments constitute around 49 per cent of AUM with a focus on debt/money market funds for the purpose of short term returns and liquidity management. Retail share of AUM is around 20 per cent and it is expected to rise.

High Net worth Individual have emerged as the fastest growing investor segment growing at a rate of 20 per cent over the period of FY10- FY13 with a preference for debt oriented funds due to increased investor awareness, product penetration and greater distribution reach. However, AUM growth largely remains restricted to the top 5 metropolitan cities in India viz. Mumbai, Delhi, Bangalore, Chennai and Kolkata which contributes around 74 per cent of AUM as of September 2013. The top 35 cities have been contributing around 90-92

per cent of the industry AUM. The equity-debt mix is largely dependent on the performance of the capital markets and interest rate cycles. AUMs in debt and liquid money market funds have seen a rise in financial year 2014 due to the anticipation of favorable monetary policies and investor preference to seek fixed returns. Debt oriented products have gained most traction in terms of absolute net new money, with an absolute increase in AUM of INR 1,000 billion indicating a clear shift in investor interest from equity to debt in recent times due to complex interaction of different market variables.

- CATEGORY WISE MUTUAL FUNDS PERFORMANCE IN INDIA

The details of various categories of mutual funds along with their average returns in last 3 years are shown in ***TABLE 03*** and ***TABLE 04***. ***TABLE 03*** demonstrates the earnings of equity and hybrid equity funds. On the contrary, ***TABLE 04*** demonstrates the earnings of debt and hybrid debt funds .Research literature further reveals that in last few years' average returns from debt and hybrid debt funds is more than equity and hybrid equity funds and investor gave more priority to debt funds and hybrid debt funds in comparison to equity funds and hybrid equity funds. The major reason behind the priority of investors is inflation and bad economic cycle which made investor risk averse and they paid more attention to the fixed income funds. Financial experts are anticipating shifting of investors from debt and hybrid debt funds to equity and hybrid equity funds due to economic revival and positive election results.

- PROFITABILITY OF MUTUAL FUNDS IN INDIA

Research literature reveals that the Indian mutual fund industry's profitability in India hits a three-year high, even as revenues have hit a five-year high. During the financial year, 41 mutual funds made a net profit of around Rs 764 crore, while revenue stood at around Rs 4,792 crore, these stand at Rs 860 crore and Rs 5,134 crore, respectively, if one considers the estimates based on average numbers in previous years for firms whose results are awaited .HDFC Mutual Fund attains the top slot with a net profit of Rs 318.75 crore , followed by Reliance Mutual Fund with a net profit of Rs 228.99 crore and UTI Mutual Fund with a net profit of Rs 148.9 crore . Financial experts are anticipating a tough competition between HDFC, ICICI and BIRLA.

V.FUTURE OUTLOOK OF MUTUAL FUNDS IN INDIA

The long-term outlook for the mutual funds industry in India seems to be bright and positive but when it comes to short to medium term outlook; it seems to be moderate as per various market experts in different research papers. This can be attributed to the existing performance in financial markets and the evolving market and regulatory landscape. Looking to good election results compounded by the economic recovery may leads to good prospects of mutual funds industry in India.

Some authentic research literature also reveals the interesting facts that Industry. AUM is likely to continue to grow in the range of 15 to 25 percent from the period 2010 to 2015 on average basis. In the event of a quick economic recovery and positive reinforcement of growth drivers are identified, Indian mutual fund industry may grow at the rate of 22-25 percent in the period from 2010 to 2015, resulting in AUM of INR 16,000 to 18,000 billion in 2015. On the contrary, in the event of a relatively slower economic revival resulting in the identified growth drivers not reaching their full potential, the Indian mutual fund industry may grow in the range of 15-18 percent in the period from 2010 to 2015, resulting in AUM of INR 15,000 to 17,000 billion in 2015 as per various financial experts and security analyst.

MAJOR CHALLANGES OF MUTUAL FUNDS IN INDIA

Research literature reveals the fact that despite of the growth, potentials and opportunities offered by the mutual fund industry in India, there still remain some major challenges faced by the mutual fund industry

in India which may have bad impact on growth as well as future prospects of the Indian mutual fund industry. These include:

• Limited incentives for distributors for MF products as compared to other financial products
• Lack of product differentiation and ability to communicate value to investors
• Low MF penetration and relatively lower addition of retail investors
• Lack of investor awareness about MF industry
• Evolving nature of industry regulations

VI.SUGGESTIONS

The master key to combating with major challenges of Indian mutual fund industry is to ensure a wider distribution reach to widen the existing base of the industry. Additionally, there needs to be an improvement in overall investor awareness through strategic initiatives and investor education. Association of Mutual Funds of India (AMFI) recently launched a new campaign to promote mutual funds to make aware the prospective investors about different savings and capital appreciation products. The campaign also tries to tell investors to check out the various fund options that are available as well as advice prospective investors to visit a good and qualified financial advisor because it is very important to invest systematically with proper guidance. Such initiatives and campaign should be launched by other agencies and associations to tide over the major challenges and problems of mutual funds industry in India

ANNEXURE-TABLES AND FIGURES

	TABLE 01	
S.NO	TYPE OF INVESTOR	AUM COMPOSITION (%)
1	BANKS & FI'S	49
2	NET WORTH INVESTOR	28
3	RETIAL INVESTOR	20
4	CORPORATES	2
5	FII'S	1

Source: The Association of Mutual Funds in India (AMFI); Data as of September 2013

	TABLE 02	
S.NO	MUTUAL FUNDS	MARKET SHARE (%)
1	HDFC MUTUAL FUND	13
2	RELAINCE MUTUAL FUND	12
3	ICICI MUTUAL FUND	10
4	BIRLA SUN LIFE MUTUAL FUND	9
5	UTI MUTUAL FUND	9
6	SBI MUTUAL FUND	7
7	FRANKLIN TEMPLETON	5
8	IDFC MUTUAL FUND	5
9	KOTAK MAHINDRA MUTUAL FUND	4
10	DSP BLACK ROCK MUTUAL FUND	4
11	AXIS MUTUAL FUND	2
12	OTHER	20

Source: the Association of Mutual Funds in India (AMFI); Data as of September 2013

		TABLE 03		
S.NO	AVERAGE RETURN OF EQUITY AND HYBRID EQUITY FUNDS	YEAR 1 (%)	YEAR 2 (%)	YEAR 3 (%)
1	LARGE CAP EQUITY FUND	2.9	6	1.9
2	DIVERSIFIED EQUITY FUND	2.1	6.1	1.7
3	SMALL & MID CAP EQUITY FUND	3.4	8.5	2.8
4	EQUITY ORIENTED HYBRID SPECIALITY FUND	3.6	5.3	2.8
5	GLOBAL COMMADITIES	8.6	5	1.4

Source: the Association of Mutual Funds in India (AMFI); Data as of September 2013

As on 20 Jan Source: moneycontrol ; returns over 1 years are annualized

		TABLE 04		
S.N0	AVERAGE RETURN OF DEBT AND HYBRID DEBT FUNDS	YEAR 1 (%)	YEAR 2 (%)	YEAR (%)
1	LONG TERM INCOME FUNDS	4.8	3.6	3.6
2	SHORT TERM INCOME FUNDS	7.8	5.2	4.9
3	LIQUID FUNDS	7.8	5.3	5
4	ULTRA SHORT FUNDS	8.2	5.2	5.2
5	GILT SHORT TERM FUNDS	4.4	3.2	2.9
6	GILT LONG TERM FUNDS	3.4	3.4	3.5
7	BALANCED FUNDS	4.4	5.9	2.8

As on 20 Jan 2014 Source: moneycontrol ; returns over 1 years are Annualized

VII.CONCLUSION

In nutshell, The scope and growth of Indian mutual funds industry is seems to be bright and positive as far as long term prospects are concerned but it may witness moderate growth in short term due to complex interaction of different market variables. In last few years, investors gave more attention to debt and hybrid debt funds due to unfavorable market factors. At present, market factors are in favor because of economic recovery compounded with positive election results. Now the Investors may try to train their sights on equity funds and hybrid equity funds to reap more profits from their investments. The Indian mutual funds industry, however, faces the challenge of achieving sustained profitable growth while increasing retail penetration & expanding the reach of mutual funds in rural areas. Investor awareness campaign and generating innovative and attracting mutual fund schemes are some of the major tools to overcome the challenges of mutual funds in India.

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IMPACT OF CELEBRITY ENDORSEMENT ON CONSUMER BUYING BEHAVIOUR TOWARDS BRANDED PRODUCTS

Supandeep Kaur
Research Scholar,
School of Management Studies
Punjabi University, Patiala
saini.supan@gmail.com

Jaideep Singh
Research Scholar,
School of Management Studies
Punjabi University, Patiala
jaidepsaini@gmail.com

Abstract— Statement of Purpose – The purpose of this paper is to to study the role of demographic variables of consumer buying behaviour towards branded products and to assess the role of celebrity and non-celebrity endorser on consumer preferences while purchasing FMCG and consumer durables.

Design / Methodology / Approach – This paper uses a qualitative as well as a quantitative approach which is based on theories and practices concerning social contagion, role of media, changing attitudes, demographic effect and rational action. A random sample survey of 120 individuals was used to verify the conceptual model and framework.

Findings – The research shows that Celebrity endorsement helps them to recall the brands of the endorsed products. The study revealed that the celebrity endorsement motivates them to materialize the purchase of durables. The consumers are simulated significantly by the celebrity endorser when the target is on quality and price. The purchase attitude is influenced by the celebrity endorsement factors, product evaluation and brand recognition.

Research Implications – This research gives the reflection of the demographic profile of consumers and the impact of the celebrity endorsement in understanding how consumers behave in relation to endorsed branded products.

Originality/Value - This study will be of value to organizations to recognize the importance of celebrity endorsement and the need to select the celebrity and develop the endorsements to retain the customer base and to attract the new ones.

Keywords**:** Brand, Celebrity, Celebrity Endorsement, Consumer Behaviour

I. INTRODUCTION

Celebrity endorsement is majorly used technique by marketers and it has been proved that celebrities endorsing a company or brand can greatly increase consumers' cognizance of an advertisement, capture their attention and make the advertisement more memorable.

1. Celebrity endorsement is a common marketing communication strategy for building brand image. Advertisers believe that the use of a celebrity affects advertising effectiveness, brand recall and recognition, as well as purchase intentions and follow through. Marketers often choose celebrity endorsers who are attractive, credible or who have expertise. The word "brand" derives from the Old Norse "brandr" meaning "to burn" - recalling the practice of producers burning their mark (or brand) onto their products.

Celebrity Endorser

McCracken's (1989) definition of a celebrity endorser is "an individual who is known to the public (actor, sports figure, entertainer, etc) for his or her achievements in areas other than that of the product class endorsed" [12].

Celebrity Endorsement

According to McCracken (1989) "Any individual who enjoys public recognition and who uses this recognition on behalf of a consumer good by appearing with it in an advertisement" [12].

Indian FMCG Sector is the fourth largest sector in the economy and is characterized by strong MNC presence, well established distribution network, intense competition between the organized and unorganized players as well as low operational cost.

Figure 1. FMCG MARKET

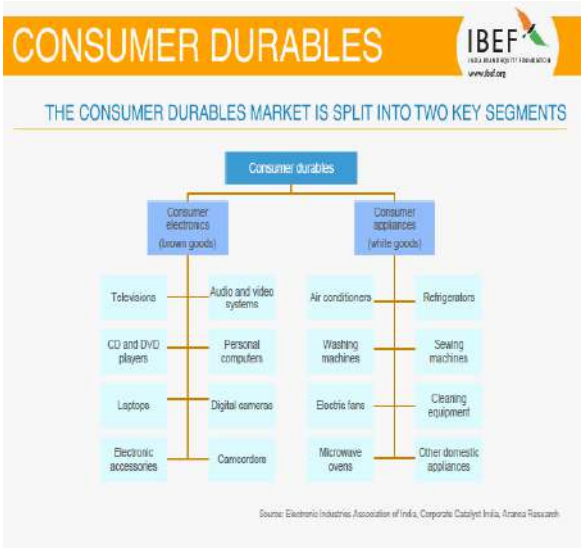


Figure- 2 Consumer Durables

II. REVIEW OF LITERATURE

Rashid, Nallamuthu, & Md. Sidin (2002) in their study entitled *"Perceptions of Advertising and Celebrity Endorsement in Malaysia"* tried to examine the overall perceptions of Malays, Chinese, and Indian consumers towards advertising by celebrities, and the influence of celebrity advertising towards customer purchasing behaviour. When consumers could associate a product with an endorser, they could easily recall the brand and consequently influence them to purchase the product. As such consumers must be familiar with the endorser [15].

Dimed & Joulyana (2005) in their study on "*Celebrity Endorsement -Hidden factors to success"* attributed the celebrity endorsement strategy was more frequently used by marketers in order to increase their sales and thereby extend their market shares. It was proven in this study that consumers do get affected by celebrities as endorser. But, the consumers' perception of the attributes differs in different cases[5].

Eltom Hadia (2006) in her study entitled *"Celebrity Endorsement Branding"* discussed that due to the immense availability of media, the emergence of a new stage of commercial communication has taken place. In this study examines that the effect celebrity endorsed branding has on consumer purchasing behaviour. The concept of celebrity endorsement is not effective in fragrances when the consumers are highly involved because they view perfumes as something personal and individualistic and do not want to be associated with a celebrity[9].

Rodriguez (2008) *"Apparel brand endorsers and their effects on purchase intentions: A study of Philippine consumers"* This study explored the effects of endorser type (celebrity and anonymous) and endorser credibility on consumers' attitudes and purchase intentions. The study concludes that an endorser with a high celebrity status more positively influences the consumer's attitude towards the advertisement and purchase intentions[17].

Mukherjee (2009) *"Impact of Celebrity Endorsements on Brand Image*" Study examined how self-brand connections are formed. He inferred that it is easy to choose a celebrity but it is tough to establish a strong association between the product and the endorser[13].

Edwards & La Ferle (2009) *"Does Gender Impact the Perception of Negative Information Related to Celebrity Endorsers?"* Celebrity endorsements are frequently used as a means of attracting attention and can be effective at positioning products in consumers' minds. The outcome of the study is that any negative information related to a celebrity has negative influence over the product and celebrity both[6].

Pughazhendi, Thirunavukkarasu, & Susendiran (2011) *"A Study on Celebrity Based Advertisements on the Purchase Attitude of Consumers towards Durable Products in Coimbatore city, Tamil Nadu, India"* The consumers of durable products have their motivational sources from need and product utility. In this study authors found that the celebrity's convincing endorsement motivates them to materialize the purchase of durables. The consumers are induced significantly by the celebrity endorser when the target is on quality and price. The purchase attitude is influenced by the celebrity endorsement factors, product evaluation and brand recognition [15].

Khorkova (2012) *"The Impact on Consumer Behavior: Risk and Benefits of Celebrity Endorsement. Fault and Success"* The paper has evaluated how positive and negative factors of celebrity endorsements influence consumer's brand attitude and consumer's brand purchase intentions [10].

Zafar & Rafique (2012) *"Impact of Celebrity Advertisement on Customers' Brand Perception and Purchase Intention"* This paper aims at investigating the impact of celebrity endorsements with respect to their physical attractiveness, source credibility and congruence on customers' brand perception and purchase intention. The purpose for this study was to investigate the customers' attitude toward brand image and their purchase intention towards celebrity's advertised products [19].

Traditionally, explanations of consumer behavior are cast in terms that are rooted in cognitive psychology (Bargh, 2002) [2]. Before people buy, or choose, or decide, they engage in more or less elaborate, conscious *information processing* (Chaiken, 1980; Petty, Cacioppo & Schumann, 1983)[4,14]. Information processing may lead to certain attitudes, and these attitudes, in turn, may or may not affect *decisions.* The amount of information that is processed is dependent on various moderators, such as involvement (Fazio, 1990; Krugman, 1965)[8,11].

The "consumer" includes both personal consumers and business / industrial / organizational consumers. Consumer behaviour explains the reasons and logic that underlie purchasing decisions and consumption patterns; it explains the processes through which buyers make decisions. (Schiffman and Kanuk, 2004) [18].

Consumer Behaviour may be defined as "the interplay of forces that takes place during a consumption process, within a consumers' self and his environment. - this interaction takes place between three elements viz. knowledge, affect and behaviour; - it continues through pre-purchase activity to the

post purchase experience; - it includes the stages of evaluating, acquiring, using and disposing of goods and services"(Peter et al, 2005).

III. NEED OF STUDY

The consumer behaviour has been influenced by the advancements in technology, globalization, competition and other economic forces. However, with the celebrity endorsement in existence, the psychology of the consumer has been influenced and depending on the demographic profile, the consumers tend to make decisions so as to simulate the endorsed effect.

This research focuses on various dimensions of celebrity endorsement, trying to clarify and to add new information on the topic. The research study aims to identify the effects of celebrity endorsement in FMCG & Consumer Durables sectors in the districts of Panchkula & Patiala. Now-a-days, lot of advertisements are endorsed by the celebrities. It has created a great confusion in the mind of the consumers' regarding the purchase of the product. So there is a need to study the impact of celebrities' endorsers on the purchasing behavior of consumers.

IV. OBJECTIVES

The following were the objectives of the study:

1. *To study the role of demographic variables of consumer buying behaviour while purchasing FMCG and consumer durables*.
2. *To assess the role of celebrity and non*-celebrity endorser on consumer preferences while *purchasing FMCG and consumer durables*.

METHODOLOGY

The study sample covered Panchkula and Patiala region with 120 respondents. User-centred research techniques and a questionnaire were used to capture the psychology of balanced demographic profile of respondents and to explore the impact of celebrity endorsement on the consumer buying behaviour towards branded products.

Convenience Sampling was used for capturing balanced demographic prfile and consumers. Out of 120 respondents. there were only 106 respondents whose data was found valid for analysis.

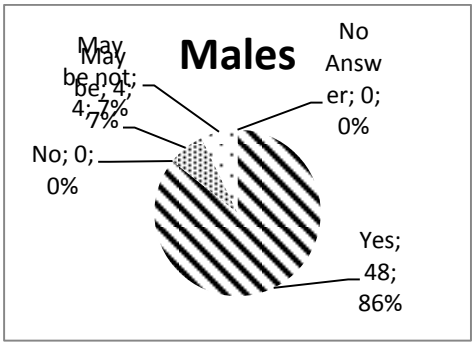
V. FINDINGS

Table 1. Demographics of Endorsed Product Consumers.

Endorsed Product Consumers (120)	
Age	
< 35	59.10%
36-50	34.00%
> 50	6.90%
Education	
Graduate degree	46.80%
Masters degree	37.90%
Others	14.80%
Sex	
Male	77.30%
Female	22.70%
Marital status	
Married	56.30%
Single	38.80%
Divorced	4.90%
Occupation	
Govt. servant	56.20%
Self employed	34.50%
Others	9.30%
Annual income	
< Rs 100, 000	25.60%
Rs. 100,000- Rs.400,000	22.70%
Rs. 4,00,000	51.70%

Source: Authors' field survey (2013)

Table 2: Factors important in selecting endorsed brand (5 = most important, 1 = least important)



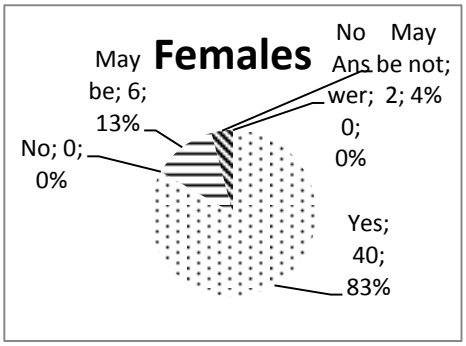


Fig.3: Response for positive influence of celebrity endorsement on the consumer attitude while purchasing FMCG & consumer durables

It is clear that majority of respondents have positive influence of celebrity endorsement on the consumer attitude while purchasing FMCG & consumer durables. 86% of the male respondents and 83% of the female respondents agree to this.

H_{01}: There is no consideration of price and quality of the product if a Celebrity is endorsing it.

Table3: Response of the age group for not taking in consideration price and quality of the product if a Celebrity is endorsing it.

Calculated Value $\chi^2 = 25.53974$ Degrees of freedom, $\nu = 16$

Age group	Strongly Agree	Agree	No Ans	Disagree	Strongly Disagree
21-30	9	11	18	7	0
31-40	7	11	12	2	2
41-50	8	2	4	2	0
51-60	4	0	0	2	0
61-70	2	0	0	1	0

Table Value χ^2= 26.296 @5% Level of Significance Since, the Calculated Value of χ^2 is less than the Tabular Value, therefore the Null Hypothesis is accepted. Hence it can be said that the people belonging to Age group 20-40 years have maximum influence of Celebrity Endorsement.

Factors	Mean score
Celebrity Endorsement	4.69
Quality of Product	4.21
Income of Consumer	4.11
Non-Celebrity Endorsement	3.69
Price of product	3.42

Age group	No Ans	Any	Neutral	Celebrity	Non-Celebrity
21-30	0	2	5	35	3
31-40	2	0	7	23	4
41-50	0	0	9	5	2
51-60	0	0	3	1	2
61-70	0	0	0	0	3

Table 4: Age groups Response to Type of Endorsers in recalling the brands of endorsed products.

78% of the respondents agree that celebrity endorsers are major source of motivation.

H_{02}: There is no preference between the endorsement by celebrity/non-celebrity and the income of the person.

Table 5.: Positive Responses to types of endorser appearing in advertisements.

Calculated Value $\chi^2 = 32.140$ Degrees of freedom, $\nu = 20$

Income	Celebrity	Non-Celebrity	Both	Any	No Ans
1-2lacs	8	0	2	0	0
2-3lacs	16	0	6	0	0
3-4lacs	13	0	4	2	1
4-5lacs	9	0	5	0	0
5-6lacs	18	0	0	4	1
6lacs n above	12	0	1	0	4

Table Value χ^2=31.410 @5% Level of Significance Since, the Calculated Value of χ^2 is more than the Tabular Value, therefore the Null Hypothesis is rejected and the alternate hypothesis is accepted that there is significant *preference between the endorsement by celebrity/non-celebrity and the income of the person*

Hence, it can be claimed that people prefer celebrity endorsers to appear in the advertisements. Around 15% people are influenced by any of the endorsers. Income groups with 5lacs or more strongly prefer celebrity to appear in advertisements.

H_{03}: There is no association between education and occupation for selecting endorsed brand.

Income	Strongly Agree	Agree	No Ans	Disagree	Strongly Disagree
1-2lacs	2	5	3	0	0
2-3lacs	4	7	2	9	0
3-4lacs	6	4	3	7	0
4-5lacs	7	5	0	2	0
5-6lacs	5	6	0	12	0
6lacs n above	4	3	0	10	0

Table 6: Response of Income groups towards factor for social change.

Calculated Value $\chi^2 = 28.732$ Degrees of freedom, $\nu = 20$

Table Value χ^2=31.410 @5% Level of Significance

Since, the Calculated Value of χ^2 is less than the Tabular Value, therefore the Null Hypothesis is accepted. Therefore it can be claimed that there *is no association between education and occupation for selecting endorsed brand.*

VI. SUGGESTIONS / RECOMMENDATIONS

The fact that many companies put so much emphasis on celebrity endorsements highlights how important they believe the issue to be. Celebrity endorsements have a great impact on the people in India specially youth group So organizations should adopt measures to choose the right celebrity to avoid the negative impact and the general public should not perceive the attitude intention gap.

Marketing through Celebrity Endorsement for many companies is an integral part of their business model and sometimes they develop the advertisement of the product by conducting a market research that what features in the product consumer wants to get endorsed and devote significant resources to find out which segment of customers are buying their products and services, whether they are happy with what they buy and what is making them buy or not buy. Consumers should preferably give feedback to the companies to be conscious of what they are buying and the attributes of product are in congruence with what is claimed in the advertisement.

The Internet and the rise of the digital world have further enhanced the scope of advertisements and promoting the product through endorsers. While as per saying "The consumer is King" as consumers have access to a wealth of information to help them with the purchase of goods and services, the social networks have their contribution in making people reflect the extent and even the number which celebrity they appreciate the most. The companies should keep in mind these facts while choosing the celebrity endorser as what is reflected by people through spreading information on forums and threads and track complicated consumer behaviour by taking feedbacks.

Celebrity Endorsement is a powerful tool for achieving a tangible and measurable impact on behaviours and should be exploited more to reach general public as it is a consumer-focused approach empowering citizens and persuading them to change by preaching to them. Celebrity Endorsement is also concerned with achieving tangible and measurable behavioural goals. Celebrity Endorsement can be used to develop effective behavioural interventions to promote the new paradigms such as sustainable behaviour i.e. recycling, reduce and re-use (environment)

VII. CONCLUSIONS

Consumer behaviour is complex and very often considered limited rational. A further challenge is to capture the consumers' perceptions, attitudes and intentions through endorsements. The vulnerable consumer, who does not always have access to the information and do not recognize the endorser whether celebrity or non-celebrity also needs to be taken into account. Understanding these differences and how they will impact on a average consumer is the key to success in effectuating the endorsements.

There is a need to make consumers conscious about products and sustainability. Moreover, this digital age requires keeping up with new trends like the social media. The Internet has become the first medium to allow for complex interaction between Celebrity and networks of people via social networks like Twitter, Facebook and YouTube, amongst many more. Influencing through Celebrity Endorsement is in fact about targeting the right people with the right message and motivate them to spread the message or even convince people who have different opinion through the interactions leading to a collective effort.

Last but not least the government can make legislations regarding endorsements not to hypnotize and hallucinate the consumers and to spreading awareness, initiate launching environmental friendly practices like green power rather than eyeing profit only.

VIII. AGENDA FOR FUTURE RESEARCH

There is a huge potential for policy-makers to fully understand how consumers get inclined to endorsements and on their spending, especially as it seems that Internet users are increasingly using the medium as a way to improve their lifestyles and their buying behaviour too. Further research can be pursued to detect what influences people's behaviour to.

Furthermore, future work can be carried out, regarding furthering the investigation on how to select a celebrity or endorser and how endorsements can be improved.

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E- COMMERCE – INDIAN SCENARIO

Jyotishna Jairath

Research Scholar,

Lovely Professional University, Phagwarha,

E-mail : jjairath@gmail.com

Mobile no. 9814028003

Abstract

The present paper is a conceptual research and is focused on the concept of e- commerce. A brief introduction of e commerce and the governmental regulations relating to e commerce are discussed in this paper. A little introduction of e commerce activities and online business is mentioned with some online retailers. Indian scenario of e commerce is also discussed with its key drivers and also the challenges faced by e commerce in India.

Keywords: E-commerce, Online Retailers, Mobile Users, Market, Growth.

I.INTRODUCTION

Electronic commerce, commonly known as E-commerce or eCommerce, is trading in products or services conducted via computer networks such as the Internet. Electronic commerce draws on technologies such as Mobile Commerce, Electronic Funds Transfer, Supply Chain Management, Internet Marketing, Online Transaction Processing, Electronic Data Interchange (EDI), Inventory Management Systems and Automated Data Collection Systems. Modern electronic commerce typically uses the World Wide Web at least at one point in the transaction's life-cycle, although it may encompass a wider range of technologies such as e-mail, mobile devices, social media, and telephones as well.

Electronic commerce is generally considered to be the sales aspect of e-business. It also consists of the exchange of data to facilitate the financing and payment aspects of business transactions. This is an effective and efficient way of communicating within an organization and one of the most effective and useful ways of conducting business. It is a Market Entry Strategy where the company may or may not have a physical presence.

E-commerce can be divided into 7 subsections:

1. E-tailing or "virtual storefronts" on websites with online catalogs, sometimes gathered into a "virtual mall"
2. Buying or selling on websites and/or online marketplaces
3. The gathering and use of demographic data through web contacts and social media
4. Electronic data interchange, the business-to-business exchange of data
5. E-mail and fax and their use as media for reaching prospective and established customers (for example, with newsletters)
6. Business-to-business buying and selling
7. The security of business transactions

II.GOVERNMENTAL REGULATIONS

In the United States, some electronic commerce activities are regulated by the Federal Trade Commission (FTC). These activities include the use of commercial e-mails, online advertising and consumer privacy. The CAN-SPAM Act of 2003 establishes national standards for direct marketing over e-mail. The Federal Trade Commission Act regulates all forms of advertising, including online advertising, and states that advertising must be truthful and non-deceptive.http://en.wikipedia.org/wiki/E-commerce - cite_note-26 Using its authority under Section 5 of the FTC Act, which prohibits unfair or deceptive practices, the FTC has brought a number of cases to enforce the promises in corporate privacy statements, including promises about the security of consumers' personal information. As result, any corporate privacy policy related to e-commerce activity may be subject to enforcement by the FTC.

The Ryan Haight Online Pharmacy Consumer Protection Act of 2008, which came into law in 2008, amends the Controlled Substances Act to address online pharmacies.

Internationally there is the International Consumer Protection and Enforcement Network (ICPEN), which was formed in 1991 from an informal network of government customer fair trade organizations. The purpose was stated as being to find ways of co-operating on tackling consumer problems connected with cross-border transactions in both goods and services, and to help ensure exchanges of information among the participants for mutual benefit and understanding. From this came Econsumer.gov, an ICPEN initiative since April 2001. It is a portal to report complaints about online and related transactions with foreign companies.

There is also *Asia Pacific Economic Cooperation (APEC)* was established in 1989 with the vision of achieving stability, security and prosperity for the region through free and open trade and investment. APEC has an Electronic Commerce Steering Group as well as working on common privacy regulations throughout the APEC region.

In Australia, Trade is covered under Australian Treasury Guidelines for electronic commerce, and the Australian Competition and Consumer Commissionhttp://en.wikipedia.org/wiki/E-commerce - cite_note-30 regulates and offers advice on how to deal with businesses online and offers specific advice on what happens if things go wrong.

Also Australian government e-commerce websites provides information on e-commerce in Australia.

In the United Kingdom, The FSA (Financial Services Authority) is the competent authority for most aspects of the Payment Services Directive (PSD). The UK implemented the PSD through the Payment Services Regulations 2009 (PSRs), which came into effect on 1 November 2009. The PSR affects firms providing payment services and their customers. These firms include banks, non-bank credit card issuers and non-bank merchant acquirers, e-money issuers, etc. The PSRs created a new class of regulated firms known as payment institutions (PIs), who are subject to prudential requirements. Article 87 of the PSD requires the European Commission to report on the implementation and impact of the PSD by 1 November 2012.

E-Commerce: Indian Scenario

India has an internet user base of about 137 million as on June 2012. The penetration of e- commerce is low compared to markets like the United States and the United Kingdom but is growing at a much faster rate with a large number of new entrants. The industry consensus is that growth is at an inflection point.

Unique to India (and potentially to other developing countries), Cash on delivery is a preferred payment method. India has a vibrant cash economy as a result of which 80% of Indian e-commerce tends to be Cash on Delivery. Similarly, direct imports constitute a large component of online sales. Demand for international consumer products (including long –tail items) is growing much faster than in-country supply from authorized distributors and e-commerce offerings.

India's e-commerce market was worth about $2.5 billion in 2009, it went up to $6.3 billion in 2011 and to $14 billion in 2012. About 75% of this is travel related (airline tickets, railway tickets, hotel bookings, online mobile recharge etc.). Online Retailing comprises about 12.5% ($300 Million as of 2009). India has close to 10 million online shoppers and is growing at an estimated 30% CAGR vis-à-vis a global growth rate of 8–10%. Electronics and Apparel are the biggest categories in terms of sales.

Key drivers in Indian e-commerce are:

1. Increasing broadband internet (growing at 20% MOM) and 3G penetration.
2. Rising standards of living and a burgeoning, upwardly mobile middle class with high disposable incomes
3. Availability of much wider product range (including long tail and Direct Imports) compared to what is available at brick and mortar retailers
4. Busy lifestyles, urban traffic congestion and lack of time for offline shopping
5. Lower prices compared to brick and mortar retail driven by disintermediation and reduced inventory and real estate costs
6. Increased usage of online classified sites, with more consumer buying and selling second-hand goods
7. Evolution of the online marketplace model with sites like eBay, Flipkart, Snapdeal, Infibeam,qnetindia.in,Dealkyahai.com and Tradus. The evolution of ecommerce has come a full circle with marketplace models taking center stage again.

India's *retail market* is estimated at $470 billion in 2011 and is expected to grow to $675 Bn by 2016 and $850 Bn by 2020, – estimated CAGR of 7%.. According to Forrester, the e-

commerce market in India is set to grow the fastest within the Asia-Pacific Region at a CAGR of over 57% between 2012–16.

As per "India Goes Digital", a report by Avendus Capital, a leading Indian Investment Bank specializing in digital media and technology sector, the Indian e-commerce market is estimated at Rs 28,500 Crore ($6.3 billion) for the year 2011. Online travel constitutes a sizable portion (87%) of this market today. Online travel market in India is expected to grow at a rate of 22% over the next 4 years and reach Rs 54,800 Crore ($12.2 billion) in size by 2015. Indian e-tailing industry is estimated at Rs 3,600 Crore (US$800 mn) in 2011 and estimated to grow to Rs 53,000 Crore ($11.8 billion) in 2015.

On March 7, 2014 e-tailer Flipkart claimed it has hit $1 billion in sales, a feat it has managed to achieve before its own target (2015).

Overall e-commerce market is expected to reach Rs 1,07,800 crores (US$ 24 billion) by the year 2015 with both online travel and e-tailing contributing equally. Another big segment in e-commerce is mobile/DTH recharge with nearly 1 million transactions daily by operator websites.

III.CHALLENGES IN E- COMMERCE IN INDIA

The growth of ecommerce volumes in India is attracting the attention of players around the globe. India, the second most populous country in the world, is home to 1.2 billion people.

To put that number into perspective, consider this: the combined populations of Germany, UK, France, Italy, Netherlands, Belgium, and Greece equal one-fourth the population of India alone! Despite lower per-capita purchasing power, this still makes India one of the most attractive emerging markets for ecommerce. But India is far from being a bed of roses. Here are the top 8 challenges that ecommerce businesses face in India.

1. Indian customers return much of the merchandise they purchase online.

Ecommerce in India has many first time buyers. This means that they have not yet made up their mind about what to expect from ecommerce websites. As a result, buyers sometimes fall prey to hard sell. But by the time the product is delivered, they demonstrate remorse and return the goods. Though consumer remorse is a global problem, it is all the more prevalent in a country like India, where much of the growth comes from new buyers.

Returns are expensive for ecommerce players, as reverse logistics presents unique challenges. This becomes all the more complex in cross-border ecommerce.

2. *Cash on delivery is the preferred payment mode.*

Low credit card penetration and low trust in online transactions has led to cash on delivery being the preferred payment option in India. Unlike electronic payments, manual cash collection is laborious, risky, and expensive.

3. Payment gateways have a high failure rate.

As if the preference for cash on delivery was not bad enough, Indian payment gateways have an unusually high failure rate by global standards. Ecommerce companies using Indian payment gateways are losing out on business, as several customers do not reattempt payment after a transaction fails.

4. Internet penetration is low.

Internet penetration in India is still a small fraction of what you would find in several western countries. On top of that, the quality of connectivity is poor in several regions. But both these problems are fast disappearing. The day is not far when connectivity issues would not feature in a list of challenges to ecommerce in India.

5. Feature phones still rule the roost.

Though the total number of mobile phone users in India is very high, a significant majority still use feature phones, not smartphones. So, for all practical purposes this consumer group is unable to make ecommerce purchases on the move. Though we are still a couple of years away from the scales tipping in favor of smartphones, the rapid downward spiral in the price of entry-level smartphones is an encouraging sign. I expect that the next few quarters will witness announcements of new smartphones in India at the $30-40 price point. That should spur growth in smartphone ownership.

6. Postal addresses are not standardized.

If you place an online order in India, you will quite likely get a call from the logistics company to ask you about your exact location. Clearly your address is not enough. This is because there is little standardization in the way postal addresses are written. Last mile issues add to ecommerce logistics problems.

7. Logistics is a problem in thousands of Indian towns.

The logistics challenge in India is not just about the lack of standardization in postal addresses. Given the large size of the

country, there are thousands of towns that are not easily accessible. Metropolitan cities and other major urban centers have a fairly robust logistics infrastructure. But since the real charm of the Indian market lies in its large population, absence of seamless access to a significant proportion of prospective customers is a dampener. The problem with logistics is compounded by the fact that cash on delivery is the preferred payment option in India. International logistics providers, private Indian companies, and the government-owned postal services are making a valiant effort to solve the logistics problem. If someone could convert the sheer size of the problem into an opportunity, we might soon hear of a great success story coming out of the Indian logistics industry.

8. Overfunded competitors are driving up cost of customer acquisition.

The vibrancy in the Indian startup ecosystem over the past couple of years has channeled a lot of investment into the ecommerce sector. The long-term prospects for ecommerce companies are so exciting that some investors are willing to spend irrationally high amounts of money to acquire market share today. Naturally the Indian consumer is spoiled for choice. However, this trend has reversed as investors are getting worried about slipping further down a slippery slope, and I expect more rational behavior in 2014.

CONCLUSION

While this article focuses on ecommerce challenges in India, an intrinsically one-sided topic, it is important to note that ecommerce giants are increasingly attracted to India. Cross-border ecommerce to India is growing, and many large international players are also making a significant investment in setting up shop in India.

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PERFORMANCE APPRAISAL SYSTEM: A STUDY ON ITS PROCESS AND METHODS

***Ms. Supriya Mahajan,**

M.Phil Research Scholar, Department of Management, Lovely Professional University, Phagwara, mahajansupi@gmail.com, (M) – 07508612857

ABSTRACT

Human resource management plays an important role in the organisation. The function like recruitment, selection, training, development, and performance appraisal system every function comes under human resource management. This paper basically focuses on the one of the important function of human resource management that is Performance Appraisal System. Performance Appraisal System is a method which is used to evaluate the performance of employees in the organisation. There are many appraisal methods which are used to evaluate the performance of employees. It depends on the organisation which method they used to evaluate their employees. This paper basically explains the process and methods of Performance Appraisal System which are used in the organisation.

Keywords: Performance appraisal system, Process of Performance Appraisal System, Methods of Performance Appraisal System

I. INTRODUCTION

A. WHAT IS PERFORMANCE APPRAISAL SYSTEM?

Performance appraisal is a systematic, periodic and impartial rating of an employee's excellence in the matters pertaining to his present job and potential for a better job. Performance appraisal is among the most important human resource practices and is one of the most heavily researched topics in work psychology (Fletcher, 2002). The most difficult task in human resource management for supervisors is to appraise employee's performance. Appraising performance of an individual is a most complex and challenging job. Judgements about how individuals are performing will be made if there is a formal appraisal system because people regularly make judgments about others (Grote, 1996; Seldin, 1988). Performance appraisal is the unavoidable element of the organisational life (Brown, 1988; Longenecker and Flink, 1999). Through Performance Appraisal System organisation seek to provide feedback to their employees, develop their competencies, enhance performance and distribute rewards.

B. Terms in Performance Appraisal System

The most important terms which are used in Performance Appraisal System are:-

- Rater: - The person who evaluates the employee is called rater or appraiser.
- Ratee: - The employee who is rated is called ratee.

- Rating: - The process of performance appraisal is called rating.

II. REVIEW OF LITERATURE

According to Professor of Management, Sir Wayne Cascio Performance appraisal is the systematic description of an employee's job relevant strength and weakness.

(Grote, 2002) defined Performance Appraisal is a formal management system for the evaluation of the quality of individual's performance in an organisation. The appraisal is prepared by the employee immediate supervisor. This appraisal procedure requires the supervisor to fill out a standard assessment form that evaluates the individual on different dimensions and then after evaluation the result will be discussed with the employee.

(Herwig, 2003) defined that the point of Performance appraisal is to check the people under contract are performing as well as they can and also to assess whether they are being fairly rewarded (their remuneration, like their duties, is subject to contractual agreement.

(Mondy and Noe, 2005) defined that Performance appraisal is a formal system of review and evaluation of individual or team task performance.

(Armstrong, 2006) defined performance appraisal as formal assessment and rating of individuals by their managers at, usually, an annual review meeting.

(Turk and Roolaht, 2007) Performance appraisal can be defined as a process aimed at determining the results of employee's work. The main function of performance appraisal is to offer a justice compensation for an employee's effort.

(Army, 2007) defined Performance appraisal is a process not a form. A good appraisal system includes observation, documentation and communication. It can improve employee performance and morale; identify who are the poor performers and what are the ways of their improvement.

Performance appraisal is a process by which a manager (a) examines and evaluates an employee's work behaviour by comparing it with present standards,(b) documents the results of the comparison and (3) uses the results to provide feedback to the employee to show the employee need improvement and why. Performance appraisal are employed to who needs training and type of training needed and who will be retained, promoted, demoted and fired.

III. OBJECTIVE OF THE STUDY

The main objective of the paper is to study the Process and Methods of Performance Appraisal System.

IV. PROCESS OF PERFORMANCE APPRAISAL SYSTEM

- **Establishing Performance Standards:** The first step in the process of Performance Appraisal is the setting up of the standards which will be used to as the base to compare the actual performance of employees. The standards set should be clear, easily understandable and in measurable terms.
- **Communicating Standards and Expectations:** Once the standards are set it is the responsibility of the management to communicate the standards to all the employees of the organisation. The employees should be informed and

standards should be clearly explained to them. This will help them to understand their roles and to know what exactly is expected from them.

- **Measuring the Actual Performance:**The most difficult part of the Performance appraisal process is measuring the actual performance of the employees that is the work done by the employees during the specified period of time. It is a continuous process which involves monitoring the performance throughout the year. This stage requires the careful selection of the appropriate techniques of measurement, taking care that personal bias does not affect the outcome of the process and providing assistance.
- **Comparing with Standards:** The comparison tells the deviations in the performance of the employees from the standards set. The result can show the actual performance being more than the desired performance or, the actual performance being less than the desired performance depicting a negative deviation in the organizational performance. It includes recalling, evaluating and analysis of data related to the employees' performance.
- **Discussing Results (Providing Feedback):** The result of the appraisal is communicated and discussed with the employees on one-to-one basis. The results, the problems and the possible solutions are discussed with the aim of problem solving and reaching consensus. The feedback should be given with a positive attitude as this can have an effect on the employees' future performance.
- **Decision Making (Taking Corrective Action):**The last step of the process is to take decisions which can be taken either to improve the performance of the employees, take the required corrective actions, or the related HR decisions like rewards, promotions, demotions, transfers etc.

V. METHODS OF PERFORMANCE APPRAISAL SYSTEM

- **Easy Appraisal Method: -**This involves a description of the performance of an employee by his superior. The description is an evaluation of the performance of any individual based on the facts and often includes examples and evidences to support the information.
- **Straight Ranking Method: -** In this method, the appraiser ranks the employees from the best to the poorest on the basis of their overall performance. It is quite useful for a comparative evaluation.
- **Critical incident Method: -** In this method, the evaluator rates the employee on the basis of critical events and how the employee behaved during those incidents. It includes both negative and positive points. The drawback of this method is that the supervisor has to note down the critical incidents and the employee behavior as and when they occur.
- **Paired Comparison Method: -** This method compares each employee with all others in the group, one at a time. After all the comparisons on the basis of the overall comparisons, the employees are given the final rankings.
- **Checklist Method: -** The rater is given a checklist of the descriptions of the

behavior of the employees on job. The checklist contains a list of statements on the basis of which the rater describes the on the job performance of the employees.

- **Forced Distribution Method: -** To eliminate the element of bias from the Rater's ratings, the evaluator is asked to distribute the employees in some fixed categories of ratings like on a normal distribution curve. For example you may decide to distribute employees as follows:
  15% high performance
  20% high average performance
  30% average performance
  20% low average performance
  15% low performance
- **Assessment Centres:** -An assessment center typically involves the use of methods like tests and exercises, assignments being given to a group of employees to assess their competencies to take higher responsibilities in the future. Employees are given an assignment similar to the job they would be expected to perform if promoted. The trained evaluators observe and evaluate employees as they perform the assigned jobs and are evaluated on job related characteristics. The major competencies that are judged in assessment centers are interpersonal skills, intellectual capability, planning and organizing capabilities, motivation, career orientation etc.
- **Human Resource Accounting Method: -** It tries to find the relative worth of these assets in the terms of money. In this method the Performance appraisal of the employees is judged in terms of cost and contribution of the employees. The cost of employees include all the expenses incurred on them like their compensation, recruitment and selection costs, induction and training costs etc. whereas their contribution includes the total value added (in monetary terms). The difference between the cost and the contribution will be the performance of the employees.
- **Management By Objectives :-** In this method, the manager jointly with the employee determines specific measurable goals or targets to the employees, then periodically monitors his progress towards these goals or targets. Depending on the performance exhibited, goals or targets are redesigned or modified for the next appraisal cycle.
- **360 degree Appraisal Method: -** The most comprehensive appraisal where the feedback about the employees' performance comes from all the sources that come in contact with the employee on his job. 360 degree respondents for an employee can be his/her peers, managers (i.e. superior), subordinates, team members, customers, suppliers/ vendors - anyone who comes into contact with the employee and can provide valuable insights and information or feedback regarding the "on-the-job" performance of the employee. 360 degree appraisal has four integral components:
  Self-appraisal
  Superior's appraisal
  Subordinate's appraisal
  Peer appraisal

VI. CONCLUSION

The study concludes that Performance appraisal system plays a very important role for the

satisfaction of employee with the job. If employee is satisfied with their appraisal system then they are satisfied with their job so satisfaction of employee with Performance Appraisal System is very important. Now it is concluded that for the satisfaction with Performance Appraisal System the system should be proper. That means the system is Fair, free from any kind of Error so that it motivates the employee to perform better in future.

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Title: Financial Analysis of Pre and Post - Merger of HDFC Bank with CBOP

1) **Ms. ANJALI SHARMA (Lecturer, Lovely Professional University, Phagwara, Phone:9781033377, email : anjalisharma13b@yahoo.co.in)**
2) **Mr. RAMANDEEP GAUTAM (HOD & AP, St. Soldier Management & Technical Institute, BastiMitthu, Jalandhar, Phone : 9465580520, email : ramangautam11@yahoo.com*)***

Abstract: **In today's competitive world Mergers and Acquisition is one of the important corporate level strategies. There are various reasons like creating synergy, achieve economies of scale, expand operations and cut costs etc. due to which the entities adopt this strategy. The purpose of our research paper is to go behind the scene highlighting those forces which are playing active role in the mergers and acquisition of Centurion Bank of Punjab and Housing Development Finance Corporation Bank in year 2008.This paper discusses two time slots, one pre and second post-merger period. In these time slots five years before and after merger has been studied by doing financial analysis of the two banks on the basis of following Ratios like, debt equity ratio, financial coverage ratio, net profit margin ratio, return on net worth ratio, credit to deposit ratio etc. The data pre and post-merger was collected and its impact on financial position of HDFC Bank was studied by applying Time Dummy model through SPSS software to test the statistical significance which helps to know that Merger had a positive effect on financial health of the Bank. The results found suggest that the bank has gained efficiency and is able to pass benefits to all stakeholders in the society. Thus it can be said that the banks benefitted from this venture.**

Keywords*:* Mergers & Acquisition, Banking Industry, Statistical Significance, Time Dummy Model, SPSS.

INTRODUCTION: Mergers and Acquisitions have gained substantial importance in the present day Corporate World as it is one of the best processes of Capital Restructuring. Restructuring usually means major alterations and modifications in the corporate strategies and beliefs. This strategic alliance is adopted with an aim of getting a competitive edge over competitors, eventually creating a new economic paradigm. The increasing popularity of mergers can be attributed to breaking of trade barriers and high-end competition. This expansion is either done through absorption or consolidation. The present case is also one such example of consolidation. This type of set up was a horizontal merger and was mainly taken up to meet the competition from foreign banks, Policies of Government of India, Inflation, gaining synergy etc.

Need of the study: The Merger between HDFC & CBOP Bank was one of the biggest in Indian Banking Sector. It proved beneficial in taking CBOP out of financial crises and financially strengthened HDFC. Therefore, through our research, we tried to study reasons behind the merger and its effect on financial position of HDFC Bank.

Scope of the Study: This study is restricted to merger between HDFC Bank and Centurion Bank of Punjab. The Pre- Merger and Post-Merger financial ratios have been compared for 5 years before the merger and 5 years after the merger.

Objectives of the Study: 1) To compare Pre-Merger financial Performance of the HDFC Bank and CBOP 2) To analyze Post-Merger Financial Performance of HDFC Bank

RESEARCH METHODOLOGY:
(Research Design)

Type of Research: The research design used for the study is descriptive research.

Research Tools: Dummy Variable Model using SPSS has been used to analyze data.

Sources of Data: The research has been conducted with the help of secondary data. The secondary data may be defined as the data that has been collected by someone other than the user. Entire research is dependent upon secondary data which has been collected from moneycontrol.com and capitolline.com.

(Sample Data)

Sample Size: The Study is based on the merger of Housing Development Finance Corporation (HDFC) Bank & Centurion Bank of Punjab (CBOP). To study the impact of the merger of HDFC Bank and CBOP sample data has been taken for 10 years. The data has been divided into pre- merger period **(2003 – 2007)** and post-merger period **(2009 – 2013)**.

Sampling Technique: Convenient sampling has been used as a sampling technique.

Sampling Unit: Sampling unit for the research is banking sector of India.

Sampling Selection: For the purpose of the research HDFC Bank and CBOP has been selected as their merger was one of the major mergers in Indian banking industry.

Hypothesis: For the purpose depicting the significance of Financial Ratios, Hypothesis has been formulated:

H0 = There is no significant difference between pre and post ratio of acquirer bank.

H1= There is significant difference between pre and post ratio of acquirer bank.

DATA ANALYSIS

1. **Debt Equity Ratio**

SPSS Output: (The Table No4.1Shows the SPSS Output of Dummy Variable Test on Debt Equity Ratio)

Model	Value	Significance	R Square
Constant	10.092	.000	.448
Time Dummy	-1.658	.034	

Before Merger = 10.092 – 1.658 * 0 = 10.092

After Merger = 10.092 – 1.658 * 1 = 8.434

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average current ratio of banks. H1: There is significant difference between pre average and post average current ratio of banks.	.034	Accept H1

At 5% level of significance, we find both Intercept and Time Dummy to be significant as the value is less than 0.05. Thus the merger of HDFC Bank and CBOP has

some **positive** impact on the debt equity ratio of HDFC Bank as it has reduced by 1.658 after the merger.

2. **Financial Charge Coverage Ratio**

SPSS Output: The Table No4.2Shows the SPSS Output of Dummy Variable Test on Financial Charge Coverage Ratio

Model	**Value**	**Significance**	**R Square**
Constant	1.642	.000	.700
Time Dummy	-1.000	.003	

Before Merger = 1.642 –1.000* 0 = 1.642

After Merger =1.642 –1.000 * 1 = 0.642

Hypothesis	**P Value**	**Accept / Reject**
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	.003	Accept H1

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value is ***less than 0.05***. The merger of HDFC Bank and CBOP has **negative** impact on financial charge coverage ratio as it has ***reduced by 1.000*** after the merger.

3. Net Profit Margin

SPSS Output: The Table No4.3Shows the SPSS Output of Dummy Variable Test on Net Profit Margin

Model	**Value**	**Significance**	**R Square**
Constant	15.846	.000	.087
Time Dummy	-1.004	.409	

Hypothesis	**P Value**	**Accept / Reject**
Ho: There is no significant difference between pre average and post average current ratio of banks. H1: There is significant difference between pre average and post average current ratio of banks.	.409	Accept Ho

At 5% level of significance, we conclude that both the Intercept and Time Dummy are insignificant as the value is ***more than 0.05***. The result clearly indicates that the merger of HDFC Bank and CBOP ***does not have any impact*** on the Net Profit Margin of HDFC Bank.

4. Return on Net worth

SPSS Output: The Table No4.4Shows the SPSS Output of Dummy Variable Test on Return on Net Worth

Model	**Value**	**Significance**	**R Square**
Constant	23.038	.000	.849

Time Dummy	-6.974	.000	

Before Merger =23.038 – 6.974* 0 = 23.038

After Merger =23.038 – 6.974* 01= 16.064

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	.000	Accept H0

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value is ***less than 0.05***. The merger of HDFC Bank and CBOP has ***negative*** impact on return on net worth of HDFC Bank as it has ***reduced by 6.974*** after the merger.

5.Credit to Deposit Ratio

SPSS Output: The Table No4.5Shows the SPSS Output of Dummy Variable Test on Credit/Deposit Ratio

Model	Value	Significance	R Square
Constant	60.094	.000	.588
Time Dummy	14.566	.010	

Before Merger = 60.094 + 14.566* 0 = 60.094 After Merger = 60.094 + 14.566* 1 = 74.66

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	.010	Accept H1

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value is ***less than 0.05***. The merger has ***positive impact*** on credit/deposit ratio as it has ***increased by 14.566*** after the merger.

6. Investment to Deposit Ratio

SPSS Output: (The Table No4.6Shows the SPSS Output of Dummy Variable Test on Investment to Deposit Ratio)

Model	Value	Significance	R Square
Constant	55.942	.000	.790
Time Dummy	-17.496	.001	

Before Merger = 55.942 –17.496* 0 = 55.942

After Merger = 60.094 – 14.566* 1 = 45.528

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	.001	Accept H0

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value is ***less than 0.05***. The merger has ***negative impact*** on investment to deposit as it has ***reduced by 17.496*** after the merger.

7. Interest Expended to Interest Earned Ratio

SPSS Output: The Table No4.7Shows the SPSS Output of Dummy Variable Test on Int. Expended to Int. Earned Ratio

Model	Value	Significance	R Square
Constant	45.838	.000	.495
Time Dummy	5.858	.023	

Before Merger = 45.838 + 5.858* 0 = 45.838 After Merger = 45.838 + 5.858* 1 = 51.696

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	.023	Accept H1

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value is ***less than 0.05***. The merger has ***positive impact*** on interest expended to interest earned ratio as it has ***increased by 5.858*** after the merger.

8. Interest Expended to Total Funds

SPSS Output: The Table No4.8 Shows the SPSS Output of Dummy Variable Test on Int. Expended to Total Funds

Model	Value	Significance	R Square
Constant	3.264	.000	.522
Time Dummy	1.398	.018	

Before Merger = 3.264 + 1.398 * 0 = 3.264

After Merger = 3.264 + 1.398 * 1 = 4.662

Hypothesis	P Value	Accept / Reject
Ho: There is no significant difference between pre average and post average Current ratio of banks. H1: There is significant difference between pre average and post average Current ratio of banks.	0.18	Accept H1

At 5% level of significance, we conclude that both the Intercept and Time Dummy are significant as the value *is less than 0.05*. The merger has *positive impact* on credit/deposit Ratio as it has *increased by 1.398* after the merger

S. No.	Ratio	SPSS Output		Hypothesis
		Significant	Insignificant	
1.	Debt Equity Ratio			Accept H1
2.	Financial Charge Coverage Ratio			Accept H1
3.	Net Profit Margin			Accept Ho
4.	Return on Net Worth			Accept H1
5.	Credit to Deposit Ratio			Accept H1
6.	Investment to Deposit Ratio			Accept H1
7.	Int. Expended to Int. Earned Ratio			Accept H1
8.	Interest Expended to Total Funds			Accept H1
	Total	**7**	**8**	

CONCLUSION:

Thus by applying the dummy model through SPSS, we can say that yes, the merger has proved to be a profitable venture for HDFC Bank financially although for CBOP it was a win - win situation.
The statistical analysis done on ratios shows that there is a significant impact of merger on HDFC Bank after

Etailing: Challenges, Issues and Future Scope in Indian Business

Hardeep Singh Assistant Professor and Head
Department of Training & Placement
Ferozepur College of Engineering & Technology (FCET)
Ferozeshah, Ferozepur City, India
geniussodhi@gmail.com

Bikram Pal Singh Training & Placement Officer
Department of Training & Placement
Global Institutes
Amritsar City, India
bikram2k2@gmail.com

Abstract*—*In today's innovative world of advanced technologies especially Information Technology (IT), lot of companies are doing its retail business with the help of internet. It is growing day by day. This is called Etailing or Eretailing. In this paper we have discussed: what actually etailing is; steps involved in etailing and benefits and challenges to etailing in India. Research Methodology used is based on primary as well as secondary data. Theoretical frame work has been developed from the literature, data collected from the multiple sources of evidence in addition to books, news papers, journals, websites and other professional magazines. Some primary data has been discussed collected on the basis of personal interactions with internet users, discussions with experts and the learned persons. Sample size was 200. Method of sampling used was Non-probability sampling method and convenience sampling. The research paper will help retailers; professionals; and readers understand the nature of the Indian consumers' concerns that form an obstacle to online shopping.

Key Words— **Companies; Etailing; Internet; IT; Technology.**

I. INTRODUCTION

The e-retailing(less frequently; e-Retailing, e-Tailing, etc.) is the concept of selling of retail goods using electronic media, in particular, the internet. The vocabulary "electronic retailing," that used in internet discussions as early as 1995, the term seems an almost in evitable addition to e-mail, e-business and e-commerce, etc. e-retailing is synonymous with business- to- consumer (B2C) transaction model of e-commerce. Although e-retailing is an independent business model with certain specific constituents like; trust model, electronic transaction process, etc, but in reality it is a subset of e- commerce by nature.

E-Retailing stores sell online promotion only for goods that can be sold easily online, e.g., Amazon did for Books & CDs, etc. The online retailing require lots of displays and specification of products to make the viewers have a personal feel of the product and its quality as he gets while physically present in a shop.

E-Retailing refers to retailing over the internet. Thus an e-Retailing is a B2C (Business to customer) business model that executes a transaction between businessman and the final consumer. E-Retailers can be pure play businesses like amazon.com or businesses that have evolved from a legacy business such as tesco.com. The e-retailing is a subset of e-commerce. Thus, e-commerce is the master domain defining the e-retailing operation.

II. WHAT IS ETAILING

The word E-tail has its roots in the word 'retail'. Here the letter E stands for 'electronic' since the shopping process happens through the electronic media (internet). E-retailing, most commonly known as e-tailing is nothing but shopping through the Internet and other media forms. With the use of a web-space a virtual shop is created and the products are displayed through images in this space with the features and price tags. By accessing this shopping site a customer can choose his/her products into a cart. The payment to this product can be done in various modes as mentioned by the shopping site. The product would be delivered to the address specified by the customer. There are many things that are common between direct retail stores and online retail stores. Both have the process of billing of the customers and have to maintain a relationship with the suppliers. There are certain essential ingredients for an electronic retailing business to be successful. One must consider these components well in advance before setting up an electronic storefront. These essential components are: Attractive business-to-consumer (B2C) e-commerce portal; Right revenue model; Penetration of the Internet.

III. ONLINE SITES FOR ETAILING IN INDIA

Etailers in India are Yebhi.com; Flipkart.com; Infibeam.com; Myntra.com; E-bay.com; Indiatimes shopping. E Bay is heading the race of online retailers. In this race it has become very difficult to determine the online retail store that makes the products available at convenient and cheap rates. From this very difficulty has cropped up comparison sites. Comparison is done on the basis of an index which is constructed from the data available from different shopping sites. The bechna.com and the ultop.com are such sites though many more sites are entering this zone.

The comparison sites not only help to choose the online sites that would be providing the best deal but also offline as well. Sites like Rediffproductsearch, Compare India.com have constructed the data that is taken from the conventional local retailers. These sites help the customer in finding out the local retail store that will best suit his purpose.

IV. STEPS INVOLVED IN ETAILING

The shopping process through internet media happens in 5 steps generally.

a) Customer visit

The customer accesses the website of the e-tailer through his/her mobile or PC or laptop. This visit is very critical to the e-tailer because it is this visit that would create an opportunity for a business. The simplicity of the site, the arrangements of the products in the site and various other factors decide the first impression of the customer.

b) Choice of product

Once the customer visits the site he/she would choose a product based on the image and valid information available on the web page. This information can include the price tag, details about the product, availability/deliverable time span and even customer reviews on the product.

c) Payment online

Once the customer chooses the product the next step would be to go through a secure process of data exchange. The e-tailer may provide a unique user account to the customer to keep the transaction safe. Payments to the product can be made online through credit or debit card or even cash on delivery basis where the customer pays the e-tailer when the product is delivered to him/her.

d) Product delivery

Once the order is placed with the e-tailer the next process would test the efficiency of supply chain network of the e-tailer. The delivery of the product would be based on the availability of the product in the inventory closest to the customer's delivery address. This process may also involve shipment of the product. There are different methods used in this process. Some e-tailers just create a platform through a website where the business actually takes place between the customer and a company (or business) who is a client to the e-tailer. Here the e-tailer would just take the commission on each product sold. Typically an e-tailer may also choose to buy products that have potential demand and then display it on the site. In this case the e-tailer would have to take care of inventory expenses and also the entire procurement and disbursement cycle.

e) Customer feedback

Once the product is delivered to the customer the feedback from the customer is very much important. This is primarily because of the absence of a real shopping store environment. The entire experience of the customer during the process would be an indicator of the efficiency of e-tailing. This experience of the customer can be accessed through proper customer service for feed backs and the problems faced by the customer should be corrected by the e-tailer. Late delivery, wrong product, damaged product etc can be some of the customer complaints which the e-tailer would have to sort out.

V. OBJECTIVES OF THE STUDY

Objective is an end that can be reasonably achieved within an expected timeframe and with available resources. In general, an objective is broader in scope than a goal, and may consist of several individual goals. Objectives are basic tools that are underlying all planning and strategic activities. They serve as the basis/policy and performance appraisals. Any study done without any objective is useless. The main objectives of this research paper are: To study and understand the concept of Etailing; To study the scope and issues of etailing in future business; To make the public aware about benefits and bottlenecks faced by etailing in India; To study the future scope of etailing in India.

VI. RESEARCH METHODOLOGY

Research is the systematic investigation into existing or new knowledge.[citation needed] It is used to establish or confirm facts, reaffirm the results of previous work, solve new or existing problems, support theorems, or develop new theories. This paper is totally based on empirical studies and data. The data used in the study is primary as well as secondary. Primary data has been discussed collected on the basis of personal interactions with internet users, discussions with experts and the learned persons. Sample size was 200. Method of sampling used was Non-probability sampling method and convenience sampling. Structured questionnaire was also used to collect the primary data. Secondary data has been collected from the books, professional magazines, websites, journals, research papers and news papers.

VII. BENEFITS OF ETAILING

1. It reduces the space occupied by retail outlets in the real world.
2. It gives quick and easy access to a shopping space at any time and from any place where there is access to internet.
3. It saves time of the customer that is spent on travelling to a shopping place in real world.
4. It creates a new platform for goods from different parts of the world which could be imported by placing an order.
5. The electronic channel gives the existing brick-store retailers an opportunity to reach new markets
6. For the existing retailers, it is an extension to leverage their skills and grow revenues and profits without creating an altogether new business.
7. E-Retailing overcomes some limitations of the traditional formats, for instance the customers can shop from the comfort of their homes.
8. The e-commerce software that also traces the customers' activities on the Net enables e-retailers to gain valuable insights into their customers shopping behavior.
9. The e-retail channels transcend all barriers of time and space. The retailers' server must be on 24*7. An order

can come from any customer living any place at any time of the day.

10. E-Commerce channels are definitely efficient and retailers do not have to pay a heavy price for brick-n-mortar shops in costly shopping malls.

VIII. Bottlenecks faced by Etailing in India

a) Unproven Business Models

In the formative years of dot-com era, most of the businesses on the Net were experiments in new areas and did not provide enduring sources of profit. This was the primary reason behind closing down of 90 per cent of the purely e-commerce companies in the beginning of this century. Today, dot-com businesses have matured a little. Still some of the businesses are at experimental level and do not guarantee regular revenue.

b) Channel Conflicts

Companies selling through the Internet as well as through brick stores may find their interest conflicting at many places. In electronic storefront orders, the goods directly reach the end-consumer and so the distributors and sellers may feel the threat to their existence. Most of the time, it is seen that retailers tend to reduce price over the Net. The sale at the brick store may store may drop because the retailer may tend to sell more through the Internet as a result of reduction of prices.

c) Problems Payment System

People in India are not used to the online shopping system and moreover the online payment system through the credit card is also totally alien to them. Most of them do not avail of the transaction facilities offered by the credit cards. They are also dubious regarding the online payment system through the credit cards. Hence different payment options should be made available to them like the credit card, cash on delivery and net banking to give them further assurance.

d) Problems With Shipping

The customers using the online shopping channel should be assured that the products that they have ordered would reach them in due time. For this the retail companies have resorted to private guaranteed courier services as compared to postal services.

e) Offline Presence

The customers should be assured that the online retailers are not only available online but offline as well. This gives them the psychological comfort that these companies can be relied upon.

f) Products Offered at Discounted Rates

The online retailers save on the cost of building and employee salaries. Some part of this benefit should also be enjoyed by the online customers by a reduction in the price of the product. The customers should be conveyed this message that they are getting the products at a discounted price.

g) Language Problem

Most internet retail shops use English as their mode of communication. English may not be comprehensible to the majority of the Indian population . To increase the customer base, content in the online retail shops should be provided in local language.

h) Legal Issues

Proper laws have not yet evolved for Internet based transactions. Validity of e-mails, digital signatures and application of copyright laws is being checked by various government authorities. E-mail and digital signatures are now being recognized as valid for any legal purpose. Value Added Tax (VAT) is yet another area that creates problems. Taxes on goods and services are still an issue. Since the taxes are levied and shared by multiple government agencies at local, state or federal level, there are no clear rules to guide retailers on that. In e-retailing, the place of billing, the place of dispatch of goods and the place of delivery all differ. If these three places fall in different jurisdictions of governments, levy and submission of taxes would be a problem.

i) Security and Privacy

Security is one of the major challenges in the digital world. Despite a lot of security arrangements, such as passwords and firewalls, we come across the news of website hacking and data pilferages. The Internet being on public domain is more susceptible to unauthorized peeping. People are wary of divulging information regarding their credit cards and personal details on the Net because they can be misused. Cyber criminals have exploited the Internet weaknesses and have broken into computer systems, retrieving passwords and banking information. Security of payment gateway is a major concern, which has to be taken care of by the retailer by putting up proper security layers.

j) Another reason why the concept of e- retailing or online retailing has not gained prominence in India is that the Indians prefer to touch the products physically before buying them. This facility is provided through the multi-brand outlets, not available online. Studies have revealed the preferences of the customers towards the traditional shopping methods. Hence the retailer online should first make it a point to spot the potential customers and accordingly plan out the product. If the customers are more open to online shopping, then nothing can be more beneficial. They save the time and effort to visit, departmental stores, shopping malls, etc. products can be delivered by a click of the mouse.

k) Another problem is that the retail industry is standing on its point of inflexion and considering its infant stage, it would take time for the new concept of e-retailing to take off.

IX. Future of Etailing in India

There are divergent views on the future of e-retailing in India. Some experts are of the opinion that the giant, big brand retailers would dominate the small ones due to their wider investment capacities. It would be next to impossible for the small retailers and the kiranas to prove their existence in the battlefield of online retailing. Another viewpoint is that there would be an exponential growth in the online retailing business in India.

X. Conclusions

Finally, to conclude that e-retailing isn't just about building a pretty website. An established management consulting firm will bring in the requisite skills to evaluate business plan,

check out revenue models, help identify alliances and integrate supply chain processes with e-commerce initiatives.

The most and important concentration is to keep focus on back- end system. Customers keep coming back only if earlier shopping experiences have been pleasant and successful. Quit gloating over the 70% success rate of on-line purchases. In this intricate business world, the e-retailing will become tremendous business strategic concept, and it may be very helpful and most profitable method of business process in coming decade to the textile and garment industries.

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We hereby acknowledge the contribution of information providers to give us proper information and enable us to write this paper. We would also like to thank the eminent personalities who spared their precious time to respond to our questionnaires, personal interviews and telephonic interviews. We once again thank all and one who contributed in our research work by providing us worthy information. Moreover we are highly thankful to "Dr. Rajneesh Arora" VC Punjab Technical University Jalandhar (Punjab) who always motivates all the manpower to participate in research work. Without motivation of such high authorities it was not only difficult but even impossible to do such creative work. Our acknowledgement also goes to an eminent learned educationist, "Professor Joginder Singh Jogi" for his cordial support and motivating us for doing this creative research work and publications. May he live long!

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AUTHOR'S BRIEF BIOGRAPHY

Hardeep Singh Main Author Having more than 10 years experience, he is working as Asst Prof & Head Training & Placement Department at FCET, Ferozepur, Punjab, India. He has authored 2 books. He is life member of many national & international bodies like IACSIT; IETE; PCMA; IFRSA; IEDRC. He has received Gold Medal & **Rashtriya Vidya Saraswati Puraskar**. He has been invited as Key Note Speaker ICMLC 2011 Singapore; Conf. Tech. Chair ICMET 2011 Dalian, China; ICMEI 2012 Kala Lumpur, Malaysia; ICFT 2012 Hong Kong, China; ICHSC 2012 Hong Kong, China; ICEME 2012 Hong Kong, China; CBETM 2012 Hong Kong, China; ICMEI 2013 Copenhagen, Denmark; ICMSS 2013 Copenhagen, Denmark; & ICEBI 2013 Copenhagen, Denmark. He has attended 65 National & International Conference & has 93 Research Publications.

Bikram Pal Singh (Co-Author) currently employed as an Assistant Professor cum Training and Placement Officer at Global Institutes Amritsar, Punjab. He is Life Member of many national and international bodies. Mr. Singh has received **Award of Honor** from DAV College, Malout, Punjab, INDIA. He has attended 35 International/National Conferences and has 40 Research Papers in International and National Research Publications/Conferences

HRM: A paradigm that brought a shift towards sustainable corporate management in India

Hardeep Singh Assistant Professor and Head
Department of Training & Placement
Ferozepur College of Engineering & Technology (FCET)
Ferozeshah, Ferozepur City, India
geniussodhi@gmail.com

Bikram Pal Singh Training & Placement Officer
Department of Training & Placement
Global Institutes
Amritsar City, India
bikram2k2@gmail.com

Abstract*— *In the age of competition, companies do not have any other choice than to compete better than their competitors. Human resource management has a critical role to play in supporting the corporate strategic plan. The main task of human resource management is to support other departments to have the best people. Therefore, there is a critical need of human resource planning (right number of people at right time for right place). The world of work is rapidly changing. As a part of an organization or a company, Human Resource Management (HRM) must be prepared to deal with effects of changing world of work. For the HR people it means understanding the implications of globalization, work-force diversity, changing skill requirements, corporate downsizing, continuous improvement initiatives, re-engineering, the contingent human resources, decentralized work sites and employee involvement.

Key Words— ***Companies; Employee; Globalization; Human Resource Management; Organizations.***

I. INTRODUCTION

India is a country in transition. Historical, socio-economic and cultural factors strongly influence Indian HRM. Keeping in mind the dynamic changes taking place in India, and their subsequent influence and reflection in Indian HRM, the following factors provide essential background and context about key aspects of the Indian landscape: 1) language, 2) geography and 3) generational differences. Ultimately, to be successful in business in India, it is important to realize the many unique aspects of talent mindset in the Indian HRM context. In recent years, the connections among

Human resources, employee engagement, HR retention and productivity have got more attention. The level of engagement is necessary for organizational productivity and, ultimately, success of an organization, as it reflects the interest of the workforce to help the companies succeed.

Many Indian corporations are now an integral part of the global community. As important contributors to the world economy, Indian corporations require human the World Federation of Personnel Management Associations, points out that although there is not a labor shortage in India, talent is in short supply and in great demand. Thus, this becomes the responsibility of HR leaders to attract and keep talent. Some Indian companies or organizations pressurize the HR managers to retain the work force. Further, in the global arena, the number of Indian high-performance companies are growing. At the same time, Indian global enterprises, particularly in the information technology (IT) industry, are gaining ground with their innovative work cultures. Still, traditional characteristics of Indian management remain—authority, hierarchy, familial networks, community boundaries and acceptance of ambiguity. According to scholars of business culture, it appears that there is a blending of values in Indian organizations, as they develop their own unique form of management, with a mix of tradition and the best of global and/or Western management practices. Ultimately, managerial challenges with global links will create opportunities to develop world-class Indian organizations through learning and innovation. Successful movement forward will greatly depend on the competencies and changing mindsets of a new generation of Indian managers.

II. WHAT IS HRM

A basic concept of management states that manager works in organizations. Organization has three basic components, People, Purpose, and Structure. HRM is the study of activities regarding people working in an organization. It is a managerial function that tries to match an organization's needs to the skills and abilities of its employees. HR management involves the policies and practices needed to carry out the staffing (or people) function of management.

HR department regardless of the organization's size must perform following human resource management functions...

- Staffing (HR planning, recruitment and selection)
- Human resource development
- Compensation and benefits
- Safety and health
- Employee and labor relations
- Records maintaining, etc.
- HR research (providing a HR information base, designing and implementing employee communication system).
- Interrelationship of HR functions.

III. GLOBALIZATION, BUSINESS, HRM: IMPLICATIONS

Business today doesn't have national boundaries – it reaches around the world. The rise of multinational corporations places new requirements on human resource managers. The HR department needs to ensure that the appropriate mix of employees in terms of knowledge, skills and cultural

adaptability is available to handle global assignments. In order to meet this goal, the organizations must train individuals to meet the challenges of globalization. The employees must have working knowledge of the language and culture (in terms of values, morals, customs and laws) of the host country. Human Resource Management (HRM) must also develop mechanisms that will help multicultural individuals work together. As background, language, custom or age differences become more prevalent, there are indications that employee conflict will increase. HRM would be required to train management to be more flexible in its practices. Because tomorrow's workers will come in different colors, nationalities and so on, managers will be required to change their ways. This will necessitate managers being trained to recognize differences in workers and to appreciate and even celebrate these differences.

IV. ROLE OF HR MANAGER IN THE RECENT GLOBAL CORPORATE

The role of the Human Resource Manager is evolving with the change in competitive market environment and the realization that Human Resource Management must play a more strategic role in the success of an organization. Organizations that do not put their emphasis on attracting and retaining talents may find themselves in dire consequences, as their competitors may be outplaying them in the strategic employment of their human resources. With the increase in competition, locally or globally, organizations must become more adaptable, resilient, agile, and customer-focused to succeed. And within this change in environment, the HR professional has to evolve to become a strategic partner, an employee sponsor or advocate, and a change mentor within the organization. In order to succeed, HR must be a business driven function with a thorough understanding of the organization's big picture and be able to influence key decisions and policies. In general, the focus of today's HR Manager is on strategic personnel retention and talents development. HR professionals will be coaches, counselors, mentors, and succession planners to help motivate organization's members and their loyalty. The HR manager will also promote and fight for values, ethics, beliefs, and spirituality within their organizations, especially in the management of workplace diversity. The future success of any organizations relies on the ability to manage a diverse body of talent that can bring innovative ideas, perspectives and views to their work. The challenge and problems faced of workplace diversity can be turned into a strategic organizational asset if an organization is able to capitalize on this melting pot of diverse talents. With the mixture of talents of diverse cultural backgrounds, genders, ages and lifestyles, an organization can respond to business opportunities more rapidly and creatively, especially in the global arena (Cox, 1993), which must be one of the important organizational goals to be attained. More importantly, if the organizational environment does not support diversity broadly, one risks losing talent to competitors. This is especially true for multinational companies (MNCs) who have operations on a global scale and employ people of different countries, ethical and cultural backgrounds. Thus, a HR manager needs to be mindful and may employ a 'Think Global, Act Local' approach in most circumstances. The challenge of workplace diversity is also prevalent amongst Singapore's Small and Medium Enterprises (SMEs). With a population of only four million people and the nation's strive towards high technology and knowledge-based economy; foreign talents are lured to share their expertise in these areas. Thus, many local HR managers have to undergo cultural-based Human Resource Management training to further their abilities to motivate a group of professional that are highly qualified but culturally diverse. Furthermore, the HR professional must assure the local professionals that these foreign talents are not a threat to their career advancement (Toh, 1993). In many ways, the effectiveness of workplace diversity management is dependent on the skilful balancing act of the HR manager. One of the main reasons for ineffective workplace diversity management is the predisposition to pigeonhole employees, placing them in a different silo based on their diversity profile (Thomas, 1992). In the real world, diversity cannot be easily categorized and those organizations that respond to human complexity by leveraging the talents of a broad workforce will be the most effective in growing their businesses and their customer base.

Many companies are now realizing the advantages of a diverse workplace. As more and more companies are going global in their market expansions either physically or virtually (for example, E-commerce-related companies), there is a necessity to employ diverse talents to understand the various niches of the market. For example, when China was opening up its markets and exporting their products globally in the late 1980s, the Chinese companies (such as China's electronic giants such as Haier) were seeking the marketing expertise of Singaporeans. This is because Singapore's marketing talents were able to understand the local China markets relatively well (almost 75% of Singaporeans are of Chinese descent) and as well as being attuned to the markets in the West due to Singapore's open economic policies and English language abilities. (Toh, R, 1993)

With this trend in place, a HR Manager must be able to organize the pool of diverse talents strategically for the organization. He/She must consider how a diverse workforce can enable the company to attain new markets and other organizational goals in order to harness the full potential of workplace diversity. An organization that sees the existence of a diverse workforce as an organizational asset rather than a liability would indirectly help the organization to positively take in its stride some of the less positive aspects of workforce diversity.

V. OBJECTIVES OF THE STUDY

Any study done without any objective is useless. The main objectives of this research paper are: To study and understand the concept of Human Resource Management (HRM); To study the role of HR Manager in the recent global corporate; To make the public aware about the challenges for HR Manager in India; To study the emerging trends in HRM.

VI. RESEARCH METHODOLOGY

This paper is totally based on empirical studies and data. The data used in the study is primary as well as secondary. Primary data has been discussed collected on the basis of personal interactions with experts and the learned persons. Secondary data has been collected from the books, professional magazines, websites, journals, research papers and news papers.

VII. CHALLENGES FOR INDIAN HUMAN RESOURCE MANAGER

a) Work-force Diversity

In the past HRM was considerably simpler because our work force was strikingly homogeneous. Today's work force comprises of people of different gender, age, social class sexual orientation, values, personality characteristics, ethnicity, religion, education, language, physical appearance, martial status, lifestyle, beliefs, ideologies and background characteristics such as geographic origin, tenure with the organization, and economic status and the list could go on. Diversity is critically linked to the organization's strategic direction. Where diversity flourishes, the potential benefits from better creativity and decision making and greater innovation can be accrued to help increase organization's competitiveness. One means of achieving that is through the organization's benefits package. This includes HRM offerings that fall under the heading of the family friendly organization. A family friendly organization is one that has flexible work schedules and provides such employee benefits such as child care. In addition to the diversity brought by gender and nationality, HRM must be aware of the age differences that exist in today's work force. HRM must train people of different age groups to effectively manage and to deal with each other and to respect the diversity of views that each offers. In situations like these a participative approach seems to work better.

b) Changing skill requirements

Recruiting and developing skilled labor is important for any company concerned about competitiveness, productivity, quality and managing a diverse work force effectively. Skill deficiencies translate into significant losses for the organization in terms of poor-quality work and lower productivity, increase in employee accidents and customer complaints. Since a growing number of jobs will require more education and higher levels of language than current ones , HRM practitioners and specialists will have to communicate this to educators and community leaders etc. Strategic human resource planning will have to carefully weigh the skill deficiencies and shortages. HRM department will have to devise suitable training and short term programmes to bridge the skill gaps & deficiencies.

c) Corporate downsizing

Whenever an organization attempts to delayer, it is attempting to create greater efficiency. The premise of downsizing is to reduce the number of workers employed by the organization. HRM department has a very important role to play in downsizing. HRM people must ensure that proper communication must take place during this time. They must minimize the negative effects of rumors and ensure that individuals are kept informed with factual data. HRM must also deal with actual layoff. HRM department is key to the downsizing discussions that have to take place.

d) Continuous improvement programs

Continuous improvement programs focus on the long term well being of the organization. It is a process whereby an organization focuses on quality and builds a better foundation to serve its customers. This often involves a company wide initiative to improve quality and productivity. The company changes its operations to focus on the customer and to involve workers in matters affecting them. Companies strive to improve everything that they do, from hiring quality people, to administrative paper processing, to meeting customer needs. Unfortunately, such initiatives are not something that can be easily implemented, nor dictated down through the many levels in an organization. Rather, they are like an organization wide development process and the process must be accepted and supported by top management and driven by collaborative efforts, throughout each segment in the organization. HRM plays an important role in the implementation of continuous improvement programs. Whenever an organization embarks on any improvement effort, it is introducing change into the organization. At this point organization development initiatives dominate. Specifically, HRM must prepare individuals for the change. This requires clear and extensive communications of why the change will occur, what is to be expected and what effect it will have on employees.

e) Re-engineering work processes for improved productivity

Although continuous improvement initiatives are positive starts in many of our organizations, they typically focus on ongoing incremental change. Such action is intuitively appealing – the constant and permanent search to make things better. Yet many companies function in an environment that is dynamic- facing rapid and constant change. As a result, continuous improvement programs may not be in the best interest of the organization. The problem with them is that they may provide a false sense of security. Ongoing incremental change avoids facing up to the possibility that what the organization may really need is radical or quantum change. Such drastic change results in the re-engineering of the organization. Re-engineering occurs when more than 70% of the work processes in an organization are evaluated and altered. It requires organizational members to rethink what work should be done, how it is to be done and how to best

implement these decisions. Re-engineering changes how organizations do their business and directly affects the employees. Re-engineering may leave certain employees frustrated and angry and unsure of what to expect. Accordingly HRM must have mechanisms in place for employees to get appropriate direction of what to do and what to expect as well as assistance in dealing with the conflict that may permeate the organization. For re-engineering to generate its benefits HRM needs to offer skill training to its employees. Whether it's a new process, a technology enhancement, working in teams, having more decision making authority, or the like , employees would need new skills as a result of the re-engineering process.

f) Contingent workforce

A very substantial part of the modern day workforce are the contingent workers. Contingent workers are individuals who are typically hired for shorter periods of time. They perform specific tasks that often require special job skills and are employed when an organization is experiencing significant deviations in its workflow. When an organization makes its strategic decision to employ a sizable portion of its workforce from the contingency ranks, several HRM issues come to the forefront. These include being able to have these virtual employees available when needed, providing scheduling options that meet their needs and making decisions about whether or not benefits will be offered to the contingent work-force. No organization can make the transition to a contingent workforce without sufficient planning. As such, when these strategic decisions are being made, HRM must be an active partner in these discussions. After all its HRM department's responsibility to locate and bring into the organization these temporary workers. As temporary workers are brought in, HRM will also have the responsibility of quickly adapting them to the organization. HRM will also have to give some thought to how it will attract quality temporaries.

g) Decentralized work sites

Work sites are getting more and more decentralized. Telecommuting capabilities that exist today have made it possible for the employees to be located anywhere on the globe. With this potential, the employers no longer have to consider locating a business near its work force. Telecommuting also offers an opportunity for a business tin a high cost area to have its work done in an area where lower wages prevail. Decentralized work sites also offer opportunities that may meet the needs of the diversified workforce. Those who have family responsibilities like childcare, or those who have disabilities may prefer to work in their homes rather than travel to the organization's facility. For HRM, decentralized work sites present a challenge. Much of that challenge revolves around training managers in how to establish and ensure appropriate work quality and on-time completion. Work at home may also require HRM to rethink its compensation policy. Will it pay by the hour, on a salary basis, or by the job performed. Also, because employees in decentralized work sites are full time employees of the organization as opposed to contingent workers, it will be organization's responsibility to ensure health and safety of the decentralized work force.

h) Employee involvement

For today's organization's to be successful, there are a number of employee involvement concepts that appear to be accepted. These are delegations, participative management, work teams, goal setting, employee training and empowering of employees. HRM has a significant role to play in employee involvement. What is needed is demonstrated leadership as well as supportive management. Employees need to be trained and that's where human resource management has a significant role to play. Employees expected to delegate, to have decisions participatively handled, to work in teams, or to set goals cannot do so unless they know and understand what it is that they are to do. Empowering employees requires extensive training in all aspects of the job. Workers may need to understand how new job design processes. They may need training in interpersonal skills to make participative and work teams function properly.

VIII. EMERGING TRENDS IN HRM

The trends in human resource industry are dynamic in nature which contributes towards to achievement of organization goals. Over the years, highly skilled and knowledge based jobs have increased while low skilled jobs are decreasing. This calls for skill mapping through proper HRM initiatives. Change is inevitable as said and that's what Indian organizations are witnessing in management cultures, systems and working style. Alignment with global companies has forced Indian organization accept and incorporate change in every day life which makes role of HRM all the more important.

Some of the recent changes are as follows:

1. The policies of many companies have become people centric, traditionally the policies mainly focused on achievement of organizational goals showing negligence towards the human resource.
2. Attracting and retaining of human resource has become difficult as loyalty factor is losing its shine, today HR personnel have to motivate and design healthy career road map to make them stay in the company.
3. Human Resource Outsourcing is the new name in the industry to replace the redundant traditional HR department. Many HR outsourcing companies in India are already established and some are coming up to support increasing demand of corporate India.
4. With the increase of global job mobility, recruiting competent people is also increasingly becoming difficult, especially in India. Therefore organizations are also required to work out a retention strategy for the existing skilled manpower.

HR managers today are focusing on policies (trust, openness & equality), Motivation, Relations. Due to new

trends in HR the manager should treat people as resources, reward them equitably and integrate their goals with that of the organizational goals through suitable HR policies.

IX. CONCLUSIONS

The role of the HR manager must parallel the needs of the changing organization in India. Successful business organizations are becoming more sustainable adaptable, resilient, quick to change directions, and customer-centered. Within this environment, the HR professional must learn how to manage effectively through planning, organizing, leading and controlling the human resource and be knowledgeable of emerging trends in training and employee development.

ACKNOWLEDGEMENTS

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AUTHOR'S BRIEF BIOGRAPHY

Hardeep Singh Main Author Having more than 10 years experience, he is working as Asst Prof & Head Training & Placement Department at FCET, Ferozepur, Punjab, India. He has authored 2 books. He is life member of many national & international bodies like IACSIT; IETE; PCMA; IFRSA; IEDRC. He has received Gold Medal & **Rashtriya Vidya Saraswati Puraskar**. He has been invited as Key Note Speaker ICMLC 2011 Singapore; Conf. Tech. Chair ICMET 2011 Dalian, China; ICMEI 2012 Kala Lumpur, Malaysia; ICFT 2012 Hong Kong, China; ICHSC 2012 Hong Kong, China; ICEME 2012 Hong Kong, China; CBETM 2012 Hong Kong, China; ICMEI 2013 Copenhagen, Denmark; ICMSS 2013 Copenhagen, Denmark; & ICEBI 2013 Copenhagen, Denmark. He has attended 65 National & International Conference & has 93 Research Publications.

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CSR: A Strategy To Build Corporate Reputation And Brand Image

Asstt. Prof. Anupam Mishra
Dept. of Management,
Govt. Mohindra College,
Patiala, India.
anu.cnn@gmail.com

Abstract **– Research identified that corporate social responsibility (CSR) has had a positive impact on consumer behavior and the brand image but even so little was known about these effects (Sen & Bhattacharya, 2001). The limited amount of research on CSR and consumer behaviors to date has determined that CSR affects consumers both indirectly and directly, through company evaluations and purchase intentions, but the effects are varied (Sen & Bhattacharya, 2001). Corporate Social Responsibility creates a landing place in the minds of the target consumers. It not only provides to the Brand Equity awareness among the consumers but also leads to a positive Brand Image in the minds of the potential consumers. The purpose of this paper is to understand how Corporate Social Responsibility can lead to the creation of better brand image. It investigates the effectiveness of Corporate Social Responsibility initiatives creating positive brand image in the minds of the consumers. The present study is based on secondary data, information collected from authentic sources such as books, journals, magazines and research reports and electronic data gathered through related web sites.**

Keywords – Corporate Social Responsibility , Integrated Marketing , Brand Image, Consumer Perception, Company's Reputation.

I. INTRODUCTION

"It takes 20 years to build a reputation and five minutes to ruin it." – Warren Buffet, Chairman, CEO and largest shareholder of Berkshire Hathaway.

"Corporate social responsibility is a hard-edged business decision. Not because it is a nice thing to do or because people are forcing us to do it... because it is good for our business" - Niall Fitzerald, Former CEO, Unilever.

With the advent of the era of globalization and cut-throat competition concern of the companies has shifted to Corporate Social Responsibility. "Doing good" seems to be the new slogan for many brands nowadays. CSR isn't just about compliance with a new Act. It is strategic. Done well, CSR contributes to building corporate reputation and trust. This is critical because trust in businesses is very low, and people are disgusted with corrupt business practices and crony capitalism. CSR is also a fantastic way of engaging employees. There is a growing desire among educated people to "give back" to society, and a company's social initiatives are an excellent outlet for this desire.

After the years of economic misery and banking crisis, consumers want to get associated with the brands that believe more than a profit. The evolution of corporate social responsibility in India refers to changes over time in India of the cultural norms of corporations' engagement of corporate social responsibility(CSR), with CSR referring to way that businesses are managed to bring about an overall positive impact on the communities, cultures, societies and environments in which they operate. The fundamentals of CSR rest on the fact that not only public policy but even corporate should be responsible enough to address social issues. Thus companies should deal with the challenges and issues looked after to a certain extent by the states. CSR today "means something, but not always the same thing, to everybody" and unruly path or not, it is making its presence felt. Today every corporate felt the need of CSR, because this is the reality that if they want to successful they have to obey the social responsibility towards society. The very lack of clarity regarding what CSR means has perhaps become its single greatest strength: without any formal determination or widely accepted definition, CSR has come to mean so very much.

In 2006, Andrew Winston and Daniel Esty wrote in Green to Gold that building corporate reputation and trusted brands is one of the ways smart companies can profit from sustainability. "The better a company does at protecting its reputation and building brand trust; the more successful it will be at gaining and maintaining competitive differentiation."

Every company is responsible for their shareholders, customers and other constituents. In our experience, companies' failure to integrate their brand and CSR strategies is often the reason why CSR initiatives are not as well received or effective as intended. To overcome this, marketers and their CSR counterparts need to follow a few key principles that will enhance their success as well as that of the organization as a whole. These are mentioned as,

1. The business strategy must be the foundation upon which both the CSR and brand strategy is built. Furthermore, any promise made must be supported by business proof points. And finally, the alignment with the brand should drive those CSR elements that sustain are to be communicated to key stakeholders – internal and external.

2. Thus, the first critical step in developing an integrated and effective CSR strategy is to assess how CSR investments support business objectives and practices.

3. This should be followed by identification of the subset of business objectives that both CSR and brand are best suited to support.

4. The strategic alignment of CSR and brand should be supported by an implementation plan containing key initiatives, core messages and supporting business proof points.

II. APPROACHES OF CSR

In a paper about concepts and definitions of CSR and corporate sustainability, Marrewijk (2003, p. 96 – 97) presents an academic literature sequence review of three corporate responsibilities approaches, each one including and transcending the next one.

1. Shareholder approach: This view could be considered the classical or "narrow" perspective on CSR, synthesized by Friedman in "the social responsibility of business is to increase its profits" and create long-term value for the owners of the business, "without deception or fraud". This approach considers that the shareholder, in pursuit of profit maximization, is the focal point of the company, meanwhile socially responsible activities and initiatives do not belong to the domain of business organizations, but are a major task of governments (Milton Friedman, The Social Responsibility of Business Is to Increase its Profits, 1970).

2. Stakeholder approach: The second perspective on corporate responsibilities indicates that business organizations are not only accountable to their shareholders, but they should also consider the contrasting interests of all other stakeholders that can affect or are affected by the achievement of business objectives (R. E. Freeman, Strategic Management: A Stakeholder Approach, 1984).

3. Societal approach: The last approach is actually the "broader" view on CSR, companies are considered responsible to society as a whole, because they are an integral part of it. The main idea behind this view is that business organizations operate by public consent (license to operate) in order to serve constructively the needs of the society.

This societal approach, a new perspective on corporate social responsibility, appears to be a strategic response to changing circumstances and new corporate challenges that had not previously occurred; it requires organizations to fundamentally rethink their position and act in accordance with the complex societal context of which they are a part.

So the concept of CSR may be defined as, an activity which involves doing business in a responsible fashion that delivers value not only to the organization, but also to its stakeholders and the community within which it operates.

CSR covers five main areas:

1.Environment,

2.Community,

3.Employee welfare,

4.Financial performance and

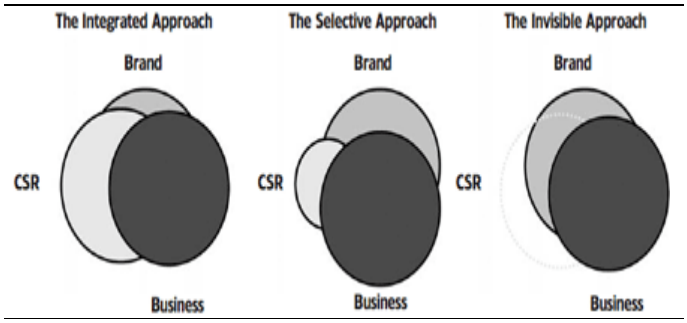
5. Corporate governance.

III. IMPACT OF CSR ON BRAND IMAGE

To understand the impact of CSR on brand image we need to understand the following concepts,

1. The Concept of Integration of CSR with Marketing:-

While the assessment of CSR's relationship with the business strategy is generally understood, the alignment of brand and CSR strategies tends to be more difficult for companies to grasp. Achieving alignment requires companies to bring their CSR and marketing departments together to define an approach. This approach can range from fully integrated to invisibly linked and should be determined based on an assessment of purchase drivers and the business strategy.



The Integrated approach:

In this approach, the brand and CSR operate in synchrony. This is appropriate when market research shows responsible business practices to be a key driver of brand preference. According to our definition of CSR this would mean a consistent performance across environmental, community, employee welfare, financial performance and corporate governance commitments.

The Selective approach:

In the selective approach, CSR manifests itself in very specific, targeted ways. This can, for example, take the form

of sub brands or strategic partnerships. The selective approach is effective either when market research shows responsible business practices drive preference, but the company does not have the proof points across all five CSR components to support a fully integrated approach, or when only a specific identifiable sub-segment of the target market places significant value on responsible business practices.

The Invisible approach:

In the invisible approach, CSR may play an important strategic or philosophical role in guiding the company, but plays a very understated role in external communications and initiatives. This allows companies to use CSR as an asset to bolster trust in their brand and company. This option differs from the others in that messages regarding corporate responsibility initiatives never really become part of the company's mainstream communications.

Express both the internal outcomes (e.g., awareness, attitudes, attachment) and external outcomes (e.g., word of mouth, purchase, loyalty) of CSR initiatives for not just the company, but also the consumer and the CSR issue/cause (Bhattacharya/C.B.;Sen,Sankar-2004).

2.The Concept of Consumer Perception:

A lot of work has been done in Western countries to identify an organization's behavior regarding consumer purchasing decisions. However, not many studies have been conducted in emerging markets, such as India. CSR activities should enhance a corporation's image.

Corporations that do not provide themselves with CSR activities will often be left behind with the increasing global competition and borderless markets, and international corporations with sound CSR activities grow stronger (Altman, 2007). As the education level increases, consumers are made more aware of the need for pro social corporate behavior.

A marketing concept that encompasses a customer's impression, awareness and/or consciousness about a company or it offerings. Customer perception is typically affected by advertising, reviews, public relations, social media, personal experiences and other channels.

There is a major role of a company to be open to the customer, because he is the major affected part of their products that are demonstrate in front of them.

Company's performance

Company's reputation

Company's competitive pricing of a product

Company's connectivity with customer

Consumer's perception

From an outsider's view, if a particular product was so focused on the perception that they are the streaming business that they failed to consider the context of their customer's perception. When this occurs, plan and performance fall short of creating a full, meaningful and valued connection to the target market. The lacking of the connection with consumer's force a company to rethink and stressed upon their strategies linked with the common person. Because maximum market can be fetch with the lower area of customer and for the gap between plan and performances should be covered broadly. When the three P, s or drivers are more balanced and considered fully to the context of the market, the maximum connection and relevance to the market is established. This optimizes both opportunity and profit. The perception derives the fitting plan and the performance plan is more naturally achievable.

Diagnosing a company's imbalanced drivers start with paying attention to what your own employees, your customers and even your competitors might say about your brand, products and services.

2. Concept of Company's Reputation and Brand Image:

Brand Image is an important idea in the consumer behavior since it was purposed by 1950s (Li, Wang & Cai, 2011). Levy (1959) in his studies. He projected the concept of brand image and suggested that the commodities have publically and emotional uniqueness and consumers develop emotional connections with the brands. Brand Image is the most important part of the brand equity as brand image contains of all the links in the brain of consumers correlated to that brand. So if anything that affects that is only the brand of that particular company. The brand image of a well liked brand is a precious business asset as the consumer recognize products

and services easily through the perspective brand. These observations which are grounded on the links between the features and the brand name normally conformed as the brand image (Keller,1993). Thus, brand image is basically a perception of a particular brand held in the mind of a consumer and it shows a consumer's general perception.

Bloomberg Business Week states " it's what you want to convey about yourself, your business, your product, your work ethic, and your professionalism combined with the strategy you've developed to reach your target audience."

Nowadays brand is not taken as a logo but it is more likely taken as a cautiously attained experience which is carried by enormous promotional resources, action and refined state of mind. A positive brand image facilitate to increase large number of customers such as customer's satisfaction, service advantages, customer's faithfulness and repurchasing objectives (Lai, Griffin & Babin, 2009). So much of the marketing struggle in centered on making up perceptions about the brand in the memory of a consumers.

Theoretical Structure

So having and sustaining a good reputation is an absolutely fundamental asset for businesses success, due to the fact that a greater part of consumer's decision making depends on brand image and reputation. Consider for instance, the damage done to Nike's reputation from using child labor in the 90's. So, the lullaby of *"sticks and stones might break your bones but words will never hurt me"*, does not always apply in the business arena, word of mouth will hurt you.

Reputation Institute, an International Organization, has tracked how CSR ratings affect the company's reputation and brand. In the '08 and '09 studies, they discovered that the CSR index predicted 40% of overall reputation.

The modern generation of Business Managers show greater concern for the CSR of business. This is so because of following reasons:

(1)Compelling Forces: The business managers fulfill their CSR because of fear of public interference in business through the Government.

(2)Persuasive Forces: Businessmen have been perusing their obligations towards social responsibilities. Enlightened businessmen have always appealed to the business opportunity to act with the constraint. Government also tends to persuade the businessmen by advising them in various occasions .Persuasion have proved to be effective in many cases. This has avoided direct action by the government.

(3)Favorable Forces: The new generation of managers are well educated and fully with the expectations of the society. They give the required weighted to social and human values in their decisions as they realizes the business undertaking is the creature of the society and it can't afford to maximize points at the cost of social welfare.

(4)Changes in Business Environment:

Rise in consumerism

Growth of labor movement

Increase in level of literacy

Improved communication and transport

Legal provisions against exploitations of workers and consumers.

(5)Need of Favorable Public Image: Modern businessmen are aware of the need of good public opinion of their business if they have to run their business successfully.

(6)Changing Public Expectations Towards The Image and Brand of The Company: Today's customer wants more and more satisfaction through the halo effect and further in their life. They jump to another brand if they are not satisfied with that particular brand.

(7)Creating Awareness Among Customers: Awareness among consumers cannot be neglected at any cost, there has to be a proper communication strategy to create consumer awareness.

(8)Customer Recommendations: There can be some methods through which a customer recommends other customer to buy a product as recommendations have been found quite important.

So it becomes very easy to understand that an exposure to any type of well-conceived promotional initiative for a brand leads to more positive feelings and judgments about the brand in a consumer's mind. A promotional initiate emphasizing a brand's affiliation with a social cause has a high degree of affinity. A high degree of affinity can enhance the effectiveness of a promotional initiative that increases the likelihood of consumers treating the initiative as an important

and positively weighted attribute of the brand. Those initiatives in which the logic behind the brand's affiliation can be easily recognized by most consumers – typically produce a more positive effect on consumer brand judgments and feelings than initiatives with weaker fit.

When a brand promotes a high-fit social-cause, it may be more likely to be viewed by some consumers as opportunistic and seeking commercial gain. Enriching a brand with ethical and social questions increases its value. These associations influence the consumer in their assessment of products and increased brand loyalty. So the management of socially responsible behavior is important because of its impact on the perception of the brand image.

IV. INITIATIVES OF INDIAN COMPANIES TO PROMOTE BRAND IMAGE WITH THE HELP OF CSR

The Times Foundation survey (2009-2010) found that TATA Group (67%) was the numero uno company with active CSR initiatives, distantly followed by Infosys (13%), ITC (12%), Anil Dhirubhai Ambani Reliance Group (10%), Ambuja Cement (9%), Microsoft (7%) Wipro, BILT and L&T (6% each). The findings of the survey place education, health and environment as three of the most popular areas of intervention for companies as part of their CSR initiatives.

Illustrations of some Indian companies are mentioned below,

TATA Group which has become synonymous with trust and ethics, and doing good for the community- the company has achieved what many firms would like to get. Consumers trust the brand and anything which has a 'TATA' to its name, must be honest and true. It is noteworthy that even the Tata Group which traditionally never advertised its CSR, is now doing the same. The 'Values Stronger than Steel' campaign, highlights how Tata Steel, a Tata Group company has always focused on ethical practices and employee and society development.

Coca Cola (another brand which has a dedicated sustainability report for India) focuses on water stewardship, sustainable packaging, energy management, climate protection, solid waste management etc. and this has led to greater brand recognition and increased brand equity. Coca Cola India has won the Golden Peacock Global CSR Award for 2009 for two consecutive years in recognition of the company's water conservation/management practices and community development initiatives .The fact that such awards have to exist, again prove the point that brands are being built by CSR.

At Vodafone, the outlook towards CSR is far beyond passive philanthropy. Through products and services, it aims to transform people's lives and contribute towards sustainable living. Vodafone India's sustainability initiatives focus on two broad categories: delivering transformational solutions and operating responsibly and ethically. From the year 2011 partnerships such as that with the Gujarat government to launch e-Mamta programme - (a mother and child tracking system) helped lower the high infant mortality rate recorded in many Indian states. The e-Mamta web-based application covers 80% of the population with a database of about 98 lakh families in 26 districts of Gujarat.

As a part of its sustainability project, Vodafone has deployed hybrid solutions at 2,435 sites. Installation of variable speed diesel generators at 234 sites has helped reduce diesel usage by 35%. Deployment of fuel catalysts at 1,182 sites has increased the combustion capability of fuel resulting in reduced carbon emission by 8-10%. Replacing 3,000 desktops with laptops to reduce carbon emissions; working closely with suppliers to curtail plastic packaging for SIM cards, and several similar initiatives are being undertaken to support a cleaner and healthier environment.

Idea Cellular is another telecom service provider, which historically lacked the market leaders in terms of performance. With its new campaign, which sets the tagline, „What an idea" in the landscape of rural India, it has managed to become a stronger and more credible player. The advertising focuses on stories that demonstrate how the mobile phone helps education and democracy to rural India, not to mention solving the caste problem.

Another big Indian Public sector company named ONGC which is an oil exploration company in the public sector. It is one among the few Indian multinationals in the public sector discharging CSR activities both nationally and internationally. Internationally the company has undertaken many significant initiatives in Africa. This includes providing artificial limbs to the war ridden amputees of Sudan, donation for cancer patients in Sudan, popularizing modern farming methods in Sudan and proving state of the art online IT library and distribution of free school bags in the same country. The company has committed nearly $2.45 million for total development of that country.

In India the company has joined hands with the Rotary club in 2006 to distribute artificial limbs to the affected people of Karaikal in Puduchery. Moreover ONGC is assisting Rotary club in carrying out a project aimed for corrective surgery for cleft lip palates. More than 100 patients per year are getting the benefit out of this.

For solving water problems, project 'Saraswathi' was launched in west Rajasthan in 2005 to locate underwater reservoirs of the river Saraswathi. This project was a boon to people in drought hit areas.

In 2009-10 ONGC spent around 300 crores for CSR activities (ONGC case stories).

So corporate volunteerism is today an intrinsic part of CSR in India as companies move away from the traditional 'cheque book' approach towards sustainability. Globally as well as locally, corporate volunteerism is considered to have

the potential to increase employee productivity, identify new opportunities and improve brand and reputation while contributing to the community development.

V. CONCLUSION AND SUGGESTIONS

For academicians, this research makes a contributionto the understanding the underlying dynamics of the role of CSR in consumers' buying behavior and the brand image of a company. Companies in India can use CSR as a tool to implement long term strategy and can help to improve its relationship with community as well as economic performance. Not only FMCG but also other companies can create a consumer market by implementing environmental practices in their strategy as a company with environmental practices can maintain its existence in the market for longer period of time. Because brand image is the goodwill of the company and it should be increased through the satisfaction and the loyalty with the customers.

The benefits of using Corporate Social Responsibility in branded content are endless. The most important one is that it helps to build a brand's reputation and is a point of differentiation. It also encourages consumer trust and loyalty. If the consumers see that brands are addressing the issues that are important to them, it follows that they are likely to continue to buy their products.

Corporate Social Responsibility initiatives can be extremely effective at forging deep meaningful connections with its consumers that transforms the loyalty of the consumer to them as a promoter of the company within their social networks.

The need for more emphasis on the Corporate Social Responsibility concept and its company to consumer communication is mandatory. Though a number of companies‟ websites and their annual reports include information on these practices but it is seen that either this information does not reach the consumers or the current communication strategy is not strong enough to link the Corporate Social Responsibility actions to brands.

"Everyone wants to make a difference and this goes some small way in allowing us all to make a
contribution. Yes, it is shopping. Yes, it is advertising. No one is saying it's the answer to
everything, but it's a small step that allows all of us to make a difference"

So it's important to learn that CSR helps build brands, but only when brands live up to their promise. So it won't be long before the consumer realizes the difference between CSR and window dressing, and that will be when the true impact of CSR on brands will be realized.

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Comparative Analysis between Branding and Non-Branding Products

DR. Maninder Singh Gill
(Associate professor
Dept of Mgt studies
Acet, Asr

Lokesh Arora
(MBA student 4th sem
Dept of Mgt studies
Acet, Asr ,

Abstract

This study explores the popularity of branded and Non-branded product available in the market and aims to find out if customer is attracted towards branded product or if they prefer non branded product. For the outlined stated personal survey technique was employed for grabbing the first hand data. The sample of 200 people is being conducted to make this research more reliable. This competitiveness was used to understand and judge the co-variation between branded and me too (unbranded) products. Consumers have numerous options to select and buy various kinds of products. The consumption pattern of both forms of products has which sort of variations, requires an accurate estimation and findings. The results shows that the people are more brand conscious and change their purchase according to the income and product characteristic(Brand Name, Product Quality, Design, Store Environment, Price and Promotion). Age does an effect on consumer's preference on a particular media to perform the selection of product. It can be concluded that branded products is having more influence in to the people. And it is showing some positive effect for the upcoming new brand and their product in to the Indian market. No doubt unbranded product is also providing a competition but it does not have a proper life into their products.

Introduction to Branding

The American Marketing Association defines a brand as "A name, term, sign, symbol or design or a combination of them, intended to identify the goods and services of one seller or group and to differentiate them to those for competitors". A brand is thus a product or service that's adds a Dimension that differentiates it in some way from other products or services designed to

satisfy the same need. These differences may be functional, rational, or tangible-relate to product performance of the brand.

Branding has been around for centuries as a means to distinguish the goods of one producer to those of another. The earliest signs of branding can be traced to Europe where the medieval guilds required that craftsmen put trademarks on their product to protect themselves and producer against inferior quality substitutes. Also in fine arts branding began with artists signing their works. Brands today play a number of important roles that improve the consumer's lives and enhance the financial value of firms.

Brands identify the source or maker of the product and allow consumers-either individual or organizations- to assign responsibility to a particular manufacturer or distributor. Consumers may evaluate the identical product differently depending how it is branded. Consumers lean about the brand with its past experience and the marketing program. As consumers lives becomes more complicated, time starved the ability of brand to simplify decision making is invaluable. Brands also perform valuable functions for the firm. First they simplify the product handling and tracing. Brands help to organize inventory and accounting records. The brand name can be protected registered trademarks. The intellectual property rights ensure that the firm can safely invest in the brand and can reap the benefits over a long period of time.

Brands can signal a certain level of quality so that satisfied buyers can easily choose the product again. Brand loyalty provides predictability and security of demand for the firm and creates barriers to entry that makes it difficult for other firms to enter the market. This brand loyalty can translate into willingness to pay higher price. In this sense branding can be seen as powerful means to secure a competitive advantage. Brands represent enormously valuable pieces of legal property that can influence consumer's behavior. Strong brand results in better earnings and profit performance for firms, which in turn, creates greater value for shareholders.

How do you "BRAND" a product? Although firms provide the impetus to brand creation through marketing programs and other activities, ultimately a brand is something that resides in the mind of the consumers. A brand is a perpetual identity that is rooted in reality but reflects the perceptions and perhaps even the ultimate choice of the consumers. Branding is endowing products and services with the power of brands. To brand a product, it is necessary to teach the

consumers "who" the product-by giving a name. Branding involves creating mental structures and helping consumers organize their knowledge about products and services in a way that clarifies their decision making and in process provides value to the firm.

Literature review

Namita Rajput and Subodh Kesharwani and Akanksha Khanna(2012),The relationship between consumers' decision-making styles and their choice between domestic and imported brand clothing is investigated using a sample of Indian consumers. The objective of this paper is to gauge the factors affecting purchase decision taking gender perspective as base. Empirical findings are calculated using survey technique and chi square test with a sample of 320 participants in Delhi and NCR. The objective of this paper is to analyze the significance of demographic profile of consumers affecting the purchase decision of branded garments and to observe from gender perspective the consumer awareness about different apparel brands available in the Indian market and also to find out whether there is a significant difference in total expenditure on branded apparels done by males vise- a - visa females. The results exhibit no significant differences in the brand awareness, shopping frequency and shopping expenditure between males and females.

Amber Osman (2012) Consumers have numerous options to select and buy various kinds of products. A retail outlet offers branded and me too (unbranded) items to the customers to buy from. The consumption pattern of both forms of products has which sort of variations, requires an accurate estimation and findings. For the outlined stated manifesto, personal survey technique was employed for grabbing the first hand data. Co- integration was used to understand and judge the co-variation between branded and me too (unbranded) products. Exclusive insights were revealed between the two different classes of product that an increase in consumer's income level urges consumers to increase their consumption of branded products. Similarly, consumers opt to purchase branded product as there is a strong perception that branded items have good quality. While, it is also found that if there is an increase in the prices of branded and unbranded products than none of the products clearly win the battle and they have the same pattern for being consumed which is the co-movement of their consumption patterns.

Sandeep Saxena (2012) : India is a developing country. In today's brands scenario are the basis of consumer relationship .Global brand is a product that adds other dimensions that differentiate it in some way from other products designed to satisfy the same need. Global Marketing needs clear marketing mix vision in re the context of International market. Brand is the biggest asset of any company. A global brand should provide relevant meaning and experience to people across multiple societies. The perception of quality that is associated with the global brands is difficult too clean of unlock opportunities for but Indian it's ea brands. Branding strategy must be devised, after considering the brands own capabilities and competencies, strategies of competing brands, and the outlook of consumers, which are largely formed by experiences in their respective societies. The marketing policy has huge influence, when there is right translation of brand into the marketing mix. The main focus of this paper is on Global Branding and challenges in it. It also looks into six challenges (6E's) and strategies of branding in Global Market.

Dr Manish aggarwal (2009) According to C. K. Prahalad also "four billion poor can be the engine of the next round of global trade and prosperity." As in India maximum numbers of poor is still dual in the rural

market and most of the companies like Mahindra & Mahindra, HLL, ICICI, ITC, IFFCO, etc. are focusing their operations in rural India, a new market has emerged out of the blue . In this market the customer is not only becoming aware what is available but a long term bond between the company and the consumer is developing. This relationship is taking away the traditional "features and benefit" marketing toward creating experiences for their consumers. India has more than 0.6 million villages, housing two third of its people, earning one-third of the national income. All the income groups consume FMCG products though brands will be different. They prefer to purchase form the Haats, which is good, channel of distribution. Moreover some youths, are also influenced by City culture and it is also reflected in their purchasing decision. The marketer should understand the psychology of rural customers before entering into the market. The objectives of the study are to know the brand preferences of rural customers, the mode of communication in rural markets, and penetration rates for various consumer durables and non-durables.

Research Objective

- Find out factor influencing the people at the time of purchasing Branded.

  [QUALITY,DURABILITY, VARIETY , PRICE]
- To study what is mostly preferred by people as per their perception
- To analyze the significance of demographic profile of consumers affecting the purchase
- To observe consumer awareness about different apparel brands available in the Indian market
- To find out whether there is a significant difference in total expenditure on branded and unbranded.

RESEARCH METHODOLOGY

Particulars	Description
Project Title	**A comparative analysis of branding and NON Branding products**
Sample Size	**200**
Sample Unit	**Shopkeeper, Service men, students etc**
Area Covered	**Amritsar**
Sampling Procedure	**Random Sampling**

Data Collection Method	**Survey**
Research Instrument	**Questionnaire**
Type of Questionnaire	**Structured**
Method of Survey	**Sample Survey**
Analysis method	Chi-square method

Data Analysis

Demographic profile of Respondents

Gender	**Frequency**	**Percentage**
Male	134	67.0
Female	66	33.0
Total	**200**	**100**
Age	**Frequency**	**Percentage**
18-25 years	103	51.5
26-30 years	33	16.5
31-35 years	24	12.0
36-40 years	25	12.5
Above 41	15	7.5
Total	**200**	**100**
Marital status	**Frequency**	**Percentage**
Married	72	36.0
Unmarried	128	64.0
Qualification	**Frequency**	**Percentage**
Illiterate	10	5.0
Metric	41	20.5
12^{th}	43	21.5
Graduate	54	27.0
Post graduate	52	26.0
Total	**200**	**100**

Occupation	Frequency	Percentage
Business	81	40.5
Service	34	17.0
Student	76	38.0
Retired	0	0
Not working	9	4.5
Total	**200**	**100**

Relation b/w Age and Preference

q2 * q11 Cross tabulation

Count

		preference		
		branded	Un branded	Total
age	18-25	85	18	103
	25-30	22	11	33
	31-35	13	11	24
	36-40	11	14	25
	Above 41	10	5	15
Total		141	59	200

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	68.214[a]	4	.000
Likelihood Ratio	79.147	4	.000
Linear-by-Linear Association	24.382	1	.000
N of Valid Cases	200		

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 2.70.

H0:- there is no significant relationship between Age of the respondents & the preference.

Above Results indicates the relationship between Age of the respondents & the preference. The hypothesis formulated for the purpose was: 'There is no association between Age& preference 'The hypothesis originally formulated was rejected and hence it can be held that there is association between age & preference.

q6 * q27 Cross tabulation

Count

		satisfaction		
		Branded products	Unbranded product	Total

income	10000-15000	10	56	66
	15000-20000	15	11	26
	20000-30000	51	28	79
	30000-above	29	0	29
Total		105	95	200

Relation b/w Income and Satisfaction toward Their Choice

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	68.042[a]	3	.000
Likelihood Ratio	82.466	3	.000
Linear-by-Linear Association	55.440	1	.000
N of Valid Cases	200		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.35.

Ho: - there is no significant relationship between Income level of the respondents & their satisfaction toward their choice

Above Results indicates the relationship between Income level of the respondents & the preference. The hypothesis formulated for the purpose was: 'There is no association between income & preference 'The hypothesis originally formulated was rejected and hence it can be held that there is association between Income & preference.

Relation b/w gender and What People go for ShShopping

q1 * q10 Crosstabulation

Count							
		Go shopping for					
		clothes	Shoes and bags	accessories	others	All of above	Total

gender	male	70	9	4	10	41	134
	female	9	5	8	0	44	66
Total		79	14	12	10	85	200

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	41.343[a]	4	.000
Likelihood Ratio	46.383	4	.000
Linear-by-Linear Association	25.748	1	.000
N of Valid Cases	200		

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is 3.30.

Ho: - there is no significant between Gender of the respondents & for what the mostly go shopping.

Above Results Indicates the relationship between Gender of the respondents & for what the mostly go shopping. The hypothesis formulated for the purpose was: 'There is no association between gender & what the mostly go shopping 'the hypothesis originally formulated was rejected and hence it can be held that there is association between Gender of the respondents & for what the mostly go shopping.

Relation b/w Age and media Effect factor

q2 * q24 Crosstabulation

Count

		Media effect					
		Newspaper	TV	Shop display	banner	magazine	Total
age	18-25	24	62	10	6	1	103
	26-30	7	20	4	1	1	33
	31-35	8	12	3	0	1	24
	36-40	7	13	2	1	2	25
	41-above	4	7	1	1	2	15
Total		50	114	20	9	7	200

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.863[a]	16	.753
Likelihood Ratio	11.615	16	.770
Linear-by-Linear Association	2.430	1	.119
N of Valid Cases	200		

a. 15 cells (60.0%) have expected count less than 5. The minimum expected count is .53.

H1:- There is a significant relationship between Age & effectiveness of Media

The hypothesis that 'There is association between Age & effectiveness Of Media' was tested using the data. The chi-square values show that the hypothesis has been accepted which indicates that effectiveness of media has bearing on age. Despite the acceptance of the hypothesis we can see that respondents in the age group 18-25 are more influenced by media irrespective of its type.

Relation b/w gender and what people look for in product

q1 * q9 Crosstabulation

Count

		What look for					
		Value for money	Good quality	Customer services	Product image	other	Total
gender	Male	6	86	9	30	3	134
	female	4	23	5	4	30	66
Total		10	109	14	34	33	200

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	64.234[a]	4	.000
Likelihood Ratio	64.892	4	.000
Linear-by-Linear Association	26.240	1	.000
N of Valid Cases	200		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.30.

Ho: - there is no significant between Gender of the respondents & for what they look in product .

Above Results indicates the relationship between Gender of the respondents & for what they look in product. The hypothesis formulated for the purpose was: 'There is no association between gender & what they look for in to the product 'The hypothesis originally formulated was rejected and hence it can be held that there is association between Gender of the respondents & for what they look for in to the product

- **Relation b/w income and preference**

q6 * q11 Cross tabulation

Count

		Preference		
		branded	unbranded	Total

income	**10000-15000**	**30**	**36**	**66**
	15000-20000	**15**	**11**	**26**
	20000-30000	**50**	**29**	**79**
	30000-above	**27**	**2**	**29**
Total		**122**	**78**	**200**

Chi-Square Tests

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	**89.135[a]**	**3**	**.000**
Likelihood Ratio	**97.608**	**3**	**.000**
Linear-by-Linear Association	**50.295**	**1**	**.000**
N of Valid Cases	**200**		

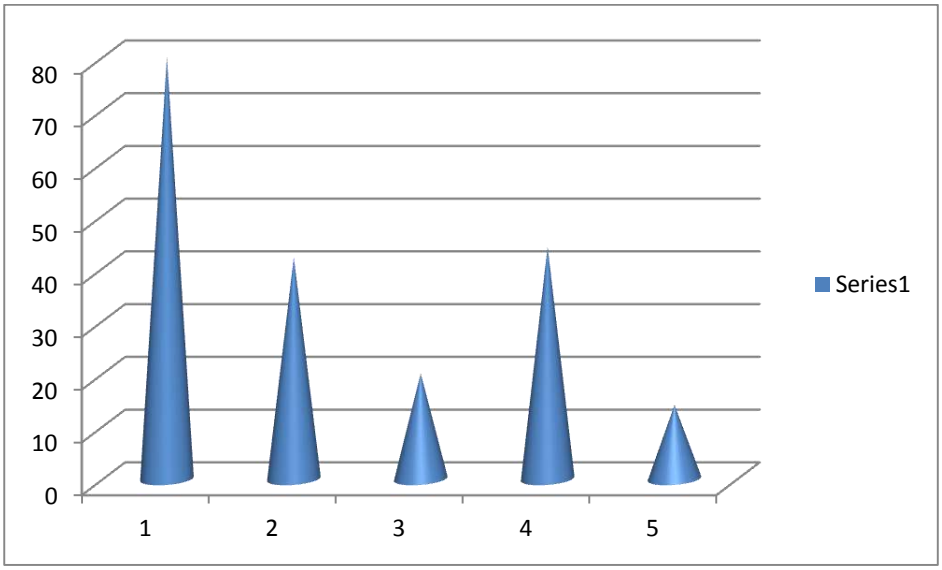
a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 4.68.

H0:- there is no significant relationship between Income level of the respondents & the preference.

Above Results indicates the relationship between Income level of the respondents & the preference. The hypothesis formulated for the purpose was: 'There is no association between income & preference 'The hypothesis originally formulated was rejected and hence it can be held that there is association between Income & preference

Factor influencing brand preference

Factors influencing brand preference?	• **Advertisement** • **Quality** • **Good words of Mouths** • **Product image** • **Celebrity**	**( )** **( )** **( )** **( )** **( )**



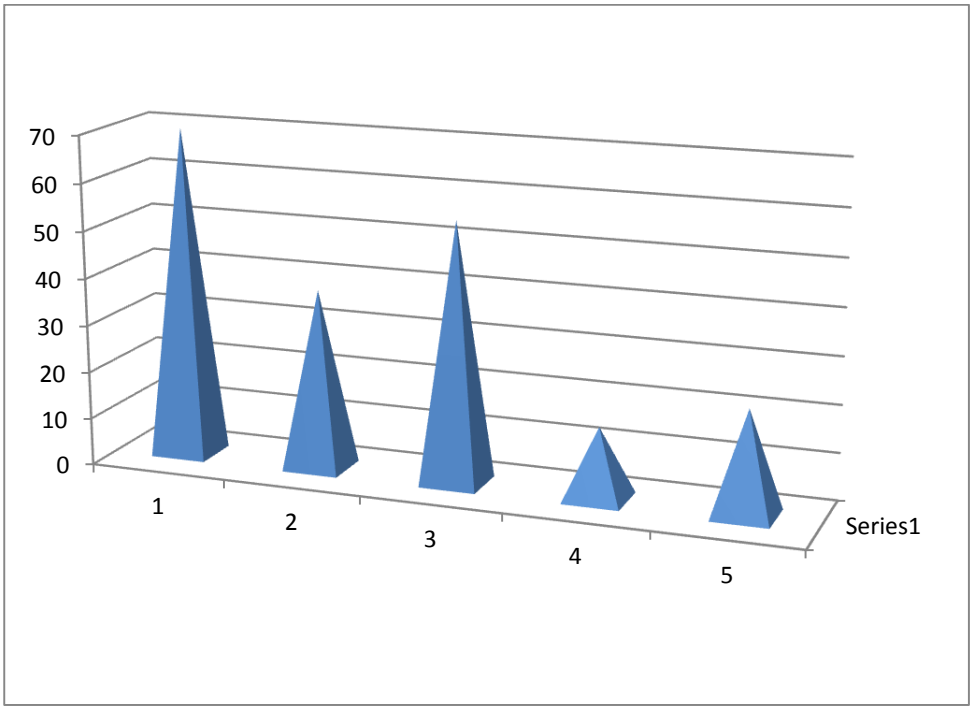
Results highest Rank:

1. **Advertisement**
2. **Product image**
3. **Quality**
4. **Good words of mouth**
5. **Celebrity**

As above results show that advertisement is the ranked highest by the respondents while Factors influencing brand preference. And then the reliable and other things are considered

What important while buying a well name brand?

	What is Importance of buying a name brand?	• **Quality** • **Attractive** • **Reliable** • **Advertisement** • **Various Offers**	**( )** **( )** **( )** **( )** **( )**



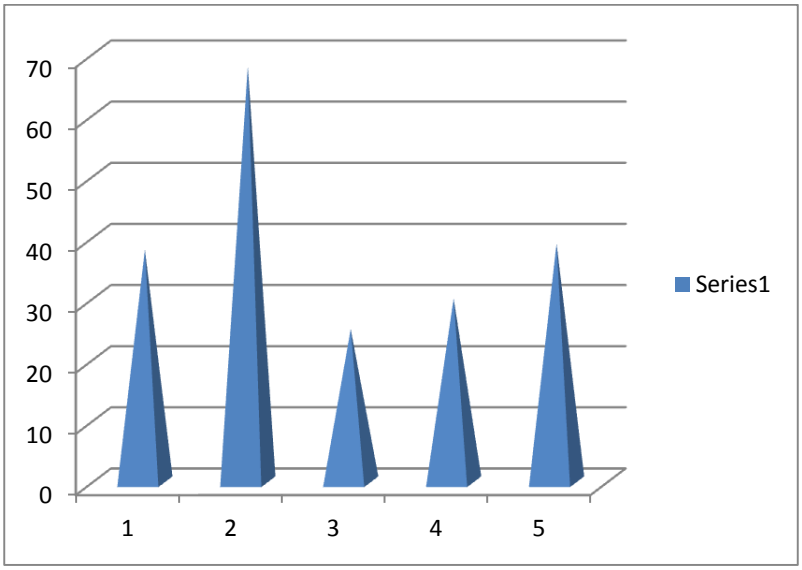
Results highest rank:

1. **Quality**
2. **Reliable**
3. **Attractive**
4. **Various offer**
5. **Advertisement**

As above results show that quality is the ranked highest by the respondents while buying a name brand And then the reliable and other things are considered

How get influence with unbranded goods.

	How you get influence with unbranded Goods?	• **Quality** • **Price** • **Reliable** • **Advertisement** • **Various Offers**	**( )** **( )** **( )** **( )** **( )**



Results highest rank:

1. **Price**
2. **Various offer**
3. **Quality**
4. **Advertisement**
5. **Reliable**

As above results show that price is ranked highest by the respondents while get influence with unbranded product. whereas various offer given to the customer get the 2nd highest rank.

Finding

- The analysis revealed that there is a strong association between Income & use of Branded which means that with the variation in income levels the choice for branded / unbranded also varies.
- It was inferred that there is association between the purchase of a Brand & the factors affecting its choice, thereby meaning that while choosing a brand the consumer does consider factors like quality, product image, taste etc.
- Effectiveness of media has bearing on age, that is, age does affect a consumer's preference for a particular media.
- People with high income mostly prefer the branded products and are satisfied with their use of product

Conclusion

Customer is having a sense of freedom and choice. Now the market is said to be customer oriented. The preference of consumer is continuously shifted from unbranded to branded items. Braded items lie on high price scale and consumers want that price should be reduced where unbranded items lie on a low price scale but quality is not good. Branded items have a great impact on the unbranded items because the sale of branded items is increasing and unbranded is decreasing because of consciousness of customer regarding quality. Purchasing power of consumers is changed due to change in income level. Today's customer is not loyal to one, they switch to other if they don't get brand they want.

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ETL TOOLS EVALUATION THROUGH DEVELOPMENT OF A CRITERIA FRAMEWORK

Amanpartap Singh Pall
Research Scholar
PTU, Jalandhar
Email: amanpall@hotmail.com

Dr. Jaiteg Singh Khaira
Associate Professor
Chitkara Institute of Engineering and Technology, Rajpura

Abstract: The organization dealing with voluminous data has two options, either to build its own ETL tool or buy one from the market. Extraction-Transformation-Loading (ETL) tools are specialized tools that deal with data warehouse homogeneity, cleaning and loading problems. Selecting an ETL tool has always been a tedious task as one wrong choice would incur in huge losses of resources, time and money. The organization however, has few options either to go in for some known closed source commercial tool or go in for an open source tool. In this paper, we have attempted to compare and evaluate the leading open source ETL tools. The choice of the tools has been done by looking at the vendors and survey reports discussions and disclosures on key features incorporated in them.

Objective: *The purpose of our research paper is to evaluate some of the leading (Closed Source as well as Open Source) ETL tools on a criteria framework developed by us.*

Methodology: *To form a criteria framework for evaluation of some of the leading ETL tools we compared the ETL tools against each other by searching and analysing different survey reports by leading groups, articles, journals and books and websites. Upon analysing these Reports, whitepapers, journals, website we successfully revealed the criteria and its categories which will allow us to compare these ETL tools to each other.*

Keywords: ETL tools, Open Source ETL tool, ETL tool comparison, Data Integration

Research Method: To conduct our research we needed to create a framework of criteria (Table 1) which would allow us to compare the ETL tools against each other. We conducted research in different survey reports by leading groups, articles, journals and books and websites. Upon analyzing these Reports, whitepapers, journals, website we successfully revealed the criteria and its categories which will allow us to compare.

I. INTRODUCTION

Organization relies on the voluminous data of the data warehouse that has been created for every type of decision that has to be taken in the organization. These data warehouses provide a greater knowledge for the specific area but they also aim at facilitating the organization to base decisions on a well formed knowledge and at a much faster pace. However, data warehouse cannot be created unless data from all sources is fed into it, that too in a format desirable by the organization. ETL tools helps in this purpose. ETL (Extraction, Transformation, and Load) represents the warehousing tools and are responsible for the constitution or restitution of data in the data warehouse [1]. Since, ETL involves three stages namely extraction, transformation and loading hence, it must take into account heterogeneity of the data , verification of the same and applying the cleaning phase as well to it, needless to mention that these ETL tools have some additional tasks to perform that of maintenance , availability , task management and evolution support [2]. There is a diverse range of commercial ETL tools available in the market offering variety of features and capabilities. The organization has its disposal the choice of choosing an Open Source ETL tool which is available on the internet. In this paper, we would try to bring out the extensive features of the front runner ETL tools, be it closed source or open source, and their comparison on the same parameters. Today, organizations don't hesitate in spending one-third of their revenue only to build a well-designed data warehouse and this data warehouse's implementation if not completely then 60 percent to 80 percent is handled by ETL tools [3].

Extraction-Transformation-Loading (ETL) tools are specialized tools that deal with data warehouse homogeneity, cleaning and loading problems. ETL and Data Cleaning tools are estimated to cost at least one third of the effort and expenses in the budget of the data

warehouse and this may further increase to 80% of the development time in a data warehouse project [4] [5].

ETL processes are responsible for the operations taking place in the back stage of data warehouse architecture. First, the data are extracted from the source data stores that can be On-Line Transaction Processing (OLTP) or legacy systems, files under any format, web pages, various kinds of documents (e.g., spreadsheets and text documents) or even data coming in a streaming fashion. Typically, only the data that are different from the previous execution of an ETL process (newly inserted, updated, and deleted information) should be extracted from the sources. After this phase, the extracted data are propagated to a special-purpose area of the warehouse, called the Data Staging Area (DSA), where their transformation, homogenization, and cleansing take place. The most frequently used transformations include filters and checks to ensure that the data propagated to the warehouse respect business rules and integrity constraints, as well as schema transformations that ensure that data fit the target data warehouse schema. Finally, the data are loaded to the central data warehouse (DW) and all its counterparts (e.g., data marts and views). In a traditional data warehouse setting, the ETL process periodically refreshes the data warehouse during idle or low-load, periods of its operation (e.g., every night) and has a specific time-window to complete. Nowadays, business necessities and demands require near real-time data warehouse refreshment and significant attention is drawn to this kind of technological advancement [6].

The ETL processes costs 55% of the total costs of data warehouse runtime [7]. Still, due to the complexity and the long learning curve of these tools, many organizations prefer to turn to in-house development to perform ETL and data cleaning tasks. Thus, it is apparent that the design, development and deployment of ETL processes, which is currently, performed in an ad-hoc, in house fashion, needs modeling, design and methodological foundations. The most important components during the design and deployment phase in a data warehousing is the design flow of data from the source relations towards the target data warehouse relations, this flow is provided by the ETL tools.

II. Literature Review

The early 90s focused on the straight-away methods of creation of data warehouses. There was a lack of good quality tools and the task was performed by system integrators. During the next decade various warehousing techniques were studied but not all the problems were resolved. The data tools that were developed were too primitive in nature and were mainly developed to support OLAP and DSS.

Vassiliadis et al. [8] highlighted some key problems concerning the ETL tools are primarily of complexity, usability, maintainability and price. Rifaieh and Benharkat [2] gave another methodology for extraction of data. They suggested QELT- Query-based ETL that has the capability to read the mapping guideline defined in the meta-data repository to create the transformation process. Later Henry et al. [9] studied and identified comprehensive ETL criteria, testing procedures and these were applied to commercial ETL tools. The study covered all major aspects of ETL usage and could be used to effectively compare and evaluate various ETL tools. The tools could further generate accuracy if only they can be incorporated with UML and EMF modeling technology and with the addition of simple Java-based operators to a transformation tool [10]. The study of Ranjan [11] on ETL and E-LT based on three approaches i.e. Full Pushdown, Target Pushdown and Source Pushdown observed that there was no performance difference in terms of running a job to load data into data warehouse tables if complete pushdown powers of E-LT jobs were not used. Akkaoui and Zimányi [12] reiterated the fact that current ETL tools propose specific languages for expressing such processes, which differ among tools and have different expressive power. The elimination of data heterogeneity so as to develop ETL tools for data warehouse construction through ontology-based approach to cover full ETL process given by Jiang et al. [13]. Reddy et al. [14] presented a GUI based ETL procedure/tool to the continuous loading of the data in the Active Data Warehouse. Jian and Bihua [20] analyzed the weaknesses of traditional Extract, Transform and Load (ETL) tools' architecture of its openness and repeatedly development, and proposed a three layers-architecture based on metadata. Xu et al. [15][19] in their put forward a metadata driven ETL service model and Metadata-driven ETL service framework that has strong flexibility, extensibility and can process large scale data efficiently. The model takes full advantage of the platform and variety of metadata, and can effectively design and share the ETL process no that open-source or commercial ETL tools possess. Bergamaschi et al. [16] gave a data integration and data analysis based ETL tool focused on the extraction phase by implementing a technique that semi-automatically defines mappings between a data warehouse schema and a new data source, and on the transformation phase, by proposing a new function based on relevant values, particularly useful for supporting drill down operations. Zhao [18] showed through a case study that using the optimization technique for queries will make SETL overtake other programs based existing tools the system is able to generate automatically new transformations; no extra update will be needed to enable evolution. Muthukumar et al. [17] discussed the key issues related with creation, migration and harvesting Knowledge Repositories and harvesters using open source tools and their success lies in awareness among the stakeholders on Open Access and Knowledge Repositories.

II. Need and Scope

There are many commercial ETL tools (Open Source or Closed Source) available in the market. A general

problem of ETL tools is their limited interoperability due to proprietary application programming interfaces (API) and proprietary metadata formats making it difficult to combine the functionality of several tools. These tools must possess to fulfill their main objectives which are to extract data from data sources, transform it in order to improve their quality and to load the resulting data in target sources. Hence, the paper aims at highlighting the comparison of some of the leading tools on some important criteria framework.

IV. Comparison of ETL Tools

The ETL tools selected for the comparative review are only the market leaders although there are so many tools, but selection of all of them would be done in a step by step manner since only peers should be compared with each other. To compare these tools a criteria or basis on which these are compared should be a universal one. To come to a universal one we reviewed various journals, articles, books and more importantly the reports that are generated from time to time to remove any bias.

Table 1: Various criteria for the comparative review

Sr. No	Criteria
1	Standalone or Integrated
2	Platforms
3	Engine based or code generated
4	SaaS
5	Ease-of-use
6	Reusability
7	Debugging
8	Corrections to syntax and field names
9	Compiler/ Validate
10	Separate Modules
11	joined tables as source
12	native connections
13	real time connections

Source: The Data Integration & ETL Product Survey 2013, Passionned Group

V. Description and Comparison

Here, we have done the comparison on the criteria mentioned above and an overall description of the tools, this would bring out the clear picture as to which tool is best in which type of criteria while the criteria comparison would suggest which tool is the best in a particular criteria. The following are the description and the comparison:

Table 2: Comparison of some of the closed source ETL tools on criteria framework

Sr. No	Criteria	IBM Information Server	Informatica PowerCentre	Oracle Data Integrator	SQL Server Integration Services	SAS Data Integration Studio
1	Standalone or Integrated	Standalone	Standalone	standalone	standalone	standalone
2	Platforms	6	5	6	1	8
3	Engine based or code generated	Both	engine based	code generated	Both	code generated
4	SaaS	Yes	Yes	yes	-	No
5	Ease-of-use	high in logical orders	Yes	highly user friendly	Highly	highly
6	Reusability	Yes	Yes	yes	Yes	Yes
7	Debugging	Yes	Yes	yes	Yes	Yes
8	Corrections to syntax and field names	Yes	Half	yes	-	Yes
9	Compiler/ Validate	Yes	Half	half	Yes	Yes
10	Separate Modules	No	Yes	no	-	Yes
11	joined tables as source	Yes	No	yes	No	Yes
12	native connections	41	50	22	4	18
13	real time connections	2	6	3	2	3

Source: The Data Integration & ETL Product Survey 2013, Passionned Group

Table 3: Comparison of some of the closed source ETL tools on criteria framework

Sr. No	Criteria	Talend Open Studio	Pentaho Data Integration (Kettle)	CloverETL	Pitney Bowes (DFM)
1	Standalone or Integrated	Standalone	Standalone	Standalone	Standalone
2	No. of platforms supported	7	4	7	4
3	Engine Based or Code Generated	Code generated	Engine based	Engine based	Engine based
4	SaaS support	No	No	no	no
5	Ease of use	Yes	Yes	no	-
6	Reusability	Yes	Yes	yes	yes
6	Debugging	Yes	No	no	no
7	Row by row running (debugging)	Yes	No	yes	no
8	Corrections to Syntax and Field names	Yes	No	yes	-
9	Compiler/ Validate	Yes	Half	yes	no
10	Separate modules	Yes	No	yes	-
11	joined tables as source	Yes	No	no	yes
12	native connections	35	20	7	6
13	Real time connections	3	3	3	0

Source: The Data Integration & ETL Product Survey 2013, Passionned Group

A) Criteria-wise description and comparison

Though all the ETL tools given above are standalone tools however they have they have their own scoring points. The comparative analysis by each criterion is given below:

Platforms: This criteria signifies how many platforms are supported by the ETL product e.g Windows (all versions have been counted as one), Linux, Solaris etc. As can be seen Microsoft SQL Server has the least platform support i.e. Windows while SAS Data Integrator scores here by providing support to 8 different types of platforms which is indeed a plus point.

Engine Based or Code generated: While Both Information Center and SQL Server are both engine based and code generated all others products are either code generated or engine based.

SaaS: This criterion has been included to see whether or not the product is available as software as a service and it was found that while Information Center, PowerCentre and Oracle provide this facility others do not. This generally means these products can be a part of the cloud computing the latest facility being provided by organizations. This is a major plus point for these products and perhaps one of the reasons that they are so widely being used today.

Ease-of-Use: Ease of use includes how easy is it to use the product, how quickly can it be learnt, number of training days required for the developer and the user to learn the product , screen element designs , GUI interface , and most importantly does it work the way ETL tool should work. Oracle Data Integrator has been found to be the most users friendly followed by SQL Server and SAS Integrator. However, that does not mean that others are not user friendly it's just that these three tools and Oracle Data Integrator in particular conforms to the above said criterion more than the others.

Reusability: How are the components reused whether they are parameter driven, does it support user defined functions to be available to other programs. All the above tools are very much conforming to this criterion.

Debugging: Apart from the Pentaho, CloverETL and Pitney Bowes all others provide a good debugging facility either step by step or row by row.

Corrections to syntax and field names: Pentaho, SQL Server and Informatica does not provide any automatic suggestions if there is an error in syntax or field names whereas this is available in all other tools.

Compiler\validate: How easy it is to locate errors and if any are they highlighted in the code at a click. This facility is available with every tool except for the Pitney Bowes which does not possess this and Pentaho in which it is partially there.

Separate Modules: Usually the tool is made up of at least two modules the real time module and the batch module. Now can they be bought separately? Informatica, Talend, SAS and CloverETL has got this provision whereas this is not the case with Oracle Data Integrator, IBM Information center, SQL Server and Pentaho.

Joined tables as a source: Can two tables be joined in a graphical manner letting the database execute the join as opposed to letting the ETL tool join the tables. Informatica PowerCenter, SQL Server Integration, Pentaho and CloverETL does not provide this which is a major drawback.

Native connections: How much and which native connections does the ETL tool support? (ODBC, OLE DB and flat files excluded).Informatica PowerCenter provides the maximum native connections to the various database sources thus extraction from these sources becomes much more efficient. The IBM Information Centre and Talend Open Studio is not lacking as it follows the Informatica very closely. SQL Server lags here as it can only provide only four types of native connections.

Real time connections: How many and which type of message queuing products can the tool connect to? Here also the informatica PowerCenter takes the cake providing the maximum connections.

Tool-wise description

IBM Information Server

It provides a great flexibility and is directed towards the market with a vision in mind with common metadata platform. The Information Server provides high level of satisfaction from clients and a variety of initiatives. Though it is easy to use but it becomes very heavy because of the data involved is in GBs and the version 8.x requires a lot of processing power.

Informatica PowerCenter

Informatics PowerCenter offers a so solid technology, straightforward learning curve, ability to address real-time data integration schemes and is highly specialized in ETL and Data Integration. It has a consistent track record with most substantial size and resources on the market of data integration tools vendors.

Talend

Talend is an open-source data integration tool but not a full BI suite. It uses a code-generating approach. Uses a GUI. It has data quality features: from its own GUI, writing more customised SQL queries and Java.

Microsoft SQL Server Integration Services

SQL Server Integration Services (SSIS) provides ease and speed of implementation with standardized data integration, real-time, message-based capabilities which are relatively low cost and provide an excellent support and distribution model. However, it does not support non-Windows environments.

Oracle Data Integrator

There is no doubt as to why it is being regarded as one of the leaders in the ETL markets; it's because of its tight connection to all Oracle data warehousing applications and the tendency to integrate all tools into one application and one environment.

SAS Data Integrator

SAS Data Integrator provides great support and most of all very powerful data integration tool with lots of multi-management features. It is great support for the business-class companies as well for those medium and minor ones. It can work on many operating systems and gather data through number of sources – very flexible.

Talend Open Studio

Talend Open Studio for Data Integration helps you to efficiently and effectively manage all facets of extraction, data, and data loading. The tool boosts of developer productivity with a rich set of features e.g. graphical integrated development environment that enables easy data profiling and modelling, drag-and-drop job design, and efficient reuse of completed work across projects and modules. It is because of these functionalities that the Talend Open Studio has a wide customer base of 3500. Organizations using Talend Open Studio for Data Integration in production environments range from small start-ups to some of the largest corporations in the world, as well as local and national government agencies.

What Open Studio offers is a user-friendly graphical modelling environment as it provides traditional approach for performance management as well as a pushdown optimization (architectural approach). The latter allows users to bypass the actual cost of dedicated hardware to support an ETL engine and enables users to leverage spare capacity of the server within both the source and target environments to power the transformations..

Pentaho Data Integration (Kettle)

Pentaho Data Integration PDI (Kettle) is the default ETL tool in Pentaho's ecosystem. With a very intuitive graphical editor (Spoon) you can define procedures that are stored in XML format. Procedures can interpreted by Kettle runtime in different ways, using the command line utility (Pan), a small server (Carte), a database repository (Kitchen) or directly from the IDE (Spoon). Both Pentaho Kettle and Talend Open Studio are user friendly tools. Having a good background in data and database management (JDBC, SQL, file formatting, programming basics, etc) becoming productive is a matter of days.

Kettle and Talend comes with a graphical tool that makes thing quick and easy to do. These tools help you to design and test reliable ETL procedures quickly. . The main difference is that Kettle is an interpreter of ELT procedures in XML format, while Talend Open Studio is a code generator (Java or Perl) tool. Talend

Open Studio and Pentaho Kettle are both user friendly, well documented and have a strong community support. In Talend Open Studio you need a little more effort to get familiar with. But once you get started you can enjoy the great power and potential of the tool.

Clover ETL

It's not that Clover ETL is not feature rich, it does possess some of the features seen in any other Open Source ETL tool. Take for instance Visualize Data Flows like any other tool this tool supports this feature wherein a sequence of components are placed into the transformation graph and connected with edges that channel data from one component to another. Assets like input data, shared metadata, connections, scripts, Java sources can be easily managed. Instant editing and previewing of metadata is available too .Metadata also helps CloverETL to parse data from text files, Excel spread sheets and other sources. However, the tools does not provide ant SaaS support and so the other three also doesn't provide this but they do provide ease of use through a good GUI and debugging is also easy. CloverETL does not enjoy such a large customer base may be because of these reasons only.

Pitney Bowes Data Flow Manager

The tool is clear cut winner in terms of being user friendly however, it lacks in areas such as debugging, SaaS support, integration etc. The other competitors do provide some basic functionality of these whereas Data Flow Manager completely lacks in it. But that surely doesn't mean that it does not carry any advantages. The main advantages of Pitney Bowes Data Flow Manager are that it concentrates on data integrity and quality and supports mainly all ETL patterns. Its fast implementation makes it a perfect choice for an ETL tool.

VI. Conclusion

In our research comparison we find that Oracle Data Integrator and IB Information Server are the ones which satisfy needs of large enterprises and other tools mentioned here have their own aspects to be implemented. Most of the upcoming tools are slow and have very few functions to satisfy the needs of the larger organizations but, they can't be ruled out for semi-large or small enterprises where the only compromise would be on speed and still one would get lots of other functionalities. Some of the aspects we have left out and have not included in our criteria one being the price. Since , every organization can only decide upon buying the product by evaluating the functionalities and the benefits expected to be reaped from it .Also not all products guarantee to provide all functionalities and its always a compromise as to what should work for one may not work for the other firm, so, although we have given our review and evaluation on these tools yet , the enterprise can decide by attaching a weight to the criteria and external variables that the enterprise feels are important and then decide which tool to go with.

Limitations and Future Scope

The research has been done by analyzing reports, articles, journals and gathering information from the vendor websites. The research was not conducted by testing the products with real world data. We were not able to evaluate the tools in a "hands on" manner and so the criterion followed to evaluate the tools was based on the reports that we had gone through. We have based our criteria of evaluation of other market researchers because we don't have a strong foundation in BI as yet and moreover the cost involved to do so goes into thousands of dollars. Also, ETL is only a part of the BI suite offered by the vendors. Price of the product was also not included because most of the organizations have not revealed its pricing to remain competitive and many solutions are tailored to fit an organization's specific needs via quotes. Many other criterions has been left out because of space constraints.

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A study of Consumer perception on use of E-technology in Retail Banking

Dr. Harinder Singh Gill
Principal, Amritsar College of Hotel Management & Technology, Amritsar

Mrs. Pooja Puri
Assistant professor, Department of Management studies
Amritsar College of engineering and technology,
Amritsar, Punjab, India

Meenu Sharma
Management Student
Amritsar College of engineering and technology,
Amritsar, Punjab, India

***Abstract*: The purpose of this paper is to examine the consumer's perception on the use of electronic Banking in Retail sector. Due to rapid technological change, the banks have also improved its services & operating successfully since last two decades. Banks have been providing E-Banking service to its customers very effectively. The present study is based on perception of customer towards E-Banking services provided by banks. It is an attempt to determine the future of E-Banking in our country. The collected data is examined through statistical tool and by using various methods like percentage, Chi square and Factor analysis. The study concludes that future of E-Banking is bright is bright in India and many customers are in favor of it. It is hoped that this study would make a small contribution in this area which will assess the future of e-banking from customer point of view. The basic aim is to find the response towards E- banking facilities provided by various banks in Amritsar region.**

***Keywords* - E-Banking, Retail sector, Perception, Factor** analysis and Chi square.

I.INTRODUCTION

In today's world of rapid change in technology it becomes the necessity of every business to stay up to date. The same is implemented in the retail banking sector. The traditional method of banking includes huge paper work and labour. And also there was many difficulties faced by customers like difficulty of doing transaction, long procedures of enquiry and so on. To solve this problem the new method of banking introduced which was E-banking. These days' E-banking services are provided by all retail banks all over the world. This new change in the banking system has brought the change in the pattern of banking. And also it is very convenient for customers. According to Ainscough and Luckett (1996), the provision of customer of e-banking, i.e. the ability of an innovation to meet users' needs using different feature availability on the web site. For instance, the provision of interactive loan calculators, exchange rate converters, and mortgage calculators on the web sites draw the attention of both users and availability on the web site. For instance, the provision of interactive loan calculators, exchange rate converters, and mortgage calculators on the web sites draw the attention of both users and non-users into the bank's web site. A UK study uncovered five key service quality attributes, such as security related issues, convenience, speed and timeliness of the service, and product variety/diverse features (White and Nteli,2004). Banks in India need to be complimented on the inculcation of technology in a large way in their day-to-day operations. Now banks are providing various E-Banking facilities to their customers which include- Online Enquiry, Online Payment, ATM Car, Credit Card ,debit Card, Internet Banking, Telephone Banking, Depository Service, Investment Advisory Service, E-Transfer of Funds, Anywhere Banking etc. E-banking technologies have proliferated in recent years, and the availability of a wide range of products has led to increasing adoption among consumers. These technologies include direct deposit, computer banking, stored value cards, and debit cards (Servon and Kaestner, 2008). Consumers are attracted to these technologies because of convenience, increasing ease of use, and in some instances cost savings (Anguelov *et al.*, 2004). E-banking, in particular, has grown at impressive rates. Between 1995 and 2003, e-banking increased eightfold (Hogarth and Anguelov, 2004). Between late 2002 and early 2005, use of online banking increased 47%, a clear evidence that e-banking is associated with better household financial management (Smith, 2006). There are various advantages of E-banking.

II. REVIEW OF LITERATURE

Bahl ,Sarita ,(2012) determined that security and privacy issues are the big issue in e-banking. If security and privacy issues resolved, the future of electronic banking can be very prosperous. **Aashish Shashikant Jani (2012)** identify relative important factors affecting the areas of strength and weaknesses of public and private sector banks in terms of different technologies offered to customers and future growth of e-channels in retail banking. Parameters like money transactions, efficiency, financial services, reliability and motivation were used to find the above. The empirical data

from 100 respondents of customers of bank were selected using a survey questionnaire and hypothesis were framed and tools like Mean, Standard Deviation, Coefficient of Variation, Correlation Analysis and Z test were used. The result reveals that use of technology inferred a positive perception of customers of public sector and private sector banks. **Anber Abraheem Shlash Mohammad and Shireen Yaseen Mohammad Alhamadani (2011)**to examine the level of service quality as perceived by customers of commercial bank working in Jordan and its effect customer satisfaction. Which involve five dimensions namely reliability, responsiveness, empathy, assurance and tangibles. Customer satisfaction was measured by 9 item adapted from (Walfried et al., 2000). A pilot study was conducted and questionnaire was distributed to 30 willing respondents through convenient distribution. A structured questionnaire contains 30 items and distributed to 260 randomly selected customers of commercial banks. Statistical tools like factor analysis and multiple regression analysis was employed to test the impact of service quality on customer satisfaction and the result indicates that to improve the elements of service quality is an important antecedent of customer satisfaction. **Wise and Ali (2009)** argued that many banks want to invest in ATMs to reduce branch cost since customers prefer to use them instead of a branch to transact business. The financial impact of ATMs is a marginal increase in fee income substantially offset by the cost of significant increases in the number of customer transactions. The value proposition however, is a significant increase in the intangible item "customer satisfaction". **Suresh (2008) highlighted that recently developed e-banking technology had** created unpredicted opportunities for the banks to organize their financial products, profits, service delivery and marketing. The objectives of the study were to evaluate the difference between traditional and e-banking, and to identify the core capabilities for the best use of e-banking. The author analyzed that e-banking will be an innovation if it preserved both business model and technology knowledge, and disruptive if it destroys both the model and knowledge. He also differentiated e-banking from traditional banking in five ways, namely, value proportion, market scope, cost structure, profit potential and value network. However, in order to exploit technical and business capabilities of ebanking, banks should generate more customers inside and outside India so that more revenues could be generated that lead to better future of Indian economy. A study by **Singhal and Padmanabhan (2008)** on customer perception towards internet banking (a type of innovative product) provides a comprehensive framework of various factors which contribute to customers' perception such as convenience, reliability, time factor, real time access to information, faster transfer, easy to use, user friendly, low transaction fee, any time and anywhere banking facility, among several other factors. Their empirical results showed that out of total respondents, 81% respondents felt that internet banking is very convenient and flexible banking. And the same percentage (i.e. 81%) from total users agrees or strongly agrees that internet banking is convenient. They felt it gives benefits like no queuing in bank and one can do banking anytime and anywhere. Other empirical research findings support this construct. **Sohail and Shaikh (2007)**Security, which involves protecting users from the risk of fraud and financial loss, has been another important issue in safe use of the internet when conducting financial transactions in Saudi Arabia. **Daniel, E., and Storey, C(2007)** Many private banks initially took to internet banking in the belief that the profitability of online banking would be huge. But most of them have failed to ensure adequate returns from these new service seven after many years. **Rogers(2005)** All products that are new do not have equal opportunities for consumer acceptance. Although there are no precise formulas by which marketers can evaluate a new product's likely acceptance, diffusion researchers have identified five characteristics that seem to influence consumer acceptance of new products: relative advantage; complexity; compatibility; trial ability; and observably. **Pikkarainen et al (2004)** define internet banking as an "internet portal, through which customers can use different kinds of banking services ranging from bill payment to making investments". With the exception of cash withdrawals, internet banking gives customers access to almost any type of banking transaction at the click of a mouse. **Simpson (2002)** suggests that e-banking is driven largely by the prospects of operating costs minimization and operating revenues maximization. A comparison of online banking in developed and emerging markets reveal that in developed markets lower costs and higher revenues are more noticeable.

III.OBJECTIVES

The objective of study is as follows:

1. To identify the banking sector that is largely availed by the customers.
2. To examine the expectations and the level of satisfaction of the customers towards the services rendered by retail banks.
3. To understand the various product and services provided by the bank under e-banking.
4. To know the most influential factor affecting E-Banking.
5. To suggest the remedial measures for future growth of banking.
6. To know about the relationship between the convenience of using services and saving time & proving fast services.

IV. RESEARCH METHODOLOGY

In a view to precede the research in a systematic way the following research methodology has been used. By means of obtaining detailed opinion of the customers, this research falls under the category of conclusive research. Both primary and secondary data collection was made. To collect the primary

data Questionnaire is prepared. And area of research is AMRITSAR city.

- **Types Of Research Design**

  Conclusive Research Design

- **Sources of Data**

  a. Primary Data: Survey Method

- **Sampling Technique**

  Non-Probability Technique- Random Sampling Method

- **Sampling Size**

  100 samples

- **Sampling Unit**

  Consumers from different age group, background, gender, income group etc.

- **Research Equipment**

  Questionnaire

- **Method of data collection**

  Personal interview

- **Test Applied**

  Percentage, Factor Analysis and Chi square.

- **Software used**

  SPSS version 16.0

V.DATA ANALYSIS AND INTERPRETATION

Table 1 is showing the demographic characteristics of the respondents. It has been shown that most of the respondents i.e. 69% are between the age of 21-25. Most of the respondents i.e. 63% are women. While the 47% of people are post graduate. Talking about the occupation most of the respondents are students.

Table :1

Demographic Characteristics of respondents

	FREQUENCY	**PERCENTAGE**
1. AGE		
18-20	11	11
21-25	69	69
26-35	11	11
36-50	9	9
51-above	0	0
Total	100	100
2.GENDER		
Male	37	37
Female	63	63
Total	100	100
3.EDUCATION		
Matric	2	2
+2	12	12
Graduate	39	39
Post Graduate	47	47
Total	100	100
4.OCCUPATION		
Student	63	63
Employee	19	19
Housewife	11	11
Businessman	7	7
Total	100	100

Interpretation: Table 1 shows that most of the respondents i.e. 69% are between the ages of 21-25. Most of the respondents i.e. 63% are women while only 37% are men. While the 47% of people are post graduate 39% are graduates 12% are +2 and only 2% are matric. Talking about the occupation most of the respondents are students i.e. 63%.

Table:2
Banking Information

	FREQUENCY	PERCENTAGE
1.Bank		
Public	52	52
Private	48	48
Total	100	100
3. In how many bank you have account?		
1-2	74	74
More than2	26	26
Total	100	100

4. Awareness of services provided by bank		
Yes	92	92
No	8	8
Total	100	100
5. Do you use internet banking?		
Yes	91	91
No	9	9
Total	100	100

Interpretation: The above table shows that 52% of people have account in public sector banks while 48% have account in private sector banks. 74% people have only 1 account. While 92% people are aware of E-Banking facilities provided by banks. And 91% are the people who use E-banking facilities provided by banks.

INTERPRETATION OF FACTOR ANALYSIS

The approach used in the factor analysis is "Principle Component Analysis". In this component analysis, total variance in the data is considered. The diagonal of the correlation matrix consists of unities and full variance is bought into factor matrix. It determines the minimum number of factors that will account for maximum variance in the data for use in subsequent multivariate analysis. The factors are also called principle components. Although the initial or un-rotated factor matrix indicates the relationship between the factors and individual variables, it seldom results in factors that can be interpreted, because the factors are correlated with many variables. Hence the variance explained by each factor is redistributed by rotation.

Table: 3
Shows the list of variables along with their description

Variable	Description
Q6B	Easy access to data
Q7	Consistency of performance and dependability
Q8	Bill payment service
Q9	Updated information
Q10	Ease of transfer funds
Q11	Regular transaction alerts
Q12	Convenience to use
Q13	Providing instant feedback
Q14	Saves time and provide fast services
Q15	Cost effectiveness
Q16	Better E-shopping facility
Q17	Technical problem in using cards
Q18	Ease of online trading
Q21	Accurate ,error free information
Q22	Safety and security
Q23	Hidden charges
Q24	Demo facility
Q25	Screen ease
Q26	Fair charges
Q27	Provide free services

Table:4

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.508
Bartlett's Test of Sphericity	Approx. Chi-Square	684.250
	Df	190
	Sig.	.000

The Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity . The KMO statistics varies between 0 and 1. A value of 0 indicates that the sum of partial correlations, indicating diffusion in the pattern of correlations. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as acceptable. Here it is .508 which mean data is adequate for factor analysis.

Table 5: Shows the total variance explained by various factor

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.961	14.806	14.806	2.961	14.806	14.806	2.454	12.268	12.268
2	2.871	14.355	29.161	2.871	14.355	29.161	2.305	11.523	23.791
3	2.256	11.280	40.440	2.256	11.280	40.440	2.253	11.267	35.058
4	2.004	10.020	50.461	2.004	10.020	50.461	2.018	10.090	45.149
5	1.317	6.587	57.048	1.317	6.587	57.048	1.796	8.981	54.129
6	1.308	6.539	63.587	1.308	6.539	63.587	1.503	7.514	61.644
7	1.033	5.163	68.750	1.033	5.163	68.750	1.421	7.106	68.750
8	.963	4.813	73.563						
9	.853	4.264	77.827						
10	.722	3.611	81.439						
11	.707	3.533	84.972						
12	.551	2.756	87.728						
13	.484	2.418	90.146						
14	.428	2.141	92.287						
15	.415	2.076	94.363						
16	.359	1.795	96.157						
17	.289	1.447	97.604						
18	.203	1.014	98.618						
19	.168	.841	99.459						
20	.108	.541	100.000						

Extraction Method: Principal Component Analysis

The above table shows that out of 20 variables 7 are extracted. 1 is taken as Eigen value and so all the variables having Eigen value more than or equal to 1 have been extracted and rest are rejected. The total variance explained are 1,2,3,4,5,6 and 7 having cumulative percentage as 12.26,23.79, 35.05, 45.14, 54.12, 61.64, 68.75. The cumulative percentage of the variable is 68.750.

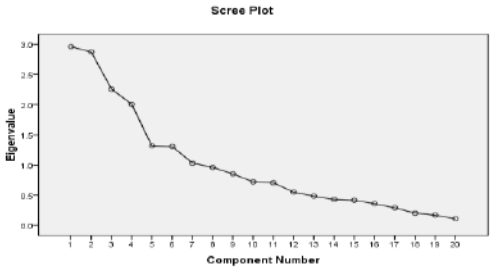

Figure 1 : Scree plot

Table:6

Component Transformation Matrix

Component	1	2	3	4	5	6	7
1	0.63	-.179	**0.65**	.246	.157	.070	.219
2	-.438	**0.55**	.298	.483	.259	-.281	.190
3	.436	**0.61**	-.151	.191	-.604	.052	-.111
4	-.131	.425	.353	-.619	.066	**0.52**	.154
5	.303	.163	-.440	-.216	.271	-.263	**0.71**
6	.259	.229	-.313	.185	**0.66**	.356	-.425
7	-.201	-.182	-.209	.453	-.157	**0.67**	.447

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table: 6

Shows the rotated component matrix. In each statement corresponding to the highlighted factor loading is correlated with factor corresponding to that factor loading. Higher the factor loading, stronger is the correlation between the factors and statement. On the basis of rotated component matrix the factor extraction table has been prepared which is as:

Table-7

Factor Extraction Table shows the variables in each factor with corresponding loading and percentage of variance

The above table 6 stated factors are in the order of degree of importance that is factor 1 is more important than factor 2; factor 2 is more important than factor 3 and so on up to factor

Factor	**% age of factor**	**Factor interpretation**	**Variable included in factor**	**Loading**
F1	14.806	Time saving, facilities and financial services	Accurate, error free information(Q 21) Hidden charges(Q 23) Free services(Q 27) E-shopping facility(Q 16) Save time (Q 14)	.749 .697 .601 .566 .541
F2	14.355	Convenience in services	Instant feedback (Q 13) Transaction alert(Q 11) Bill payment service(Q 8) Ease of transfer fund(Q 10)	.764 .592 .581 .569
F3	11.280	Access to data	Easy access to data(Q 6B) Convenience to use(Q 12) Demo facility(Q 24)	.831 .788 .531
F4	10.020	Reasonable and accessible facility	Cost effectiveness(Q 15) Screen ease in using cards (Q 25)	.861 .687
F5	6.587	Technical problem	Technical problem(Q 17)	.859
F6	6.539	Charges	Fair charges(Q 26)	.874
F7	5.163	Ease of online updating	Ease of online trading(Q 18) Updated information(Q 9)	.690 .516

7. The factor 1 has variance 14.806 which is greater than factor 2 having variance14.35 which is again higher than factor 3, 4, 5, 6 and 7 having variance 11.28, 10.02, 6.58, 6.539, 5163. Hence it is found that the factors like Accurate, error free information, Hidden charges, free services, E-shopping facility, Save time are most influential factors.

Chi Square test-

Ho- There is no significant relationship between convenience of using services and saving time & proving fast services.

INTERPETATION: Above table reveals that the calculated

Table:8
Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	58.022[a]	16	.000
Likelihood Ratio	16.158	16	.442
Linear-by-Linear Association	.187	1	.666
N of Valid Cases	100		

a. 18 cells (72.0%) have expected count less than 5. The minimum expected count is .01.

Pearson's Chi-square for the convenience of service and saving times is 0.00 (P<0.05). Thus, the value of pearson's chi-square represent a relationship significantly is zero (P<0.05) in favour of the alternate hypothesis. Hence the null hypothesis is rejected in favour of the alternate hypothesis; there is statistically significant relationship between the between convenience of using services and saving time & proving fast services.

VI.MAJOR FINDINGS

1. Most of the respondents i.e. 69% are between the ages of 21-25. Most of the respondents i.e. 63% are women.
2. While the 47% of people are post graduate.
3. Talking about the occupation most of the respondents are students.
4. The study shows that 52% people have bank account in public sector banks so public sector is availed by most of people.
5. Most of people i.e. 72% prefer to have only 1 bank account.
6. Out of 100 respondents 92% are aware of e-banking facilities provided by banks.
7. 91% of people use the E- Banking services provided by banks.
8. The Chi square test shows that there is a significant relationship between convenience of using services and saving time & proving fast services.
9. The factors analysis state that factors are in the order of degree of importance that is factor 1 is more important than factor 2; factor 2 is more important than factor 3 and so on up to factor 7. The factor 1 has variance 14.806 which is greater than factor 2 having variance14.35 which is again higher than factor 3, 4, 5, 6 and 7 having variance 11.28, 10.02, 6.58, 6.539, 5163. Hence it is found that the factors like Accurate, error free information, Hidden charges, free services, E-shopping facility, Save time are most influential factors.

VII.CONCLUSION

Thus, this study has analyzed the overall perception of customers regarding the services of e-banking. Age and occupation are the important demographic factors in the banks which have used to measure the perception of the customers on e-banking services. E-Banking will be successful for banks only when they have Commitment to e-Banking along with a deeper understanding of customer needs. This can come only when the bank has a very big base of customers, best people, and a service attitude. Banks should concentrate on above lines in order to have effective e-banking practices The study concluded that different age group of customers have different perception toward the e-banking services and the usage level of these banks' customer is different so bank should concentrate on all the age group of customers for betterment of e-banking banks. It has also seen that different occupation group of customers have different perception toward the e-banking services. There are good number of customer in every group like student, service class, business class and professionals, it shows that they all are keen interesting in using the e-banking services.

VIII.POLICY IMPLICATION

1. The number of respondents should be increased for the future study for getting the more appropriate results.
2. The scope of study can also be widen from Amritsar to the whole district or country.
3. Bank should take initiative to organize training campaign for their customer to boost use of e-banking.
4. Easy method to operate online banking should be installed by the bank so as to make more and more customer to use net banking..
5. More efforts should be taken by bank in undertaking advertisement and promotional campaign so that greater awareness among consumer is created.

6. More focus should be given on appropriate network facility in the Amritsar region .

7. E-banking has become very important for the survival of bank in the changing banking industry

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CAREER ADVANCMENTOF MBA'S
(Amritsar City)

DR. HARINDER SINGH GILL
(PRINCIPAL) A.C.H.M.C.T.

MS. POOJA PURI
(ASSISTANT PROFESSOR)
DEPARTMENT OF MANAGEMENT STUDIES,
ACET, AMRITSAR.

AMANPREET KAUR
STUDENT OF MBA 4th SEM,
ACET, AMRITSAR

Abstract-*The career advancement of MBA's program: it discuss the current scenario of management education and research on career advancement. Career growth, managerial skills and increased earnings are perhaps the most common reasons given for pursuing an MBA. An MBA degree may help to achieve a major breakthrough in one's career path accompanied with a jump in income. Many MBAs with engineering background may start with that ambition. A management qualification requires a enormous investment of effort and money. To maximize the return on that, one should think carefully about his/her own objective in seeking an MBA and the type of course that is most likely to enable one to meet those objectives.*

I. INTRODUCTION

Some people do engineering because their parents wanted them to, but later they find that higher positions in management are grabbed by MBAs. An additional MBA degree may give them the qualification to work at higher levels in multinational/national companies and live a decent life. In other words, an MBA degree in addition to engineering or other degree is a detour in career advancement. Thousands of students, including engineers from the premier institutes like the IITs, want to get into management for this reason. One often wonders why some of the brightest people in the country are opting for marketing profession, sacrificing their talent and years of hard work and education in a different profession. Career growth, managerial skills and increased earnings are perhaps the most common reasons given for pursuing an MBA. An MBA degree may help to achieve a major breakthrough in one's career path accompanied with a jump in income. Many MBAs with engineering background may start with that ambition. A management qualification requires an enormous investment of effort and money. The Masters in Business Administration (MBA) program has been the most recognized of qualifications for aspiring middle to senior managers and the most common of business School postgraduate offerings. However it is increasingly criticized as being out of touch with the needs of the business and becoming overly theoretical in its content (Schlegelmilch & Thomas, 2011).

Moving on to the subject of our study, the factors that influence MBA students' career 'choices' requires us to explore particular issues pertaining to an MBA study and the significance of studying career 'choice' between MBA students. If we consider that MBA has a history of barely two decades, the global popularity of MBA study is of unprecedented nature with over 100,000 people internationally studying for an MBA degree each year (Sturges *et al.*, 2003).

There seems to be mass migration towards management education, with mushroom growth of management schools churning MBAs out for managerial positions. The more the concentration in one stream of education, the greater may be the inefficiency and inequality among people who are not homogenous in quality. There are a number of failures who would have performed better had they chosen their career in rational way. It seems that the tendency to conform to the herd is now more pronounced in the choice of MBA for employment and career advancement. Now-a-days there are large number of women MBA students. However this was not the case during 1970's and 80's in India. According to a joint study released in 2000 by Catalyst, the University of Michigan Business School, and the Center for the Education of Women at the University of Michigan, female enrollment at top business schools averages 30 percent, while it is 44% in medical and law schools. The study suggests that there are obstacles to more women taking advantage of the opportunity an MBA provides. This study indicates that the business school environment is better for women than conventional wisdom suggests, and this survey concludes that business schools and business careers are not perceived by many women to be in line with their personal and professional goals. In the present study, it may be noted that only 15% of women MBA students were there in the School of Management Studies, CUSAT, during the period 1973 to 1984. But today the number of women students in the MBA class in the School of Management Studies, CUSAT, is around 40%. This pattern observed in the School of Management Studies is likely to be the same in other B-schools too. Women account for 50% in the engineering colleges as well as in the software training sectors (Krishnan , 2005).

Management education in India

Indian management education system is the second largest in the world today, next only to that of U.S. But here again, in terms of number of B-Schools it has already caught up with the U.S., overtaken Europe, and is slowly inching towards catching up with V.S., in terms of MBA production. Its growth in the last 40 years has been phenomenal. Many of us who grew up with the Indian management education system feels proud at its achievement, recognition and popularity.

The early 1960s under the leadership of Prof. A. Dasgupta, The Department of Business Administration of the University of

Delhi was the first institute in the country to offer a three year Post Graduate Diploma in Management on a part-time basis for senior and middle level executives. This department has its origin in 1954 in the Delhi School of Economics. Andhra University was the first University in the country to start a full-time Master's Programmer in Business Administration (MBA) in 1957 in its Department of Commerce. The first 'B-School' in India was the Indian Institute of Social Welfare & Business Management (IISWBM), Kolkata (at inception known as All India Institute of Social Welfare and Business Management) was set up in 1958 and headed by Prof.D.K.Sanyal. It was created through a resolution adopted by the Syndicate of the University of Calcutta on April 25, 1953. IISWBM introduced the first programmed on management education in India (sinha ,2004).

1.1 OBJECTIVES

- To know the career advancement of MBA's.
- To explore the factors of career advancement of MBA's.
- To study the satisfaction of career advancement of MBA's.

II. REVIEW OF LITERATURE

Baruch and Peiperl(2000) suggest that many see this qualification as a prerequisite for many senior management positions. The most popular reason for taking the MBA is to improve job opportunities. **Simpson (2005)** One strategy men and women adopt to move into the higher levels of management is to equip themselves with an MBA **Boyatzis and Renio(1989)** suggest that doing an MBA program me add value on a number of abilities related to effective managerial performance. **Shipper (1999)** the MBA programme does not provide an advantage in key managerial or leadership skills over those who possess only a bachelor's or some other master's degree. **Collin (1996)** the initial motivation for undertaking an MBA varied, of course, between the individuals involved and included concern for career prospects, for a move into management, promotion, or improved job performance; the desire for 51 stimulus, challenge and job satisfaction and, the wish to 'break the mould' set early in life by low school expectations and social class. Both the motives of men and women in embarking on an MBA seemed remarkably similar. The reason cited most frequently by both men and women is 'to improve job opportunities'. Similarly, the second most popular motive for men and women is 'to obtain a business qualification'. Together, these two reasons account for a majority of both men and women. **Heaton (2000)**. In terms of career benefits, popular choices are greater marketability, enhanced job prospects, enhanced salary or status, and enhanced credibility and confidence. In terms of skills, the two most popular choices are the ability to handle and analyze complex data and negotiation skills Almost all of the interviewees believed that they had progressed in their careers after completing their MBAs and that they had benefited from acquiring a set of hard skills, particularly financial and data analysis skills. However, intrinsic benefits, such as increased confidence and credibility, emerged as highly important for the majority of the research participants. The most crucial benefit of the MEA, acknowledged by all interviewees, was an increase in self-confidence several reported that the acquisition of the MBA had given them better business confidence and self-confidence

III. DATABASE AND RESEARCH METHODOLOGY

- **Population** The population for the present study consists of all MBA'S.
- **Sample size** The size of the sample for the present study is confined to 100.
- **Sample Technique** The sample for the present study is selected using simple random technique.

Source of data

- **Primary data**

Primary data is collected of facts on the subject of the study by the researcher. It can be collected through questionnaires.

- **Secondary data**

Secondary data refers to the use of information already collected and published or unpublished. The sources are books, journals, reports etc

- **Questionnaire**

It is formalized set of question, with are logically and systematically arranged to collect the information useful for the proposed study. The questionnaire in this study is structured containing a limited number of questions which are easy and to understand.

3.1 FACTOR ANALYSIS: It is a general name denoting a class of procedures primarily used for data reduction and summarization. Relationship among set of many interrelated variables are examined and represented with the help of factor analysis. The approach used in the factor analysis is "Principle Component Analysis". In this component analysis, the total variance in the data is considered. The diagonal of the correlation matrix consists of unities and full variance is bought in to factor matrix. It determines the minimum number of factors that will account for maximum variance in the data for use in subsequent multivariate analysis. The factors are also called principal components. Although the initial or un-rotated factor matrix indicates the relationship between the factors and individual variables, it seldom results in factors that can be interpreted, because the factors are correlated with many variables. Hence the variance explained by each factor is redistributed by rotation. The method used for rotation in this study is "Varimax". It is a method of factor rotation that minimizes the numbers of variables with high loading on a factor, thereby enhancing the interpretability of the factors.

IV. DATA INTERPRETATION AND ANALYSIS

Table: I

Classification of Respondents According To Their Profile

Gender	**Frequency**
Male	9
Female	91
Total	100
Age	**Frequency**
15-20 years	23
21-25 years	62
26-30 years	15
31-35 years	0
36-40 years	0
Above 41	0
Total	100
Designation	**Frequency**
Private job	36
Govt. job	20
Business	11
Other	33
Total	100

To sum up above, it can be concluded that most of respondent in were female. Most of respondents were between 21-25 years. Most of the respondents do private jobs.

INTERPRETATION OF FACTOR ANALYSIS

The approach used in the factor analysis is "Principle Component Analysis". In this component analysis, the total variance in the data is considered. The diagonal of the correlation matrix consists of unities and full variance is bought in to factor matrix. It determines the minimum number of factors that will account for maximum variance in the data for use in subsequent multivariate analysis. The factors are also called principal components. Although the initial or un-rotated factor matrix indicates the relationship between the factors and individual variables, it seldom results in factors that can be interpreted, because the factors are correlated with many variables. Hence the variance explained by each factor is redistributed by rotation.

Table: II

Shows the List of Variables Along With Their Description

Variables	**Description**
V1	Enhancement Of Managerial Skills
V2	Degree Holder
V3	Requirements Of Business
V4	Diversified Skill Holders
V5	Manage Time In A Better Way
V6	Management Only Learnt Through Degree
V7	Prominent Stress Management
V8	Good Communicators
V9	Skill Of Writing Good Presentations
V10	Don't Feel Hesitation
V11	Many Promotion Chances Than Other Graduates
V12	Manage Conflicts Raised By Fellows
V13	Good Team Players
V14	Handle Any Financial Matter
V15	Good Decision Makers Than Other Business Graduates
V16	Sharp Enough In Development Of Teams
V17	Present Any Situation In Better Way
V18	Oral Presentation Is Very Good Due To Business Graduation
V19	Burden For Doing Research About Any Problem
V20	Overall Satisfied With Your MBA Carrier Advancement

Table: III

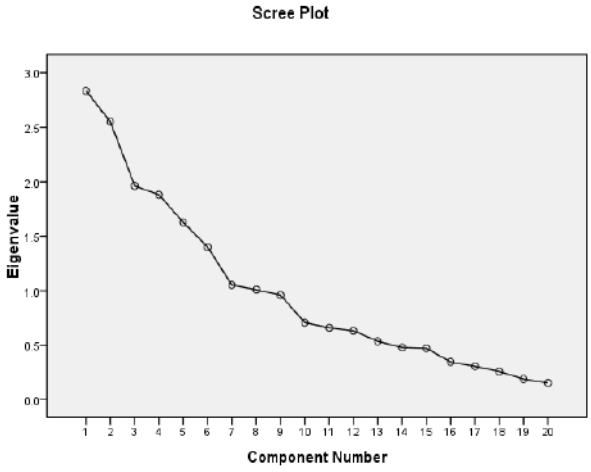
Shows the Total Variance Explained By Various Factors

Component	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	2.836	14.182	14.182	2.836	14.182	14.182	2.514	**12.570**	12.570
2	2.551	12.756	26.938	2.551	12.756	26.938	2.134	**10.669**	23.238
3	1.963	9.814	36.752	1.963	9.814	36.752	2.000	**9.998**	33.236
4	1.880	9.401	46.153	1.880	9.401	46.153	1.702	**8.512**	41.747
5	1.628	8.139	54.292	1.628	8.139	54.292	1.607	**8.033**	49.781

6	1.400	7.002	61.294	1.400	7.002	61.294	1.526	**7.631**	57.412
7	1.051	5.257	66.551	1.051	5.257	66.551	1.435	**7.176**	64.588
8	1.008	5.038	71.589	1.008	5.038	71.589	1.400	**7.000**	71.589
9	.959	4.793	76.381						
10	.707	3.534	79.916						
11	.659	3.293	83.209						
12	.630	3.150	86.358						
13	.535	2.675	89.034						
14	.477	2.385	91.419						
15	.470	2.351	93.769						
16	.344	1.722	95.492						
17	.305	1.524	97.015						
18	.257	1.283	98.299						
19	.188	.938	99.237						
20									

Table: IV
Shows the Rotated Component Matrix

All this provided that we can proceed with factor analysis and the result of factor analysis over 20 factors shown that there are 8 key factors, which was determined by clubbing the similar variables and ignoring the rest, which majorly consider being most affecting components of career advancement. It shows the respective percentage of variance of all these factors derived from factor analysis. It is observed that only 8 factors have Eigen value more than one, so accordingly we proceeding with these factors. The total variance explained by factor 1, 2, 3, 4,5,6,7 and 8 are 12.570, 10.669, 9.998, 8.512, 8.033, 7.631, 7.176 and 7.000 percent of variance, whereas the cumulative variance explained by all these factors is 71.589 percent and rest of the variance is due to the factors which are beyond the scope of the study.



	Component							
	1	2	3	4	5	6	7	8
V14	**.755**	-.051	-.224	-.021	.007	-.071	.376	-.015
V15	**.737**	-.027	.312	-.104	-.120	.065	-.092	-.066
V19	**.824**	-.148	-.167	-.067	-.056	-.102	-.019	.011
V20	**.733**	.203	.044	.211	.210	.211	-.039	.073
V1	.077	**.771**	.006	.099	-.289	-.040	.133	-.165
V2	-.235	**.674**	.041	.017	.080	.285	.213	.081
V4	-.048	-.042	**.787**	.056	.181	.000	-.280	-.055
V5	-.098	.155	**.633**	-.311	.415	-.045	.143	.062
V7	-.083	.125	-.296	**.673**	-.023	-.064	.037	-.370
V11	.022	.201	.107	**.614**	.063	.223	-.415	.331
V12	.047	-.042	.137	**.711**	-.207	-.083	.236	.258
V8	-.026	.094	-.758	-.062	**.117**	-.132	-.122	-.173
V9	.058	-.186	.273	-.064	**.716**	-.248	-.014	-.166
V10	-.024	-.061	-.040	-.047	**.789**	.278	-.106	.091
V16	.135	.016	.068	-.124	-.025	**.767**	-.041	-.024
V17	-.222	-.207	.033	.393	.208	**.647**	.155	-.152
V13	.050	.174	-.021	.097	-.082	.042	**.823**	.048
V18	.071	-.682	.108	-.041	.054	.328	**.372**	-.132
V3	-.155	-.589	.105	.034	-.010	.162	-.145	**.481**
V6	.024	-.046	.063	.064	-.013	-.131	.058	**.834**

It shows the each statement corresponding to the highlighted factor loading is correlated with factor corresponding to that factor loading. Higher the factor loading, stronger is the correlation between the factors and statement. On the basis of rotated component matrix the factor extraction table has been prepared which is as:

Table: V

Factor Extraction Table Which Is Shows the Variables in Each Factor with Corresponding Loading and Percentage of Variance

Factors	**% of variance**	**Factor interpretation**	**Variables included in the Factors**	**Loading**
F1	12.570	Problem solver	Handle Any Financial Matter(V14), Good Decision Makers Than Other Business Graduates(V15), Burden For Doing Research About Any Problem(V19), Overall Satisfied With Your MBA Carrier Advancement(V20)	.755 .737 .824 .733
F2	10.669	Enhance skills	Enhancement Of Managerial Skills(V1), Degree holder(V2)	.771 .674
F3	9.998	Time management	Diversified Skill Holders(V4), Manage Time In A Better Way(V5)	.787 .633

F4	8.512	Conflict handler	Prominent Stress Management(V7), Many Promotion Chances Than Other Graduates(V11), Manage Conflicts Raised By Fellows(V12)	.673 .614 .711
F5	8.033	Good communicatio n skills	Good Communicators(V8), Skill Of Writing Good Presentations(V9), Don't Feel Hesitation(V10)	.117 .716 .789
F6	7.631	Presentation skills	Sharp Enough In Development Of Teams(V16), Present Any Situation In Better Way(V17)	.767 .647
F7	7.176	Team building	Good Team Players(V13), Oral Presentation Is Very Good Due To Business Graduation(V18)	.823 .372
F8	7.000	Perform accurate job	Requirements Of Business(V3), Management Only Learnt Through Degree(V6)	.481 .834

The above table stated factors are in the order of degree of importance i.e. factor 1 is more important than factor 2; factor 2 is more important than factor 3 and so on. The factor 1 and 2 has 12.570% and 10.669% of variance which is the highest variance as compared with factor 3, 4, 5, 6, 7 and 8 where % of variance is 9.998%, 8.512%, 8.033%, 7.631%, 7.176%, and 7.000%.

V. FINDINGS

- Most of respondent in were female.
- Most of respondents were between 21-25 years.
- Most of the respondents do private jobs.MBA is degree for enhancement of managerial skills.
- Respondents were overall satisfied with the MBA degree.
- MBA are good decision makers.
- MBA can also handle the financial matter.

VI. RECOMMENDATIONS

It is important to realize that a preliminary study of this nature will normally lead to more questions and ideas for future research than answers and recommendations. We would like to do three things in our future studies on the effectiveness of a formal training intervention. Firstly, we will scan the literature and develop a list of most important job related tangible and intangible personal, organizational and societal outcomes. We will use this list to determine major dependent variables to study. Secondly, we will look at, in addition to the intervention, all possible independent variables such as motivation, social networks and individual difference. Thirdly, we will elaborate our basic model by introducing an exhaustive list of mediating variables such as knowledge, network and change in attitude gained through the intervention.

Also we would propose that future study should pay more attention to overcome some of the methodological difficulties encountered in the present study. For example, to establish a clear causal relationship between MBA and financial benefit, one should make sure that both MBA holders and people without MBA have the same level of motivation, knowledge, experience and socio-economic background.

VII. CONCLUSION

The students seem to have a strong expectation of a non-traditional, higher education program being flexible enough to meet the time demands of today's working professionals and affording job advancement and marketability in today's competitive workplace. In addition, they recognized the distinctiveness of the academic institution utilized in this study that affords both undergraduate and graduate degrees. At the same time, while it is easy to establish a rank ordering of information regarding the selection of a particular academic institution, the final decision is most probably an amalgamation of inputs. Further studies should be pursued regarding other institutions of higher learning to research the importance of the distinctiveness in choosing a school for the pursuit of a graduate degree, and there could be an opportunity to explore demographics as determining factors.

From the study it is clear that the major significant variables that contribute to career advancement of MBAs are professional ambition, need for power, promotion process and ethnic/regional considerations. Father's higher educational level and desire for personal growth may also facilitate career advancement of MBAs. But these two aspects of the conclusions are to be verified by further research. All other variables mentioned in the study are not relevant in career advancement of MBAs. In short, career advancement is a function of one's own professional motivation such as ambition, personal growth, and need for power. Promotion process, ethnic/regional considerations, and educational level of father may facilitate or hinder career advancement of MBAs.

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QUALITY OF WORK LIFE IN MSME,s AND ITS IMPACT ON WORK PERFORMANCE

Chitra Mishra
Research scholar in Management,
Punjab Technical University,
Kapurthala, India.
mishrachitra76@gmail.com

Abstract- In this paper the main highlight is on the study of quality of work life for the employees of MSME,s. The intention of study is to establish the survival of QWL (Quality Of Work Life) in MSME,s as per the observation of employees. As the QWL is very essential for industries to continue to attract and retain employees. We can preserve the employees through healthy working atmosphere and strong Quality Circles. This is the requirement of the day. The presence of QWL in the industrial unit is beneficial to both employees and industries.

Keywords--Workforce, MSME,s, Quality of Work life (QWL), Working Environment, occupational stress.

I.INTRODUCTION

Work life plays a prominent part in personal life and the fulfillment of a person in both facet of life is very important. QWL is the eminence of association between employees and the overall working environment (Davis, 1983). QWL is about the betterment of the work, how the organization thinks about its people and also how the people think about the industry. Quality of work life is a multidimensional form that includes concepts such as job security, reward systems, training and career advancements opportunities and participation in decision making (Saraji and Dargahi, 2006). Quality of work life has been defined as the surroundings of place of work that endorse and preserve employee satisfaction with an aim to improving working condition for employees. In India a large number of people are working in private sector and they give a certain level of valuable time to their companies. In there, they give their best attempt to acquire a positive reception and for company's goodwill. But quality of work life is such a concept which needs a certain balance both in professional and personal life. 'Quality of work life' (QWL) has different meanings of different peoples, some consider it industrial democracy or codetermination with increased employee participation in the decision making process. It varies from person to person, how they interpret the word quality of work life. For others, particularly managers and administrators, the term denotes improvement in the psychological feature of work to improve productivity. Unions and workers interpret it as more equitable sharing of profits, job security and healthy and humane working conditions. Others view it as improving social relationships at workplace through autonomous workgroups. Finally, others take a broader view of changing the entire organizational climate by humanizing work, individualizing organizations and changing the structural and managerial systems. There has been much concern today about decent wages, convenient working hours, conductive working conditions etc. Their term QWL has appeared in research journal and the press in USA only in 1970s. There is no generally accepted definition about this term. Quality of work life is a attitude or set of principals which holds that people are reliable, accountable and competent of making valuable contribution to the organization (Rose, Beh, Uli & Idris, 2006).

II. SIGNIFICANCE OF QWL IN MSME,S

The Micro, Small and Medium Enterprises (MSMEs) play a fundamental role in the economic and social development of the country, often acting as a playgroup of entrepreneurship. They also play a key role in the development of the economy with their effective, efficient, flexible and innovative entrepreneurial spirit. The MSME sector contributes significantly to the country's manufacturing output, employment and exports and is credited with generating the highest employment growth as well as accounting for a major share of industrial production and exports.

The labor intensity of the MSME sector is much higher than that of large enterprises. MSMEs constitute more than 90% of total enterprises in most of the economies and are credited with generating the highest rates of employment growth and account for a major share of industrial production and exports. MSMEs account for about 45% of India's manufacturing output. MSMEs accounts for about 40% of India's total exports. The sector is projected to employ about 73 million people in more than 31 million units spread across the country. MSMEs manufacture more than 6,000 products

ranging from traditional to high tech items. For FY11, total production coming from MSME sector was projected at ` 10,957.6 billion, an increase of more than 11% over the previous year. For FY12, the MSME sector is estimated to have an average credit off-take of ` 7.16 lacs for 32.2 million units.

The deficiency of QWL escorts to the dissatisfaction in job, lack of motivation and moral.

The reason to non-performance in MSME are many like lack of finance, technology, non availability of skilled labor, turnover, absenteeism etc. but the hidden cause for all these troubles is one and only "Quality of work life".

III. Occupational Stress and Employee Control

Employee control over work can reduce stress and enhance motivation and growth. Several key findings have prompted employers to search for ways to give workers a greater sense of control, to improve health, productivity and morale.

Employers could improve job-related mental health without sacrificing productivity. That is, organizations could reduce job strain by increasing employee control or decision autonomy, without reducing actual workload. Employers could fine-tune their administrative structure in order to reduce employee stress and protect workers' mental health - without cutting productivity.

IV. Related Reviews

For more than two decades a sizable volume of literature has been developed on Quality of Work Life. In India, scholars as well as practitioners of Human Resources Management and Industrial Relation have studied its various aspects and developed a few case studies. However, no comprehensive attempt has been made so far in India, to objectively measure the Quality of Work Life in those specific contexts.

Walton (1974) attributes the evolution of Quality of Work Life to various phases in history. Adequate and fair compensation, Safe and healthy working conditions, Opportunity to utilize and develop human capacities, Opportunity for continued growth and security, Social integration in the work organization, Constitutionalism in the work organization, Work and total life space and Social and relevance of work life.

Legislations endorsed in early twentieth century to protect employees from job-injury and to eliminate hazardous working conditions, followed by the unionization movement in the 1930's and 1940's were the initial steps in this direction. Emphasis was given to job security, due process at the work place and economic gains for the worker.

The 1950's and the 1960's saw the development of different theories by psychologists proposing a positive relationship between morale and productivity that improved human relations.

Stein (1983) explained the QWL as the Independence and autonomy, being outstanding and important, Property and belongingness, Development and progress, outside rewards

Levine, Taylor & Davis(1984) observes QWL as Esteem and confidence to staffs, capabilities by Directors, Work change; Work challenge; Future development comes from current work; Self-esteem; Cohesion and interference of work and life; share of work in enhance of society.

Sekharan (1985) observes that, in the past the concept of Quality of Work Life had initially included only the issues of wages, working hours, and working conditions. However, the concept has now been expanded to include such factors as the extent of workers' involvement in the job, their levels of satisfaction with various aspects in the work environment, their perceived job competence, accomplishment on the job etc.

According to Keith (1989), Quality of Work Life refers to "the favorableness or unfavorableness of a job environment for people". The basic purpose in this view is to develop jobs aiming at Human Resource Development as well as production enhancement.

In the words of Kumar and Tripati (1993), Quality of Work Life is a philosophy of management that believes supportive connection between employees and employers and also believes that every employee has the ability and right to show his excellence and useful inputs into decisions at various levels in the organizations.

Cai Hui-ru (1994) stated that QWL is the Quality of life-reward of services, welfare, work security, work support; social quality: relationship with superior, colleagues, and clients; growth quality: participation management, rise, individual growth, self esteem, work features.

Jia Ha wee (2003) enlightened the QWL as Need to surveillance; Need to eagerness and desire; Need to belongingness; need to self.

Chen Jia-Sheng, Fan Jing-Li (2000) viewed QWL as Work environment; Salary and allowances; Welfare; Rise; Work nature; Training and development; Style of superior leadership; Participation of colleagues; Organization face; Communications; Organizational rules; Organizational culture and atmosphere; work time and work pressure.

Qing Tao, Peng Tian-Yu & Lou Jian (2007) explained QWL as Work duties: work independence, importance of duties, work feedback, work importance; organizational environment: team spirit, interpersonal relations, management style; social psychology, psychic and social support, mutual esteem, social picture of organization, economical situation

According to Dolan, Garcia, Cabezas and Tzafrir (organizational2008), quality of work life is a major concern for employees and how organizations packed together with this issue is both of intellectual and realistic outcomes. Therefore, job satisfaction and satisfaction in private life both are important for having a positive quality of work life

experience. Mostly the quality of work life is affected by the environment and the quality circles in which employee has to spare their lot of time with their supervisors and managers.

V. OBJECTIVE

Objectives of this research paper:

1. To find out in which area of the industry is performing well and in which aspect it needs the least improvement.
2. To find various QWL factors.
3. To prevent organizational anxiety or strain.

VI. FACTORS THAT AFFECT THE QUALITY OF WORK LIFE:

T S Nanjundeswaraswamy, Swamy D R (2013)[20] Used 9 components to measure quality of work life of employees in Technical institution and affect the quality of work life they are :

1. Work environment - To achieve the objectives of the organization employees should at least get the good environment so that they can focus the real target. Industry can improve the quality of working life through improving the nature and quality of communication of the mission and vision through the use of team as a first step the process of employee participation.

2. Organization culture and climate - Various facts of industrial climate and culture have been measured and previous researches on QWL. Three of them are- affective, cognitive and instrumental. The affective facet of industrial climate and culture primarily comprises of the quality of relationships in the industry. The cognitive climate and culture aspect consists of a sense of deriving intrinsic reward from one's work comprising of meaningfulness, competence, self determination, impact and work-family interference. The instrumental climate and culture aspect is defined as follows: work process, structure and extrinsic rewards including access to resources and time control.

3. Relation and co-operation – In any Industry the healthy relationship and the cooperation really matters with the employers and the employees. Because both of them have to reside in that environment so they have to cooperate with each other to make the quality of life better.

4. Training and development – Training and development plays an important part in QWL. It initiates the employees with positive motivation. It also creates the positive factor of QWL. It enhances the satisfaction level among the employees and maintained the environment with positive energy.

5. Compensation and Rewards – These two factors make the road smooth because employee is much concerned with the fair compensations and the rewards. An Industrialist can make the environment optimistic and constructive through strong compensation and rewards.

6. Facilities – QWL is affected by the facilities given to the employees. These facilities can reduce the turnover among the employees and they are much connected with their owner.

7. Job satisfaction and Job security - Job satisfaction and job security is one of the central variables in work and is seen as an important indication of working life quality. These two factors also generate the healthy quality of work life.

8. Autonomy of work – It is more important for an employee to work with the autonomy. Because self-sufficiency or independence is the requirement of the day. Every employee wants their own freedom to accomplish the work.

9. Adequacy of resources – In any organization adequacy or sufficiency of resources are thought to contribute to job motivation and dedication. They also enable the employee to use time more effectively by scheduling activities in a way that suits his or her situation best.

Various Variables Of Qwl And Their Indicators:

Fair Justice
- -Paying the fair reward
- -Paying rewards based on level of attempts
- -Promotion based on merit

Ability upgrading
- -Knowledge the skills
- -Possibility of improving skills
- -Development of abilities

Worker's contribution
- -Opening to involve yourself
- -Opinion polling in pronouncement

Job security
- -Opportunity assurance
- -An additional job rather than the present one
- -Survival of job

VII. RESEARCH METHODOLOGY

The study is an attempt to identify the existence of QWL in MSME with view to workforce and to find out imperative QWL aspects. The detail about the various concepts and terms used in questionnaire was identified with the help of assessments of previews studies.

Major Area of QWL:

- Healthy worki
- Possibility o
- Fair reimbursement
- Job con
- Workers
- Communic
- Flexible or appropria

- Communi
- Employee
- Assistance o
- Participation of Employee
- Autc y and independence among workers

VIII. SAMPLING

The existence of quality of work life in the MSME, s has been measured on the basis of variables related to QWL. The employees are asked to rate these variables. To find out quality of work life in MSME,s a survey is conducted on 80 employees of industries.

IX. DATA ANALYSIS

Total no. Workers (Respondents) = 80

Workers are directly involved with the situation in which they are given the particular responsibilities.

S. no		Highly satisfied	Satisfied	Avg	Dissatisfied	Highly Dissatisfied	Total
1	Healthy work atmosphere	8	18	20	22	12	80
		10%	23%	25%	27%	15%	100%
2	Work Safety	12	20	28	12	8	80
		15%	25%	35%	15%	10%	100%
3	Work protection	15	22	30	11	2	80
		19%	27%	37%	14%	3%	100%
4	Occupational Stress	5	13	26	21	15	80
		6%	16%	33%	26%	19%	100%
5	Motivated by Supervisors	12	17	27	18	6	80
		15%	21%	33%	23%	8%	100%
6	Autonomy and Independence	14	21	29	6	10	80
		18%	26%	36%	8%	12%	100%
7	New openings for Growth	7	14	23	25	11	80
		9%	17%	29%	31%	14%	100%
8	Communication Flow	11	22	29	10	8	80
		14%	28%	36%	12%	10%	100%
9	Behavioral Aspect	9	21	32	8	10	80
		12%	26%	40%	10%	12%	100%
10	Operational hours	14	20	30	10	6	80
		17%	25%	38%	12%	8%	100%
11	Productive Effort & Initiatives	7	13	26	23	11	80
		8%	16%	33%	29%	14%	100%
12	Training & Dev. Opportunities	12	19	34	12	3	80
		15%	24%	42%	15%	4%	100%
13	Wage Satisfaction	10	20	32	13	5	80
		12%	25%	40%	16%	7%	100%
14	Employee Motivation	16	25	28	7	4	80
		20%	31%	35%	9%	5%	100%
15	Participation of Employees in mgt. decisions	11	14	36	15	4	80
		14%	17%	45%	19%	5%	100%

X. RESULT AND DISCUSSION

- It is observed that 23% of the respondents or Employee are satisfied with the working Environment and dissatisfaction among the employees is 27%.
- It is seen that 35% of the employees are average satisfied with the safety rules.
- It was found that only 25% of employees are satisfied with the remuneration.
- It is also found that 31% of the employees are dissatisfied with promotion opportunities.
- Employees are not ready to take the initiatives with their own and hesitate with the efforts.
- Work improvement programs are not getting the speed due to the monotonous atmosphere, because such jobs need to allow greater autonomy and liberalization and responsibility in the performance of work tasks.
- Pre- determined objectives- Participation of an employee with his superior in setting employee goals that is consistent with the objectives of the organization as a whole. MBO is viewed as a way to integrate personal and organizational needs.
- Career alternation- A program in which employees continue their present jobs, but duties are added with the intent of making the job more rewarding.
- Worker's contribution- A program aimed at a greater sharing of responsibility for decision making.
- Employee should be focused with the safety rules, because maximum time is spent in the working area. So satisfaction level should be increased.
- Communication Flow- It is seen that information is being passed to the employee is no proper given, so there is a lack or a gap between employer and the workers. It should be removed.
- Recognition- Employees would be happy if they are recognized through their healthy efforts and the 14% employees are highly satisfied.

- Occupational Stress- It is shown in the table that 26% of the employees are dissatisfied with their work or supervisors, this frequency should be maintained through recreation activities or other role playing activities. So they can feel relief from their monotonous atmosphere and come back to the work with great zeal.

XI. SUGGESTIONS

The quality of work life plays an indispensable role for the employees of MSME,s or the small scale industries. To get the quality output from them it is very important that they should have given the priorities along with the recognition. So to improve QWL in any industry is the need of the day and particular industry should follow the healthy and quality QWL programs.

However, some attempts were made to describe this term Quality of Work Life- It refers to the favorableness or unfavorableness of a job environment for people.

XII. CONCLUSION

The existence of QWL is found in ancillary industries that is the part of MSME,s. Study discovered that QWL is not highly prevalent as per the view of employees. As we know that SSI plays as very important role in the growth of Indian economy, the industries employers should take consistent and steadfast measures to improve the Quality of Employees. However, quality of work life is directly influenced by job satisfaction and external environment and personal like. There should have be a proper level of balance in work life and total life space.

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A COMPARATIVE STUDY OF CELEBRITY AND NON CELEBRITY ENDORSEMENT ON CONSUMER'S PURCHASE INTENTIONS

Dr. Maninder Singh Gill
Associate Professor
Dept. of Mgt Studies
ACET,ASR

Ridhim Pathak
Assistant Professor
Dept. of Mgt Studies
ACET,ASR

Abstract-In the competitive business environment advertising takes a vital role to influence the buying behavior of the consumer. These firms sincerely believe that celebrity stars would definitely propel their respective brands towards the top by attracting hordes of customers. This the reason many companies use celebrities for endorsing their products but at the time customer is becoming more conscious day by day they are aware about this fact that celebrity are mere endorsers they are promoting the product because they get money for it and Single celebrity is endorsing many different brands at a same time. So, reliability of celebrity endorsers is decreasing day by day. Because of this advertiser's interest is start shifting from celebrity endorsers to non celebrity endorsers.

Keywords: celebrity endorser, non-celebrity and credibility.

I. INTRODUCTION

In an effort to give their product a differentiated identity, more and more companies are investing large sums of money on celebrity endorsements to differentiate their product. Studies across all the products show that there is high percentage of advertisement recall for the celebrity endorsement. Hence it has become a fad for the companies to invest on celebrity as an endorser. Celebrity endorsers are individuals or a person who enjoy public recognition and uses this recognition on behalf of a consumer good by appearing with it in an advertisement (McCracken, 1989). Celebrity endorsers pass on their symbolic meanings and acquired associations to the products they endorse, the symbolic meanings are passed on to the consumer; the product is uniquely differentiated and its perceived value is infinitely enhanced (Gerbner et. al. 1977). People may gain celebrity status as a result of a successful career in a particular field (primarily in the areas pertaining towards entertainment and sports), in other cases, people become celebrities due to media attention for their extravagant lifestyle or wealth (as in the case of a socialite); for their connection to a famous person (as in the case of a relative of a famous person); or even for their misdeeds (as in the case of a well-known criminal). Celebrities may be known around the world (pop stars and film actors), within a specific country (a top Australian rugby player) or within a region (a local television news anchor).There are many organizations which have never felt the need of using celebrities in their advertisements, e.g. Fevicol, Lifeboy, Dove, Amul, Fair and Lovely. Moreover, there are a few organizations where the owner is seen endorsing their own commodity, e.g. Mahashay Dharampal of MDH Masala, Rajeev Reddy of Country Club and these endorsements reflects the category of non celebrity endorsements.

Previously, the celebrity was signed for enhancing the credibility, trust and realism of the product. But today, consumers are becoming intelligent and more conscious about the quality of the product, as they show their own intellect level and practical knowledge to purchase the product. They also consider it "Celebrity Vamping", where single celebrity is branding for multiple brands. Consequently, consumer doesn't consider it reliable and it becomes suspicious of celebrity's authority and expertise.

Another reason behind the present shifting from celebrity endorsement to non celebrity endorsement is that it is not a compulsory that every brand having a celebrity can deliver a reliable and efficient product to the consumers. Many organizations with huge profits, e.g. Santro, a product of Hyundai motors whose sales sky-rocketed after Shahrukh Khan was signed for the endorsement. At the same time, when Shahrukh was endorsing Nokia as a promoter of Kolkata Knight Riders (KKR) in IPL, Nokia was piggy banking on the success of KKR in IPL. Moreover the public image of the celebrity also influences the reputation of the brand in the eyes of the consumer. In continuation of that, Salman Khan was dropped from the Thumps-Up advertisement after his negative image in India caused by a slum accident in Mumbai.

II. REVIEW OF RELATED LITERATURE

Friedman H.H. and Friedman L. (1979) found the categorization of products into low and high involvement is based on the risk perceptions consumers have when purchasing products (which are significantly higher for high involvement products). Risk perceptions can be classified into four categories: firstly, Psychological risk, the fit between product image and self-image, secondly, financial risk, Thirdly, Social risk, lastly, operational risk.

Petty, Cacioppo, and Schumann (1983) found that in the product with high involvement conditions, arguments influence the buying behavior rather than celebrity's endorsement, whereas in the products with low involvement conditions, celebrities influence the purchase decision rather than argument behavior of the consumer.

Atkins and Block (1983) studied that celebrity advertising is influential because celebrities are viewed as dynamic, with both attractive and likable qualities. Furthermore, their fame is thought to attract attention to the product or service.

McCracken's (1989), states that a celebrity endorser is an individual who enjoys public recognition and who uses this recognition on behalf of a consumer good by appearing with it in an advertisement. Celebrity endorsement influences the feelings of the consumers and can also influence the attitude consumers have towards the advertisement and attitude towards the brands, which can increase the purchase intentions and, consequently, increase sales.

Michael, A. K. (1989) found that there is a positive relationship between attractiveness, credibility and buying behavior of the consumer. Organizations try to hire such celebrities for endorsement who are not only attractive but credible as well. Additionally advertisers also look for a proper match between the celebrity's personality and product's attributes.

Ohanian, R. (1991) found that only the perceived expertise of the celebrities was a significant factor explaining the respondent's intention to purchase. He also studied celebrity endorsers on three measures, to examine which characteristics of the source would be the most effective in influencing purchase intention.

Tripp C Jensen T.D and Carlson L. (1994) found that how much consumers trust the celebrity endorser to be credible, when a celebrity endorses one or two products it is significantly more trustworthy than a celebrity who endorses even more products. Hence he states that there is always the possibility of negative effect due to multiple endorsement programs by a single celebrity.

Till and Shimp (1998) have investigated the effects of negative information about celebrities on Products. They found that negative information about celebrity can lead to lower brand evaluations. In fact a meta analysis of 32 articles on celebrities showed that negative information about the celebrity had larger impact on endorsement effect than any other positive endorsement strategies.

Erdogan, B. Z. (1999) states that advertiser go for celebrity endorsement because of its greater benefits and immense possible influence. There are certain potential advantages of celebrity endorsement, celebrities endorsed advertisements draw more attention as compared to those of non-celebrity ones, helps the company in re-positioning its product or brand and finally empowers the company when its product is new in the market or plans to go global. However celebrity endorsement doesn't hold sole key to success.

Daneshvary and Schwer (2000) studied that how consumers have a connection towards the celebrity endorsement/endorser, if a company wants a consumer to associate to an endorsed product it is important to choose an endorser who uses the product and where that use is a reflection of professional expertise.

Till, B.D and Busler, M (2000) found that Celebrity appears on media on behalf of advertised product and famous celebrity achieve a higher degree of attention and recall, they bring information for the audience, shares the experience, and gives a powerful influence to the audience for the endorsed product.

Prachi Raturi (2005), studied that there is a significant relationship between celebrity and a brand if the chemistry between the celebrity and the brand is right, it will lead to positively influence the buying behavior of the consumer and it there is no chemistry between brand and celebrity, then it may negatively influence the buying behavior of the consumer.

Shiffman and Kanuk (2006) states that a celebrity endorser used in an advertisement can be interpreted as a reference group. Reference group is defined as any person or group of persons that serves as a point of comparison (or reference) for an individual by communicating values, attitudes and providing a specific guide for behaviour .

Alsmadi (2006) in his study described the positive effects of celebrities on consumer buying behavior, such as the adoption of clothing styles, product choice, and health behaviors. Celebrity endorsers pass on their symbolic meanings and acquired associations to the products they endorse easier because they have an ability to communicate with mass.

M. Gayathri Devi and Dr. C. Ramanigopal (2010) stated that Celebrity endorsement has a positive or a negative impact on the consumer buying behaviour. These days customers are becoming more demanding .Their expectations are continuously rising while marketers are continuing their efforts to meet them.

III. OBJECTIVES OF THE STUDY:

The main objective of the study is that to describe importance of celebrity and non celebrity endorsement regarding the puuchase decision of consumer.

Share of Celebrity Endorsements on TV by Profession in Percentage

Table I

Profession	Jan-Sept 2010	Jan-Sept 2011
Film Actress	45	39
Film Actor	41	37
Sports Person	12	19
TV Actor	1	3
TV Actress	1	2

Table-II

Top 10 Celebrities as per ad volume (share %)		
Rank	Celebrity	Share %
1	Sharukh Khan	6
2	Katrina Kaif	5
3	Kareena Kapoor	5
4	MS Dhoni	4
5	Sachin Tendulkar	4
6	Abhishek Bachan	3
7	Amitabh Bachan	3
8	Saif Ali Khan	3
9	Akshay Kumar	3
10	Priyanka Chopra	2

Table III

Share of Celebrity and Non-Celebrity endorsing a brand in overall advertising of the brand

CELEBRITY	**BRAND**	**% OFADS FEATURING CELEBRITY**	**% OF ADS FEATURING NON-CELEBRITY**
Amitabh Bachan	Binani cement	100	0
	Reid Taylor Suitings	100	0
Sachin Tendulkar	Boost	54	46
	Jaypee Cement	99.96	0.04
Sharukh Khan	Dish TV	72	28
	Airtel Cellular	14	86
MS Dhoni	Pepsi	55	45
	Boost	70	30
Priyanka Chopra	Lux Peach Cream	90	10
	Lux Strawberry Cream	67	33
Katrina Kaif	Lehar Slice	99.6	0.4
	Pantene	100	0

IV. CONCLUSION

Table III reveals that percentage of ads featuring celebrity are more than those featuring non-celebrity. In the competitive business environment advertising takes a vital role to influence the buying behavior of the consumer. In India celebrities are having greater influence in customers buying decisions. These firms sincerely believe that celebrity stars would definitely propel their respective brands towards the top by attracting hordes of customers. This the reason many companies use celebrities for endorsing their products but at the time customer is becoming more conscious day by day they are aware about this fact that celebrity are mere endorsers they are promoting the product because they get money for it and Single celebrity is endorsing many different brands at a same time. So, reliability of celebrity endorsers is decreasing day by day. Because of this advertiser's interest is start shifting from celebrity endorsers to non celebrity endorsers.

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Impact of Multi Brand Foreign Direct Investment: Indian Retail Consumer's Perspective

*Principle, Amritsar College Of Hotel Management & Technology, Amritsar
** Management Student, Department Of Management Studies, Amritsar College Of Engineering & Technology, Amritsar
@gmail.com

*Dr. Harinder Singh Gill
** Miss Komal

Abstract-Retail Sector is one of the most important pillars of Indian economy and it is growing at a phenomenal pace. Foreign Direct Investment (FDI) in retail sector plays an integral role in the economic growth. FDI in Multi-brand retail can be seen as an important reform to revive the economy and to ease supply side pressures especially in unorganized sectors. At present India does not allow FDI in multi-brand retail but permits up to 51 percent. This was done with a primary motive of giving a boost to organized retailing in India. However, there's another equally strong lobby that has been opposing this idea tooth and nail. They claim that it will mop away the corner shops in every locality and chuck inhabitants out of the jobs and bring unthinkable melancholy. The Government cap over FDI in retail, like in many other sectors, has been essentially a personification of the dilemma that confronts policy makers about whether opening up FDI in retail would be a boon or bane for the retail sector. This Research Paper makes a modest attempt of developing an insight as to what are the trends in the Indian Retail Industry and to the benefits and drawbacks of FDI in retail sector. It has also focused on the perception of consumers, industrialists, academicians and policy makers in respect of the organized and unorganized retailers keep on changing. The organized and unorganized retailers are also in a dilemma about the perception of the different segments.

KEYWORDS: FDI, Retail industry, Personification, Melancholy, Consumer Perception and Economic Growth.

I. INTRODUCTION

SECTION –I

Retailing industry in India is one of the main pillars of the economy and accounts for about 15 percent of its GDP. The value of Indian retail market is estimated to be 450 billion US $ and is rated as one of the top five retail markets in the world. Indian Retail is growing at a faster rate backed by a huge population of 1.2 billion people. Indian retail industry comprises sole proprietary small units which are in the form of small shops and business establishments meeting the needs of people around their locality. India's retail industry employs about 40 million people (3.3% of Indian population). Retail market in India is spread over in two major sectors, Organized Sector and Unorganized sector. .It is estimated that as on date 3-4% of retail trade in India is covered by Organized Sector and 96-97% is covered by Unorganized sector .Until 2011, Indian central government denied foreign direct investment (FDI) in multi-brand retail, forbidding foreign groups from any ownership in supermarkets, convenience stores or any retail outlets. But there is a turnaround in the policy of the Government and Indian retail market has been thrown open for FDI. As on date, 51% equity in Multi Brand Retail Market is allowed for FDI operators (S.V.Shridhara Murthy 2012).

Organised/Modern retailing refers to trading activities undertaken by licensed retailers and includes formats such as hypermarkets and supermarkets, and retail chains. Organised Retail, valued at INR 96500 Crores in 2008, accounts for around 5% of the total retail market. Organised Retail has been growing at an impressive rate of 35% to 40% Y-O-Y in the last few years compared to 9-10% growth in the overall retail industry. Retail in India is essentially "unorganized." 98% of the retail industry is made up of counter-stores, street markets, hole-in-the-wall shops and roadside peddlers. Unorganized retail is characterized by Family-run stores, lack of best practices when it comes to inventory control and supply-chain management, lack of standardization and essentially a sector populated by anyone who has something to sell. Recognizing the short-term and long-term growth of retail in India, a number of domestic business giants have entered the retail industry or are planning to do so in the near future. Some like Pantaloon Retail, Shopper's Stop and Pyramid Retail have been in the industry for a decade. Others like Reliance Retail Ltd. (RRL) (RRL is part of the Mukesh Ambani run Reliance Industries Ltd., one of India's largest industrial houses) have entered and Birla (Also known as the Aditya Birla Group, another large industrial house with various business interests) and Bharti (India's largest cellular service provider) opened up a number of stores across the country (Kamaladevi Baskaran 2012).

India has the highest retail density in the world, with 12 million small shops catering to 209 million households. India has a high potential market with accelerated retail growth of 15-20% expected over the next five years. However, a significant decrease of 60% (amounting to $24.2 billion) of

FDI was noticed in 2010, when compared to 2009. This appeared to be mainly because most the Indian rural and small towns' retail markets are unorganized (Moghe, 2012).The Indian retail sector is highly fragmented and weighted towards unorganized retailers which is 93% of the market and only 7% by organized retailers but is quickly growing and organized retail market is expected to reach 20% by 2020 (Kearney Report, 2011).

Advantages of FDI in Retail

1. FDI is the best way of investment in developing countries like India. It increases the capital investment, growth rate of the country (Bhattacharya, 2012).
2. It brings competition between different companies producing/selling same type of products/brands which will lead to availability of variety of similar products at suitable price hence it is in general welfare of consumers (Bhattacharya, 2012).
3. In addition, larger space for product display, hygienic environment in the shopping area, availability of a large number of products under one roof, and better customer care will increase customer satisfaction (Nath, 2013).
4. India will get a proper storage system of the vegetables and fruits with help of this FDI. It give farmers' good amount for their produce and increase their productivity with help of new technology. Farmers will get better price because their products will directly get purchased by the MNCs as intermediaries will get cut down (Bisaria, 2012).
5. The distribution system and logistics will also get improved with the improvement in the technology. It is officially found that almost 25% of the product gets wasted in distribution and logistics (Chari and Raghavan, 2011).

Disadvantages of FDI in Retail

1. FDI in retail will have an adverse impact on the traditional unorganized retail which is currently more dominant. It will affect very badly the local kirana stores, local markets, etc who earn their daily livings because of this (Bisaria, 2012).
2. It will also harm employment in India as lot of foreign players will be purchasing the products directly from the main supplier. This will harm the intermediaries of the system (Bhattacharya, 2012).
3. Lifestyle of Indian consumer will be changed lot. Consumption pattern and adoption of foreign culture up to a certain extent will change or have an impact on Indian culture (Sikri and Wadhwa, 2012).
4. Certain Indian brands may start losing its importance. As the similar kind of product will be available in a foreign brand, consumers will long to buy foreign brand product (Bisaria, 2012).

In spite of many efforts and much progress made in recent past there still exist a wide scope of Multi Brand Foreign Direct Investment in Retail Sector in India. There is requirement for more systematic analysis and empirical testing in the field of crucial and worldwide importance. This study has been planned in the above mention context. The overall objectives of the study are to examine preference of Un-organized and Organized Retail shops by the consumers in the Amritsar City. More specifically the Objectives are

- To find out the Merits and Demerits of Multi Brand FDI in Retail Sector in India.
- To study the reasons for preference of Organized Retail outlets by the consumers in the Amritsar City.
- To study the reasons for preference of Unorganized Retail shops by the consumers in the Amritsar City.
- To find out the factors influencing the consumers to buy from the organized and un-organized retailers.
- To offer suggestions for organised and unorganized retailers in India.

The study has been divided into five sections including the present one. Section II reviews the literature related to the study. Data sources and methodology for analysis are discussed in Section III. The interpretations of the results are described in Section IV. Section V contains summary conclusion along with the policy implications derived from the study.

SECTION-II
REVIEW OF LITERATURE

Gegowda (2014) studied the flow of FDI in developing countries during 1990's was a prominent source of external financing and has become key component of economic development in these countries. India considered to be most potential land for FDI. Chandrachud And Gajalakshmi (2013) analyzed that India has the most liberal and transparent policies on FDI among the emerging economies. India has been a major recipient of FDI Inflows in the majority of sectors. Kumar (2013) examined the decision of government to allow 51 percent FDI in multi brand retail India came under serious flak due to many reasons, loss of employment being one of them. Moghe (2012) critically analyzed the decision of Indian government to open retail sector for FDI in single-brand and multi-brand category and it's likely to have impact on various components of Indian economy. Mahadevaswamy And Nalini (2013) analyzed the perceptions of the common man about foreign direct investment (FDI) in multi-brand retailing (MBR). The major objectives of this study are: (i) to know the perceptions of the common man about FDI in multi-brand retail in India (as the common man's perceptions on the said topic have been less explored) ; and (ii) to know the differences in their perceptions. Fernandes, Banu. A And Simon (2012) also supported the FDI in multi-brand retail sector as it can be seen as an important reform to revive the economy and to ease supply side pressures especially in unorganized sectors. To revive the Indian economy, FDI policy in multi-brand retail is an important reform that would ease supply side pressures and mitigate inflation. Shallai And Singh Mehta (2013) studied the impact of the malls and opening up of retail sector is not going to impact unorganized retail and is a unique in that it has revealed some astonishing facts. The analysis revealed that the malls and opening up of retail sector is not going to impact unorganized retail in a bad way. Jain (2013) examined that retailing is the interface between the producer and the individual consumer buying for personal consumption. As such, retailing is the last link that

connects the individual consumer with the manufacturing and distribution chain. Indian retail industry is one of the sunrise sectors with huge growth potential. Vaidehi And Alekhya (2012) studied the positive and negative effects of FDI on India economy. It can be concluded that to keep pace with the forecast of Indian GDP, government should encourage foreign investment. Jain And Sukhlecha (2012) studied FDI in multi-brand retail and tried to establish the need of the retail community to invite FDI in multi-brand retailing. Jain And Sukhlecha (2012) analyzed Retailing is the interface between the producer and the individual consumer buying for personal consumption. As such, retailing is the last link that connects the individual consumer with the manufacturing and distribution chain. This paper tries to establish the need of the retail community to invite FDI in multi brand retailing. Mckinsey Report (2012) stated that the retail productivity in India is very less compared to other International counterparts. The over-all retail employment in India, account for about 6% of current Indian labour force, mostly unorganized, and which is about half when compared to the other emerging economies. Baskaran (2012) studied that the Indian consumers have undergone a remarkable transformation. Just a decade or two ago, the Indian consumers saved most of their income, purchased the bare necessities and rarely indulged themselves.

SECTION-III
RSEARCH METHODOLOGY

This study has been done in two parts. In part 1 secondary data has been used from different studies, research papers, journals and websites and the second part consists of the experience survey of 200 consumers from organised and unorganized sector in the AMRITSAR city as per details mentioned below :-

Types Of Research Design	Conclusive Research Design
Sources of Data	a. Primary Data: Survey Method b. Secondary Data: research papers, journals and websites
Sampling Technique	Non-Probability Technique-Convenience Sampling Method
Sampling Size	200 samples
Sampling Unit	Consumers from different age groups, gender, income levels and educational backgrounds.
Research Equipment	Questionnaire
Type of Questionnaire	Structured questionnaire with suitable scaling.
Type of questions	Close ended, likert scale and multiple choice questions.
Method of data collection	Personal interview with respondents.

Scope of the study:

The research was carried on in certain part of AMRITSAR. I have surveyed 200 respondents from organized and unorganized sector in the AMRITSAR city.

SECTION-IV

DATA ANALYSIS & INTERPRETATION

The Table 1 shows that majority of the respondents were males having frequency 113 and remaining are females with frequency 87. Significant portion of Respondents were belong to age group less than 30 and followed by 36-40 and 41-45.

Table: I

BACKGROUND CHARACTERISTICS OF RESPONDENTS

	FREQUENCY	PERCENTAGE
Gender		
Male	113	56.5
Female	87	43.5
Total	200	100
AGE		
Less than 30	52	26
Less than 35	30	15
36-40	48	24
41-45	44	22
Above 45	26	13
Total	200	100
EDUCATION QUALIFICATION		
Metric	14	7
Intermediate	25	12.5
Graduation	86	43
Post Graduation	65	32.5
Professional	10	5
Total	200	100
OCCUPATION		
Student	30	15
Government Employee	75	37.5
Private Employee	42	21
Business/Trade	22	11
Professional	2	1
Housewife	29	14.5
Total	200	100
MONTHLY INCOME		
Less than Rs 15000	18	9
Rs. 15000-Rs. 25000	41	20.5
Above Rs. 25000	82	41
Total	141	100
FAMILY NATURE		
Joint	70	35
NUCLEAR	130	65
Total	200	100
MARITAL STATUS		
Single	40	20
Married	160	80
Total	200	100
FAMILY STRUCTURE		
Bachelor	36	18
Newly Married Without Children	16	8
Married With Dependent Children	129	64.5
Married With Independent Children	16	8
Married With No Children	3	1.5
Total	200	100

Source: Author's Calculations

In this study 14 respondents are metric pass, 25 respondents are intermediate, 86 respondents are graduate,65 respondents

are post graduate and 10 respondents having professional degree. 30 respondents are student,75 respondents are government employee,42 respondents are private employee,22 respondents are business man,2 respondents are professionals,29 respondents are housewife.Out of 141 respondents,18 respondents earning less than Rs 15,000 , 41 respondents earning between Rs15,000-25,000 and 82 respondents earning above than Rs 25,000 because 30 respondents are student and 29 respondents are housewife with no income. In this study 70 respondents have joint family nature and 130 respondents have nuclear family nature. Majority of the respondents were married having frequency 160 and 40 respondents were unmarried. In this study 36 respondents are bachelor, 16 respondents are newly married without children, 129 respondents are married with dependent children, 16 respondents are married with independent children and 3 respondents are married with no children.

CONSUMER PREFERENCES OF SHOPPING

The Table 2 shows that out of 200 respondents majority of respondents buy from both outlets i.e. un-organized stores and organized stores and zero respondents buy only from organized outlets. Here majority of respondents buy from conventional stores. Out of 146 respondents significant portion of respondents buy from Supermarket and followed Chain Stores and 14 respondents buy from other stores because 54 respondents only buy from Un-Organized Stores. In this study out of 146 respondents,39 respondents rated the Organized sector as Very good,93 respondents rated the Organized sector as Good,14 respondents rated Organized sector as Neutral 54 respondents do not rate the Organized sector because they only buy from Un-Organized stores. Out of all respondents, 31 respondents rated the Un-Organized sector as Very Good,116 respondents rated the Un-Organized sector as Good,51 respondents rated the Un-Organized sector as Neutral. As per the survey 128 respondents have pleasant shopping experience in Organized stores, 72 respondents have pleasant shopping experience in Un-Organized stores. So according to survey majority of respondents purchased from Organized store in the income group less than Rs 15,000. 68% respondents purchased from Un-Organized store in the income group less than Rs 15,000

Table: II

	FREQUENCY	PERCENTAGE
Sources of purchase		
Un-Organized Shops	54	27
Organized Outlets	0	0
Both	146	73
Total	200	100
Purchase Preference in Un-Organized store		
Conventional Stores	74	37
Neighbourhood Stores	119	59.5
Others	7	3.5
Total	200	100
Purchase Preference in Organized store		
Supermarket	97	48.5
Chain Stores	35	17.5
Other	14	7
Total	146	100
Rating Of Organized Stores		
Very Good	39	19.5
Good	93	46.5
Neutral	14	7
Bad	0	0
Very Bad	0	0
Total	146	100
Rating Of Un-Organized Stores		
Very Good	31	15.5
Good	116	58
Neutral	51	2
Bad	2	1
Very Bad	0	0
Total	200	100
Pleasant Shopping Experience		
Organized Retailers	128	64
Un-Organized Retailers	72	36
Total	200	100
Purchase as per Income level in Organized Store		
Less than Rs. 15000	88	44
Rs. 15000-25000	27	13.5
Above Rs. 25000	31	15.5
Total	200	100
Purchase as per Income level in Un-Organized Store		
Less than Rs. 15000	136	68
Rs. 15000-25000	56	28
Above Rs. 25000	8	4
Total	200	100
Influence Of Family Pattern on purchasing Behavior in Organized Outlet		
Joint	68	34
Nuclear	78	39
Total	200	100
Influence Of Family Pattern on purchasing Behavior in Un-Organized Outlet		
Joint	100	50
Nuclear	100	50
Total	200	100

Source: Author's Calculations

In this study significant portion of population believed that influence of family pattern for purchasing behavior in organized outlets is due to nuclear Family. 50% respondents believed that influence of family pattern for purchasing behavior in Un-Organized outlets is due to Joint Family and others believed due to nuclear family.

INTERPRETATION OF FACTOR ANALYSIS

The approach used in the factor analysis is "Principle Component Analysis". In this component analysis, total variance in the data is considered. The diagonal of the correlation matrix consists of unities and full variance is bought into factor matrix. It determines the minimum number of factors that will account for maximum variance in the data for use in subsequent multivariate analysis. The factors are also called principle components. Although the initial or un-rotated factor matrix indicates the relationship between the factors and individual variables, it seldom results in factors that can be interpreted, because the factors are correlated with

many variables. Hence the variance explained by each factor is redistributed by rotation.

Table: III

Shows the list of variables along with their description

Variables	Description
Q16.1	Good Quality
Q16.2	Affordable Price
Q16.3	Offers
Q16.4	Attractive Schemes
Q16.5	Door Delivery
Q16.6	Self –Service and Satisfaction
Q16.7	Discount
Q16.8	Credit Facility
Q16.9	Value Added Customer Services

Table:IV

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.558
Bartlett's Test of Sphericity	Approx. Chi-Square	451.349
	Df	36
	Sig.	.000

The KMO statistics varies between 0 and 1. A value of 0 indicates that the sum of partial correlations, indicating diffusion in the pattern of correlations. A value close to 1 indicates that patterns of correlations are relatively compact and so factor analysis should yield distinct and reliable factors. Kaiser (1974) recommends accepting values greater than 0.5 as acceptable. For these data the value is 0.558, which fall in the range 0to 1.so, we should be confident that factor analysis is appropriate for these data.

Table: V

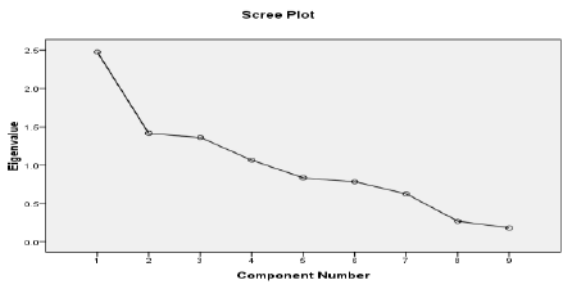
Shows the total variance explained by various factors

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.476	27.511	27.511	2.476	27.511	27.511
2	1.414	15.709	43.221	1.414	15.709	43.221
3	1.360	15.114	58.335	1.360	15.114	58.335
4	1.063	11.813	70.148	1.063	11.813	70.148
5	.832	9.248	79.396			
6	.782	8.684	88.080			
7	.625	6.948	95.028			
8	.268	2.982	98.009			
9	.179	1.991	100.000			

Extraction Method: Principal Component Analysis.

All this provided that we can proceed with factor analysis and the result of factor analysis over 9 factors shown that there are 4 key factors, which was determined by clubbing the similar variables and ignoring the rest, which majorly consider being most affecting product for purchasing from organized and un-organized stores. The table 16 shows the respective percentage of variance of all these factors derived from factor analysis. It is observed from table 16 that only 4 factors have Eigen value more than 1, so accordingly we proceeding with these factors. The total variance explained by factor 1,2,3 and 4 are 27.511 , 15.709, 15.114 and 11.813% percent of variance, whereas cumulative variance explained by all these factors is 70.148% and rest of the variance is due to factors which are beyond the scope of the study.

Figure: I



Interpretation:

The Scree Plot has two lines: the lower line shows the proportion of variance for each principal component, while the upper line shows the cumulative variance explained by the first N components. The principal components are sorted in decreasing order of variance, so the most important principal component is always listed first. Generally, we extract the components on the steep slope. The components on the

shallow slope contribute little to the solution. The last big drop occurs between the fourth and fifth component, so we choose the fourth component.

Table: VI
Show the rotated component matrix.

	Component			
	1	2	3	4
16.1	**.866**	-.151	.212	-.038
16.2	.155	**.554**	.278	.389
16.3	**.787**	-.083	-.479	-.029
16.4	.240	**.343**	-.289	-.693
16.5	.196	**.662**	-.176	.010
16.6	.164	.614	-.200	**.318**
16.7	**.884**	-.146	.168	-.057
16.8	.284	.108	**.848**	-.065
16.9	.312	-.334	-.327	**.566**

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

In each statement corresponding to the highlighted factor loading is correlated with factor corresponding to that factor loading. Higher the factor loading, stronger is the correlation between the factors and statement. On the basis of rotated component matrix the factor extraction table has been prepared which is as:

Table: VII
Factor extraction table which shows the variables in each factor with corresponding loading and percentage of variance

Factors	**percentage of variance**	**Factor Interpretation**	**Variables included in factors**	**Loading**
F1	27.511	Customer attraction tools	Good Quality (16.1) Offers (16.3) Discount (16.7)	.866 .787 .884
F2	15.709	Customer retention services	Affordable Price (16.2) Attractive Schemes (16.4) Door Delivery(16.5)	.554 .343 .662
F3	15.114	Credit Facility	Credit Facility (16.8)	.848
F4	11.813	Service delivery platform	Self – Service and Satisfaction (16.6) Value Added Customer Services (16.9)	.318 .566

The above table 18 stated factors are in the order of degree of importance that is factor 1 is more important than factor 2; factor 2 is more important than factor 3 and factor 4. The factor 1 and 2 has 27.511%, 15.709% and 15.114% of variance which is highest variance as compared with factor 4 of variance 11.813%. Hence it is found that factors such as Good Quality, Offers, Discount, Affordable Price, Attractive Schemes, Door Delivery are the main factors of Purchasing Behaviour for Organized stores.

Table: VIII

Rating Of Organized Stores	**Weight**	**Respondents of organized stores**	**Mean Score**	**Respondents of Un-Organized Stores**	**Mean Score**
Very Good	5	39	4.17	31	3.88
Good	4	93		116	
Neutral	3	14		51	
Bad	2	0		2	
Very Bad	1	0		0	
Total		146		200	

INTERPRETATION: Above table depicts the shopping experience of the consumers in the organized and un-organised outlets. There is not much difference as the respondents have justified their preference of shopping in both the sectors. However, the first rank has been given to the respondents of organized retails stores on the basis of mean score i.e. 4.17 against 3.88 as compared with Un-Organized retail stores.

Table: IX

Opinion on Buying Preference from Organized Vs Un-Organized Retailers											
Sr. No	Quality of organized Vs Unorganised Retailers	Organised					Unorganized				
		3	2	1	Total Weight	Rank	3	2	1	Total Weight	Rank
		G	N	B			G	N	B		
1	Grocery	91	53	2	2.61	3	116	80	4	2.56	4
2	Textile	118	23	5	2.77	1	84	99	17	2.33	6
3	Stationary	57	83	6	2.35	5	129	59	12	2.58	3
4	Vegetables	45	89	12	2.22	6	163	33	4	2.79	1
5	Food Items	73	71	2	2.48	4	127	68	5	2.61	2
6	Durables	100	44	2	2.67	2	95	93	12	2.41	5
G-Good			N-Neutra				B-Bad				

SECTION-V

CONCLUSION

The liberalization of Indian Trade and Economy by the Govt. of Indian and allowing foreign participation in retail sector has registered substantial growth in retail sector. This is because of consumers in the young generation, urbanization of villages, growth of personal disposable income of the consumers and the requirement of development of infrastructure in India. Now, the Retailers in Organised and Un-organised sector are adopting new strategies to retain their customers and to enhance their market share. The present study has been conducted with the purpose of understanding the changes taking place in the minds of the consumers, industrialists, investors, Government and Big Retail Outlets in respect of organized and unorganized retailers. The researchers have observed that there are tremendous changes in the demographic system of consumers in India. Now, they prefer to buy different products both from the organized and unorganized retailers. Due to the awareness of quality consciousness consumption both the organized and unorganized retailers endeavour to implement various value added services to provide pleasant shopping experiences to consumers.

LIMITATIONS OF THE STUDY

This study has undernoted limitations:

- The primary data used in this study has been collected from the organized and un-organised retail outlets in the AMRITSAR city only. Further studies by including more universes may present different results.
- Convenience Sampling Design has been used in this study instead of Random Sampling Method which is considered to be more scientific.

POLICY IMPLICATION

There is no doubt that both the retailers i.e. in organised and un-organised sectors are making good efforts to improve their service but there are some factors where the service gap level is wider in nature. The researchers have given some suggestions for both the sectors which have been mentioned above to bridge this gap.

(a) For Organized Retail Outlets

· The organized retailers should take effective steps on consumer complaint management.
· They should focus on retaining the consumers.
· They should work out a comprehensive credit scheme to enhance their sales potential and growth.
· They should respect the Indian ethos while displaying, presenting, advertising or in selling of the products.
· They should try to involve the Indian Small and Medium Enterprises in some way or the other.
· They should develop a comprehensive segmentation strategy to focus on the low income consumer groups with a positioning package of volume cum beneficial base.

(b) For Unorganized Retail Outlets

· The unorganized retailers should give adequate importance to the consumers.
· The behaviour of the retail shop owners helps a lot in retaining the consumers.
· They should also focus on the quality of the products.
· The Retail outlets be redesigned to facilitate the consumers. They should be given the choice of product selection.
· They should provide some facilities to the consumers.
· They should get feedback from shoppers about the products they offer to them, that will help them to retain the existing buyers.
· A better product mix and assortment strategy may be reconstituted to target the low income
Consumers.

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Relationship between Training and Employee Engagement with Special Reference to Job Satisfaction.

Dr. Maninder Singh Gill
Associate professor
Dept of Mgt studies
Acet, Asr

Amandeep Kaur
MBA student
Dept of Mgt studies
Acet, Asr

Abstract: The current study is an attempt to find out various factors that lead to employee engagement and training need in organization. The data is collected randomly in the form of questionnaire and the sample size is 100 respondents .Employee engagement refers to a condition where the employees are fully engrossed in their work and are emotionally attached to their organization and organization is a place where employees go to upgrade their skills and learn something new every day. In addition to the basic training required for a trade, occupation or profession, observers of the labor-market recognize today the need to continue training beyond initial qualifications: to maintain, upgrade and update skills throughout life. These ingredients include the degree to which employees fully occupy themselves in their work, as well as the strength of their commitment to the employer and role.

Keywords**:** Employee engagement, training and development, organization, commitment.

I. INTRODUCTION

What is Employee Engagement?

Employee engagement, also called worker engagement, is a business management concept. An "engaged employee" is one who is fully involved in, and enthusiastic about their work, and thus will act in a way that furthers their organization's interests. According to Scarlett Surveys, "Employee Engagement is a measurable degree of an employee's positive or negative emotional attachment to their job, colleagues and organization which profoundly influences their willingness to learn and perform at work". Thus engagement is distinctively different from employee satisfaction, motivation and organizational culture from a management perspective, engagement is the process of leading people by enabling them to want to do whatever is necessary to ensure the continuous high performance and success of the business. From the employees' perspective, engagement is their attitudinal and emotional state developed from experiences perceived to be controlled by management. These experiences or "drivers" determine engagement level. By managing these drivers to be positive experiences, leaders can stimulate an intrinsic desire for employees to consistently do their best work. Employee engagement management is an alternative to commanding and controlling what specific work should be done, when, at what speed and with what kind of attitude. Employee engagement refers to a condition where the employees are fully engrossed in their work and are emotionally attached to their organization. One can't achieve anything unless and until one is serious about it.

Employee Engagement: Key Ingredients

The term does cover several ingredients for which researchers have developed measurement techniques. These ingredients include the degree to which employees fully occupy themselves in their work, as well as the strength of their commitment to the employer and role. Fortunately, there is much research on these elements of engagement—work that has deep roots in individual and group psychology. The sections below highlight some of these studies.

Occupying the Job

Psychologist William Kahn drew on studies of work roles and organizational socialization to investigate the degrees to which people "occupy" job roles. He used the terms "personal engagement" and "personal disengagement*"* to represent two ends of a scale. At the "personal engagement" end, individuals fully occupy themselves—physically, intellectually and emotionally—in their work role. At the "personal disengagement" end, they uncouple themselves and withdraw from the role.

Committing to the Work and the Company

Some experts define *commitment* as both a willingness to persist in a course of action and reluctance to change plans, often owing to a sense of obligation to stay the course. People are simultaneously committed to multiple entities, such as economic, educational, familial, political and religious institutions. They also commit themselves to specific individuals, including their spouses, children, parents and siblings, as well as to their employers, co-workers, supervisors and customers.

Categories of Employee Engagement

Engaged--"Engaged" employees are builders. They want to know the desired expectations for their role so they can meet and exceed them. They're naturally interested about their company and their place in it. They perform at consistently high levels. They want to use their talents and strengths at work every day. They work with passion and they drive innovation and move their organization forward.

Not Engaged---Not-engaged employees tend to concentrate on tasks rather than the goals and outcomes they are expected to accomplish. They want to be told what to do just so they can do it and say they have finished. They focus on accomplishing tasks vs. achieving an outcome. Employees who are not-engaged tend to feel their contributions are being overlooked and their potential is not being tapped. They often feel this way because they don't have productive relationships with their managers or with their coworkers.

Actively Disengaged –The "actively disengaged" employees are the "cave dwellers."They're "Consistently against Virtually Everything." They're not just happy at work, they're busy acting out their unhappiness. They sow seeds of negativity at every opportunity. Every day, actively disengaged workers undermine what their engaged coworkers accomplish. As workers increasingly rely on each other to generate products and services, the problems and tensions that are fostered by actively disengaged workers can cause great damage to an organization's functioning.

Ways to Boost Employee Engagement

For employee engagement initiatives to be successful, they must be tailored to the unique needs and motivations of each individual. Here are five key ways that managers can help boost the engagement of their employees:

- Inspiring Leadership
- Growth and training Opportunity:
- *Meaningful Work*
- *Recognition and Rewards*
- *People-Focused Culture*

II. TRAINING AND DEVELOPMENT

The term training refers to the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies. In addition to the basic training required for a trade, occupation or profession, observers of the labor-market recognize today the need to continue training beyond initial qualifications: to maintain, upgrade and update skills throughout working life. People within many professions and occupations may refer to this sort of training as professional development.

Training and development is a subsystem of an organization. It ensures that randomness is reduced and learning or behavioral change takes place in structured format. In the field of human resource management, *training and development* is the field concerned with organizational activity aimed at bettering the performance of individuals and groups in organizational settings. It has been known by several names, including employee development, human resource development, and learning and development.

METHODS OF TRAINING

The most widely used methods of training used by organizations are classified into two categories:

On-the-Job Training and Off-the-Job Training.

ON-THE-JOB TRAINING: is given at the work place by superior in relatively short period of time

- Coaching
- Job Rotation

OFF THE JOB TRAINING: is given outside the actual work place.

- Lectures/Conferences
- Simulation Exercise
- Experiential Exercises
- Vestibule Training
- Role Play
- Management Games

REVIEW OF EXISTING LITERATURE

- Herman aguinis (2000) in his article provides a review of the training and development literature he review the literature focusing on the benefits of training and development for individuals and teams, organizations, and society.
- Hannson (2002) conducted a study on Company-based determinants of training and the impact of training on company performance: Results from an international HRM survey.
- Sasmita palio(2003) in her article says that Total Quality Management (TQM) is a never ending process of improving work processes. It operates according to the premise that organisations cannot rest comfortably without continuously improving whatever is being done. There has to be a culture of continuous improvement and everyone in the organisation must strive towards it.
- David (2006) In his article says that employee relations training is how to increase employee engagement. With the right skills, developing and maintaining high employee engagement can be done even with limited resources.
- Mohammed asad (2007) in his article has examined the relationship between the beliefs of senior employees regarding training benefits as measured by the benefits of employee training,

and employees organizational commitment as measured by the three-component model of organizational commitment. This relationship was assessed through a quantitative associational research design.. The findings suggest that there is a positive relationship between employees beliefs regarding training benefits
and employees organizational commitment.

- Yahn-Shir Chen, Bao-Guang Chang (2008) conducted research on Organization Type, Professional Training, Manpower and Performance of Audit Firm. This study investigates the effects of professional training and manpower on performance of audit firm under different organization type.
- Robbins (Mar 2009) conducted a study on performance proficiency as a measure of learning needs. He used Kirkpatrick evaluation method of four levels i.e. Reaction, Learning, Behaviour and Results at US coast guard. According to him level 2 evaluation often advocates protest and pastiest measures be collected to assess learning gains
- David shoemaker (2010) in his article that a comprehensive human resource training program should cover the development of an engagement strategy as well as cover the tools needed to assess the current engagement climate.
- Brad shuck(2012) in his article examined the links between job fit, affective commitment, psychological climate, and employee engagement, and the dependent variables, discretionary effort, and intention to turnover.

III. RESEARCH OBJECTIVE:

- To investigate the relationship between training and employee engagement.
- To examine degree of association between two variables.

IV. RESEARCH METHODOLOGY

- Area : Jalandhar , Amritsar
- Sampling Type: Random Sampling
- Data Type : Primary and Secondary data
- Data Collection Tool: Questionnaire
- Data Analysis tools used: SPSS
- Sample Size : 100
- Primary data : The study undertaken is mainly based on the primary data i.e. structured questionnaire
- Secondary data : The study also contains secondary data i.e. data from books, authenticated websites and journals
- The data is collected randomly in the form of questionnaire and the sample size is 100 respondents.

V. Methodology& Presentation of Data

Factor Analysis is apply on 19 questions. From 13th to 31st question.

KMO and Bartlett's Test(Table No 1)

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.778
Bartlett's Test of Sphericity	Approx. Chi-Square	1.816E3
	Df	171
	Sig.	.000

- KMO MSA is 0.778 .because value is not below to 0.6 so this KMO MSA accepted and Significance is .000.

TOTAL VARIANCE EXPLAINED

Table-2

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.214	37.967	37.967	7.214	37.967	37.967
2	3.505	18.446	56.412	3.505	18.446	56.412
3	2.061	10.845	67.258	2.061	10.845	67.258
4	1.416	7.454	74.712	1.416	7.454	74.712
5	.880	4.633	79.345			
6	.695	3.658	83.003			
7	.608	3.198	86.201			
8	.514	2.707	88.908			
9	.510	2.685	91.593			
10	.418	2.199	93.792			
11	.282	1.487	95.279			
12	.243	1.280	96.559			
13	.198	1.043	97.602			
14	.128	.671	98.273			
15	.123	.648	98.921			
16	.096	.507	99.429			
17	.048	.254	99.683			
18	.037	.196	99.879			
19	.023	.121	100.000			

Interpretation

- Initial components are 19.There are 4 components having Eigen value more than 1 so extracted components are 4 and extraction method is applied – Principal component analysis.
- The cumulative percentage is 74.712 , which is more than 65 ; that is good enough for sampling.

Rotated Component MatrixTable-3

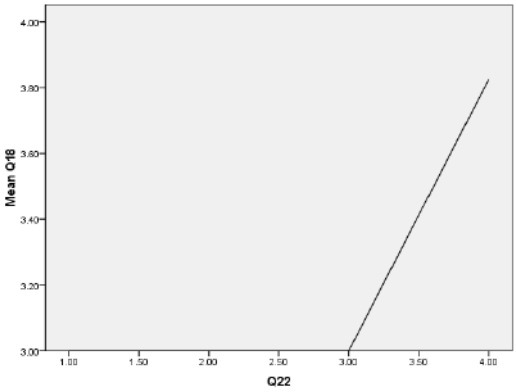
	Component			
	1	2	3	4
Q11	.918			
Q15	.804			
Q29	.789			
Q28	.772			
Q20	.715			
Q26	.696			
Q21	.538			
Q12		.903		
Q16		.785		
Q17		.586		
Q13			.911	
Q14			.881	
Q18			.488	
Q23				.782
Q27				.709

Interpretation: Table-4

S No.	TITLE	STATEMENTS	VALUES
1	Effects on job	Training relevant to job	.918
		Reduce turn over	.804
		Avoid working hard	.789
		Avoid overtime	.772
		Rarely distract from job	.715
		Exert full energy	.696
		Forget everything else	.538
2	Benefits of training programs.	Increase skills & knowledge	.903
		Feel enthusiastic	.785
		Training connect to job	.586
3	Interest in job	Feel strong in job	.911
		Increase loyalty towards job	.881
4	Emotional attachments with job	Excitement on better performance	.782
		Take work home to do	.709

CORRELATION ANALYSIS

Feelings are affected by how well performing job * Training and learning programs has help in reducing turn over and absenteeism from organization.



VI. INTERPRETATION

There is positive relationship between above two statements.
Findings:

- To check suitability of analysis a part from correlation matrix, anti image correlation coefficient are calculated.
- KMO methods of Samplings Adequacy (MSA) for individual variable also studies overall MSA found to be 0.778 that sample good enough for sampling.
- Communalities of variable range from 0.46 to 0.935 where as extract factor loadings range is 4.

VII. CONCLUSION

Training and learning program are effective according to the survey. There was the mix response of some respondents. They were neither strongly agree nor strongly disagree with regarding to the training programs being provided to them by the organization. Training and learning program is very helpful in engaging the employees in the work which help the organization as well as the employees. According to our result of survey the employees are not fully engaged in their work due to less number of training programs. Company should provide more training programs.

Policy implication
Respondents sometime may not give right, true information While filling questionnaire or during interview due to many

- Reasons like unawareness, miss-understanding, casual approach towards questions.
- We may not be able to extract true and correct information from respondents as we were not sufficiently trained about research.
- We may not be able to extract true and correct information from respondents as we were not sufficiently trained about research.

- Sample size should be large for more accuracy.

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Non-life Insurance Sector in India: Growth Pattern and Challenges

*Dr. Harinder Singh Gill and **Pooja Kansra
*Principal, Amritsar College of Hotel Management and Technology, Manawala.
**Research Scholar, Punjab Technical University, Jalandhar

Abstract- The Non-Life Insurance is responsible for policy-making, regulation and ongoing supervision of all lines of the insurance industry, with the exception of life insurance. The non-life insurance industry is witnessing shifting trends across the front office, policy administration, and claims—the three core functions of the insurance value chain. But it has been felt that high claim paid was the most serious issues in the sustainability of non-life insurance business. To improve the performance and the customers' retention and loyalty, of these companies should focus on improving procedures and formalities of claim settlement claim can be settled as early as possible to satisfy the existing customers and to fetch the new. The results also indicate that growth of gross direct premium is more of public sector companies than of private sector and out of various segments health insurance is now emerging as the fastest growing segment in non-life insurance. Understanding the customer better will allow these insurance companies to design appropriate and-customized products, determine pricing correctly and increase profitability.

Keywords: Non-Life, Performance, Growth, Challenges.

SECTION-I
INTRODUCTION

The insurance industry of India consists of 51 insurance companies of which 24 are in life insurance business and 27 are non-life insurers. Among the life insurers, Life Insurance Corporation (LIC) is the sole public sector company. Apart from that, among the non-life insurers there are six public sector insurers. In addition to these, there is sole national re-insurer, namely, General Insurance Corporation of India. Other stakeholders in Indian Insurance market include Agents (Individual and Corporate), Brokers, Surveyors and Third Party Administrators servicing Health Insurance claims. Out of 27 non-life insurance companies, 4 private sector insurers are registered to underwrite policies exclusively in Health, Personal Accident and Travel insurance segments. They are Star Health and Allied Insurance Company Ltd, Apollo Munich Health Insurance Company Ltd, Max Bupa Health Insurance Company Ltd and Religare Health Insurance Company Ltd. There sre two more specialised insurers belonging to public sector, namely, Export Credit Guarantee Corporation of India for Credit Insurance and Agriculture Insurance Company Ltd for Crop Insurance (Indian Insurance Market, 2014).

Despite multiple global macroeconomic challenges, the Indian non-life insurance market has remained resilient. The level of competition in the non-life insurance market is high due to the strong presence of both private and public companies, and while public-sector insurers dominate the market, product innovation and distribution channel penetration will be key factors to enable private participants to gain market share (Business Wire, 2011).Suitable Non-Life insurance is an absolute essential for every family. This is necessary to overcome uncertainties and risks prevalent in life. It is also necessary to protect one's property against risks as a loss or damage to one's property (MeD India, 2011). The challenge before the Indian insurance industry today is profitability of private companies. The industry was privatized a decade ago, but profitability/ returns are still tough for most insurers, both in life and non–life

The objective of the present paper is to examine the growth pattern and trends of Non-Life insurance in India and to compare the growth of gross direct premium of public and private companies in India. To accomplish the objective, the paper has been divided into six broad sections. Section I introduces the Non-Life insurance in India. Section II deals with review of the work done on Non-Life insurance. Section III presents a data base and methodology to work out the growth and trends of non-life insurance in India. Section IV explained the analysis and interpretation of results. The Section V concludes the discussion along with challenges faced by non-life insurance in India and suggested measures to meet these challenges. accordingly the hypothesis of the present study is defined as:

Ho: There is no significant difference in the growth of the premium of public and private sector companies of Non-Life insurance in India.

SECTION-II
REVIEW OF LITERATURE

Ahuja (2004) highlighted that community based health insurance is more suitable arrangement for providing insurance to the poor in India and increased public health spending and reforming of public health facilities are a must for the success of these community based health initiatives. Majumdar (2004) explained that the health insurance policy contract needs to be carefully examined and made more comprehensive and customer friendly. The health insurance business must include medical expense, critical illness, hospital cash insurance, long term care insurance and disability insurance. Bhat and Jain (2006) identified factor affecting the insurance in a micro insurance scheme and factors were income, age, knowledge about insurance, perception regarding future healthcare expenditure and household size . Bawa and Ruchita (2011) have concluded the presence of seven key factors which are acting as barriers to subscription of insurance. These were lack of funds, lack of willingness and awareness, lack of intermediaries, lack of reliability and lack of accessibility to services. Shijith and Shekar (2011) found that Indian insurance market is dominated by public mandatory schemes and employer based schemes, even after the entry of private players in the health insurance market and suggested that governmental agencies need to play more active role in facilitating the health insurance coverage to our population, particularly to poor.

SECTION-III
DATA BASE AND METHODOLOGY

The study is based upon secondary data which is mainly collected from the statistical year book, annual reports and monthly journals of insurance regulatory and development authority (IRDA), reports of Insurance Information Bureau (IIB) and other publications related with the health insurance were used for the collection of certain facts and figures necessary for the achievement of the said objectives. Annual growth rate, compound annual growth rate and t-test have also been applied for the analysis. The important parameters used to measure the growth pattern are number of policies, number of members, and company-wise analysis of gross direct premium.

SECTION-IV
ANALYSIS AND INTERPRETATION

In this section an attempt has been made to evaluate the performance of non-life insurance in India. The following table examined an international comparison of non-life insurance penetration in India and Asian countries.

I) International Comparison of Non-Life Insurance Penetration

TABLE 1
INTERNATIONAL COMPARISON OF NON-LIFE INSURANCE PENETRATION
(In Percentage)

Asian Countries	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bangladesh	0.17	0.17	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Hong Kong	1.21	1.45	1.5	1.39	1.29	1.2	1.2	1.3	1.4	1.4	1.4
India	0.56	0.67	0.62	0.64	0.61	0.6	0.6	0.6	0.6	0.7	0.7
Japan	2.22	2.22	2.2	2.25	2.22	2.2	2.1	2.2	2.1	2.1	2.2
Malaysia	1.8	1.97	2.06	1.88	1.82	1.7	1.5	1.5	1.6	1.6	1.8
Pakistan	0.38	0.38	0.38	0.43	0.4	0.5	0.4	0.4	0.4	0.3	0.3
PR China	0.86	0.95	1.03	1.05	0.92	1.0	1.1	1.0	1.1	1.3	1.2
Singapore	1.18	1.43	1.5	1.48	1.48	1.1	1.5	1.6	1.7	1.6	1.5
South Korea	3.38	3.38	2.86	2.77	2.98	3.2	3.6	3.7	3.9	4.2	4.6
Sri Lanka	0.67	0.75	0.75	0.77	0.84	0.9	0.9	0.9	0.9	0.9	0.6
Taiwan	2.59	2.81	3.03	3.07	2.93	2.9	2.8	2.9	3.0	3.0	3.1
Thailand	1.08	1.15	1.2	1.58	1.62	1.6	1.5	1.5	1.6	1.7	1.7
World	3.15	3.38	3.47	3.44	3.18	3.0	3.1	2.9	3.0	2.9	2.8

Note: Insurance penetration is measured a ratio of premium (in US Dollars) to GDP (in US Dollars)
Source: Handbook of Insurance Statistics 2011-12, IRDA

After comparing the Asian countries, it was found that the penetration of non-life insurance is low in India as compared to other countries. It was lower than Hong Kong, Japan, Malaysia, PR China, Singapore, South Korea, Taiwan and Thailand.

II) Growth Pattern and Trends in Non-Life Insurance in India

In the part an attempt had been made to examine the growth pattern and trends in non-life insurance in India. For the analysis, annual growth rates and compound annual growth rate (CAGR) have been used.

TABLE 2
SEGMENT WISE GROSS DIRECT PREMIUM OF NON-LIFE INSURANCE SEGMENT IN INDIA

(In lakhs)

YEAR	FIRE	MARINE	MOTOR	HEALTH	OTHERS	TOTAL
2000-01	206436	98515	N.A.	N.A.	6757447	980695
2001-02	266739 (29.21)	1105340 (1022.00)	N.A.	N.A.	772485 (-88.57)	1144582 (16.71)
2002-03	295478 (10.77)	121519 (-89.00)	N.A.	N.A.	973695 (26.05)	1390692 (21.50)
2003-04	315005 (6.61)	111754 (-8.03)	N.A.	N.A.	1132722 (16.33)	1559481 (12.14)
2004-05	333092 (5.74)	122810 (9.89)	N.A.	N.A.	1292158 (14.07)	1748060 (12.09)
2005-06	377453 (13.31)	128409 (4.56)	873338	222075	434697 (-66.36)	2035972 (16.47)
2006-07	413238 (9.48)	162784 (26.77)	1069666 (22.48)	331929 (49.47)	512929 (17.99)	2490549 (22.33)
2007-08	345921 (-16.29)	32857 (-79.82)	1268525 (18.59)	489442 (47.45)	498604 (-2.79)	2788134 (11.95)
2008-09	338468 (-2.15)	195615 (495.35)	1333602 (5.13)	608800 (24.39)	558698 (12.05)	3035183 (8.86)
2009-10	386927 (14.31)	216759 (10.81)	1504699 (12.83)	731137 (20.09)	622522 (11.42)	3462045 (14.06)
2010-11	455512 (17.72)	251877 (16.20)	1818052 (20.82)	994403 (36.01)	737801 (18.52)	4257645 (22.98)
2011-12	542971 (19.20)	287459 (14.13)	2423864 (33.32)	1177730 (18.43)	855553 (15.96)	5287577 (24.19)
CAGR	6.4605	0.5613	16.57	31.87	-10.74	15.69

Source: Author's Calculations based on Secondary Data
Note: The Secondary data obtained from IRDA,
The figures in brackets indicate growth over the previous year.

The table 2 shows that gross direct premium of fire segment was 206436 lakh in 2000-01 and has increased to 542971 lakhs in 2011-12. During the entire period it has been found that growth in the fire segment was negative in two years only in 2007-08 and 2008-09.Whereas, the maximum growth was observed in 2001-02 of 29.21 percent. The compound annual growth rate of fire segment is 6.46 percent per annuam. In case of marine the gross direct premium increased from 98515 lakh to 287459 lakh from 2007 to 2012. The maximum growth of 1022 percent was observed in year in 2001-02. During the entire period of study three years have reported negative growth i.e. 2002-02, 2003-04 and 2007-08. Marine segment recorded a compound annual growth rate of 0.56 percent per annuam. It was observed that gross direct premium of motor insurance increased from 2005-06 to 2011-12 from 873338 to 2423864. Whereas, in this segment the maximum growth was recorded of 33.32 percent in 2011-12 and minimum growth was of 5.13 percent in 2008-09. This segment attained a compound annual growth rate of 16.57 percent per annuam. In case of health insurance the gross direct premium rose from 222075 lakh to 1177730 lakh form 2005-06 to 2011-12. The highest growth was noticed in 2006-07 of 49.47 percent and lowest growth was recorded in 2011-12 of 18.43 percent. Health insurance segment obtained a compound annual growth rate of 31.87 percent per annuam.It is experiential that gross direct premium income from the others increased from 6757447 lakh to 855553 lakh. The maximum growth was witnessed in 2002-03 of 26.05 percent and faced negative growth for two years in 2005-06 and 2007-08. Whereas this is the only with segment with (-) 2.48 compound annual growth rate percent per annuam. It was examined that non-life insurance segment as a whole recorded a gross direct premium of 980695 lakh in 2000-01 which rose to 5287577 lakh in 2011-12 and also obtained a compound annual growth rate of 13.36 percent per annuam. From above, segments, it can be concluded that highest compound annual growth rate was recorded in health segment (31.87 percent) followed by Motor (16.57 percent), Fire (0.56 percent), Marine (6.46 percent), others (-2.48 percent).

III) Comparison of Gross Direct Premium of Public and Private Companies of Non-Life Insurance Segment in India

In the present study an attempt have been made to examine the difference between the growth of public and private companies in India. For the analysis data, over a period of 12 years from 2001 to 2012 were examined and evaluated for the present analysis. It was found that the mean growth premium of public companies more than private companies.

TABLE 3
RESULTS OF INDEPENDENT SAMPLE T-TEST

Company	Sector	N	Mean	Std. Deviation	t	Df	Sig (2-tailed)
	Private	12	1725.10	1042.333	-4.778	22	0.000*
	Public	12	5830.90	2787.998			

Source: Author's Calculations based on Secondary Data.
Note: The Secondary data obtained from IRDA
**** at 1% level of Significance***

The value of t-test 4.778 which was significant at one percent level.Thereby it leads to the rejection of null hypothesis (which state there is no significant difference of the gross direct premium earned by public and private companies). Hence it is concluded that there is a significant difference in the gross direct premium earned by public and private companies. By comparing table 9 and 10 it can be stated that public sector companies are having more GDP income as compared to private sector companies. The reason might be attributable to the fact still in India the people rely on buying a public sector health insurance policy as compared to private sector policies due to various exclusions and other problems.

IV) Problems in the Growth of Non-Life Insurance in India

Although the Indian non-life insurance market has seen rapid growth over the 2006-2010 in review periods, it remains largely underpenetrated due to low awareness, low penetration in rural areas, and lack of a robust distribution models.

The market is, at present, dominated by public-sector insurers; all the private non-life insurers together account for less than half the total non-life insurance written premium.

Insurers' fascination for top line growth at any cost has resulted in inefficient operating models and hence less profits as compared to global benchmarks, in both life and non–life.

The claims cost in the case of non–life are very high arising from four key reasons — third party liability claims, health loss ratios (group health cross subsidy), fraud in the case of auto and health and lack of supplier (hospital/garage) management by insurers

There is limited focus on the end customer and the intermediary is being given a more prominent

position by insurers, with insufficient focus on maximizing value from existing customer.

Recent regulatory changes on commission caps, caps on surrender changes and minimum guarantee return for pension products have turned the world upside down and tightened insurer margins.

High claims costs in the non–life sector is the main reason the industry still has underwriting losses. The claims ratio in the Indian non–life industry in the last five years has ranged from 80 to 85 percent. This can turned the non -life insurance into loses.

SECTION-V
CONCLUSION

The level of competition in the non-life insurance market is high due to the strong presence of both private and public companies, and while public-sector insurers dominate the market, product innovation and distribution channel penetration will be key factors to enable private participants to gain market share. There are a number of key opportunities in the market, particularly in motor insurance which dominates non-life insurance and will open up further with space for new entrants as the automobile sector experiences rapid growth. The proposal to increase the country's FDI limit to 49% can create a favorable environment for innovation in terms of product offerings and distribution networks. Understanding the customer better will allow these insurance companies to design appropriate and-customized products, determine pricing correctly and increase profitability. Ensuring high levels of training and development can also help to attain better results. As the market matures, with increasingly demanding customers, better infrastructure, and more data, insurers will have to continually evolve better products. For example, in the case of health, moving from hospitalization reimbursement alone, to adding dental and OPD, to wellness and disease management offerings is a journey that is underway. There is a need to address all challenges holistically. This can be done by designing simple, competitively priced products that meet customer requirements; by radically redesigning underwriting and claims processes to control operational

expenses; by leveraging technology to automate processes and make the operations simple and efficient; and by using alliances.

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Analytical Comparison Of Load Balancing Algorithms in Cloud Computing

Tejinder Sharma
Amritsar College of Engineering and Technology
tejinder.acet@gmail.com

Narinder Sharma
Amritsar College of Engineering and Technology
narinder.acet @gmail.com

Abstract ***-Large-scale heterogeneous distributed computing environments such as Computational Grids and Clouds offer the promise of access to a vast amount of computing resources at a relatively low cost. Cloud computing enables a wide range of users to access scalable, virtualized hardware, distributed and/or software infrastructure over the Internet. Load balancing is a methodology to distribute workload across multiple computers, or other resources over the network links to achieve optimal resource utilization, minimum processing time, minimum response time, and avoid overload. The objective of this paper to identify the best scheduling algorithm that can maintain the load balancing and provides better improved strategies through efficient job scheduling and modified resource allocation techniques. Load balancing ensures that all the processor in the system in the network does approximately the equal amount of work at any instant of time. The simulated results discussed in this paper based on Equally Spread Current Execution, Round Robin and Throttled scheduling algorithms, Each one is compared to estimate processing time and response time, which are directly related to the cost. By comparing the parameters we identify that Throttled scheduling algorithm is the best among all three algorithms.***

1. INTRODUCTION

Cloud computing involving distributed technologies to satisfy a variety of applications and user needs. Share resources, software, information via internet are the main functions of cloud computing to reduced cost, better performance and satisfy needs. To improve the response time of the job, distribute the total load of the collective system. By this removing a condition in which some of nodes are overloaded while some other are under loaded. Load balancing algorithms dose not taken the previous state or behaviour of the system, it depends upon the present behaviour of the system because it is dynamic in nature. Round robin algorithm process on circular order by handling the process without priority but equally spread current execution handle the process with priories. Throttled algorithm the client first requests the load balancer to find a suitable Virtual Machine to perform the required operation. The architecture is complete formation for virtual machines, less response time and minimum delay to transfer. Therefore model estimated the virtual machine cost and low data transfer cost. This type of computational model promises to reduce the capital and operational cost of the client. The total execution time is estimated in three phases. In the first phase the formation of the virtual machines and they will be idle waiting for the scheduler to schedule the jobs in the queue, once jobs are allocated, the virtual machines in the cloud will start processing, which is the second phase, and finally in the third phase the cleanup or the destruction of the virtual machines. The throughput of the computing model can be estimated as the total number of jobs executed within a time span without considering the virtual machine formation time and destruction time

2. DISTRIBUTED LOAD BALANCING FOR CLOUD

Distribute workload of multiple network links to achieve maximum throughput, minimize response time and to avoid overloading. We use three algorithms to distribute the load. And check the performance time and cost.

A. Round Robin Algorithm

Round robin algorithm is random sampling based. In this algorithm [25], the processes are divided between all processors. Each process is assigned to the processor in a round robin order. The process allocation order is maintained locally independent of the allocations from remote

processors. Though the work load distributions between processors are equal but the job processing time for different processes are not same. So at any point of time some nodes may be heavily loaded and others remain idle. This algorithm is mostly used in web servers where Http requests are of similar nature and distributed equally. It means it selects the load randomly in case that some server is heavily loaded or some are lightly loaded.

B. Equally Spread Current Execution Algorithm

Equally spread current execution algorithm process handle with priorities. it distribute the load randomly by checking the size and transfer the load to that virtual machine which is lightly loaded or handle that task easy and take less time , and give maximize throughput. It is spread spectrum technique in which the load balancer spread the load of the job in hand into multiple virtual machines. Though there algorithm offers better results as shown in further section, it however requires a lot of computational overhead.

C. Throttled Load Balancing Algorithm

Throttled algorithm is completely based on virtual machine. In this client first requesting the load balancer to check the right virtual machine which access that load easily and perform the operations which is give by the client or user. In this algorithm the client first requests the load balancer to find a suitable Virtual Machine to perform the required operation

3. CLOUD ANALYST

In order to study the various load balancing techniques we are using cloud analyst in this three techniques are given . Analyst[3] is a GUI based tool that is developed on CloudSim[4]architecture[5]. CloudSim is a toolkit that allows doing modeling, simulation and other experimentation. The main problem with CloudSim is that all the work need to be done programmatically. The cloud analyst tool removes all the complexities by making GUI so that focus can be done on simulation rather than programming. It allows the user to do repeated simulations with slight change in parameters very easily and quickly. The cloud analyst allows setting location of users that are generating the application and also the location of the data centers. In this various configuration parameters can be set like number of users per hour ,no of requests generated per hour, number of virtual machines, number of processors, amount of storage, network bandwidth and other necessary parameters. Based on the parameters the tool computes the simulation result and shows them in graphical form. The result includes response time, processing time, cost etc .By performing various simulations operation the cloud provider can determine the best way to allocate resources,based on request which data center to be selected and can optimize cost for providing services. The various activities performed in cloud **analyst** tool are summarized below

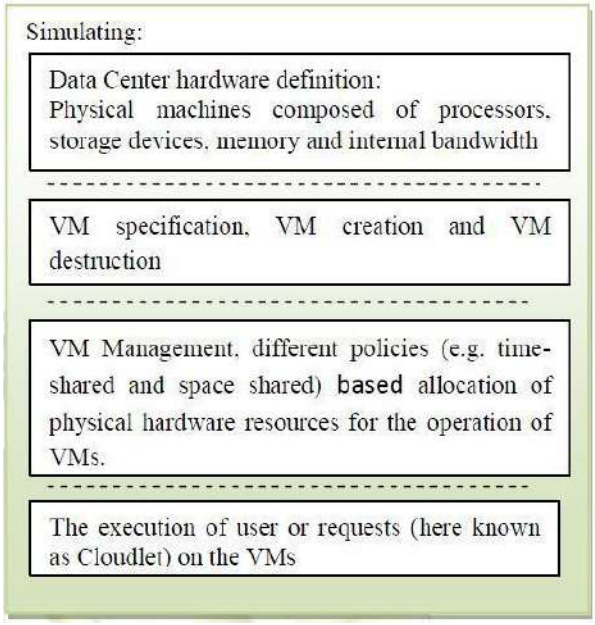

Fig1 :-Activities done in cloud analyst

The main components of cloud analyst tool are:

GUI Package: It provides various user interfaces to configure the various simulation parameters in a better and easy way. The GUI of cloud analyst is shown in figure2.

Fig2 : Cloud Analyst

Simulation: Based on the various parameters set it executes the simulation to provide necessary results.

UserBase: In this user base is modelled to represent the users who deploy application. DataCenterController. This component is used to control thevarious data center activities.

InternetCharacteristics:- In this component various internet characteristics are modelled simulation, which includes the amount of latency and bandwidth need to be assigned between

regions, the amount of traffic, and current performance level information for the data centers.

VmLoadBalancer:The responsibility of this component is to allocate the load on various data centers according to the request generated by users. One of the three given policies can be selected. The given policies are round robin algorithm, equally spread current execution load, and throttled.

CloudAppServiceBroker:- The responsibility of this component is to model the service brokers that handle traffic routing between user bases and data centers. The service broker can use one of the routing policies from the given three policies which are closest data center, optimize response time and reconfigure dynamically with load. The closest data center routes the traffic to the closest data center in terms of network latency from the source user base. The reconfigure dynamically with load routing policy works in the sense that whenever the performance of particular data center degrades below a given threshold value then the load of that data center is equally distributed among other data centers.

4. SIMULATION CONFIGURATION

In order to analyze various load balancing policies configuration of the various component of the cloud analyst tool need to be done. We have set the parameters for the user base configuration, application deployment configuration, and data center configuration as shown in figure 6, figure 7 and figure 8 respectively. As shown in figure the location of user bases has been defined in six different regions of the world. We have taken two data center to handle the request of theseusers. One data center is located in is located in region 0 and another in 2. On DC1 number of VM allocated are while that on DC2 are 50. In order to analyze various load balancing policies configuration of the various component of the cloud analyst tool need to be done. We have set the parameters for the user base configuration, application deployment configuration, and data center configuration as shown in figure 3, figure 4 and figure 5 respectively. As shown in figure the location of user bases has been defined in six different regions of the world. We have taken three data center to handle the request of these users. One data center is located in is located in region 0 , second in 2,third in 4. On DC1 and DC2 number of VM allocated are 50. The duration of simulation is 60hrs.

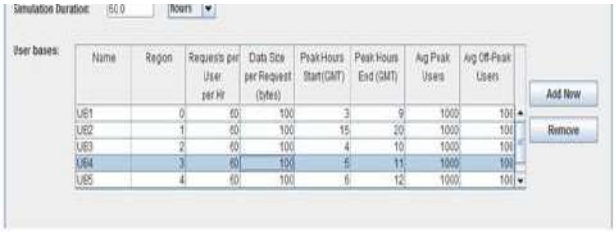

Fig3:User Base Configuration

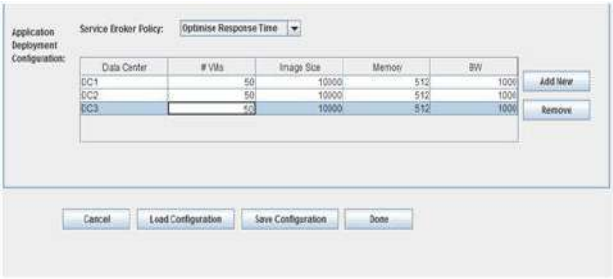

Fig4: Application Deployment Configuration

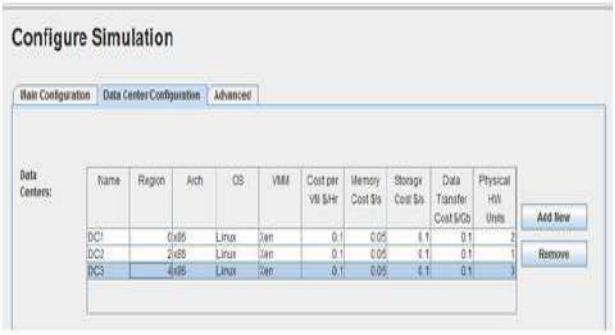

Fig5: Data center Configuration

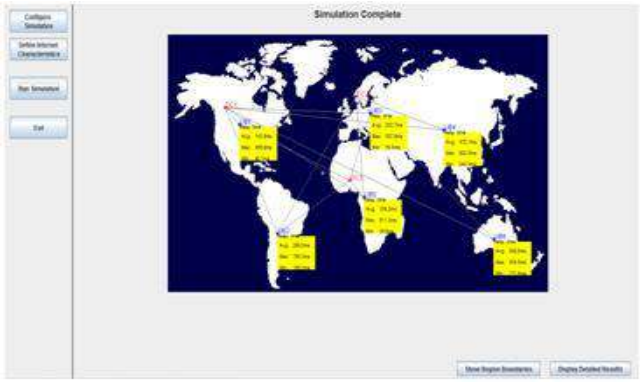

Fig6: Complete Simulation

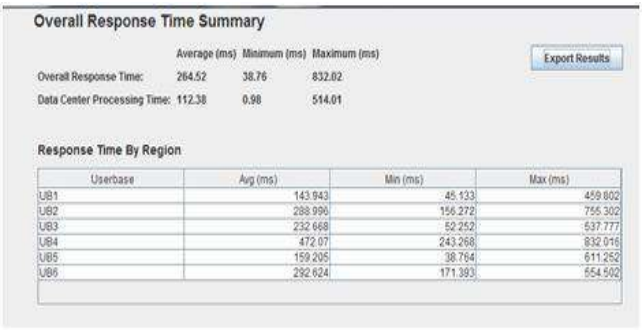

Fig 7:Overall Response Time by using RR Algorithm

Fig 7:Data Processing Time by using RR Algorithm

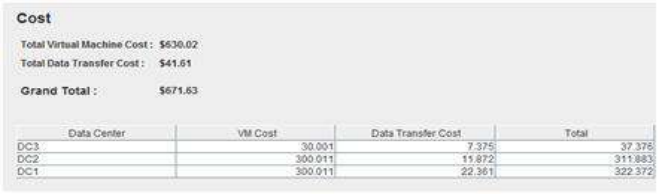

Fig8: Overall Data Transfer Cost by RR Algorithm

Fig 8:Overall Response Time by using ESCEAlgorithm

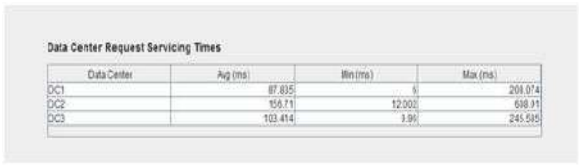

Fig 9:Data Processing Time by using ESCE Algorithm

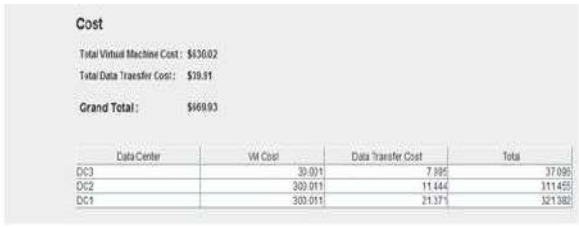

Fig10:Data Transfer Cost by using ESCE Algorithm

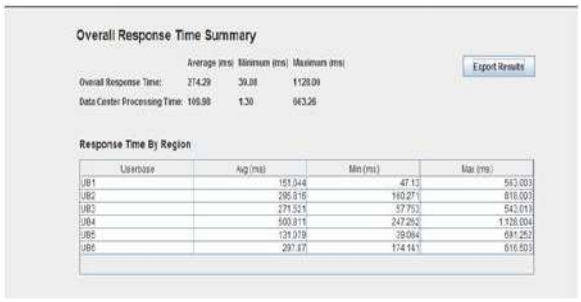

Fig11:Overall Response Time by using Throttled Algorithm

Fig 12:Data Processing Time by using Throttled Algorithm

Fig13:Data Transfer Cost by using Throttled Algorithm

5. CONCLUSION AND RESULTS:

In Load balancing algorithms Cost and time are the key challenges of the IT industry, as policies used for scheduling leads to increased operational cost and time. In this paper, After performing the simulation the result computed by cloud analyst for three different load balancing policies is shown in the figures. We have used the above defined configuration for each load balancing policy one by one and depending on that the result calculated for the metrics like overall response time, data processing time and cost of data transfer, shown in the figure 7 to figure 13. As we identify that the overall response time of Round Robin policy and ESCE policy is almost same but as for the throttled policy is concerned, it has quite less overall response time and correspondingly low cost.

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Reducing Software Maintenance Cost by Introducing Autonomic Elements

Maneet kaur
M.Tech (CSE)
G.N.D.U. ASR

Abstract-As the advancement in technology make the software complex and more difficult to maintain. For the developer software maintenance is the nightmare and it is a big challenge for the developers to maintain such advanced high tech software system. In this paper I put efforts to how we can reduce software maintenance cost with autonomic manager as a self maintenance system. Autonomic manager is derived from autonomic computing. Autonomic computing is the effective computing system, which has the four self characteristics - Self Configuration, Self Optimization, Self Healing and Self Protection. In this paper a simple case study is done which helps in proving that if we introduce autonomic computing in software development life cycle then software maintenance cost will definitely reduce at some extent.

1. INTRODUCTION

Maintenance is the most expensive phase of the software life cycle and therefore it is usually cost effective to invest in time and effort while developing the product and *to emphasize on maintainability of the product to reduce the maintenance cost.*

Software maintenance denotes any change made to a software product after it has been delivered to the customer. Software maintenance is becoming an important activity of a large number of organizations. In other words software maintenance becomes a nightmare for software engineers. As management complexity and maintenance cost of software system keep spiralling upward. Autonomic computing promises to move most of this complexity from humans to the software itself and to reduce software maintenance costs, and hence drastically reducing the dominant cost factor in the software life cycle. This reduction is expected to come about because autonomic computing environments offer features for self-configuration, self-healing, self-optimization and self-protection to cope with the uncertainty, complexity and heterogeneity of modern systems.

2. TOWARDS OPEN WORLD SOFTWARE [2]

Most adaptable technique for handling environment changes is by eliciting the change requirements, modify the software design and code, test the resulting product and redeploy the application. This approach is suitable when changes occur slowly i.e. few changes to software occur for long periods. This is the mainly situation for closed world software where requirements are fixed or changes occur less frequently.We need some new approaches which supports the open world i.e. environment changes continuously software must be able to evolve dynamically in an open world.In an era of ubiquitous and pervasive computing, where the world is intrinsically open systems can discover and such components dynamically to the application while it's executing .Existing solutions: Service Oriented Architectures**,** Web services**,** Publish/Subscribe middleware systems**,** Grid computing, Autonomic computing

3. TOWARDS AUTONOMIC COMPUTING [5,7,8]

Autonomic computing is the computation of systems which can manage themselves with less human intervention. *Autonomic computing* is inspired by biological systems such as the autonomic human nervous system, and enables the development of self-managing computing systems and applications. To implement autonomic computing, the industry must take an evolutionary approach and deliver improvements to current systems that will provide significant self-managing value to customers without requiring them to completely replace their current IT environments.

Autonomic computing, launched by IBM in 2001 [5], is emerging as a valuable new approach to the design of effective computing systems. *In particular, it brings together work in software engineering and artificial intelligence.*

These are the four basic properties of autonomic computing known as S-CHOP where S stands for self:

Self-Configuring: An autonomic application/system should be able configure and reconfigure itself under varying and unpredictable conditions.

Self-Healing: An autonomic application/system should be able to detect and recover from potential problems and continue to function smoothly.

Self-Optimizing: An autonomic application/system should be able to detect suboptimal behaviours and optimize itself to improve its execution.

Self-Protecting: An autonomic application/system should be capable of detecting and protecting its resources from

both internal and external attack and maintaining overall system security and integrity.

4. TOWARDS AUTONOMIC ELEMENT

IBM view [5] that represents the closed control loop within the autonomic element as consisting of four stages: 'MAPE'—monitor, analyze, plan and execute. The monitor and analyse parts of the structure process information from sensors to provide both self-awareness and an awareness of the external environment. The plan and execute parts decide on the necessary self-management behaviour that will be executed through the effectors. The MAPE components use correlations, rules, beliefs, expectations, histories and other information known to the autonomic element or available to it through the knowledge repository within the autonomic manager (AM).[6]

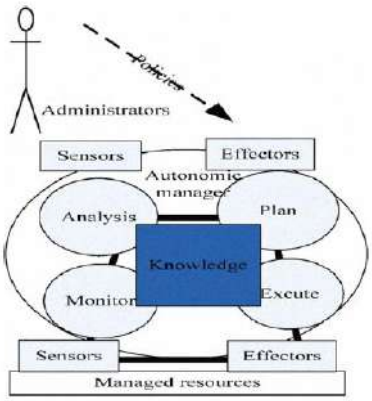

Figure1. Autonomic Manager Architecture

Autonomic managers (AMs) can be joined in hierarchy and work together for a complete system. Moreover they are consuming and providing services to each other.

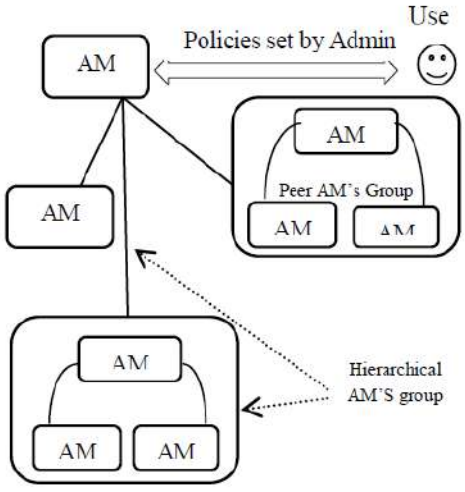

Figure 2: Interconnection of AMs[1]

5. INTRODUCING NEW SDLC FRAME SUPPORTING AUTONOMIC COMPUTING AUTO-SDLC [1]

If we introduce autonomic computing with traditional software development life cycle (SDLC), then the resultant application will be robust, and have ability of self-managing itself. Development cost of such application definitely raised but the maintenance cost will reduce rapidly. Then conventional SDLC will become Autonomic SDLC. The main objective is to collect its autonomic manager requirements for the application. The difference is in requirements and designing phase only because the development of Autonomic Manager (AM) is depend on the type of a application on which AM performs its operation and designing phase the decision making and machine learning algorithm is come into picture.

Life of software is consisting of three phases:

1. PRE-DEVELOPMENT PHASE
2. DEVELOPMENT PHASE
3. POST-DEVELOPMENT PHASE

Software development life cycle (SDLC) is a subset of life of software.

SDLC consist of four major phases:

1. Requirement Analysis
2. Design
3. Coding
4. Testing

Post-development is the most costly phase of software life cycle.

Most of the developer's time and effort is spend in Maintenance. We can reduce effort and time by introducing Autonomic Computing.

TABLE 1: Importance of autonomic computing elements in conventional SDLC phases [1]

Maintenance phase	
Autonomic elements in SDLC	**Importance of autonomic elements in SDLC**
Adaptive – dealing with changes and adapting in the software environment **Perfective** – accommodating with new or changed user requirements which concern functional enhancements to the software **Corrective** – dealing with errors found and fixing it **Preventive** – concerns activities aiming on	**Self-configuration** Configure themselves automatically High-level policies (what is desired, not how) **Self-optimization** Hundreds of tunable parameters. Continually seeks ways to improve their operation. **Self-healing:** Analyze information from log files and monitors. **Self-protection:** From Malicious attacks, cascading failures.

increasing Software maintainability and prevent problems in the future	

6.CASE STUDY DEMONSTRATING MINIMIZATION OFMAINTENANCE COST WITH AUTONOMIC MANAGER

The case study on Fee management system to demonstrate minimization of maintenance cost with autonomic manager.

TABLE 2: ANALYSIS OF FUNCTIONAL POINTS OF FEE SYSTEM

FUNCTIONAL POINTS TYPES	HIGH COMPLEXITY
EI	14
EO	6
EQ	7
ILF	7
ELF	2

To illustrate, above functional points in details, we showed them below, and we only outlined the functional points for High complex fee management system:

Number of External Inputs (EIS) =14

- Student-name
- Roll number
- Student address
- Student contact-no
- Student date of birth
- Student gender
- Student id number
- Department name
- Course name
- Date of admission
- Fee amount
- Student semester
- Concession(if any)
- Input command for print of fee receipt

Number of External outputs (EOS) =6

- Fee-amount
- Fee submission date
- Journal ID
- Bank Branch code
- Print of fine amount slip
- Print of student statistic late fine slip

Number of External Inquiries (EQs) = 7

- Search fee data by student name
- Search fee data by student roll no
- Search fee data by department name
- Search fee data by course name
- Search fee data by late fee students
- Search fee data by student having concession
- Miscellaneous

Number of Internal logical Files (ILFs) = 7

- Student database
- Department database
- Fee database
- Fine database
- Fee Concession database
- Bank fee deposition database
- Miscellaneous

Number of External interface files (ELFs) =2

- Bank fee depositor
- Department clerk

Below we assumed the scenario to assign values to variable "B" for high complex fee management system as shown below:

- 20 Data entry inputs screen (EI)
- 10 External output reports (EQ)
- 10 External queries (EQ)
- 11 Internal logical files (ILFs)
- 8 External logical files (ELFs)

TABLE 2: FUNCTIONAL POINT COMPUTATION

Type of Function Components	**Total FPS (A*B)**
EI	14*20=280
EO	6*10=60
EQ	7*10=70
ILF	7*11=77
ELF	2*8=16
Total FPS	**503**

Calculation of KLOC of Fee management System

TABLE 3: RELATION BETWEEN LOC and FPs

Language	**LOC/FP**
C	128
Cobol	105
Fortran	105
Pascal	90
C++	64
JAVA	53

If software is developing in JAVA then 53 LOC/FP are needed.
Hence, the resultant KLOC will be as follows:
FPS=503*53=26659 LOC /1000 = 26.659 KLOC

Now compute EFFORT using Constructive Cost Model.

TABLE 4: BASIC COCOMO model

Mode	**A**	**b**
Organic	2.4	1.05
Semidetached	3.0	1.12
Embedded	3.6	1.20

Effort (E) = a * (size) ^{b}

We consider Semidetached model,

E = 3.0 * (26.659) $^{1.12}$ = 118.59 or 119 person-month

Functional points computation of Autonomic Manager:

1. Functional Points for Self-Healing Module:

Number of External inputs (EIs) =2

- DBMS's -Log file- for symptoms
- GU I's Log file -for symptoms

Number of external outputs (EOs) =0

Number of External Inquiries (EQs) =1

- Search- history of good back-up in DB of AM's

Number of Internal Logical Files (ILFs) =2

- Meta database of DBMS and GUI's environment (rules based data)
- Control data (h/w, s/w ports).

Number of External interface Files (ELFs) =3

- Fee management system interface for sensors-effectors
- OS's Touchpad Interface
- Hardware Touchpad Interface

TABLE 5: FUNCTIONAL POINT COMPUTATION

Type of Function Components	Total FPS (A*B)
EI	2*5=10
EO	0*6=0
EQ	1*6=6
ILF	2*10=20
ELF	3*11=33
Total FPS	**69**

If software is developing in JAVA then 53 LOC/FP are needed.
Hence, the resultant KLOC will be as follows:

FPS= 69*53= 3657 LOC /1000 = 3.657 KLOC

Effort (E) = 3.0 * (3.657) $^{1.12}$ = 12.818or 13 person-month

2. Functional Points for Self-Protection Module:

Number of External inputs (EIs) =2

- DBMS's -Log file- for symptoms
- GU I's Log file -for symptoms

Number of external outputs (EOs) =0

- none

Number of External Inquiries (EQs) =1

- Detecting potential dangers on DBMS via sensors interfaces

Number of Internal Logical Files (ILFs) =2

- Meta database of DBMS and GUI's environment (rules based data)
- Control data (h/w, s/w ports).

Number of External interface Files (ELFs) =3

- Fee management system interface for sensors-effectors
- OS's Touchpad Interface
- Hardware Touchpad Interface

TABLE 6: FUNCTIONAL POINT COMPUTATION

Type of Function Components	Total FPS (A*B)
EI	2*5=10
EO	0*6=0
EQ	1*6=6
ILF	2*10=20
ELF	3*11=33
Total FPS	**69**

If software is developing in JAVA then 53 LOC/FP are needed.
Hence, the resultant KLOC will be as follows:
FPS= 69*53= 3657 LOC /1000 = 3.657 KLOC

Effort = a * (size) ^{b}

E = 3.0 * (3.657) $^{1.12}$ = 12.818 or 13 person-month

3. Functional Points for Self-Optimizing Module:

Number of External inputs (EIs) =2

- Parameters for tuning DBMS
- Parameters for tuning GUI

Number of external outputs (EOs) =0

Number of External Inquiries (EQs) =2

- Search knowledge repository to reduce load of DBMS queries
- Seek parameters for optimizing the fee management system

Number of Internal Logical Files (ILFs) =2

- Meta database of DBMS and GUI's environment (rules based data)
- Control data (h/w, s/w ports).

Number of External interface Files (ELFs) =3

- Fee management system interface for sensors-effectors
- OS's Touchpad Interface
- Hardware Touchpad Interface

TABLE 7: FUNCTIONAL POINT COMPUTATION

Type of Function Components	Total FPS (A*B)
EI	2*5=10
EO	0*6=0
EQ	2*6=12
ILF	2*10=20
ELF	3*11=33
Total FPS	**75**

If software is developing in JAVA then 53 LOC/FP are needed.
Hence, the resultant KLOC will be as follows:

FPS= 75*53= 3975 LOC /1000 = 3.975 KLOC

Effort = a * (size) ^{b}

E = 3.0 * (3.975) $^{1.12}$ = 14.0727or 14 person-month

4. Functional Points for Self-Configuration Module:

Number of External inputs (EIs) =4

- Configuration files of DBMS
- Configuration files of OS
- Configuration files of fee management system
- Configuration files of hardware of system

Number of external outputs (EOs) =0

- none

Number of External Inquiries (EQs) =1

- Search knowledge repository for changes occurred in internal and external environments

Number of Internal Logical Files (ILFs) =2

- Meta database of DBMS and GUI's environment (rules based data)
- Control data (h/w, s/w ports).

Number of External interface Files (ELFs) =3

- Fee management system interface for sensors-effectors
- OS's Touchpad Interface
- Hardware Touchpad Interface

TABLE 8: FUNCTIONAL POINT COMPUTATION

Type of Function Components	Total FPS (A*B)
EI	4*5=40
EO	0*6=0
EQ	1*6=6
ILF	2*10=20
ELF	3*11=33
Total FPS	**99**

If software is developing in JAVA then 53 LOC/FP are needed.
Hence, the resultant KLOC will be as follows:
FPS= 99*53= 5247LOC /1000 = 5.247 KLOC

Effort = a * (size) ^{b}

E = 3.0 * (5.247) $^{1.12}$ = 19.20or 19 person-month

Total development time of Autonomic manager (self-CHOP) is:

Module	**Effort (person-month)**
Self-Configuration	19
Self-Healing	13
Self-Optimizing	14
Self-Protecting	13
Total	59
Average	**59/4=14.75 person-month**

Maintenance cost is 30%, based on article "Total cost of software maintenance workshop" [3]. So , cost of fee management system without autonomic manager is 30% of 119=36 person-month and development cost + maintenance cost of fee management system with autonomic manager is 14.7+ (30% of 14.7) = 19 person-month.

So we are saving "36 – 19 = 17 person month".

5. CONCLUSION

I present past, present and future perspective of software in this paper. Maintenance of software is a big challenge for developers. Most of the organizations spend 30% of their total cost of ownership (TCO) i.e. mass of complexity within systems of systems, resulting in an increasing financial burden per computer in software maintenance. A case study is done on simple fee management system with autonomic manager and results shows we can save approximately 50% of efforts as compared to traditional development of software. With the introduction of autonomic computing we would have cheaper maintenance cost and most importantly there is less human intervention which leads to system much error free caused by human's fault and relief IT companies from the shortage of skilled and expert developers.

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TEXT TO SPEECH SYSTEMS IN INDIAN LANGUAGES: A BRIEF REVIEW

Preeti Verma[1]
Assistant Professor,
Department of Computer Application,
ACET, Amritsar, India.
preet_asr156@yahoo.in

Suket Arora[2]
Assistant Professor,
Department of Computer Application,
ACET, Amritsar, India.
suket.arora@yahoo.com

Gautami Daalia[3]
Student,
Punjab Technical University,
Amritsar, India.
daalia.gautami@gmail.com

***Abstract*—Text to Speech (TTS) Synthesizer system is concerned with the production of sound by a computer based system from the typed text given as input. The process of TTS conversion allows the transformation of a string of phonetic and prosodic symbols into a synthetic speech signal. This technology proves beneficial to the blind, deafened and vocally handicapped people. In India, many institutions are working in the field of speech synthesis. In this paper, we briefly highlight some Text-to-Speech systems available in different Indian Languages.**

***Key Words*— Text-to-speech system, Phoneme, Prosody, Tokenization, Concatenation**.

I. INTRODUCTION

Text-to-Speech synthesis system main task is to convert an input text into speech waveforms. Typically, Text to speech systems include three main modules, i.e., text processing, prosody and synthesis. Text processing is used to convert the given text to a sequence of phoneme. Prosody module computes phoneme durations, determine stress and assigns frequency contour to the utterance. The last module synthesizes the desired utterance by using the specifications of the previous two modules. The qualities expected from a good TTS system is characterized as Intelligibility, which means how easily the output can be understood and Naturalness, which means up to what extend the output speech imitate the speech of a real human. The ideal speech synthesizer should be both natural and intelligible.

II. APPLICATIONS OF TTS SYNTHESIZERS

The application field of synthetic speech is expanding fast whilst the quality of TTS
synthesizers are also increasing steadily. Some applications of TTS systems are:-

- Aid to Handicapped,
- Talking books and toys,
- Educational Application and Entertainment,
- Voice portals and News readers,
- Telecommunication and multimedia,
- Dialogue systems, for example, enquiry for train schedule information or information about flight reservation.
- Voice enabled e-mail and Vocal monitoring,
- SMS to speech,
- Human-machine interaction,
- Location locators,
- Concept/content-to-speech (CTS), for example, weather forecasting.
- E-Governance-Land Records information over telephone, Election services such as polling center information, Mandi prices, Govt. policy information, Application tracking/monitoring, Information dispersal through digital mandi's, kiosks, etc.

III. GENERAL ARCHITECTURE OF TEXT TO SPEECH SYSTEM

The text to speech conversion is carried out with the processing of text normalization (text preprocessing), text analysis, syllabification, prosody generation and finally the speech production [1]. There are two components of general Text-to-speech system, namely, Natural Language Processing (NLP) component and Digital Signal Processing (DSP) component of a typical TTS synthesizer [2][3].

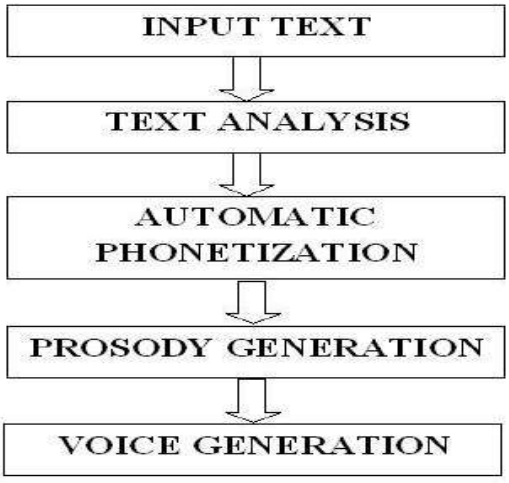

Fig. 1. General Architecture of Text-to-Speech System

A. NLP COMPONENT

A general NLP module can be seen as consisting of three major subcomponents [2]. The process of text analysis, text normalisation and prosody generation all come under Natural language processing component.

1) Input Text

The input text module is one in which user enter text in the text to speech system. User enters text through keyboard. Many system allows speech input also. This text is then send to text analysis module.

2) Text Analysis

The module step includes Text pre-processing where the inputted text is broken down into smallest unit i.e. tokens. It also identifies numbers, abbreviations, acronyms and idiomatic and transforms them into full text where so ever needed. In this module, all possible part of speech categories for each word is also proposed, on the basis of their spelling.

3) Automatic Phonetization

The Automatic Phonetization module (also known as Letter-To-Sound (LTS) module) is responsible for the automatic determination of the phonetic transcription of the incoming text. The two popular ways of implementing an Automatic Phonetization module are. Dictionary-based solution that consist of storing a maximum of phonological knowledge into a lexicon. In this, a large dictionary containing all the words of a language and their correct pronunciations is stored in the database. Another approach is rule based approach that transfers most of the phonological competence of dictionaries into a set of letter-to-sound (or grapheme-to-phoneme) rules. In this approach pronunciation rules are applied to words to determine their pronunciations based on their spellings.

4) Prosody Generation

The term Prosody refers to certain properties of speech signal, which are related to audible challenges in pitch, duration, stress over the time ,loudness, syllable length etc .With a good control over these features, gender, age, emotions, and other features can be incorporated in the speech and very natural sounding speech can be modeled.

B. DSP COMPONENT

Speech generation is a part of digital processing system. Different TTS Synthesizers can be classified according to the type of synthesis technique that is used to synthesize the speech. The methods are usually classified into three groups:

1) Articulatory Synthesis

This method attempts to model the human speech production system directly and is thus, potentially the most satisfying method to produce high quality synthetic speech. Articulatory synthesizer generates speech by mathematically modeling the movement of articulators, e.g., lips, tongue, and jaws.

2) Formant Synthesis

This models the pole frequencies of speech signal or transfer function of vocal tract based on source-filter-model. Thus speech is generated by an acoustic-phonetic production model, based on formant of the vocal tract. The acoustic-phonetic parameters such as energy, pitch and resonance (formant) frequencies associated with speech and heuristic rules are used to derive the model.

3) Concatenative Synthesis

This uses different length pre-recorded samples derived from natural speech. Here, speech is generated by combining splices of pre-recorded natural speech. One of the most important aspects in concatenative synthesis is to find correct unit length. The selection is usually a trade-off between longer and shorter units. *Unit selection synthesis*, *Diphone synthesis*, *Domain-specific synthesis* are three main subtypes of concatenative synthesis.

IV. TEXT TO SPEECH SYSTEMS FOR INDIAN LANGUAGES

In India, the development of more and more innovative text-to-speech (TTS) system in different Indian languages has necessitated. Several institutions in India are working in the field of TTS for Indian languages. Some of the already developed TTS by various institutions are described below.

A.VAACHAK INDIAN LANGUAGE TEXT TO SPEECH SYSTEM

Vaachak[4] ,developed by **Prologix Software Solutions Pvt. Ltd. is the winner of the MANTHAN award 2005 – The best in e-Content and creativity.**VAACHAK is the first Text-to-Speech Software for Indian Languages, which effortlessly renders Devanagari text into clear, natural speech. Various applications built around Vaachak include an Innovative Indian language screen reader that can help visually impaired people access electronic information on computers easily.

1) Characteristics

The main characteristics of this system are as Follows:

- The first, high quality Indian Language Text to Speech Software for Indian Languages
- Cutting edge technology used to create life-like, natural sounding speech
- Currently supports Hindi - ongoing work for Indian English and 7 other major Indian languages
- Domain independence - no restrictions on vocabulary/ domain of text

- Multiple Male/ Female voices for different kinds of applications
- Large custom dictionary implementation to handle abbreviations, special pronunciations.
- Windows XP, Windows 2000, Windows NT, Windows 98/ 95, Linux compliant
- *Text Input:*
    - Supports **Romanised hindi** (Transliteration) input
    - Supports both **Unicode** and **ISCII Devanagiri** input
    - Support for Third party fonts and font families e.g. Akshar, APS, Akshara, ISM, Leap, Chanakya, Shusha, Shivaji, Kruti Series & popular fonts such as Agra, Krishna and Chandni
    - Use Rule based approach and facilitate to speak numbers as individual digits (phone numbers, etc.) and Indian Currency(Rupees, Paise), Arabic Number System (Crore, Lakh, etc.),Decimal digits.

B. DHVANI- INDIAN LANGUAGE TEXT-TO-SPEECH SYSTEM

DHVANI [5] [6] is the TTS effort of the **Simputer Trust.** The aim of this effort is to ensure that literacy and knowledge of English are not essential for using the Simputer. Using images in conjunction with voice output in local languages makes the Simputer accessible to a larger fraction of the Indian population. Currently, it has a phonetic-to-speech engine which is capable of generating intelligible speech from a suitable phonetic description in many Indian languages. In addition, it is capable of converting UTF-8 text in Hindi and Kannada to the phonetic description, and then speaking it out using the phonetic to- speech engine.

1) Characteristics

The main characteristics of this system are as follows:

- Dhvani is a Text To Speech System specially designed for Indian languages.
- This system has been developed by Simputer trust headed by Dr. Ramesh Hariharan at Indian Institute of Science Bangalore in year 2000.
- Its sound database has been developed at IISC Bangalore.
- It is based on phoneme concatenation technology
- Currently this system supports Hindi, Kannada, Marathi, Malayalam, Gujarati, Bengali, Telugu, Panjabi, Tamil and Oriya.
- It has different modules for every language.
- All sound files stored in the database are *'gsm'* compressed files.
- In this system each language requires a Unicode parser.
- It is an attempt in India to cover all Indian languages under a single framework.
- It uses GNU/Linux Platform
- It is based on the observation that a direct grapheme to phoneme mapping exits for all Indian languages in general.
- A UTF to phonetic conversion system converts the Text to a phonetic script- Dhvani specific.

C. SHRUTI- AN EMBEDDED TEXT-TO-SPEECH SYSTEM FOR INDIAN LANGUAGES

An Indian language TTS synthesizer (named SHRUTI) that accepts text inputs in two Indian languages namely Hindi and Bengali and produces near natural audio output has been developed at **IIT Kharagpur [7].** The synthesizer runs on a Compaq iPaq PDA built around the Intel Strong Arm-1110 processor running Microsoft Pocket PC, a customized version of Microsoft's operating system WinCE for mobiles and other handheld devices. The synthesizer has also been ported to a Casio Cassioepeia built around a MIPS 124 processor running Pocket PC.

1) Characteristics

The main characteristics of this system are as Follows:

- This is the first text-to-speech system built specifically for two of the Indian languages, namely Bengali and Hindi.
- This system uses Concatenation Synthesis strstegy.
- The system it can be enhancement for other Indian languages depending on the user's requirements.
- For ease of use and portability, the system has been ported to two existing handheld platforms running two processor families, namely, the Compaq iPaq and the Casio Cassiopeia. These two versions of the synthesizer have been built, one which resides on the system memory and another which runs from a storage card.
- In this system, the waveform concatenation speech synthesis technique along with the ESOLA (Epoch Synchronous Overlap and Add) technique has been used as the basis for speech synthesis.
- It has Audio Qwerty Editor which is supported by an audio interface. This feature makes it very useful to the visually handicapped.
- It has KGP-TALK – THE TALKING WEB BROWSER which added various features include a talking
- Chat Messenger, a talking mail client, talking net sender, talking printing system and so on and so forth.

D. VANI- AN INDIAN LANGUAGE TEXT TO SPEECH SYNTHESIZER

Vani **[8] [9]** is a TTS synthesizer proposed by **IIT Mumbai**. It is primarily developed for Hindi language. The approach is similar to concatenation synthesis, with phonemes as the basic unit. However, the phonemes are not selected from a database, but are generated from a more basic unit, which they call fract-phoneme in the case of vowels. The basic observation is that vowels look like a continuous repetition of these very small segment phonemes called fract-phonemes. Since fract-phonemes are very small in size, they are a good choice for acting as a basic unit. The aim of Vani was to allow complete specification of speech, i.e., one can get the software to speak exactly what they want to.

1) Characteristics

The main characteristics of this system are as Follows:

- The major aspect of this whole project, was the introduction of the vTrans encoding scheme, which is an extension of iTrans encoding scheme.
- Vani generates speech from a given vTrans file.
- It is primarily developed for Hindi, but with minor modification could directly be modified for any language which is phonetic in nature.
- Vani is built using java to enable platform independence and uses Java Sound API (JSAPI).
- Concatenation Synthesis strategy is used.
- A major advantage of system is that parameters like emotions and prosody which make speech more human while generating intelligible speech.
- The Vani system can also sing if so desired. Also emotions can be expressed.
- For Schwa deletion algorithms for Hindi, Vani uses a rule-based algorithm [10].
- *It uses Concatenation Synthesis gives little control to the users to create arbitrary variations in the speech produced*

E. HP LABS INDIA TEXT-TO-SPEECH SYSTEM

HP Labs, India have developed a Hindi TTS synthesizer based on Festival framework[11].This effort is a part of the Local Language Speech Technology Initiative (LLSTI),which facilitates collaboration between motivated groups around the world, by enabling sharing of tools, expertise, support and training for TTS development in local languages.

1) Characteristics

The main characteristics of this system are as Follows:

- The Festival framework is chosen for developing the Hindi TTS system.
- Grapheme-to-Phoneme (G2P) converter required for the development of a good quality Hindi Text-to-Speech (TTS) system.
- The system consists of a rule processing engine which is language independent.
- A generic G2P converter has been developed at HP Labs India as part of the LLSTI (Local Language Speech Technology Initiative) initiative for rapid development of TTS synthesizers in any language.
- Language specific information is fed into the system in the form of lexicon, rules and mapping.
- Concatenation Synthesis strategy is used.
- ***This system has Grapheme to Phoneme conversion engine,* which** is a language independent engine requires language dependent information in the form of lexicon, rules and mapping.
- It follows the concatenative synthesis approach to use large databases of phonetically and prosodically varied speech, thereby minimizing the degradation caused by pitch and time scale modifications to match the target specification and to minimize the concatenation discontinuities at segment boundaries.

F. MATRUBHASHA – AN INTEGRATED SPEECH FRAMEWORK FOR INDIAN LANGUAGES

Matrubhasha is introduced by **C-DAC Bangalore**, as a part of the digital divide bridging activities [12]. It was undertaken with the intention of making end user applications speak and listen to the masses in any Indian language that they are comfortable to communicate in. The Matrubhasha project is an activity of the ICT Research and Training Centre (India) of Development Gateway Foundation.

1) Characteristics

The main characteristics of this system are as Follows:

- Matrubhasha is a Unicode and MBROLA based software solution for TTS synthesis and, CMU Sphinx based Speech Recognizer for Indian languages.
- One single engine and different language bases. By just using different language rule files, the same engine speaks different languages, and thus speaks multiple languages from the same document.
- This API can also be extended to create plug-ins to general purpose utilities like office products and internet browsers.
- Tools with a linguist friendly user interface which help the linguists to create language bases for any language and any dialect and create rules in the language base so as to bring out correct pronunciation by imposing those rules during conversion of written text to spoken phonemic form. These tools include Anuvaachak, Uchharak and Bhavna.
- The rule-base approach that is chosen instead of a lexicon-based approach is surely a compromise on naturalness, but in case of Matrubhasha it is a trade-

off between the robustness of the language modelling support and the human-sounding speech.

G. MBROLA: A SPEECH SYNTHESIZER PROGRAM. (IIT MADRAS)

Systems Development Laboratory, IIT Madras has come up with a speech enabled multilingual editor which supports text processing and speech generation for several Indian languages including Telugu. The speech is produced using the MBROLA speech engine.**MBROLA: A speech synthesizer program [13] is** used to produce speech output from the Indian language text dealt with by the application. The applications include:-

1.Multilingual editor.
2. A/ text reading program to read Indian language text.
3. Sound enhanced web browser (based on Lynx).
4. An interface program to work with Jaws for Dos under Win95.

1) Characteristics

The main characteristics of MBROLA are as Follows:

- MBROLA is very easy to work with on Windows as well as Linux platforms.
- The Mbrola system is not an application that is ready for use. It is a building block in a system for producing speech and hence one must use it in a computer program which can identify the phonemes to be used for speaking out a text string.
- MBROLA derives its basic strength from the fact that it is a piece of software that produces speech output from a list of phonemes. Thus, its operation is not specific to a language and one can get true multilingual output using the speech engine by feeding appropriate phonemes to the engine and indicating the language used for generating the phonemes.
- Since the databases required for Indian languages are not yet available for use with MBROLA, the IITM team had experimented with other available data bases where the phonemes are close to the phonemes of Indian languages. In this regard, Swedish database was used for generating the speech for Indian languages as the phonemes of Swedish are well suited to produce speech output in Indian Languages.

The Telecommunication and Computer Networking (TeNeT) Group, a coalition of 14 faculty members from the Electrical Engineering and Computer Science & Engineering Departments of IIT-Madras, has taken initiative for developing local language speech interface system. In this regard, they have worked with Festival to perform speech synthesis.
Their system has following features:

- Common phoneset for Hindi and Telugu, also usable for other Indian language.
- Diphone unit selection for synthesis.
- Data-driven prosody modeling using Classification and Regression Tree (CART).
- Concatenative synthesis technique is used to produce natural sounding speech.

H. TTS CONSORTIUM PROJECT FOR 6 INDIAN LANGUAGES

The Indian Government has **launched** Text-To- Speech system (TTS) computer software in six Indian languages namely: Hindi, Marathi, Bangla, Telugu, and Tamil & Malayalam. The focus of this project was to bring together the expertise across these organizations and provide a common platform and interface that can enable others to seamlessly integrate the synthesis systems into their products, and enhance the quality of TTS for Indian languages. **Technology Development for Indian Language (TDIL) Programme of the Department of Information Technology, under a consortium project** has developed this TTS systemhis consortium aims to integrate the TTS systems in screen readers such as Non Visual Desktop Access (NVDA), ORCA and Reading Aid for Visually Impaired (RAVI) [14].

Following are the TTS Consortium Partners:

IIT Madras (Consortia Leader)
IIIT Hyderabad
IIT Kharagpur
CDAC, Mumbai
CDAC, Thiruvananthapuram

1) Characteristics

The main characteristics of this system are as Follows:

- It Works with both for Windows & Linux It provides Good Voice Quality (Mean Opinion Score more than 3.0).
- Available in 6 Different Indian languages.
- It has also been integrated with Non Visual Desktop Access (NVDA) screen reader and Optical Character Recognition System (OCRA).
- This system is knowledge based systems.
- Techniques including Viterbi based forced-alignment using hidden Markov models, group delay based segmentation and hybrid techniques are investigated for obtaining accurate automatic segmentation of units[15]
- In unit selection, modeling of prosodic phrasing, duration and intonation is accomplished using machine learning models such as classification and regression tress (CART).
- The TTS systems are built within the FestVox voice building framework, which offers general tools for building unit selection synthesizers in new languages.

- This process is described in the following steps: Creation of lexicon, Grapheme-to-phoneme, Optimal text selection, Text normalization, Recording of speech database:, Building a baseline system, Fine tuning the TTS system.
- This TTS is available in two voices.
- Hindi and Tamil module was handled by IIT-Madras, Marathi, Telgu, Bengali, and Malayalam modules were handled by CDAC-Mumbai, IIIT-Hyderabad, IIT- Kharagpur and C-DAC Trivandrum respectively.

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I. ESPEAK TEXT TO SPEECH SYNTHESIZER

eSpeak[17] is a compact open source text-to-speech synthesizer for English and other languages, for Linux and Windows. eSpeak is available as a command line program and a shared library version. A SAPI5 version for Windows, so it can be used with screen-readers and other programs that support the Windows SAPI5 interface. Projects using eSpeak include NVDA, Ubuntu and OLPC, and it has also been used by Google Translate[18].

1) Characteristics

The main characteristics of this are as Follows [19]:

- It supports Speech Synthesis Markup Language (SSML) and HTML too.
- The eSpeak speech synthesizer supports several indian languages, includes Hindi, Kannada, Punjabi, Tamil and English. Beside that it support many other non Indian languages like Afrikaans, Albanian, Aragonese, Armenian, Bulgarian, Cantonese, Catalan, Croatian, Czech, Danish, Dutch, English, Esperanto, Estonian, Farsi, Finnish, French, Georgian, German, Greek, Hungarian, Icelandic, Indonesian, Irish, Italian, Kurdish, Latvian, Lithuanian, Lojban, Macedonian, Malaysian, Malayalam, Mandarin, Nepalese, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian, Slovak, Spanish, Swahili, Swedish, Turkish, Vietnamese, Welsh.
- Can produce speech output as a WAV file.
- Written in C.
- Can translate text into phoneme codes, so it could be adapted as a front end for another speech synthesis engine.
- Compact size. The program and its data, including many languages, totals about 2 Mbytes.
- Can be used as a front-end to MBROLA diphone voices.
- Development tools are available for producing and tuning phoneme data.
- eSpeak converts text to phonemes with pitch and length information.
- eSpeak uses an ASCII representation of phoneme names which is loosely based on the Kirshenbaum (**Kirshenbaum**, also called **ASCII-IPA** or **erkIPA**, is a system used to represent the International Phonetic Alphabet (IPA) in ASCII.) system.
- eSpeak uses a "formant synthesis" method. This allows many languages to be provided in a small size.
- The speech is clear, and can be used at high speeds.
- Phonetic representations can be included within text input by including them within double square-brackets. For example: espeak -v en "Hello [[w3:ld]]" will say "Hello world" in English.

V. CONCLUSIONS

Most of the existing TTS synthesizers produce an acceptable level of intelligibility, but the naturalness dimension, the ability to control expressivities, speech style and pseudo-speaker identity are still now the areas of concern and need improvements. However, users' demands vary to a large extent according to the field of application: general public applications such as telephonic information retrieval need maximal realism and naturalness, whereas some applications involving professionals (process or vehicle control) or highly motivated persons (visually impaired) demand intelligibility with the highest priority. TTS development is going on in several other institutions, include- Language Technologies Research Centre (LTRC), IIIT Hyderabad, Hyderabad central university (HCU), IISc Bangalore, Utkal University, TIFR Mumbai, CDAC-Noida, Thapar University, Patiala, Punjab, Advanced Centre for Technical Development of Punjabi Language Literature and Culture, Punjabi University, Patiala. Mapping rules to produce sound and phonetic base of all Indian languages are almost straight forward. Hence, a common TTS can be supposed for all Indian languages.

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Education and Economic Development

Mandeep Kaur
Assistant Professor
GNCEW Kapurthala
Punjab, India

Sapna Saini
Assistant Professor
GNCEW Kapurthala
Punjab, India

Abstract: Education in every sense is one of the key and foremost driving force behind the economic development of any country. Actually education is an important element for the strong foundation of economic development. Once this strong foundation is laid, then they both, education and economic development symbiotically help each other to progress by many folds. This paper highlights the critical aspects of education that by one or the other means drives the economic development of any state or country. Paper also emphasizes that basically an education is investment that not only benefits the economic development but leads to the prosperity of the whole society.

Keywords – Economic Development, Human Capital, Productive Activity

INTRODUCTION

The economic development aims to promote mankind and achieve a better level of welfare and prosperity, and human development is the real indicator of the advancement and promotion of societies, that is the advancement of societies is not measured anymore of how much a society have of knowledge and technological skills . Education become essential to manage development, enhance production and develop innovation. Education is considered one of the most important aspects of the development of human resources

MEANING OF EDUCATION

Education means to develop the knowledge, skill or character of students. Eric hoofer "The central task of education is to implant will and facility for learning; it should produce not learned but learning people. The purpose of education is to teach a student how to live his life-by developing his mind and equipping him/her to deal with reality.

MEANING OF ECONOMIC DEVELOPMENT

Economic development generally refers to the sustained, concerted actions of policymakers and communities that promote the standard of living and economic health of a specific area. Economic development can also be referred to as the quantitative and qualitative changes in the economy. Such actions can involve multiple areas including development of human capital, critical infrastructure, regional competitiveness, environmental sustainability, social inclusion health safety, literacy and other initiatives.

BENEFITS OF EDUCATION

- Benefits to the individual
- Improves health and nutrition
- Increases productivity and earnings
- Reduces inequality
- Benefits to society
- Poverty –reducing effects
- Contributes to democratization
- Drives economic competitiveness
- Promotes peace and stability

ECONOMIC TASKS OF EDUCATION

a) Setting up qualified and educated working human power.
b) Ensuring the possibility of the use research, apply its results in general life.
c) Increasing the human work effectiveness.

EDUCATION AND DEVELOPMENT

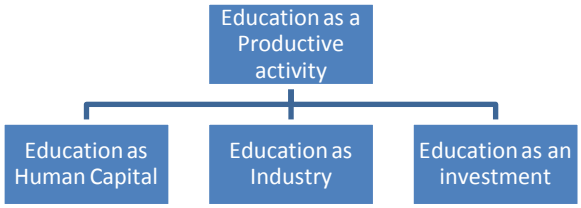
Education is central to development, it empowers people and strengthens nations. It is a powerful "equalizer 'opening doors to all lift themselves out of the poverty Education also promotes economic growth, national productivity and innovation and values of democracy and social cohesion.

RELATION B/W EDUCATION AND ECONOMIC DEVELOPMENT

Education also rebuilds ideals and opinions to cope with the social changes resulted from development process.Education does contribute indirectly by producing dynamic , capable and efficient workers who promote more and more economic development in all areas and spheres of growth .In other words, instead of producing goods directly, education improves man power engaged in production and this improvement achieves higher and higher targets of growth and production in all areas and aspects of industrial development and economic prosperity.

ROLE OF EDUCATION IN ECONOMIC DEVELOPMENT

The role of education as a major drives of economic development is well established and this role will increase as further changes in technology, globalization and demographics impacts any country or state. To remain competitive in light of these changes, regions will need to improve productivity and adopt an innovative spirit .Education plays a major role in achieving economic development through the following:



EDUCATION AS A PRODUCTIVE ACTIVITY

Education does contribute indirectly by producing dynamic capable and efficient workers who promote more and economic development in all areas and spheres of growth. In other words, instead of producing goods directly, education improves man power, engaged in production and this improvement achieves higher and higher targets of growth.

EDUCATION AS HUMAN CAPITAL

Capital is anything that involves costs but yields a steam of income over time. It is the sky to the production of income and consequently to economic growth development. It consists of largely in its power to produce or accumulate income immediately or in the long run. H.G. Johnson Classified capital in the following four categories:

- Capital goods
- Human Capital
- Social Capital
- Intellectual Capital

Education is Human Capital as it directly provides the quality and capability of human beings. It contributes to intellectual and party at least makes social capital . Economics consider human beings as a form of capital due to following reasons:

- These are costs associated with development and formation of human capital.
- The costs of skilled human resources add incrementally to the national product.
- Expenditure on human resources which increases the national product also increases the national wealth.

Factors affecting human capital formation are investment in formal education , improved health , on the job training , manpower rehabilitation ,migration etc. formal education raises the economic vales of the human capital by raising the future earning power and current assert value beings.

EDUCATION AS INDUSTRY

A country's government spends its gross national income on different sectors of the economy such as agriculture industry and education every year expecting more returns than the previous year. The share for education is increasing every year in both developed and developed economics.

Thus education is indeed a growth of industry which provides employment and services needed by the total economy. Moreover, education produces non-material goods which satisfy human wants. The education industry consists of schools, colleges and universities. Teachers and buildings are the inputs and students are outputs. In 2003, UNESCO distinguished among schooling, vocational training and tertiary education in the national content and foreign education in the international context.

EDUCATION AS AN INVESTMENT

As an investment its returns are compounded in the form of developed personalities, thoughts, behaviour and resourceful citizens in the society. Education is cent percent investment with huge returns and massive growth in human resources. Education yields knowledge, attitudes, values, skills, job, money, happiness and peace. Education can be handed over to the next generation, making them disciplined and well developed human being. Thus it is an investment. Primary education inculcates in the would be adults the capacity to acquire skill and cultivates the proper attitude to work. The harmonious development of head, hand, and heart will produce integrated personalities, who are sure to be assets to the economic progress. The secondary stage of education is terminal for the in majority, who enter work-a-day world and preparatory for few, who enter the portals of universities and

higher educational institutions. If school graduates have to lay their useful role in the in the economic development, their education should be diversified and vocationalised in conformity with their ability and aptitude so as to fit them into our complex society. Much of the economic waste will be avoided if these secondary and higher secondary school students play their role with their suitable talents of employability and productivity. The higher education has crucial role in the national development. Today we have more than fifty lakh students in higher education in our country. The relevance of their education, training and personality build has to be judged by the substantial contribution they are capable of making in the growth-rate and well as in striving for excellence in standards.

CONCLUSION

Education in every sense is one of the fundamental factors of development. No economic development is possible without good education. It enriches people understanding of themselves and world. It improves the quality of their lives and leads to broad social benefits to individuals and society.

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D-Link Institute.

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Approved by AICTE, New Delhi & Affiliated to PTU, Jalandhar

Address for Correspondence

Amritsar College of Engineering & Technology

12 Km Stone, Amritsar-Jalandhar G.T. Road, Amritsar-143001,(Pb.) INDIA

Phone : 0183-5069532,5069530,5010429 Fax : 0183-5069535

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