Edited Book

Advance Research in Computer Science & Electronics

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- Dr.(Mrs) Archana V. Potnurwar
- Dr.(Mrs) Archana V. Dehankar
- Dr. Snehlata Dongre
- Dr. (Mrs) Archana P. Khandait
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On

Advance Research in Computer Science & Electronics

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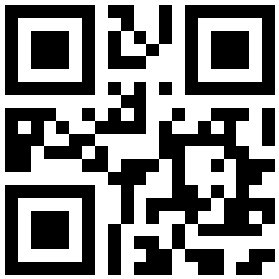

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Study of Execution Period in Relational Database

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Abstract-*Thesizeofdatainvarioustypesofdatabasesareincreasingrapidly.Atthesametime, the performances of query against the sesame data bases are degrading. There are two methods to implement a two-dimension relational database table onto a one-dimensional storage interface: store the table row-by-row, or store the table column-by-column. Traditionally, database system implementations and research have focused on the row-by row data layout, since it performs best on the most common application for database systems: business transactional data processing. However, there are a set of emerging applications for database systems for which the row-by-row layout performs poorly. The need for Column-oriented database arose from the need of business intelligence needed for efficient decision making where traditional Row-oriented database gives poor performance. We know that Business organizations have to handle large amount of data in database and extract meaningful information from that database for efficient decision making which is commonly termed as Business Intelligence. Extracting meaningful information from raw data is term as data mining. In this paper, we study the poor performance of row-by-row data layout for these emerging applications, and evaluate the column-by-column data layout opportunity as a solution to this problem. The solution will be analyzed and represented by graph .At the end of the paper we will see the performance of Oracle10g.*

Keywords*- Databases, Database Systems, Row Store, Column Store, Performance Tuning*

INTRODUCTION

Whenever we say relational data, most obvious interpretation is a table which has attribute as one dimension and entity as another. We imagine a table stored on some storage media in such a 2- dimensional form. But this is just a concept for better understanding of any relation stored some storage media. At physical level, it is not possible to store data like the way we imagine. Therefore, Data are physically stored consecutively one after another in 1-dimensional way. While storing in 1- dimensional manner we have 2 choices. We can either store the data entity-by-entity or attribute-by-attribute. This leads to two kinds of databases Row-Store and Column-Store respectively.

Rows v/s Columns

The question of which type of database system is better depends on the kind of query workloads. If after data insertion, updation, deletions are going to be more and if accessing entire tuples is a need then Row-Stores are the best. They are the most common ones for business transactional data processing. For example, a bank uses databases to store information of its customers. Some customer A might want to transfer money to the account of customer B. Here, Customer A and B are entities. Here a simple updation has to be done in accounts of A and B both which is deduct amount x from account of A and credit amount x to account of B. As it can be seen information will be required by the bank from DBMS on the granularity of an entity here, Row- Store which stores data entity-by-entity will be most obvious choice out of the two database systems we studied. If we consider another query, customers shopping for more than Rs. 5000 every month,(Owner thinks if additional benefits are given to these customers then they might visit the shop more often). This query needs only customer name, amount spent and date attributes from the entire relation. Clearly, rest 10-15 attributes will be irrelevant (assuming dataset is very large). This query will help to gain insight into

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the data and it is not business critical situation like in transactional processing. For such kind of queries Column-Stores perform better since attributes are stored separately so irrelevant

Attributes need not be accessed saving a lot of processing time. Suppose if queries are going to be Read queries which will helpto gain insight into the data, Column-Stores will certainly perform better. Therefore, when it comes to analytical applications or decision making applications, column-stores prove to be the best [3]. Business organizations have to handle large amount of data and extract meaningful information from that data for efficient decision making which is commonly termed as Business Intelligence.

Again there are some optimizations possible with Column-Stores and are not possible with Row-Stores which can improve performance of Column-Stores compared Row-Stores significantly [2, 3]. The rest and the most important is Compression [8]. As data are stored column-by-column, compression can be easily applied on a column. This is possible because a column has a data type in which similar data is stored. Like mobile number in India will always contain 10 digits. If one could store data is compressed format, performing column extraction will become very easy. Next is block processing, where multiple tuples from a column are extracted and are passed as a block from one operator to another. There is one more optimization called as Late Materialization where tuples construction i.e. joining of columns is performed as late as possible. These optimizations are specific to Column-Storesbecause Row-Stores do not have required properties to apply these optimizations.

II -BACKGROUND AND RELATED WORK

A relational database management system provides represents data into a two-dimensional table, which consist of columns and rows. Row-based systems are not efficient at performing operations that apply to the entire data set, as opposed to a specific record [2,3,4].
In our work, we see that previously there are various approaches are implemented for Column-Store database and I found that Vertical Partitioning is most preferred of all due to less complexity and no limitations on the kind of possible read queries.
In this section we are showing that what are the disadvantages of row oriented database and how we can improve the performanceof sql query with column oriented database techniques.

Merit of column store

- Improved bandwidth utilization: In a column-store only those attribute that is accessed by a query needs to be read- off disk (or from memory into cache). In a row store surrounding attributes also need to read since the attribute is generally smaller than the smallest granularity in which datacan be accessed.
- Improved data compression: Storing data from the same attribute domain increases locality and thus data compression ratio (especially if the attribute is sorted). Bandwidth requirements are further reduced when transferring compressed data [1,8]
- Improved code pipelining: Attribute data can be iterated through directly without indirection through a tuple interface. This results in high IPC (instructions per cycle) efficiency, and code that can take advantage of the super-scalar properties of modern CPUs [4, 5].
- Improved cache locality: A cache line also tends to be largerthan a tuple attribute, so cache lines may contain irrelevant surrounding attributes in a row-store. This wastes space in the cache and reduces hit rates [6].

Demerit of column-stores:

- Increased disk seek time: Disk seeks between each block read might be needed as multiple columns are read in parallel. However, if large disk pre-fetches are used, this cost can be kept small[8]
- Increased cost of inserts: Column-stores perform poorly for insert queries since multiple distinct locations on disk have to be updated for each inserted tuple (one for each attribute). This cost can be alleviated if inserts are done in bulk.
- Increased tuple reconstruction costs: In order for column-stores to offer a standards-compliant relational database interface (e.g., ODBC, JDBC, etc.), they must at some point in a query plan stitch values

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from multiple columns together into a row-store style tuple to be output from the database. Although this can be done in memory, the CPU cost of this operation can be significant. In many cases, reconstruction costs can be kept to a minimum by delaying construction to the endof the query plan [9].

III -IMPLEMENTATION

Our goal is to design column oriented databases and to propose new ideas for performance optimization. One approach of implementing column oriented database is to vertically partition a traditional row oriented database. Tables in the row store are broken up into multiple two column tables consisting of (table key, attribute) pairs. There is one two column tables for each attribute in the original table. When a query is issued, only those thin attribute-tables relevant for a particular query need to be accessed-the other tables can be ignored. These tables are joinedon table key to create projection of original table containing only those columns necessary to answer a query, and then execution proceeds as normal. The smaller the percentage the columns from table that need to be accessed to answer a query the better the relative performance with a row store will be.

In a fully vertically partitioned approach, some mechanism is needed to connect fields from the same row to together (column stores typically matchup records implicitly by storing columns in the same order, but such optimization are not available in a row store). To accomplish this, the simplest approach is to add an integer "position" column to every table- this is often preferable to use the primary key because primary keys can be large and are sometimes composite. This approach creates one physical tablefor each column in the logical schema. By the example given below the conversion of a row by row database to column orienteddatabase can be shown. For performance analysis of row oriented database vs column oriented database there is a need of large row-oriented database. Using this large row-oriented database column-oriented database can be derived by vertical partitioning. Analysis of performance will be based on execution time of sql queries on the row oriented database and column oriented respectively. In this paper Oracle10g is taken as database software.

There are two table in the database name Account_ Table (Branch Name, Account Number, Balance)) and Depositor Table (Cust_Name,Account_Number). Initially both tables contains million records each. By vertical partitioning onthe given tables we derived new tables and a separate databasehas been made.
The tables are
Account_X(SNO,Branch_Name), **Account**_Y(SNO,Account_Number), Account_Z(SNO,Balance), Depo_1(SNO Cust_Name) and Depo_2 (SNO,Account_Number),respectively.
Now we have take the internal join of any two or three table according to requirement queries will execute on this database and the performance will analyzed on the basis of query execution time(in sec).

IV- ANALYSIS OF PERFORMANCE

Performance will be analyzed on software Oracle 10 g .
Let us see what difference does this approach make in the queryplan of a
SELECT query which is as follows:

For row store

```
select count (distinct cust_ name) from Depositor, Account where Depositor . account _number = Account
. account _number and Branch_ name = 'brighton' group by branch_name;
```

For column store

```
select count ( distinct cust_name) from depo_1, Account_X where depo_1.srno = Account_X.srno and
Branch_name='brighton'
group by Branch_name;
```

In this SELECT query, Depo_1.srno , Account _X.srno and Branch_Name are predicates. Predicate is a attribute present in a query on which some condition is applied. Also, Cust_name is non-predicates. Non-predicate is an attribute present in the query which is tobe projected. Hence, these attributes are considered while taking natural join for corresponding tables. Here, two natural joins of internal tables will be taken.

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One will be for Depositor table (Cust_Name and Account_Number) and another for Account table 1 (Account_Number and Branch_Name).

Now let us see the performance comparison of Row-

Store against Column- Store with the help of some sql queries with following result.

Table1: Experimental results for simple select query

Sequence of query execution	Execution Time in seconds For Row-Store	Execution Time in seconds For Column-Store
1	0.45	0.16
2	0.03	0.02
3	0.11	0.02
4	0.02	0.01
5	0.08	0.06
6	0.08	0.02
7	0.02	0.01
8	0.03	0.02
9	0.02	0.01
10	0.05	0.03

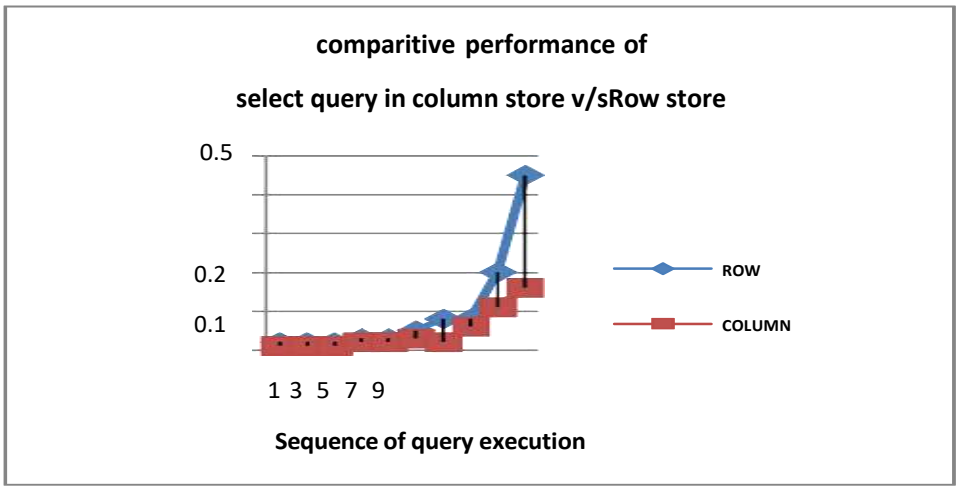

Figure1: Query Performance on Oracle10g database

By Fig it is clear that Column Oriented database performs better than Row-Oriented database at certain conditions on Oracle 10g.

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V –CONCLUSION

In our work, we investigated various approaches of implementation of Column-Store .The results show that performance of our Column-Store implementation is very high as compared to Row-Store in queries. Using Column-Stores only attributes which are present the select query as a predicate or non-predicate, are accessed which reduces execution time as compared to that in Row-Stores [8]. This concept is implemented for Column-Store implementation in oracle10g. We see that as number of columns accessed increases, the performance of Column-Store degrades which is as expected. This is because number of joins of internal tables increases in such a case which leads to increase in execution time.

Unlike row oriented databases write optimized nature column oriented databases will be read optimized. Vertical partitioning is a good approach for column oriented database design but this approach also introduces extra redundancy in the database. So instead of using primary key or serial no indexing can be used. In future I want to implement data directly into column manner in which write query can give better performance.

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Facial Identification System Using Viola Jones

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Abstract – *This paper presents a facial Identification system for automatically recognizing or verifying a human face from a digital image source. Face detection is performed using some most widely used methods including Knowledge-based method, Feature -based method, Template matching. Feature extraction techniques including Principal Component Analysis and Fisher Linear Discriminant Analysis (FLDA) has been used as pre-processing step for dimensionality reduction. Viola Jones presented in this work is a quick and robust method for face detection which is much faster than any other method and statistically significantly improves the accuracy.*

Keywords- *Principal Component Analysis(PCA), Fisher Linear Discriminant Analysis (FLDA, Viola-Jones, Feature Extraction, Pattern Matching, Face Detection System.*

INTRODUCTION

A facial Identification system is a computer application for automatically recognizing or verifying a human face from a digital image from a source. Face recognition is an extremely active field of research and there is a wide range of real-world applications. To track criminals and monitor for dangerous persons Facial recognition systems are plays an important role and it also uses in other applications. Human face has so many features and face recognition system extract those features of face from the image source or digital image. The person recognised based on these extracted features and then the system generate result in terms of non-identified and identified.

Face detection, Feature extraction and Facial recognition are the steps of face Recognition process. In digital image to find out whether the image exist human faces or not face detection methods are used. Face detection, as a significant feature of automatic face recognition system. With advancement of technologies there are various hardware and software are available that leads to high image qualities in almost every mobile devices. People do a lot of photography or snap and then upload them to social networks to share with their dear ones, friends and family members. Hence face detection plays an important role to examine or arrest the criminals and suspects. Regardless of color, size, position, and features face detection is based on locating and identifying a human face in a digital images. For Face detection there are so many Approaches. Viola and Jones proposed face detection which is most popular technique which is based on statistical methods.

To test the performance of our Face Recognition system on colour image, we have used database containing 20 still images. GUI detects the face and features in face. Here we use feature like left eye, right eye, nose, mouth. After feature detection these entire feature window extract individually and calculate their histogram. The histogram consists of the gray levels of images, that is, a graph indicating the number of times each gray level occurs in the image. Here we detect the face and extract them in a separated window. A user will be able to judge the whole tonal arrangement at a glance by looking at the histogram for a definite picture. Now days in many digital cameras are coming with picture histogram. We can recognise the face from database with the help of histogram of these entire

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features. For face detection in images there are so many approaches have been proposed, we discuss here some of them.

In this paper, the problem of face recognition has been attempted using different techniques. This algorithm and its comparison with the state-of-the-art Viola & Jones facedetector are discussed in the paper. Section II emphasizes on face detection method and their approaches. Section III includes proposed method and Section IV concludes the work.

FACE DETECTION SYSTEM

Face detection is a very hot topic in research application of pattern recognition and computer vision. It is generally applied in video surveillance, artificial intelligence, human-machine interaction, identity Identification, and so on [5]. If experienced with enough light and an uncomplicated background the accurateness of the single- face detection is higher than 92 percent with the frame-rate of 10 fps [6]. The computers, with an almost unlimited memory and computational speed and power, should conquer human's limitations [7]. Face recognitionis a appropriate subject in neural networks, pattern recognition, image processing, computer graphics and psychology [8]. Engineering started to show attention in face recognition in the 1960's. In 1960's Woodrow W. Bledsoe was the one of the first researcher on this subject, Bledsoe, along other researches, started Panoramic Research, Inc., in Palo Alto, California. Bledsoe, along with Helen Chan and Charles Bisson, worked on using computers to recognize human faces during 1964 and 1965, [9][10]. Kenade is the first one that developed a fully automated face recognition system in 1973.

A. Knowledge-based method

Knowledge-based methods extrapolate the human sympathetic of the structural characteristics of a face. From morphological facts knowledge-based rules are formalized.

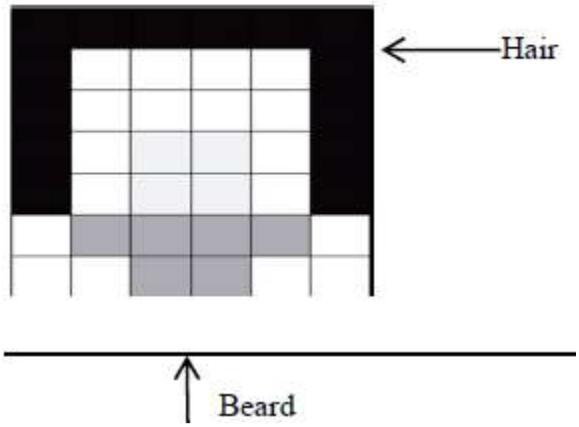

Figure1. *Structural characteristics are encoded as rules in different cells. The diagram depicts a Π-shaped hair region, a beard region and central homogenous nose and mouth region [3].*

Yang and Huang [11] divide a stereotypical face into a number of units or cells that must conform to specified descriptions as shown in Figure 3.1. In the figure the central region of the face, for instance, occupy 4 × 4 cells. This is referred to as a quartet. The bottom portion of this quartet occupies 4 cells (light gray color) and typically, this region of a face is homogeneously colored. Thus, a rule that applies here is "this part of the face has four cells with a basically uniform intensity".

B. Feature -based method

Feature-based methods are those that locating facial features at the start and then collecting their particular enclosing entities such as blobs, graphs, streaks and edges as a detected face in bottom-up manner. To identify particular shapes such as eyes, eyebrows and noses etc. edge detectors are used and between these shapes statistical models estimate distance.

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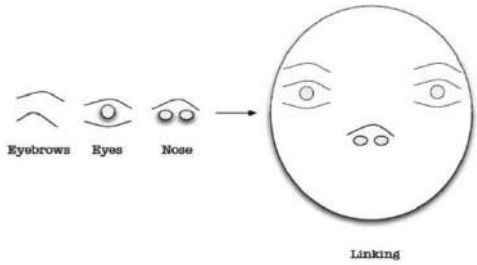

Figure 2. *Edge detection followed by linking and grouping to detect faces.*

Sirohey reasons that since the shape of a face is roughly elliptical, facial features can be combined in an ellipse fitting probe. Essentially, he uses a Canny Edge Detector1
[10] to identify all the edges. Feature-based approaches, ingeneral, perform poorly with blurred images.

C. Template matching

These methods attempt to define a face as a objective. In the given Figure 3. each region is averaged using a gray scale window. As faces in an input image can occur at many scales, the gray scale template is probed for allpossible regions of the input image at different scales to detect faces. Some authors propose a generic deformable template based on an energy minimization function. The energy function is defined by peaks, edges and valleys corresponding to a feature.

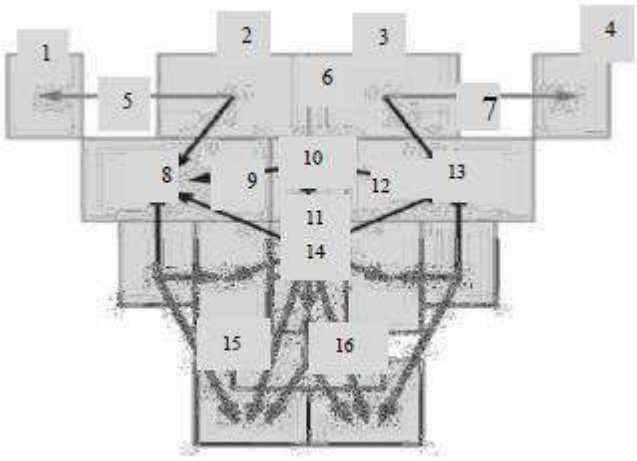

Figure 3. A division of a stereotypical face into 16 regions of interest.

Feature Extraction

Principal Component Analysis

PCA, also known as Karhunen-Lo`eve transformation [13], is a linear transformation which captures the variance of the input data. The coordinate system in which the data resides is rotated by PCA, so that the first-axis is parallelto the highest variance in the data (in a one-dimension projection). The remaining axes can be explained one atthe time as being parallel to the highest variance of the data, while all axes are constrained to be orthogonal to all previous found axes. PCA selects eigenvectors which provide best representation of the overall sample distribution. This is used to remove redundancy and compress data.

Fisher Linear Discriminant Analysis

Fisher Linear Discriminant Analysis (FLDA), also known as Canonical Discriminant Analysis is like PCA, a linear transformation [26]. Unlike PCA, FLDA is a supervised method, which implies that all training-data samples must be associated (manually) with a class. FLDA maximizes the between-class variance as well as minimizes the within-class variance.

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PROPOSED METHOD

In proposed method system consists of various steps: face detection, feature extraction, and face recognition. There is a database of features of face images which is using for recognition.
From the images of the testers database was formed. 200 images are stored in a database, in 20 different subjects each subject contains 10 images. No restrictions were imposed on the expression of the subject and subjects were asked to face the camera. Only limited side movement was tolerated. A number of the subjects had a beard and others were wearing glasses. The images for some subjects were taken at different times, facial expressions (closed or open eyes, smiling or not smiling), varying lighting, facial details and head pose.
For testing the whole database, the faces used in training, testing and recognition are changed and the recognition performance is given for whole database.

FACE DETECTION

In digital images Face detection is the procedure that determines the sizes and locations of human faces. It ignores anything else and detects facial features only. A proposed method used here is Viola-jones algorithm

Viola–Jones

Paul Viola and Michael Jones presented a quick and robust method for face detection which is 15 times faster than any method at the time of release with 97% accuracy. The method relies on the use of simple Haar-like features that are evaluated quickly through the use of a new image representation. On the bases of "Integral Image" it generates a huge set of features and to decrease the over- complete set the boosting algorithm AdaBoost is used and to provides for strong and quick interferences the introduction of a degenerative tree of the boosted classifiers is used. The detector is applied in a scanning manner and used on gray-scale images, the scanned window that is applied can also be scaled, as well as the features evaluated. Paul Viola and Michael Jones in 2001 proposed a first object detection framework to present real time competitive object detection[14].
Even though it can be skilled to detect a variety of object classes, it was motivated mainly by the difficulty of face detection. The Viola-Jones algorithm is implemented in OpenCV as cvHaarDetectObjects(). On the bases of Haar wavelets Viola and Jones features are used. These classifiers are single square waves (one low interval and one high interval). A square wave is a couple of adjacent rectangles - one dark and one light, In two dimensions.

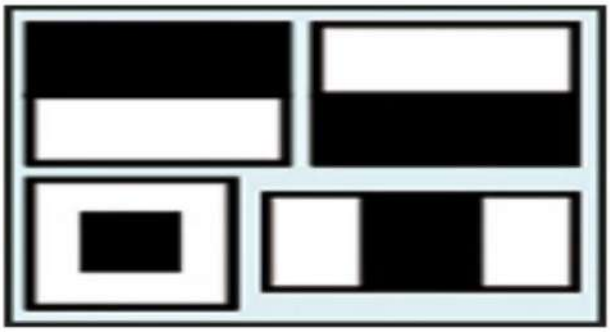

Figure 4. Different Haar classifiers used in Viola-jones

The diagram represents above are not true Haar wavelets in Figure 4. For visual object detection these feature rectangle combinations are for visual recognition tasks they are much better suited.

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Figure 5. Rectangular features over a face[14].

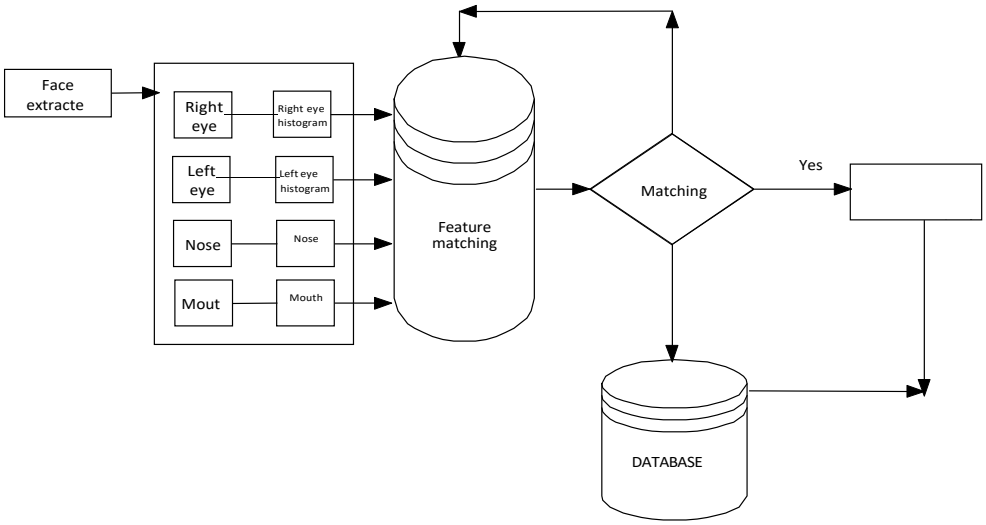

Figure 6. Step in Face recognition using featured histogram

Viola and Jones used a method called an Integral Image to conclude the occurrence or nonexistence of hundreds of Haar features at every image location and at a number of scales efficiently. In this case, the integral value for every pixel is the sum of all the pixels above it and to its left. With a few integer operations per pixel, starting from the top left and traversing to the right and down the entire image can be integrated through this process.

A machine-learning method used by Viola and Jones called AdaBoost was used to set threshold levels and select the specific Haar features. To create one "strong" classifier AdaBoost combines many “weak” classifiers.

For classifying image regions, a filter chain is a combined series of classifiers which is efficient. With a quite small number of weak classifiers, each filter is a separate AdaBoost classifier.

I. Implementation and Result Analysis

The main functions of the program are shown by the initial state of the program. The menu contains but tons for the loading of database from the file, the training of database images, the Face detection, the Face Recognition and the button for Exit the application. This GUI is shown in figure 6. Load database button load all the images and show the image in list box.

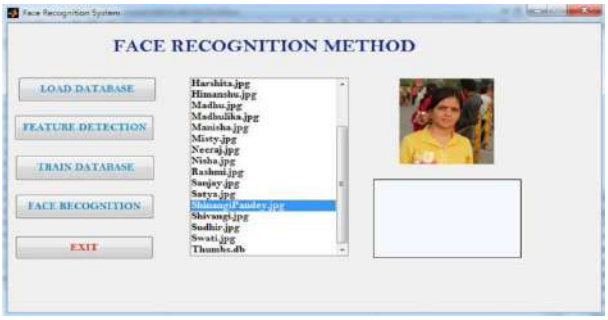

Figure 7. Main Menu GUI

Face detection button detect the face part and extracted the entire feature with their histogram. Train button is use for training of data and save all the features in a feature database. Face recognition button match the feature with the database and recognise the person.

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FACE DETECTION

Face Detection is the first option on the main menu. In real time images this part of application is able to find the faces from a camera. It's done automatically. A rectangle of red colour appears on the windows which is surrounding the face when the face detection is done. As such, they bear some resemblance to Haar basis functions, which have been used previously in the realm of image- based object detection.

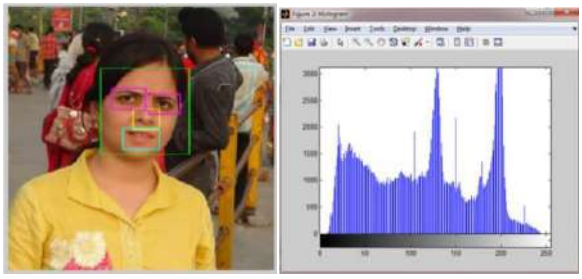

Figure 8. Detected face and their histogram

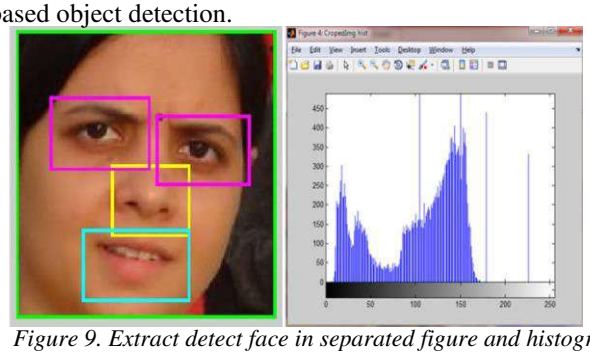

Figure 9. Extract detect face in separated figure and histogram

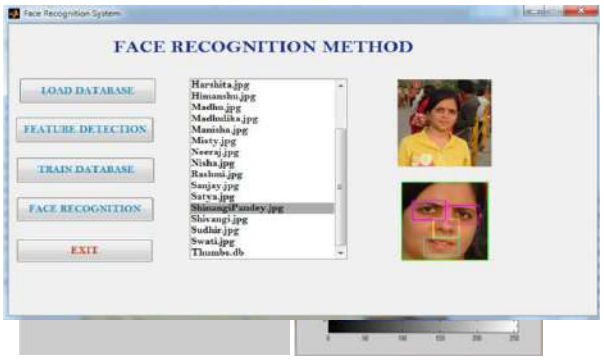

Figure 12. Extract left eye from image and histogram (Female)

Figure 11. Extract right eye from image and histogram (Female)

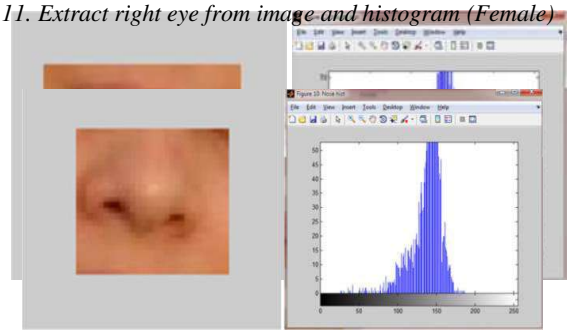

Figure 13. Extract nose from image and histogram (Female)

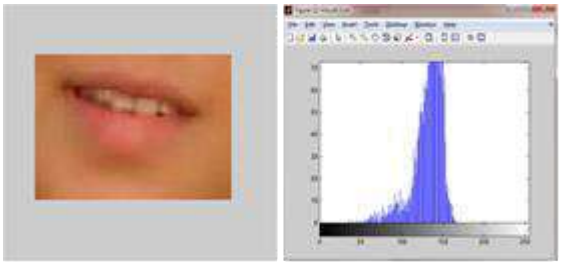

Figure 14. Extract mouth from image and histogram (Female)

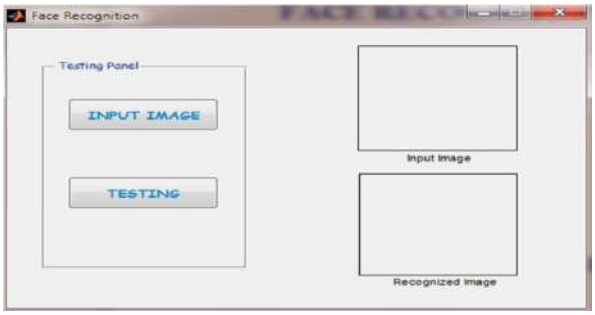

Figure 15. Face recognition GUI

Figure 16. Recognize image from database (Female)

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FEATURE EXTRACTION

Feature extraction is the task of reducing the high dimensional training data to a set of features to investigate characteristics of the data.

Here features of input image are extracted such as eye, nose and mouth and calculate their histogram for recognition phase.

These all extracted features of input image are matched with the feature database one by one, in a nested loop and have to decide if the person is belongs to the database or not. Here a female image is use for detection and her facial feature like eye, nose, mouth are extracted in a new figure window.

FACE RECOGNITION

The next options of the main menu dedicated to the Face Recognition. This button appears a new GUI to recognize With the database of previously saved images the face recognition works. The database is created and where the faces of different persons were identified and complete name were given in this part of program

The application took 10 images of the subjects, and for thelater use of the recognition process it trained the images. The database was architecture in a very simple and easyway; it is based on processed histogram method.

CONCLUSION AND FUTURE WORK

In this paper some most widely used face detection techniques has been evaluated over dataset to determine their accuracies in terms of overall accuracies using Violla-jones, and Some feature extraction techniques like Principal Component analysis (PCA) and Fisher Linear Discriminant Analysis (FLDA) are also used for dimensionality reduction.

The Viola-jones and computer vision success rates were given while for face detection, the success rate was different for different images depending on the external factors. The overall success rate was 97%. Even thoughthe aim of the study was completed, there are still a lot of possibilities for future development. Image Processing Toolbox implements many functions that were not used in my application. Among them there is a group of morphological operations such as dilation, erosion, morphological opening and closing, filling certain areas and more. IPT also provides couple of methods of a thresholding.

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Study of Miscellaneous Soft Computation Technologies in Mobile Ad-Hoc Area Network

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Abstract – *Mobile Ad-hoc Network is a collection of mobile nodes that dynamically create a wireless network amongst them without using any pre-defined environments. In such an environment, it may be necessary for one mobile host to enlist the aid of other hosts in forwarding a packet to its destination, due to the limited range of each mobile host's wireless transmissions. In any network, Quality of Service is the basic requirement and when we talk about the MANET this is the highly constraint requirement of the user. Mobile ADHOC Networks (MANET) the mobile transceivers or sensors are randomly deployed in the sensor field which brings the problem of coverage for all or some of the nodes. As the coverage problem can increase overall effective distance of all nodes from the sensor which further affects overall throughput & power required by the system. It is a unique problem and in maximizing coverage, the sensors need to be placed in a position such that the sensing capability of the network is fully utilized to ensure high quality of service. Neural Networks (NNs) promise solutions to such complicated problems, they have been used successfully in various practical applications. This network uses two different types of protocols. They are proactive protocol and reactive protocol. Proactive protocol maintains routing table information. Reactive protocol is a path between source and destination and also called as on-demand protocol. Genetic algorithm (GA) is used to find the optimal path between the source and destination nodes. Fuzzy logic is proposed which having low communication overhead and storage requirements.*

Keywords- *MANET's, Routing Protocol, Genetic Algorithm, Neural Network, Fuzzy Logic..*

INTRODUCTION

A MANET is a type of ad hoc network that can change locations and configure itself on the fly. Because MANET's are mobile, they use wireless connections to connect to various networks. Each device in a MANET is free to move independently in any direction, and will therefore change its links to other devices frequently. Each nodes must forward traffic unrelated to its own use, and therefore be arouter. The primary challenge in building a MANET is equipping each device to continuously maintain the information required to properly route traffic. A Mobile Ad-Hoc Network is an ad-hoc network but an ad-hoc network is not a MANET. It is also called a mesh- network.

The set of applications for MANETs is diverse, ranging from small, static networks that are constrainedby power sources, to large-scale, mobile, highly dynamic networks. The design of network protocols for these networks is a complex issue. Regardless of the application, MANETs need efficient distributed algorithms to determine network organization, link scheduling, and routing. However, determining viable routing paths and delivering messages in a decentralized environment where network topology fluctuates is not a well-defined problem. While the shortest path (based on a given cost function) from a source to a destination in a static network is usually the optimal route, this idea is not easily extended to MANETs. Factors such as variable wireless link quality, propagation path loss, fading, multiuser interference, power expended, and topological changes, become relevant issues. The network should be able to adaptively alter the routing paths to alleviate any of these effects. Moreover, in a military environment, preservation of security, latency, reliability, intentional jamming, and recovery from failure are significant concerns. Military networks are designed to maintain a low probability of intercept and/or a low probability of detection. Hence, nodes prefer to radiate as little power as necessary and

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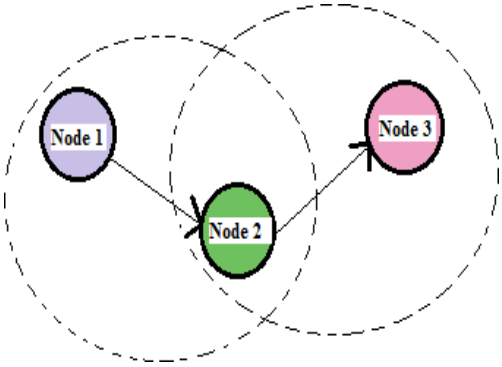
transmit as infrequently as possible, thus decreasing the probability of detection or interception. A lapse in any of these requirements may degrade the performance and dependability of the network.

MANET node can be used for monitoring heat, temperature, humidity, intrusion detection etc. Major challenge for MANET is to manage the energy constraint of nodes that form the network. For multimedia traffic delay and energy parameters are sensitive in network. Hence Quality of Service support can be achieved for an efficient routing and establish effective path between source and destination with negligible end to end delay.

Genetic algorithm is a programming methods and evaluation of problem solving method. The genetic algorithm then evaluates each candidate to fitness function. This algorithm is best of the searching algorithm. The proposed genetic algorithm using best optimal path between source and destination nodes in ad hoc networks and evaluate of fitness function for cost and bandwidth.

In a Mobile Ad-hoc Network, the communication between two adjacent nodes needs the relative movement information of nodes. Generally speaking, the state of a node includes the position, the movement speed and the movement direction. The following are the attribute description of one node. Node:- N (p, v) Where i denotes the No. of one I node, p denotes the position of Node i . According to GPS location information, each node has one unique position. v denotes the velocity of node i . It is a vectorincludes value and direction.



II ROUTING PROTOCOLS IN MANET's

Routing protocols have been proposed and can be categorized into topology-based (Royer & Toh, 1999) and position-based protocols (Giordano et al., 2004). Topology-based routing protocols route packets based on information about the network links while position-based routing protocols uses physical information about the participating nodes to decide on how to route packets. Topology-based protocols can be

further divided into proactive, reactive and hybrid routing protocols. The network links are determined long before routing process in proactive protocols, when routing in reactive protocols and a combination of before and when routing in hybrid protocols. In the position-based protocols, location information of thedestination are known and used. There are two sub- divisions in position-based routing protocols, namely greedy forwarding and restricted flooding. In greedy forwarding, nodes that have the best progress will be selected and data packet will be forwarded to these nodes. Ideally, this process is repeated until the packet arrives at the destination. Note there is no route discovery in greedy forwarding. Restricted flooding, on the other hand, will mitigate broadcast storm problem where only nodes in the direction of the destination will participate in the route discovery until the route to destination is found. The participation of nodes in routing will optimize broadcasting in MANET. Restricted flooding will broadcast messages to a selected number of nodes which is usually more than one that are located closer to the destination. It will significantly reduce not only energy but also reduce the probability of packet collisions of messages rebroadcast by neighbours using the same transmission channel (Stojmenovic, 2002; Mauve et all, 2001; Giordano et al, 2004).

(2.1) Proactive Protocols:- Proactive, or table-driven routing protocols. In proactive routing, each node has to maintain one or more tables to store routing information, and any changes in network topology need to be reflected by propagating updates throughout the network in order to maintain a consistent network view. Examples of such schemes are the conventional routing schemes: Destination sequenced distance

vector (DSDV). They attempt to maintain consistent, up-to-date routing information of the whole network. It minimizes the delay in communication and allows nodes to quickly determine which nodes are present or reachable in the network.

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(2.2) Reactive Protocols:- Reactive routing is also known as on-demand routing protocol since they do not maintain routing information or routing activity at the network nodes if there is no communication. If a node wants to send a packet to another node then this protocol searches for the route in an on-demand manner and establishes the connection in order to transmit and receive the packet. The route discovery occurs by flooding the route request packets throughout the network. Examples of reactive routing protocols are the Ad-hoc On-demand Distance Vector routing (AODV) and Dynamic Source Routing (DSR).

(2.3) Hybrid Protocols:- They introduces a hybrid model that combines reactive and proactive routing protocols. The Zone Routing Protocol (ZRP) is a hybrid routing protocol that divides the network into zones. ZRP provides a hierarchical architecture where each node has to maintain additional topological information requiring extra memory.

(2.4) Greedy Forwarding: - Greedy forwarding requires an up-to-date local topology via periodic beaconing which eliminates route discovery and hence, only data packet forwarding are employed until it reaches the destination. There are several forwarding strategies proposed that differ in the way the node selects the next hop among its neighbours.

(2.5) Restricted Flooding: - The main approach inrestricted flooding is to limit the flooding region which can be based on distance, angle and distance covered by the next intermediate node. Using distance, only nodes that are nearer to the destination will participate in the route discovery. Nodes that are further away from source will not participate.

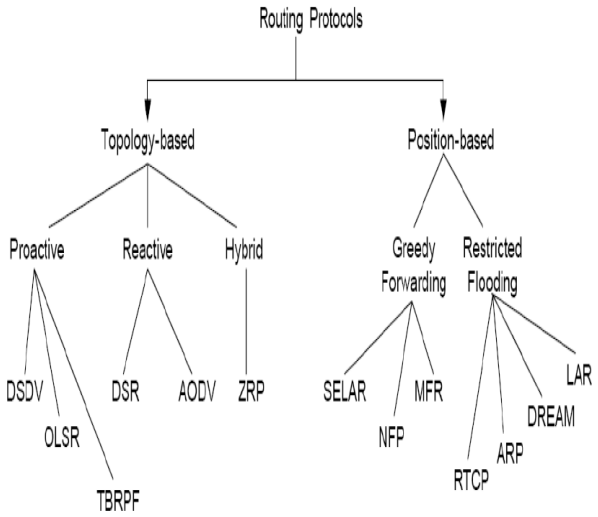

Figure 2 Protocols in MANET's

III Basic Algorithm's For MANET's *(3.1) Genetic Algorithm:-* Genetic algorithm is asearch technique used in computing to find true and approximate solutions to optimization and search problems. A genetic algorithm maintains a population of candidate solutions. Each candidate solution is called a chromosome. Subsection of the chromosomes, which are called genes (or) each character in the string, is called a gene. Genetic algorithms are example of evolutionary computing methods and optimization-type algorithms. The basic for evolutionary computing algorithms is biological evolution, where over time evolution produces the best fittest individuals. A set of chromosomes from a population, which is evaluated bya fitness function.

A genetic algorithm (GA) is a computational modelconsisting of five parts.

(a) Set of individuals, p.
(b) Crossover technique
(c) Mutation algorithm
(d) Fitness function
(e) Algorithm applies to crossover and mutationtechnique

Genetic algorithm for ad hoc network worked as a connected graph with nodes. The optimization is the cost of path

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between nodes. The goal of algorithm has to find the shortest path with minimum cost between source and destination nodes.

A. Representation of a Chromosome:- A chromosome corresponds to possible solution of the optimization problem. Each chromosome represents a path consist of sequence of positive integer that ID.

B. Evaluation of Fitness Function:- The fitness function translating the chromosome in terms of physical denoted and evaluate of fitness based problem solution. The fitness functions in the shortest path routing problem to find the minimal cost path and fitness of bandwidth.

C. Selection of Best Fit:- The selection process of the best fit is to improve the average quality of the selection. The selecting individuals from the population. There are two basic types of selection process.

(a) Proportionate.
(b) Ordinal-based selection.

Proportionate selection is chromosome based on their fitness values to the fitness of the other chromosomes in the population. Ordinal –based selection schemes select chromosome based not their fitness. The chromosomes are ranked by according to the fitness values.

D. Crossover:- Crossover process of two mating solutions and exchanging data between them finding new solutions. Crossover is performed on strings using midpoint crossover.

E. Mutation:- The mutation operator randomly alters genes to partially shift the search to new locations in the solution pace.

(3.2) Neural Network: - A neural network approach named shortest path neural networks (SP- NNs) is proposed for real time online path planning. Path planning is a crucial and an indispensable topic for robot navigation. Some methods like artificial potential field (APF) method, vector field histogram (VFH) and behavior-based path planning methods do have good performance in simple environments with a relatively low computational cost. However, they suffer from undesired local minima sometimes and generally the generated path is not a global shortest.

The shortest path problem is a classical combinatorial optimization problem arising in numerous planning and designing contexts.

The schematic architecture for NN consists of two modules:

(a) Preprocessing Module
(b) Route discovery module

(a) Preprocessing Module: Preprocessing module adapts the K-nearest neighbors' rule sensing the continuous topology changes of the network which is based on sending hello requests and reply packets during an interval of time.

(b) Route Discovery Module:- Kohonen model, which it is used to select the next route in the MANET network based on a competitive learning procedure.

Route discovery phase is divided into three steps:

- Broadcasting
- Selection of the "winner"
- Adaptation

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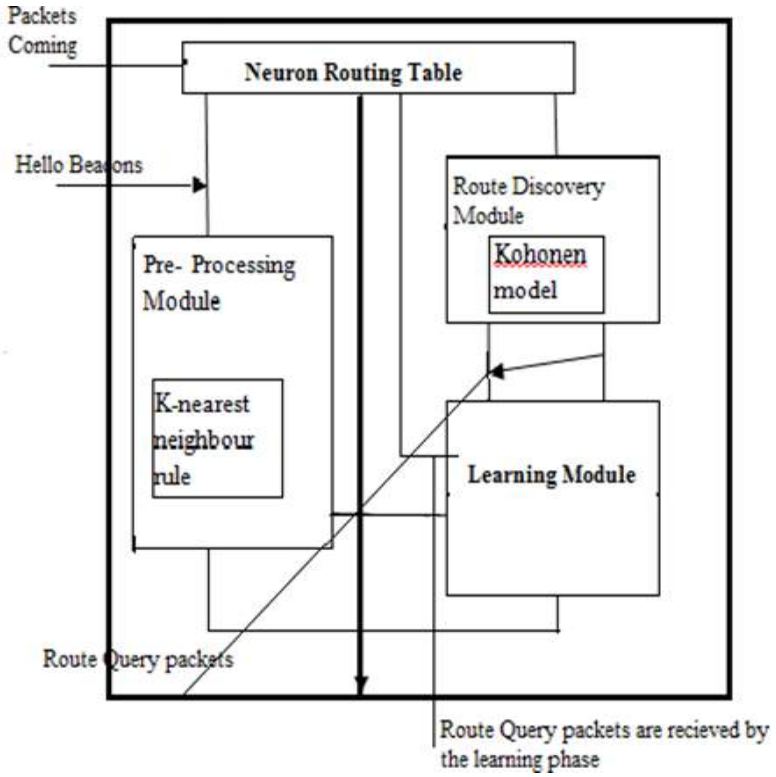

Figure 3 Schematic Architecture for NN

(3.3) Fuzzy Logic: - Fuzzy logic offers a natural way of representing and reasoning the problems with uncertainty and imprecision. Fuzzy logic is a suitable way to be applied in the mobile ad hoc network routing decision. The fuzzy routing protocols presented find a maximal set of disjoint paths from source to destination, and then employ a fuzzy logic controller to determine how to use those paths to carry the traffic. Fuzzy logic has been applied in control systems either to improve performance or to avoid difficult mathematical problems. Researchers have considered fuzzy logic for bandwidth allocation in broadband networks.

A fuzzy set is a generalization of the indicator function in classical sets. Fuzzy logic represents the degree of truth as an extension of valuation. Degrees of truth are often confused with probabilities through they are conceptually distinct. Fuzzy truth represents membership in vaguely defined sets, not even the likelihood of some event or condition.
For any set X, a membership function on X is any function from X to the real unit interval [0, 1]. Membership functions on X represent fuzzy subset of X. The membership function set is usually denoted by μA. For an element x of X, The value μA(x) is called the membership degree of x in the fuzzy set. μ$A(x)$ quantifies the grade of membership of the element x to the fuzzy set. μ$A(x)$ =0 means that x is not a member of fuzzyset. The value of μ$A(x)$=1 means that x is fully member of fuzzy set .The value of μ$A(x)$ between 0 and 1 charctarize fuzzy members , which belong to set partially. Fuzzy inference rules are given for categorizing the nodes based on trust levels.

Fuzzy Rule

1. IF trust value is VERY_HIGH THEN node is TRUSTED
2. IF trust value is HIGH THEN node is TRUSTED
3. IF trust value is MEDIUM THEN node is TRUSTED
4. IF trust value is LOW THEN node is MALICIOUS
5. IF trust value is VERY_LOW THEN node is MALICIOUS

Fuzzy logic rules are used in FLWMR to determine whether to route messages through zero, one, multiple, or all available paths in a network. These rules depend on the priority of the messages and the traffic congestion in the network. For example, if we wish to discard low importance messages when the network is congested, we would include a rule: If

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message precedence is Routine AND network status is Poor THEN Discard the message.
The Fuzzy Logic Controller (FLC) has two inputs: message precedence and network status, and one output: the routing decision.
The rules are expressed in Mamdani form: R_i : IF **x** is A_i and **y** is B_j THEN **z** is C_k

Table 1 NN based routing algorithm

AUTHORS OFALGORITHM	LIMITATIONS OF ALGORITHM PROPOSED	ADVANTAGE OF ALGORITHM
Rauch andWinarske	Need to know the number of hops required for shortest path in advance	First development towards the field ofNN based routing solutions.
Zhang and Thomopoulos	Not adaptable toexternal conditions	Finds a path with as many as N hops(N= No. of nodes in graph =Max. no. of hops SP can have)
Ali and Kamoun	NN fails to converge towards a valid solution ano. of times. Above problem intensifies as no. of nodes in graphincreases	Aims at the NN adaptability to external varyingconditions.
Park and Choi	Fails to coverage . Poorer behavior with increasingno. of graph nodes.	Multi Destination routing problem. Single Destination routing version –Here extends the range of operation of formermethod.

CONCLUSION

The Ad-hoc network has wireless communication between randomly moving nodes without fixed Infrastructure. Mobile ad-hoc network has very enterprising applications in today's world. Mobile ad-hoc networks are full of uncertainties because of dynamic topologies, dynamic traffic and different application contexts. Mobile ad-hoc network using various soft computing techniques have been done using various algorithms and routing protocols. Routing in MANET using soft computing technique is the solution to improve quality of service and route optimization in MANET.

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Implementation of Network Coding in Cognitive Radio Network

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Abstract – *Network coding is a method that can enhance the network throughput by reducing the amount of work overload in the network while still ensuring that all user data is transferred. With network coding, a node can improve its transmission efficiency by combining several packets together and sending only the resultant encoded packet if the coding conditions are satisfied. Network coding has been successfully applied in Cognitive radio network (CRN).It exploits the utilization of unused spectrum or white spaces, effectively and efficiently. In CRNs, network coding schemes are also applied to maximize the spectrum utilization, as well as to maintain the effective and secure transmission of data packets over the network. In this paper, we provide a comprehensive survey of NC schemes as well as the applications of network coding in CRNs. Finally, we present open issues, challenges, and future research directions related with network coding in cognitive radio networks.*

Keywords- *Cognitive Radio Network (CRN), Network Coding (NC), Dynamic Network Coding (DNC), Forward Error Correction (FEC), Layer Network Coding (LNC)*

INTRODUCTION

Firstly coined by Mitola in 1999 [1], cognitive radio (CR) is a promising technology for solving the problem of the coexistence of spectrum scarcity for new applications and low usage ratio of the allocated spectrum in wireless communication [2]. Based on the Network Coding.

In network coding, data packets are encoded by intermediate nodes and are then decoded at the destination nodes. Network coding has been successfullyapplied in a variety of networks including relay networks, peer-to-peer networks, wireless networks, latest development of software-defined radio technologies, CR enabled users (CRs) can dynamically sense the network environment, find idle spectrum, and reconfigure operation parameters to access the temporally unused spectrum opportunistically without insufferable interference to licensed users (also referred as primary users, PUs). This flexibility enables CR networks to increase spectrum efficiency and accommodate to various application requirements through self-organization and dynamic reconfiguration. The end-to-end performance is challenged by the distributed multi-hop architecture, dynamic network topology, diverse quality of service (QoS) requirements and time and location varying spectrum availability [4], necessitating extensive research before large scale deployment of CRAHNW [3].

As the interference to PUs is strictly restricted, CRs should vacate the spectrum on detecting the presence of PUs. Spectrum availability in CRAHNs is determined by the spatial distribution and spectrum usage of PUs, resulting in dynamic spectrum heterogeneity across the network. This dynamic and unreliable spectrumenvironment proposes special challenges for efficient utilization of idle spectrum in multi-hop collaboration. For media access control, messages with information for resource reservation and competition need to be exchanged among CRs. Yet the dynamic multi-channel environment induces much time and power cost to the process [20]. The route establishment involves a partial or network wide route request broadcast and reply process while the constructed routes are expected to be stable and reliable to avoid

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frequent re-routing which is prone to induce broadcast storm, radio resources waste and degradation of end-to-end network performance such as throughput and delay [21], [22].
cognitive radio networks, and wireless sensor networks.
Network coding can be used to improve the throughput and spectral efficiency of wireless communication [19]. NC has many advantages, such as increasing the throughput by communicating more information with fewer packet transmissions.

Implementation of NC

NC has been applied at various layers of the OSI model, such as the Physical layer, MAC layer, Network layer, Transport layer, Application layer. Network coding has also been applied in cognitive radio networks [14–18]. In CRN, there is a requirement of efficient and effective transmission of data by SUs, so that SUs can maximize the utilization of available spectrum. For this, NC has been applied to CRN to increase the throughput of CRN by reducing the transmission time for SUs. NC is also applied in CRN in order to allow multiple SUs to utilize
the spectrum at the same time for a more effective utilization of spectrum [15].

LITERATURE SURVEY

Our research survey has been conducted on cognitive radio and network coding. However, the dynamic unpredictable spectrum accessibility in cognitive radio networks introduces new challenges for network coding in cognitive radio networks. In this section, we review and analyze the existing works on network coding and cognitive radio network.
JOSEPH MITOLA III [1] is the founder of "Cognitive Radio" (CR). The term was intended to describeintelligent radios that can autonomously make decisions using gathered information about the RF environment through model-based reasoning. Lu Lu, et.al [5] provided an overview of recent research achievements of
including spectrum sensing, sharing techniques and the applications of CR systems. Gin-Xian Kok, et.al [6] proposed the Network Coding Routing (NCRT) protocolwhich consists of a new set of coding conditions, and a new routing metric that takes into consideration both coding opportunities and network workload. Wei Mu, et.al [7] considered a cognitive radio network where secondary users (SUs) employ network coding for data transmissions. SU transmission time is reduced due to network coding. And it increases spectrum availability to SUs. S. B. Mafra, et.al [8] investigated the performance of a network coding based secondary network in a CR system under spectrum sharing constraints. Ralf Koetter and Muriel Médard [9] observed the issue of network capacity. They extend the network coding framework to arbitrary networks and robust networking. For networks which are restricted to using linear network codes, they find necessary and sufficient conditions for the feasibility of any given set of connections over a given network. Christina Fragouli et.al[10] proposed an instant primer on network coding. They explain what network coding does and how it does it. They also discuss the implications of theoretical results on network coding for realistic settings and show how network coding can be used in practice. Shuoyen Robert Li et.al [11] considereda multicast problem and proved that linear coding suffices to achieve the optimum, which is the max-flow CRNs to achieve security by detecting multiple types of attacks. One of the common attacks in CRN is PUE attack [12]. A physical layer NC is applied to maximize the available bandwidth utilization and to detect any malicious behavior by attackers [13].

3.2 Neighbor discovery is another case study in CRNs to ensure effectual communication amid multiple users. The author of [14] ensures the effectiveness of the neighbor discovery process by proposing an algorithm. It is highly distributed, the number of nodes does not need to be known in advance, and it can also be used to prevent a variety of jamming attacks.

APPLICATIONS OF COGNITIVE

4 RADIO NETWORK USING NETWORKCODING

In this section we discussed the application areas ofcognitive radio network using network coding.

Public Safety: CRN plays a vital role in public safety and emergency applications. Blue Force Tracking (BFT) consists of some GPS information that is periodically shared between all public safety workers during an intervention. Random Network Coding technique is considered to be the most adapted to the BFT service support in CRNs. GPS information are from the source to each receiving node. Pouya Ostovari and Jie Wu [12] proposed two dynamic network coding

schemes that achieved the maximum throughput and reduce the number of required feedback messages. Moreover, they proposed a fair dynamic network coding (DNC) scheme that performs a trade-off between the throughput and the fairness in terms of decoding delay and the number of decodable packets at different destination nodes.
Ibrahim Demirdogen et.al[13] employed Forward error correction (FEC) driven network coding (NC) method asa defense mechanism. Their method can efficiently contribute to network performance by improving BER, in the absence of any attack.

CHALLENGES OF NETWORK CODING FORCOGNITIVE RADIO NETWORK

In this section we provide a summary of network coding challenges in CRN. Cognitive Radio links are dynamically available and likely uni-directional, in the multiple-system coexisting environments. The challenges of NC for CRN includes routing, Security, neighbor discovery.

Routing in multi-hop CR networks faces several new challenges. A unique challenge is the collaboration between the route selection and the spectrum decision [2][4][6][7]. In addition to node mobility, link failure in multihop CR networks may happen when primary useractivities are detected. How to vacate the currentspectrum band and to move to another availablespectrum band quickly is still an unexplored problem. The second study is on the **association and Security**.Security implementation is difficult to achieve due to thedynamic behavior of the network. NC is applied in periodically collected by each node. There are two buffers for each node, one for native packet and other for encoded packets. Adapted Random NC protocol combines all the native packets from the native packet buffer before sending them to available nodes in thenetwork.

Multimedia Applications (Commercial Use): NC is applied in CRN to improve the quality and efficiency of commercial applications. Some authorsdesigned framework for efficient multimedia multicastservices in CRN. Their framework protects the rights ofsubscribed user and also improves the quality of video. Proposed framework applies NC and superpositioncoding to reduce the scheduling complexity and toaccount for heterogeneous channel conditions. NC improves the scheduling complexity by encoding all packets equally and thus base station does not differentiate among packets during scheduling. Itimproves the average received data rate and save thetransmission time.

Tactical Networks:
Optimized transmissions reduce the power consumption and overhead. Multicast and broadcast transmissions canimprove the efficiency and effectiveness of wireless links when transmitting multiple copies of messages using the radio broadcast property. Multicast and broadcast faces some issues in tactical networks such as
military applications. NC for CRN solve these issues, the framework is based on intra-flow coding where the source node divides the flow in a sequence of equal size payloads.

CONCLUSION

Network coding in cognitive radio networks enhance the usability of spectrum in a network. In this paper we presented a survey of network coding techniques,routing protocols used in CRN and also discussed network coding in different layers for CRN. Then we present challenges and applications of NC for CRN.

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Chapter No-5, PP. 25-27

Current Problems with Startups in Indian IT Sector

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Abstract – *Information Technology global ranking (IT/ITES Performance Index) of India has moved to 7th position that is declared by World Bank with the score of 4.42. This indicates that the government is more concerned about the infrastructure. Implementing of GST and Make in India will change the nations entire logistics and IT structure to global standard. The value of Indian IT industry is of about $8130 billion. India spends 8.2% of its GDP only for transportation. In recent days e-commerce is playing a vital role in Indian economy. E-commerce giants were investing more than ever in Indian history. Many start-ups like Maalgaadi, Delivery were claiming the industry at the rapid rate. The challenges faced by IT start-ups are capital investment, training the teams in rapidly changing IT Trends, unorganized sector, strategic location of warehouse, research & developments, frequent technical upgradation,3PL, taxation policy, COD(Cash On Delivery),documentation process, customer service ,fleet management etc.*

Keywords- *Advertising, Start-ups, e-commerce, Consumer Sentiment*

INTRODUCTION

The newly proposed GST (Good & Service Tax) and e-commerce will change the supply chain management, warehousing and 3PLbusiness. Comparing to other countries the Indian logistics industry is in substandard state. Infrastructural bottlenecks across modes have stifled the sector's growth. The road sector is in downtrend with very low highway availability, thereby reducing the trucks' size and impacting economies of operation. India has the least warehousing capacity with modern facilities, and given the industry state (large share with unorganized players), investment in IT infrastructure is mostly absent at required scale
[3].

THE CHALLENGES FACED BY ITSTARTUPS

- Disintegrated and Concealed
- Ineffective R&D
- Raising Funds
- Skimpy Infra Structure
- Dynamic work force
- Fluctuating tax rates in India
- Payment options

Disintegrated and Concealed

Though India spends 11 per cent of its GDP on IT this industry has been disintegrated and concealed [2]. Incapable private telecom operator system adds up the industry's dependence on public network leading to its 57 per cent of freight movement on public careers. Adding on to the trouble lack of effective planning, state -to- state issues, tedious

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documentation has increased strain in the network [4]. In the upcoming years India's Ecommerce is likely to face challenges such as:

- Finding Slot

Reliable Logistics and Supply Chain

Ineffective R&D

The field of research in this sector is highly under penetrated. Prioritizing research and development can provide various tech driven solutions.

Considering the fact that our country is in the attention of capital investors towards logistics startups optimizing the technology with genuine research can help us to achieve the global standards [3].

Raising Funds

For an Industry to adapt Logistics Solution it is a capital intensive process which requires a huge amount of funds to implement sources such as:

- A new branch setup
- Required Work force deployment.
- Necessary equipment purchase-Loading & transport, tracking & immobilizers
- Bagging in customers and investors.
- Maintaining a healthy working capital.
- Hidden costs such as Toll tax, Traffic fines and Fuel charges
- Insurance & licensing

Skimpy Infrastructure:

With meager infra structure the emerging E commerce and supply chain operative firms would find it a lot difficult to cope up with the challenges in demand of service.

Infrastructure is the key component required for any such logistics start ups. India being a huge market the challenges are relevantly dynamic and has to be met with an integrated approach [3].

Dynamic workforce:

Employees who get involved in delivery are volatile. They generally deliver anything more than 50 and more orders per day at a meager salary of 10to15 thousand per month. In such situations even a small hike of rupees 500 on their pay is a huge lure for employees at delivery [2].

They easily run into another job offering a little higher package or incentive. The most difficult challenge for the logistics firm is to retaining the workforce [2].

Fluctuating tax rates in India

Taxes thus vary at different levels of operations for this industry. Though GST could create a platform of ease for the logistics firms, many players still choose counted and selected regions for delivering the consignments.

Flickering tax rates from region to region can slow down the operation levels[3].

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FINDING SLOT

Considering the Indian market and the already existing marketers and leading firms. For startups in E commerce finding a niche would be a great challenge. To fit in the already intact market and to find solutions to various failed strategies must be the forecasting part of the plan for the new steppers [3].

CUSTOMERACQUISITIONS

To attract heavy purchasing customer is not an easy task. Getting a person to make an average purchase of 500 to 1000 is vital. It can vary from customer to customer, but the medium and the startups have to stick on to the margin.

Growth Ranking Country	Percentage(%)
India	68
China	23
US	12
Global Average	16

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Upgrading Performance of Selection Sorting Algorithm

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Abstract *– Sorting is an algorithm that arranges all elements of an array, orderly. Sorting involves rearranging information into either ascending or descending order. In computer science and mathematics, a sorting algorithm is an algorithm that puts elements of a list in a certain order, not necessarily in increasing order; it may be in decreasing order as well. Efficient sorting is important to optimizing the use of other algorithms that require sorted list to work efficiently; it is also useful for producing human-readable output. Most simple sorting algorithms involve two steps which are compare two items and swap two items or copy one item. In this paper we present a new sorting algorithm, named as Dual-Element Selection Sorting, which is faster than selection sort. After studying various sorting algorithms; I found that there are no such sorting algorithms which work on the basis of selecting two elements at a time, means selecting two elements simultaneously. We also compare Dual-Element Selection Sort algorithm with selection sort. We have used the MATLAB for implementation. The new algorithm is analyzed, implemented & tested.*

Keywords- *Algorithm, Selection and Dual-Element Selection Sort, Comparison.*

INTRODUCTION

There are many fundamental and advance sorting algorithms. All sorting algorithm are problem specific means they work well on some specific problem and do not work well for all the problems. All sorting algorithm apply to specific kind of problems. Some sorting algorithm apply to small number of elements, some sorting algorithm suitable for floating point numbers, some are fit for specific range, some sorting algorithms are used for large number of data, some are used if the list has repeated values [6]. For instance, if the given input of numbers is (99, 61, 41, 51, 6, 78), then the output sequence returned by a sorting algorithm will be (6, 41, 51, 61, 78, 99).

One of the fundamental problems of computer science is ordering a list of items [9]. There is a plethora of solutionsto this problem, known as sorting algorithms. Some sorting algorithms are simple and intuitive, such as the bubble sort. Others, such as the quick sort are extremely complicated, but produce lightning-fast results. The common sorting algorithms can be divided into two classes by the complexity of their algorithms. There is a direct correlation between the complexity of an algorithm and its relative efficiency.

Sorting is one of the most important and well-studied problems in computer science. Many good algorithms are known which offer various trade-offs in efficiency, simplicity, memory use, and other factors. However, these algorithms do not take into account features of modern computer architectures that significantly influence performance. A large number of sorting algorithms have been proposed and their asymptotic complexity, in terms of the number of comparisons or number of iterations, has been carefully analyzed [10]. In the recent past, there has been a growing interest on improvements to sorting algorithms that do not affect their asymptotic complexity but never the less improve performance by enhancing datalocality.

Sorting is a fundamental task that is performed by most computers. It is used frequently in a large variety of important applications. Database applications used by schools, banks, and other institutions all contain sorting code. Because of the importance of sorting in these applications, dozens of sorting algorithms have been developed over the decades with

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varying complexity. Slow sorting methods such as bubble sort, insertion sort, and selection sort have a theoretical complexity of O (n^2) [11]. Even though these algorithms are very slow for sorting large arrays, the algorithm is simple, so they are not useless. If an application only needs to sort small arrays, then it is satisfactory to use one of the simple slow sorting algorithms as opposed to a faster, but more complicated sorting algorithm [12]. For these applications, the increase in coding time and probability of coding mistake in using the faster sorting algorithm is not worth the speedup in execution time. Of course, if an application needs a faster sorting algorithm, there are certainly many ones available, including quick sort, merge sort, and heap sort. These algorithms have a theoretical complexity of O (n log n). They are faster than the O (n^2) algorithms and can sort large arrays in a reasonable amount of time. However, the cost of these fast sorting methods is that the algorithm is much more complex and is harder to correctly code. But the result of the more complex algorithm is an efficient sorting method capable of being used to sort very large arrays [13].

But sometimes question arises in front of us, whether there any way through selection sorting can be more
Then demonstrate a modification of this algorithm, and finally to assign the coding modification as a programming. This paper suggests one simple modification of sorting algorithm: Dual-Element Selection Sort. One can argue as to whether the use of Dual-element selection sort for these small array partitions will provide improvement to this critical algorithm.

Therefore, to understand important concepts and programming practice, a good programming exercise plays a crucial role i.e. for using Dual-element selection sort in place of normal selection sorting technique that raises the sorting skills.
An effort is done in positive direction and realizes coding technique for Dual sorting offer great improvements speed up over the single selection sorting.

SELECTION SORT

The selection sort works by selecting the smallest unsorted item remaining in the list, and then swapping it with the item in the next position to be filled. The
selection sort has a complexity of O (n^2) [14].

The worst case as well as average case complexity of Selection sort is O(n^2), where n represents the total number of items in the given array to be sorted.
The selection sort is the unwanted step child of the n^2 sorts. It yields a 60% performance improvement over the bubble sort, but the insertion sort is over twice as fast as the bubble sort and is just as easy to implement as the selection sort. In short, there is not really any reason to use the selection sort-use the insertion sort instead [15].

The algorithm for selection sort having *ARRAY* as an array with N elements is as follows:

```
SELECTION (ARRAY, N)
for (i=1 to N-1)
  {
      Min = ARRAY[i]
        for (k = i+1 to N)
        {
            if  (min > ARRAY [k])
              {
                Min = A[k]Loc = k
                        }
                            }
              Temp = ARRAY [Loc]
             ARRAY [Loc] = ARRAY [i]
                 ARRAY [i] = Temp
                                }
```

DUAL ELEMENT SELECTION SORT

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Introduction

Various authors had made continuous attempts for increasing the efficiency and performance of the sorting process. The proposed algorithm is based on selectionsort.
The proposed algorithm as:
Starts from two elements and searches the entire list untilit finds the minimum value and second minimum value. The sorting places the minimum value in the first place and second minimum value in the second place, this process continues until the complete list is sorted. In otherwords, the proposed algorithm designed to minimize the number of passes/comparisons that are performed. It works by making N/2 passes over the shrinking unsorted portion of the array, each time selecting the smallest and second smallest value. Those values are then moved into their final sorted position in one pass.

Algorithm

```
DESS (ARRAY, n)
for (i = 1; i <= n-1; i = i+2)
{
   Min = ARRAY [i]; Smin = ARRAY [i+1];
       Loc_Min = i; Loc_Smin = i+1;
        for (j = i+1; j <= n; j++)
   {
        If (ARRAY [j] < Min)
        {
            Smin = Min; Loc_Smin = Loc_Min;Min = ARRAY [j];
         Loc_Min = j;
                  }
              elseif (ARRAY [j] < Smin)
            {
              Smin = ARRAY [j];
                 Loc_Smin = j;
              }
               }
                if (Loc_Min ~= i)
               {
             temp = ARRAY [i];
            ARRAY [i] = ARRAY [Loc_Min];
           ARRAY [Loc_Min] = temp;
                    }
               if (Loc_Smin == i)
               {
             Loc_Smin = Loc_Min;
                 }
                if (Loc_Smin ~= i+1)
               {
                temp1 = ARRAY [i+1];
             ARRAY [i+1] = ARRAY [Loc_Smin];
               ARRAY [Loc_Smin] = temp1;
                           }
                             }
```

COMPLEXITY ANALYSIS

The general working of the proposed algorithm is alreadydiscussed in detail. Now discuss its complexity analysis.

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Table I Complexity Analysis

Line No.	Iteration
1.	for(i=1;i<=n-1;i=i+2)
2.	Min = ARRAY[i]
3.	Smin = ARRAY [i+1];
4.	Loc_Min = i;
5.	Loc_Smin = i+1;
6.	for(j=i+1;j<=n;j++)
7.	if(ARRAY [j] < Min)
8.	Smin = Min;
9.	Loc_Smin = Loc_Min;
10.	Min = ARRAY [j];
11.	Loc_Min = j;
12.	elseif(ARRAY [j]<Smin)
13.	Smin = ARRAY [j];
14.	Loc_Smin = j;
15.	if(Loc_Min ~= i)
16.	temp = ARRAY [i];
17.	ARRAY [i] = ARRAY [Loc_Min];
18.	ARRAY [Loc_Min] = temp;
19.	if(loc1 == i)
20.	Loc_Smin = Loc_Min;
21.	if(Loc_Smin ~= i+1)
22.	temp1 = ARRAY [i+1];
23.	ARRAY [i+1] = ARRAY [Loc_Smin];
24.	ARRAY [Loc_Smin] = temp1;

Line 1 execute n/2 + 1 time in a single execution of thealgorithm.
Line 2-6 executes n/2 times in a single execution of thealgorithm.
Line 7-14 executes
$\sum_{K=0}^{n/2-1} (2k+1).t$ if n is even
$\sum_{K=0}^{n/2-1} (2k+2).t$ if n is odd
times in a single execution of the algorithm.
Line 15-24 executes n/2 times in a single execution of thealgorithm.
Note: t=1 when if statement is true, else t=0.$\sum_{K=0}^{n/2-1} (2k+1).t$
Suppose for t=1 we have

$$\sum_{K=0}^{n/2-1} (2k+1) = 2\sum_{K=0}^{n/2-1} k + \sum_{K=0}^{n/2-1} 1$$

$$= 2(((n/2-1)*((n/2-1)+1))/2) + (n/2-1)$$

[By Applying 1+2+3+…n = (n(n+1)/2)]

$$= ((n^2-2n)/4) + (n/2-1)$$

Now calculating total time taking by proposed algorithm,$T(n) = n/2+1 + n/2 +(n^2-2n)/4 +(n/2-1) + n/2$
$= n^2/4 + 3(n/2) + 1$

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Now taking only the dominant term, i.e. n^2 the runningtime of the algorithm is,

$T(n) = O(n^2)$

WORKING

Let the given set of elements are 97, 43, 58, 84, 23, 76.

A. Selection Sort

Table II - WORKING OF SELECTION SORT

Passes	**Elements**									
Initial	3	5	6	8	2	9	4	1	7	0
1.	0	5	6	8	2	9	4	1	7	3
2.	0	1	6	8	2	9	4	5	7	3
3.	0	1	2	8	6	9	4	5	7	3
4.	0	1	2	3	6	9	4	5	7	8
5.	0	1	2	3	4	9	6	5	7	8
6.	0	1	2	3	4	5	6	9	7	8
7.	0	1	2	3	4	5	6	9	7	8
8.	0	1	2	3	4	5	6	7	9	8
9.	0	1	2	3	4	5	6	7	8	9

A. DESS Sort

TABLE III WORKING of DESS SORT

Passes	**Elements**									
Initial	3	5	6	8	2	9	4	1	7	0
1.	0	1	6	8	2	9	4	5	7	3
2.	0	1	2	3	6	9	4	5	7	8
3.	0	1	2	3	4	5	6	9	7	8
4.	0	1	2	3	4	5	6	7	9	8
5.	0	1	2	3	4	5	6	7	8	9

II. COMPARISION

A. Comparison of Proposed Algorithm with Selection Sort

Table Iv -Worst Case Analysis (On The Basis Of Number Of Comparisions)

Size of input	**Selection Sort**	**DESSA**	**% Improvement**
N=50	1225	625	48%
N=99	4851	2450	49%
N=150	11175	5625	49%
N=499	124251	62250	49.9
N=1000	499500	250000	50%
N=4999	12492501	6247500	50.1%
N=10000	49995000	25000000	50.3%

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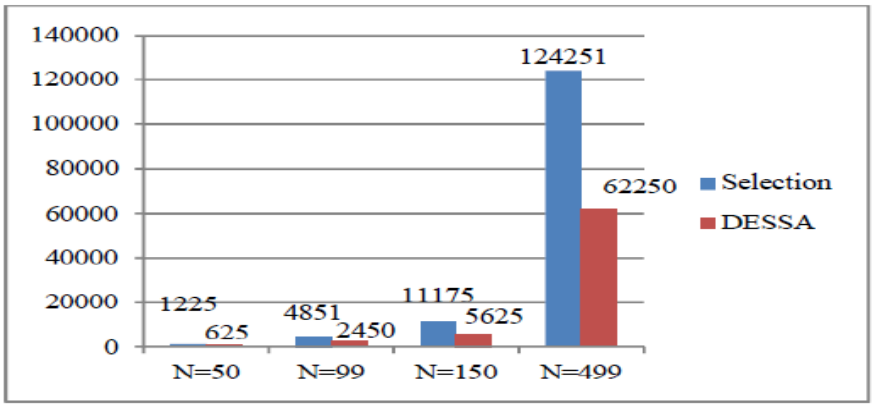

Fig 1 -Analysis On the Basis of Number of Comparisons

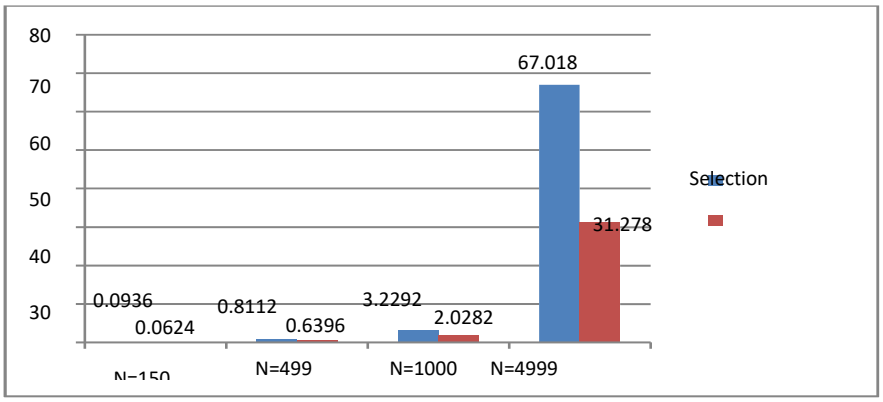

Fig. 2 Analysis On the Basis of Execution Time

B. Comparison of Proposed Algorithm withFundamental Sorting Technique

TABLE VII

ON THE BASIS OF NUMBER OF PASSES

Size of Input	Selection	Bubble	Insertion	DESSA
N=50	49	49	49	2
N=99	98	98	98	49
N=150	149	149	149	75
N=499	498	498	498	249

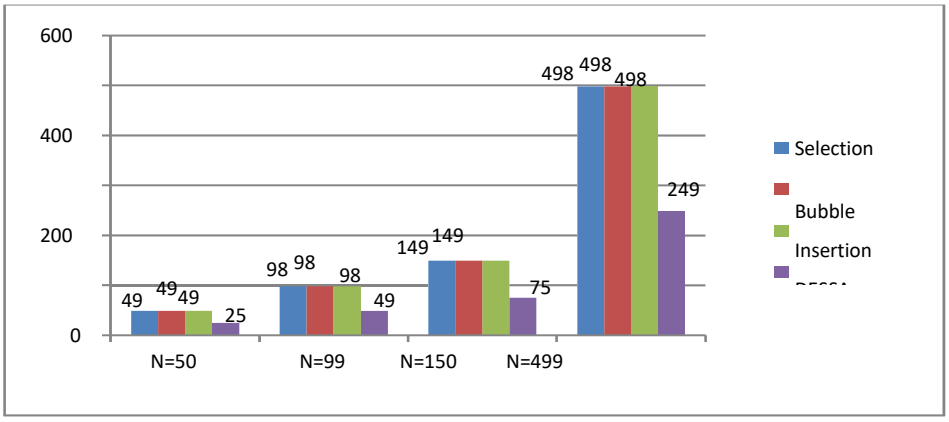

Fig. 3 Analysis On the Basis of Number of Passes

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CONCLUSION & FUTURE SCOPE

In this research paper we have studied about different sorting algorithms along with their comparison. Every sorting algorithm has advantage and disadvantage. The fundamental sorting algorithms are basic sorting algorithm and we have try to show this how disadvantage of fundamental sorting algorithm have removed in advance sorting algorithm. Various Sorting algorithms have been compared on the basis of different factors like complexity, number of passes, number of comparison etc. After the study of all various sorting algorithms we observed that there is no such algorithm, which works in this way that tosort the two elements at a time. So we have proposed sorting algorithm, which work on the basis of selecting two elements simultaneously. For implementation to the proposed algorithm we have to use MATLAB.
My first target is to remove the demerits of various sorting algorithms. It is also seen that many algorithms are problem oriented so we will try to make it global oriented.Hence we can say that there are many future works which are as follows.

- Remove disadvantage of various fundamentalsorting and advance sorting.
- Make problem oriented sorting to globaloriented.
- In the end we would like to say that there is huge scope of the sorting algorithm in the near future, and to find optimum-sorting algorithm, the work on sorting algorithmwill go on forever.

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Ant Colony Optimization Based Energy Efficient Routing in Cognitive Radio Network

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Abstract *– Cognitive Radio Networks (CRNs) is aimed to provide unused spectrum to the user which can enhance utilization of unused spectrum in a geographical region, CRNs are software defined radios whose primary objective is to use the allocated bandwidth of a Primary User(PU) at the time when it is not availed by PU and it can be released to a Secondary User(SU) for some time with a condition that if PU acquire it then SU have to release it and SU can continue its transmission through alternative path if available. Bio- emulative strategies such as Ant Colony Optimization (ACO) are one of the preferred solutions to address the issue of energy-aware routing. Energy-efficient protocols are vital for CRNs because of the crucial constraints on node's energy. Thus, the routing protocol ought to be enough capable to attain uniform power dissipation during transmission. The major objective of this paper is to maximize the network lifetime &achieve the shortest alternative path between source and destination.*

.

Keywords- ***Ant Colony Optimization, Cognitive Radio Networks, Primary User , Secondary User,NS2, AODV***

I -INTRODUCTION

Cognitive Radio Networks has aimed to provide a solution to the spectrum scarcity problem. Cognitive Radio can intelligently detect the availability of spectrums which are available& which are not, so that SU use the available spectrum. In Cognitive Radio Networks the PU(Licensed Band) have spectrums which are always not in use providing an opportunity to SU (Unlicensed band) in using these spectrum efficiently as per the availability. As per statistics of Federal Communications Commission (FCC) variations in the utilization of the assigned spectrum range varies from 15 to 85 percent in a geographical region [2]& the unused spectrum should be made available for use by the public. The temporally ideal bands are known as a spectrum hole or white space [3].

Cognitive Radio networks increase the utilization of spectrum by allowing the secondary user to use idle bands. The SU can use the licensed band when primary user in not using it, SU employ access mechanisms to transmit data when the spectrum opportunity appears and these mechanisms are known as opportunistic spectrum access (OSA), but PU is the highest priority user; it can influence SU traffic by both accessing and leaving its bandwidth. The PU in cognitive radio networks differentiates it from the other entire wireless network. If possible, SU should avoid the PU& stop transmitting data when PU wants to use the same bandwidth [1]. In CRNs the main functions of spectrum are sensing, management ,mobility& sharing. We propose an algorithm known as the ant colony optimization (ACO) for providing energy efficient routing to SU, it is inspired by real ant behavior which is optimized for finding good routes through graphs where

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multiple route are required for packet transmission resulting in an enhanced throughput. The key objective is to provide alternative path to SU while PU acquires the previous path of SU during packet transmission in an efficient manner.The channel where primary user is not using very much indicates that SU have more ideal bands on an average whereas in opposite case SU have less opportunity to access ideal bands [1][8][9][10][11].
The remaining paper is organized as follows. The related works are summarized in section II. Then, the proposed solutions are illustrated in Section III. Simulation results are presented to indicate the performance of the proposed solution in Section IV. Finally conclude the paper and future work is mentioned in Section V.

II- RELATED WORKS

Many algorithms have been proposed to address hindrance by SU to PU issues on cognitive radio network.

A. Ant Colony Optimization

ACO is based on natural phenomenon of the ant When ant starts for searching food, it leaves pheromone in the path from the nest to the point where it finds the food, while searching ant finds different paths from nest to the food & it follow the shortest path to return back, during the search the pheromone dropped on the path diminished due to evaporation. Due to this the pheromone on the longest path diminished fast as compare to shortest path so new ants follow the shortest path to reach the food point [5] as shown in Fig1. This process continues resulting in ant's movement from selected path only whereas the pheromone in the other path gets evaporated.

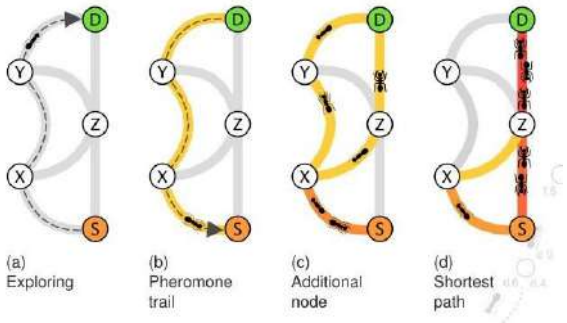

Fig1. Ant Colony Optimization

B. Ad Hoc On-Demand Distance Vector (AODV)

A lot of routing protocols have been proposed for CRNs in order to enhance the bandwidth utilization. All these protocols have their own advantages and disadvantages under certain circumstances. Tao Lin et al. [4] recommended the essentials for a routing protocol that includes minimal route possession delay, rapid reconfiguration, without loop & distributed approach. AODV is a reactive protocol that is an amalgam of Dynamic Source Routing (DSR) &Destination-Sequenced Distance-Vector (DSDV). AODV do hop-by-hop routing of DSDV and discover & maintain the route identical to DSR. Routing in a Cognitive Radio Networks (CRNs) is done with the goal to allocate unused bandwidth to the secondary user by finding short & optimized path when primary user is not transmitting the packets through that node but secondary user should immediately leave the acquired. The benefit is that less bandwidth is required for maintaining routing tables, and disadvantage is it will create major delay becauseit has to be resolved before using the route for a particular transmission[6, 7].

C. Limited Energy Capacity

Energy poses a great challenge in many applications of CRNs as the process of setting up routes in a network is greatly affected by energy considerations. In CRNs, PU has no limitation on its transmission power whereas SU have frequent interference from PU. For specific applications, it is impossible to access the sensors and recharge their batteries, routing

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protocols design for CRNs should be as energy efficient as possible to extend their lifetime, and hence, prolong the network life time without performance degradation.

III- PROPOSED WORK

The proposed work is based on how ants find routes to their food and back to the nest. Usually the route through which the ants travel is the shortest route from the nest. Ants start from their nest and go in search of food. When an ant finds its food, it travels back to its nest in the same route that it came in. Along the way these ants deposit a substance called pheromone on the ground when they travel. Pheromone is a volatile substance, so its concentration level decreases over time. Other ants sense this pheromone and choose the route that has the highest levels of concentration of pheromone. These ants also deposit pheromone on the way as they travel back. The concentration level of the pheromone would be higher in the selected path as more ants would have travelled in this path as compared to other paths. Initially, an ant has no preference on which path to choose and takes each of the paths with equal probability. But after a certain period, the ants would pick the path that has the highest level of pheromone concentration. This would be the shortest path since more ants would have travelled in this path than any other path in a given time interval. The proposed ant based energy efficient routing algorithm has several properties which makes it ideal for the above specified requirements.

Similarly when a secondary user wants to transmit packets over the network from source to destination it will acquire the bandwidth of primary user and search for the shortest path from source node to the destination node and after establishing route it starts transmitting packet, during the transmission of packets by SU if PU acquire its bandwidth the SU have to release the route & go for alternative route for transmission so that packets can be delivered at the destination. Thus in such conditions an energy efficient routing is required to maintain the transmission in CRNs. The two paths in Fig. 2 shows that if the shortest path is acquired by PU during the transmission then there is an alternative Path for SU.

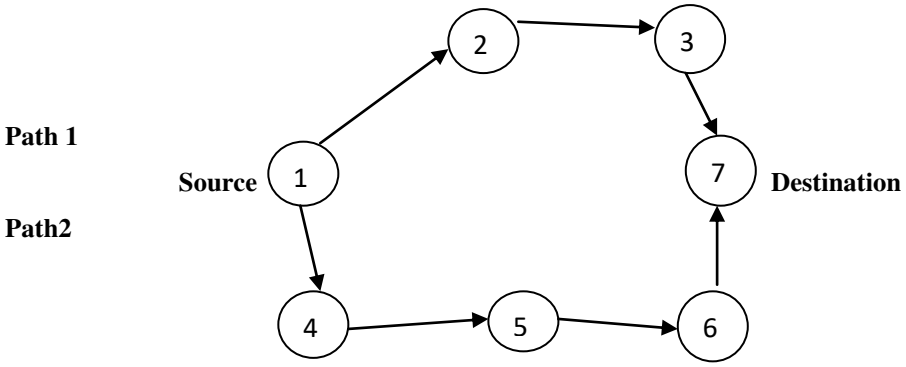

Fig2. Available Paths for Transmission

The Proposed Approach is as follows:

1)The AODV protocol starts the route discovery process between the source and destination node by sending route request (RREQ)packet to the nearest available node which will send route reply(RREP) if a valid route is available otherwise it broadcast (RREQ) to other nearby nodes, this process will continues till the destination node is reached. During this process each intermediate node will store the address of the neighboring nodes for reverse routing table for the first RREQ is received while repeated RREQ is discarded. The sequence number & broadcast ID is maintained by each node so that broadcast ID is incremented for RREQ which has broadcast ID & IP address of source for identification of unique RREQ having its own broadcast ID & sequence number.

2) Once the valid route is discovered as RREQ reached the destination, it unicast a RREP packet to the node who sent the first RREQ packet. The forward path is set up by the nodes during the RREP phase in the routing table.

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3) The route is maintained by Hello packet which is broadcasted by each node periodically to its neighborhood to detect the transmission of packet is going on over the network or not. If any issue is found by source node then it starts again the route discovery process for an alternative path.

IV- SIMULATION RESULTS

In this result we implemented the simulation of AODV protocol and indicated its performance by real images for throughput. Fig 3. Shows how the nodes are deployed in green color, the source & destination node in red color between which the transmission takes place. Fig 4.Shows the establishment of shortest route in pink color & alternative path in light green color, whereas the throughput in green colors how the energy efficiency in CRNs during the transmission of packets in shortest path as well as alternative path.

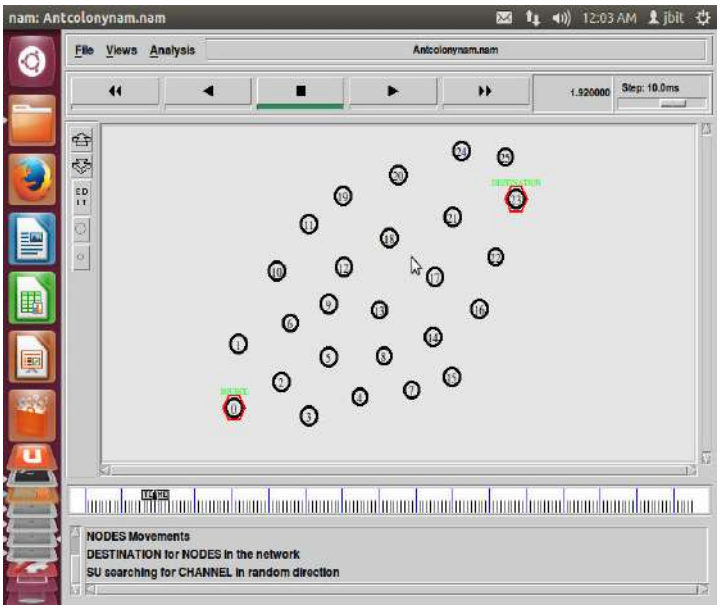

Fig3. Deployment of Nodes

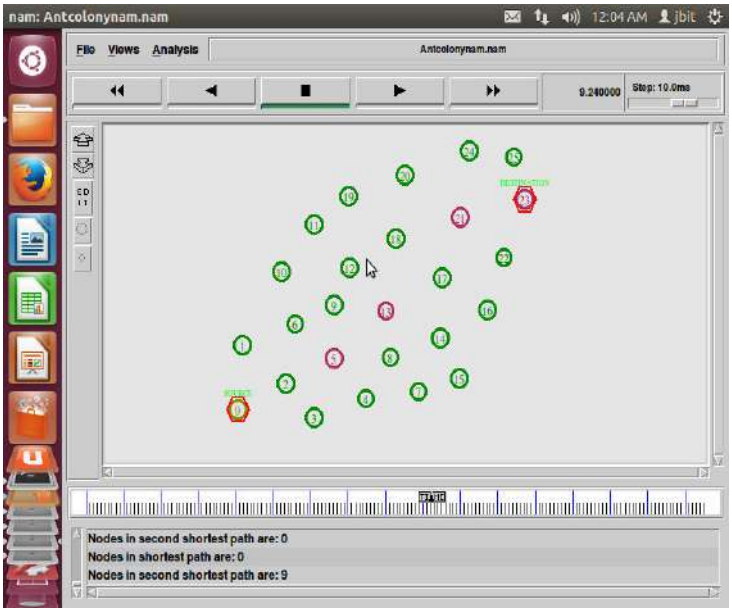

Fig 4-Establishment of First Path.

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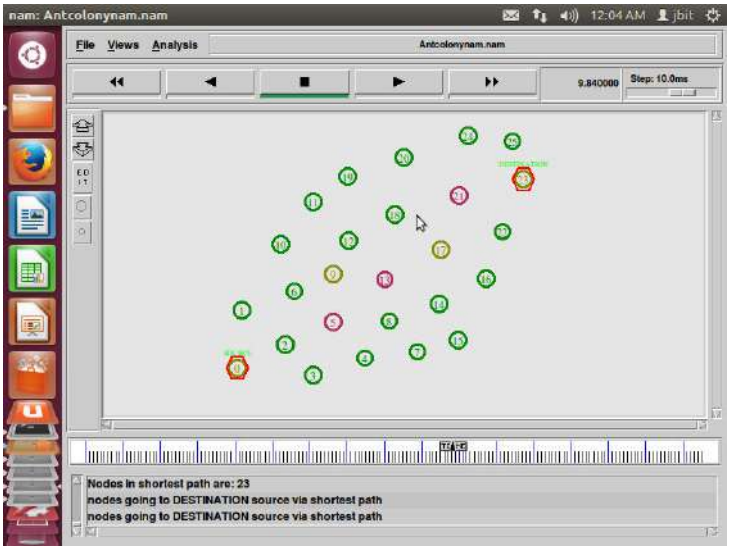

Fig5. Establishment of Alternative Path

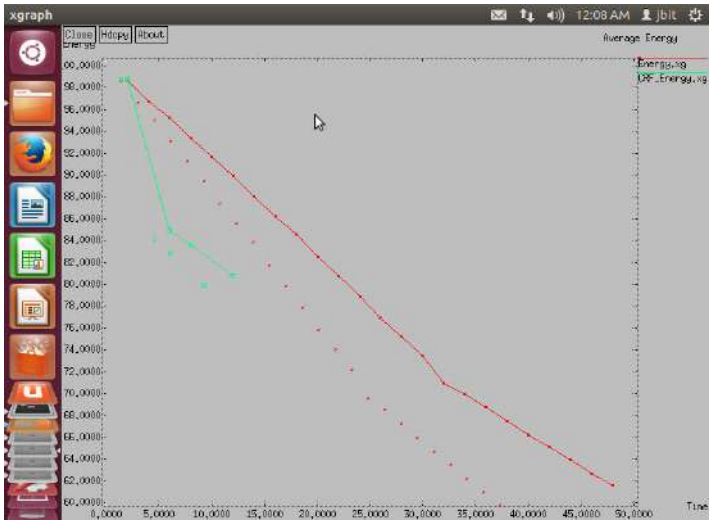

Fig 6.Throughput

V- CONCLUSION AND FUTUREWORK

The main objective of the work is to maintain network life time in maximum, while data transmission is achieved efficiently. This solution improves actively the life time network of the CRNs. The experimental results showed that the algorithm leads to very good results in different CRNs scenarios. In future work, the proposed routing protocol can be further enhanced successfully for high mobility nodes by deciding some appropriate CRNs parameters, routing network with multiple sink nodes, and topology changes in such energy constrained environment.

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An Emotion Analysis Based Face Recognition Framework Using Artificial Neural Network

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Abstract – *This paper presents a study of face recognition framework and artificial neural network for the application of emotion analysis. The proposed system is implemented using matlab and this system shows good results.*

.Keywords- Matlab, Dct, Neural Network

I -INTRODUCTION

1.1 Overview

This Section gives a complete description of the propose model and procedure useful for the performance execution of this research. I also specify things that how to handle the tools and techniques to be invented for implement of an emotion analysis based face recognition framework in MATLAB. The objective to use MATLAB is that this invention required an Image processing tool and MATLAB has a convenient way to design a code for Image processing and create a Neural Network.

1.2 Face Image Processing

For obtaining face images required a digital camera, these images pre-processed prior to become an input image for neural network. The phases of facial Image processing through diagrammatic representation as illustrates in fig. 1.1.

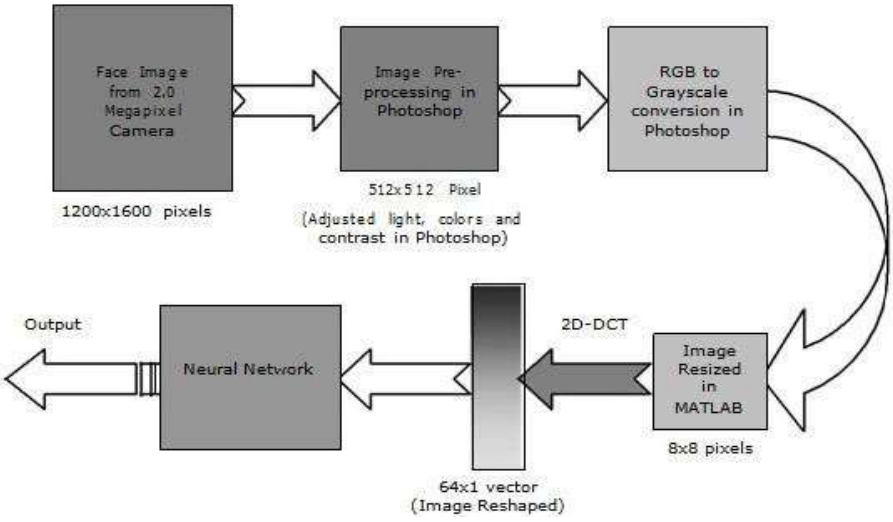

Fig. 1.1: Face pic process structure

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1.3 Proposed Model

1. Image Collection: Face images of distinct people were captured by minimum 2.0 megapixel digital camera inconsistent light surroundings and bright backdrop for the training database. After cauterization, all face images are stored in to computer. Every face image dimension must be correspondent to 1200 x 1600 pixels. In the same way, five furthermore image of each person with unlike facial emotion were obtain. The five facial emotions considered as of: "*neutral*, *happy*, *sad, angry* and *smiling"*.

2. Image Resize using MATLAB: When every sampled face image imported into MATLAB; now, it's time to resize mages again as 512 x 512 pixels to *8 x 8 pixels*. To perform this task the command ***imresize***was run in MATLAB to on stored images one by one as shown in figure 1.2.

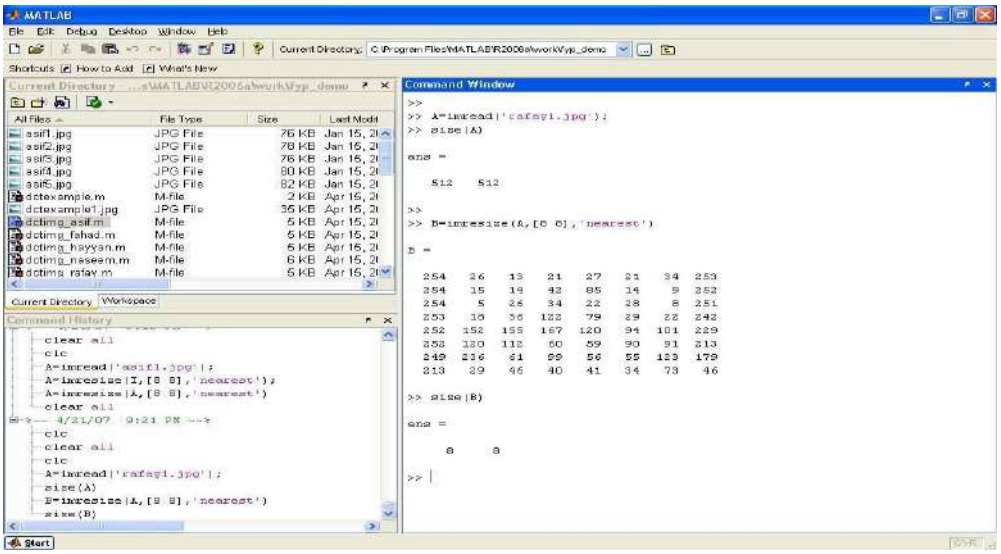

Figure 1.2: Resize picture from 512 x 512 pixels to 8 x 8 pixel

When the procedure of resize has been completed than all face images we restored with unique filenames. For this operation, run***ic write*** command in the MATLAB. Figure 5.3represent the phenomena of storing face images with unique filenames.

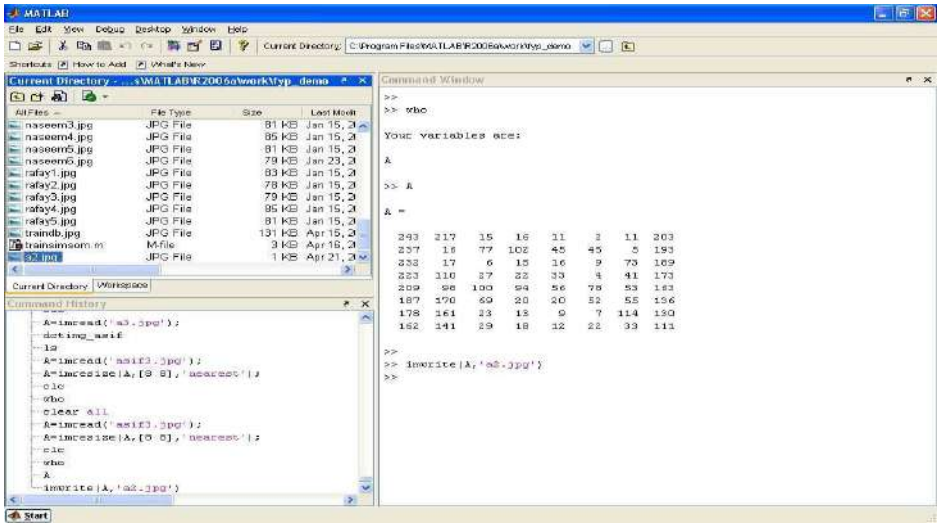

Figure 1.3: Store resized face images with unique filenames

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3. DCT Image compression: Later than image resize the upcoming stage was to compress them with the help of 2D blocked DCT. The high-coefficients of face image are leftover after 2D-DCT is used with a mask. In that case the 2D-IDCT is used to reproduce the compressed picture. This newly compressed image blurred competitively because the quality of image decrease as it lesser in size.

The MATLAB image processing toolbox was used to establish a source code for DCT image compression, after some modifications it applied on all face images.

When the DCT program established in MATLAB help was personalized as per the DCT functions and the masking host was place up to 8 coefficients and each and every face images were compressed by applying the DCT. The latest compacted face pictures were also stored with a unique filename.

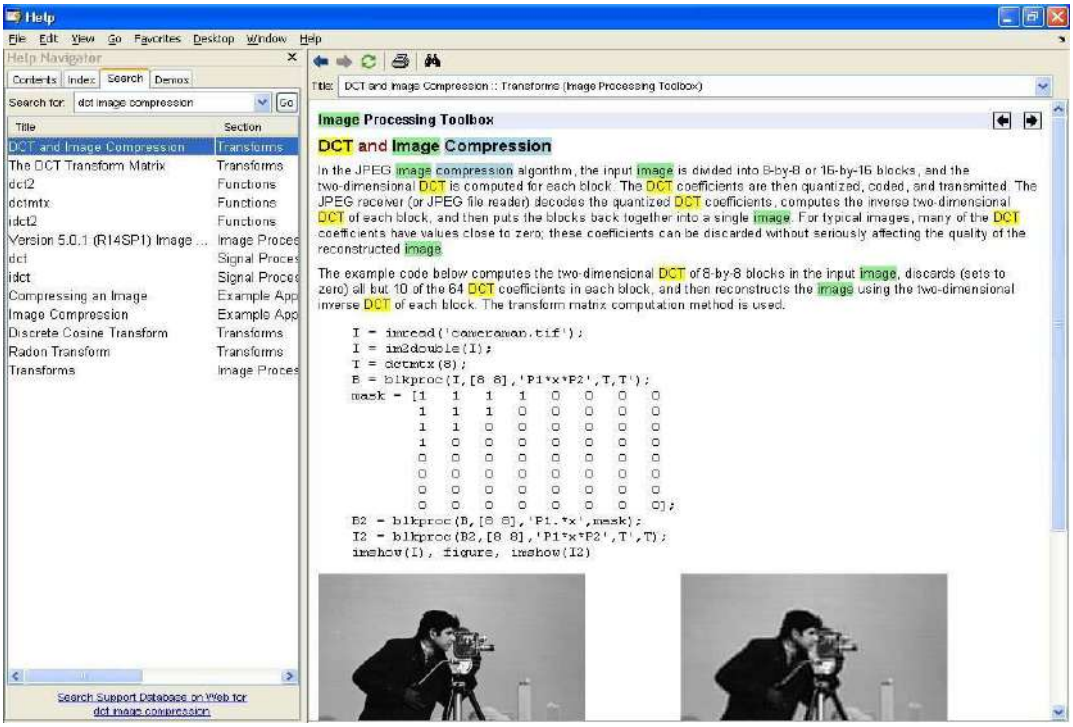

Figure 1.4: DCT picture compression program found in MATLAB

```
mask = [1   1   1   1   0   0   0   0
        1   1   1   0   0   0   0   0
        1   0   0   0   0   0   0   0
        0   0   0   0   0   0   0   0
        0   0   0   0   0   0   0   0
        0   0   0   0   0   0   0   0
        0   0   0   0   0   0   0   0
        0   0   0   0   0   0   0   0];
```

Figure 1.5: DCT masking matrix – 8 coefficients selection

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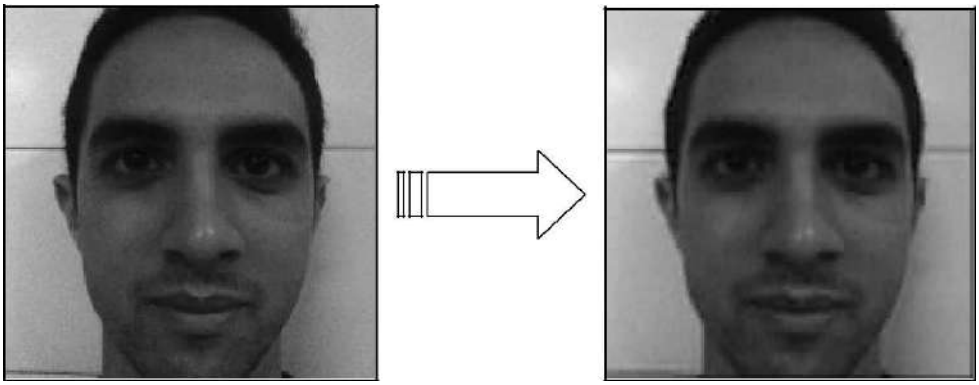
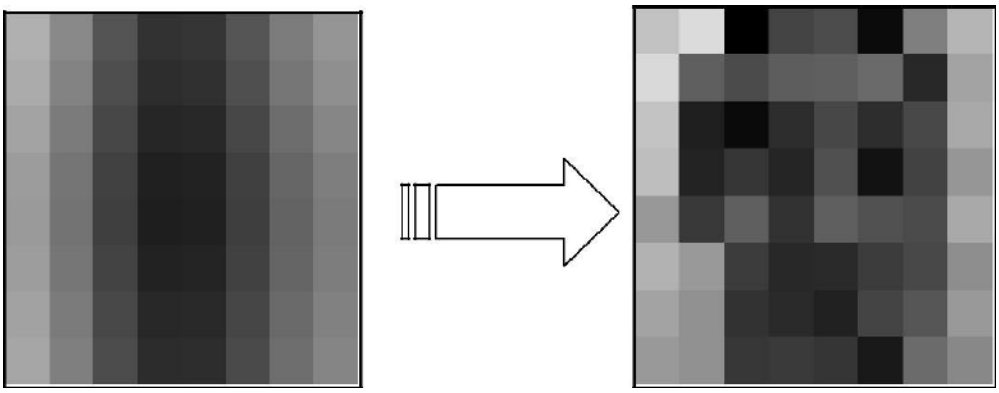
The input pictures to be present in Fig. 1.6 both are changed. The program was executed individually, for every sampled image which was to be compressed. Figure 1.6represent an example of un-resized compressed and uncompressed face picture in 512 x 512 pixels where as resized compressed and uncompressed face picture in 8 x 8 pixels are illustrates in Fig. 1.7.



(i) Original face pic *(ii) DCT compressed face pic*

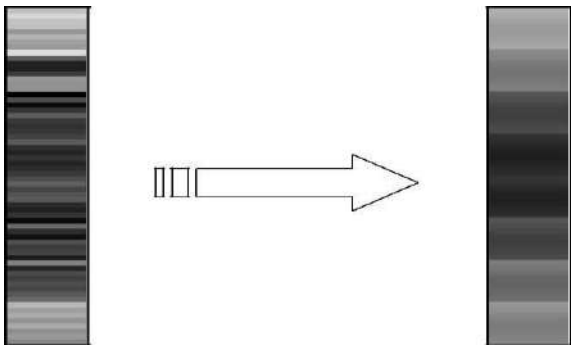
Figure 1.6:Ex. of un-resized face picture in 512 x 512 pixels



(i) Original face pic *(ii) DCT compressed face pic*

Fig.1.7: Final resized face pics in 8 x 8 pixels

4. Image Data Reshape: After completion of DCT image compression phase the final resized image in 8 x 8 pixels are ready to be input into the neural network, it must attend the order of *only one column*, notwithstanding the no. of rows. Therefore, it is essential with image data should be disposed from an 8 x 8 pixel to a *64 x 1 array* form. It is used in both operations as of input and training database of the neural network. The reshape task performs by run ***reshape*** command in MATLAB. The compressed pictures data disposed from an 8 x 8 matrix to a 64 x 1 array are represented in fig. 1.8.Simultaneously every sampled image was converted into a 64 x 1 array.



(i) Original face pic *(ii) DCT compressed face pic*

Figure 1.8: Real pic data of Figure 1.7 reshaped in a 64 x 1 array

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1.4 Neural Network Design

At the starting of research planned design technique was Radial Basis Function (RBF) Neural Network but it was botched to provide correct output for an inexpert input image through varying facial appearance. Due to failure of RBF, take a chance by applying Fuzzy C-Means (FCM) Clustering. But, FCM also was unsuccessful to provide perfect outcomes for image data management and face recognition. Later than some swot of previous research, I found that the Self-Organizing Maps (SOM's) is perfect technique to design a neural network applied for face recognition and it is traditional because enhancement over data overseeing and neural network precision.

1.4.1 Self-Organizing Maps

Some swot of work, SOM has been created using MATLAB command "*newsom*" and it is essential for image data processing. It also proved as a correct identical technique of untrained input pics with reference of trained database of pics. In favour of SOM Neural Network design, collect of 25 face images, "five dissimilar people in five unlike facial appearance", imported all images into MATLAB for training database.

There were 1024 maximum and 1024 minimum points chosen in total. When the SOM neural network was formed, it was trained only for 1000 epochs. The training of "SOM neural network" for 1000 epochs as illustrates in fig. 1.9.

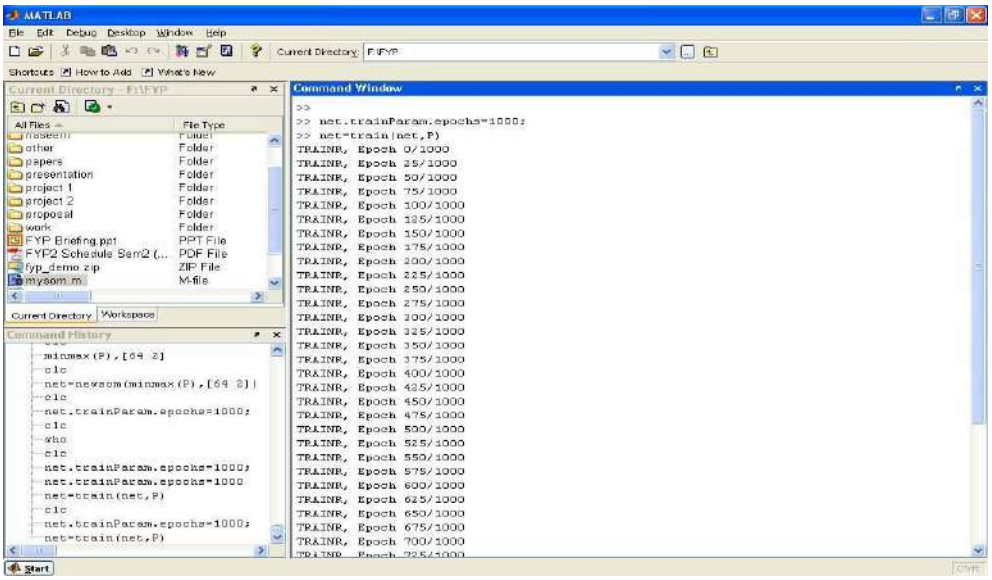

Figure 1.9: SOM neural network training for 1000 epochs

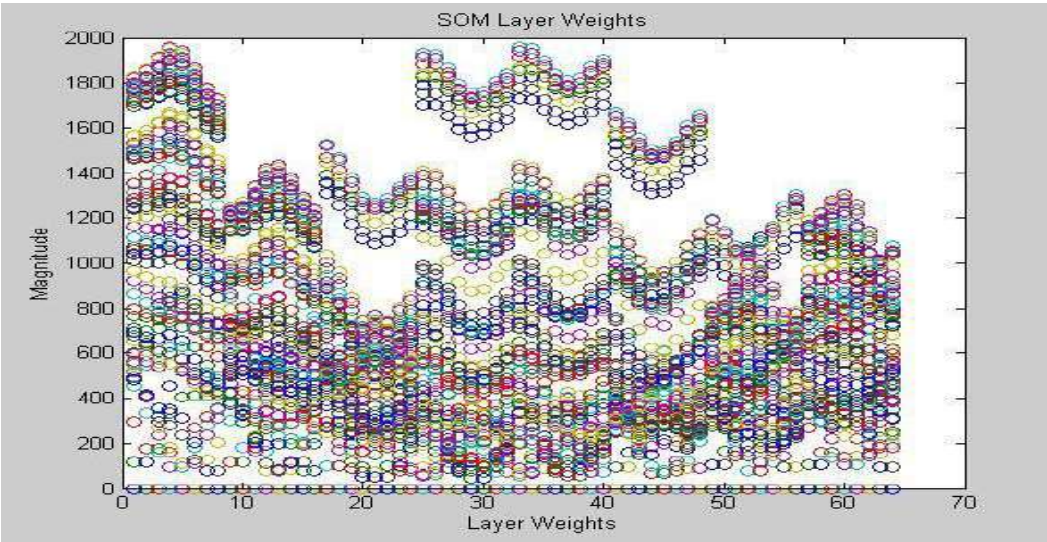

Figure 1.10:SOM layer weights for 25 face pictures in the training database

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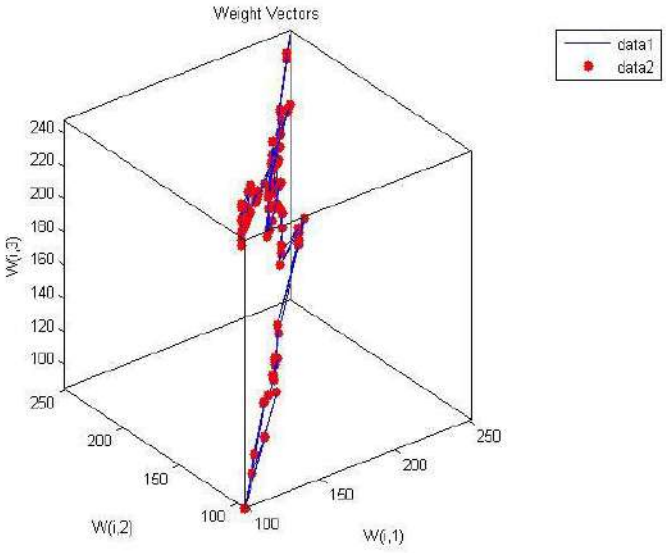

Figure 1.11: SOM weight vectors

Once, SOM neural network training process has been completed successfully thannetwork was simulated for all trained images.

1.5 CONCLUSION

At beginning of blueprint and execution phase, the 2D-DCT in MATLAB is victorious. It was applied to compressed data pics and decrease pic size as well as loss quality. At the starting wished-for design technique of RBF networks but it botched to be acquainted with untrained face images among the varying facial emotions. At last SOM verified to be greatly correct besides recognizing data images belonging an analyze is of a training set of 25 face pics, trained by 1K epochs for both trained and untrained input face pics with unlike facial emotions

1.6 VALIDATION AND EXPERIMENTAL WORK

In this section, provide a complete description of SOM neural network, validation for a diversity of trained and untrained set of images and the exploration task perform an optimum result to achieve an immediate emotion analysis.

1.6.1 Neural Network Authentication

A number of tests were performed with both kinds of input face pictures as trained and untrained for unlike faces having dissimilar motions are responsible in the validation of the SOM neural network.

1.6.2 Trained Face Pictures

At the beginning, perform a test on SOM neural network to check whether it is validated or not. For this experiment, consist of five different face images taken as training database, represent in Figure 1.12.

Figure 1.12: Trained face images of five person

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The SOM neural network provides an accurate answer for every trained face images as present Figure 1.12. If an image comes up and it is absent in the trained image data set. In this situation, the classification division gives an error. This error was removed by accumulating an additional ***else*** declaration as, ***subject not found in database***.

1.6.3 Untrained Face Pictures

As also required some untrained face images, these images are illustrate in Figure 1.13. For untrained face images, experiments perform many times and every time SOM neural network produced accurate result for all untrained face images accept the images which are not available in the trained data set. This is validating the correctness of the SOM neural network for face pics of individual person.

Figure 1.13: Untrained input face images

For improved SOM neural network validation an ultimate training data set of 5 face images of distinct facial emotion was developed. The faces in the untrained input pics matched perfectly with the similar face available in training database with distinct facial emotion. An untrained pic was input into the SOM neural network for simulation. Figure 1.13 shows the structure for the untrained face image validation

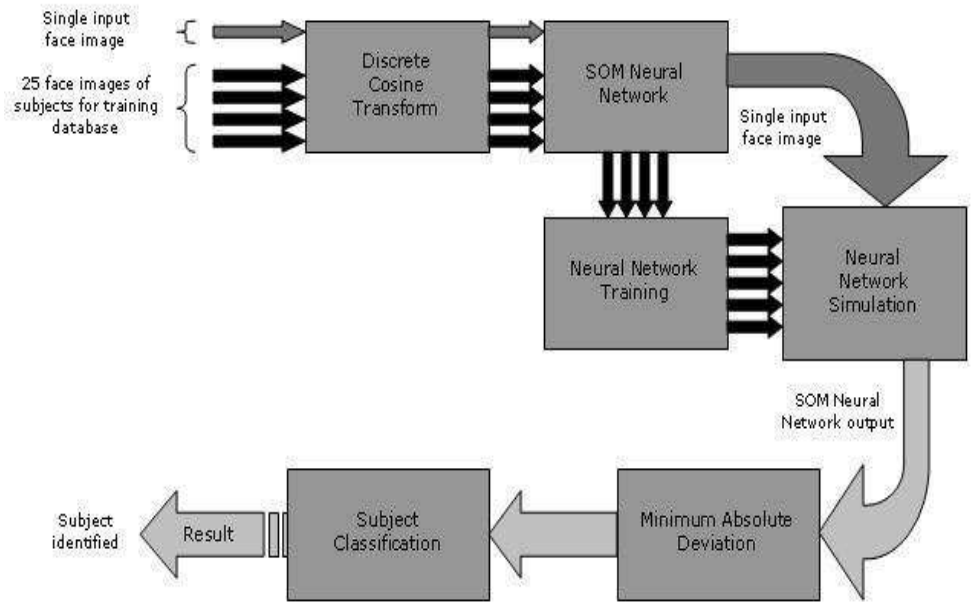

Figure 1.14: Simulation phases for untrained face images

The training database include of 25 images of 5 individual person, all person having 5 different face pics with discrete facial emotion as present in Figure 6.4.The untrained images represent in Figure 1.12 consider as input face image are simulated in the SOM network corresponding with trained database in Fig.1.15 for 1K epochs. The untrained input matched by concerning pic of the similar subject in the training database, producing an accurate result. After that take another Input face images, the network was simulated frequently and the SOM neural network produced accurate result for overall experiment.

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Figure 1.15. Training databases of 5 people with 5 distinct facial emotions

So, the tests explained yet and additional authentication tests conducted, the SOM neural network authentication demonstrate that the used face recognition method to be perfect for untrained face pics having distinct facial emotion.

1.6.4 Experimental Outcomes

Experiments are accomplished for the training and testing of frontal face pics. We measure out the overall performance of proposed algorithm with the usage of our database. The data (faces) inside the database used for training and testing are the face pics taken in a controlled environment of different illuminations. Fifty person faces were captured using a digital camera .Each person has five (5) pictures having distinct face emotions and illumination as present figure 1.16.

Figure 1.16 (a) Results after application of algorithm

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Figure 1.16 (b) Results after application of algorithm

Figure 1.17 (c) Results after application of algorithm

Table 1.1 Output produced with varying the no. of epochs

Number of face pics	Face matched correctly	Face miss-matched	Recognition rate (%)
10	10	0	100
20	19	1	95
30	25	5	83.33

1.6.5 Discussion and Analysis of Result

There is validation tests conducted on trained data set in part1.1.2 and on untrained data set in part1.1.3also validate the correctness of the SOM neural network and whole face recognition framework. These test outcomes verify that the face recognition framework developed has optimal correctness for face pictures using distinct facial emotion under identical illumination and bright backdrop.

These test outcomes enhance the neural network to achieve an emotion analysis based face recognition framework and also establish the lenity of noise rate of the neural network input that a program can tack earlier than execution of incorrect output. The efficiency of both face recognition and emotion detection can be increased by increasing theno. of pics during training. The emotion detection time is remarkably less and hence the framework yield less run-time along with lofty efficiency.

As the above discussion of test results intimated and the analysis of previous experimental work, it can be conclude that the blueprint and execution of an emotion analysis face recognition system has been efficiently accomplished as the main goal of this research.

1.7 CONCLUSION AND RECOMMENDATIONS

Conclusion

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- After design and implementation, it is to be concluding that the use of 2D-DCT in MATLAB was victorious to design a face recognition system. It helped to compress face images and decreases image size and quality. The primarily recommended design method for image compression and emotion detection among distinct facial emotion has been completed efficiently.
- Self-Organizing Maps (SOM's) has been used due to the incompatible of FCM. The test result validate that the developed face recognition system has optimal correctness for face images using distinct facial emotion under identical illumination and bright backdrop.

1.8 SUGGESTION FOR FUTURE RESEARCH

On the behalf of extensive review and exploration, suggestions for up gradation and expansion of the face recognition framework are as given bellow:

- Researcher may use Discrete Wavelet Transform (DWT) instead of DCT because it may be better algorithm for image compression which may take less processing time than the DCT with greater compression ability.

- The least quantity of image pixels contributes the most correct SOM neural network; it may be possible to decrease the block size as per decreasing the no. Of pixel for an input image.

- A set of 25 face image, 5 individuals with 5 dissimilar facial emotions for the training database has taken. In future it may be simulate for more trained images.

All above constituents will attain the minimum time for image processing and generate an emotion analysis based face recognition system with uppermost accuracy. In future this work will be implementing on android system for authentication. Dynamics of expression is likewise no longer examined on this review. It'd be exciting to discover the system included with motion features from distinct facial patches.

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In A Wireless Sensor Network, the Ant Colony Mechanism Enhancement

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Abstract:- *A wireless sensor network, also known as a WSN, is a type of network that is made up of a large number of autonomously distributed nodes. In WSNs, this is referred to as data dissemination or reprogramming. They are frequently used for controlling environmental parameters. Because almost all WSNs are deployed in hostile environments and cannot be manually reprogrammed, dissemination protocols are essential. Over time, a variety of data dissemination protocols have emerged, each of which contributes to the dissemination of program code, configuration parameters, queries, commands, bulk data, and so on. The goal of this work is to present a novel and adaptable intelligent routing scheme for wireless sensor networks in this paper. The main goal of sensor network research is to extend the network's lifespan as much as possible the shortest and optimal path between source and destination*

I- INTRODUCTION

Wireless sensor networks are a new field that combines communication, computation, and sensing in a single small device. These devices extend the reach of cyberspace into the real world by forming a sea of connectivity through advanced mesh networking protocols. The connectivity of mesh networking will hop data from node to node in search of its destination in the same way that water flows to fill every room of a submerged ship. Even though a single device can only do so much, a collection of hundreds of them opens up a world of new technological possibilities. The ability to deploy a large number of tiny nodes that can assemble and configure themselves is what gives wireless sensor networks their power. Adaptation mechanisms can respond to changes in network topologies or switch the network's modes of operation dramatically. The organization could then guide laborers to the most secure way for crisis departure. Current remote frameworks just start to expose prospects arising out of the incorporation of low-power correspondence, detecting, energy capacity, and calculation.

Wireless Sensor Network Communication Network Architecture:

We have chosen the following three application categories: sensor node tracking, security monitoring, and the collection of environmental data. We anticipate that most deployments of wireless sensor networks will follow one of these class templates.

A canonical application for environmental data collection is when a researcher wants to identify trends and interdependencies by collecting multiple sensor readings from a set of points in an environment over time. This scientist would like to offline analyze the data collected from hundreds of points scattered throughout the region. The researcher would be keen on gathering information more than a while for years to search for long haul and occasional patterns. The nodes would remain at their known locations, and regular data collection would be necessary for the data to be meaningful. The environmental data collection application is characterized by a large number of nodes constantly sensing and transmitting data to a set of base stations that store the data using conventional methods at the network level. In most

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cases, these networks require extremely long lifetimes and extremely low data rates. The nodes will be evenly distributed throughout an outdoor environment in a typical usage scenario. While the distance across the entire network will be significant, the distance between adjacent nodes will be minimal. After sending, the hubs should initially find the geography of the organization and gauge ideal steering procedures. The data can then be routed to a central collection point using the routing strategy. It is not necessary for environmental monitoring applications for the nodes to independently develop the best routing strategies. Instead, it might be possible to figure out the best routing topology outside of the network and then send the information to the nodes when it's needed.. Environmental data collection applications typically use tree-based routing topologies where each routing tree is rooted at high-capability nodes that sink data. Up the tree structure, data is periodically transmitted from child node to parent node until it reaches the sink. When using a tree-based data collection method, it is the duty of each node to forward the data of all of its descendants. Leaf nodes transmit significantly less data than nodes with many descendants. These nodes may quickly develop into energy chokepoints.

After the network is set up, each node sends data from its sensors up the routing tree and back to the base station on a regular basis. The time between these transmissions can be minutes in a lot of situations. It is anticipated that typical reporting times will range from one to fifteen minutes; while networks may have reporting rates that are significantly higher. Temperature, light intensity, and humidity—common environmental parameters being monitored—do not change sufficiently frequently to necessitate higher reporting rates..

Ant Colony Optimization (ACO)

This algorithm uses the conduct of the genuine ants while searching for the food. It has been watched that while venturing out from its home to the sustenance, theants store a certain measure of pheromone in its way.
Again while returning, the insects are exposed to follow a similar way set apart by the pheromone store and again store the pheromone in its way. As a result, the ants that travel the shorter path are anticipated to return earlier and, as a result, accumulate pheromone deposits in their path more rapidly than those that travel the longer path. The ant's behavior serves as ACO's source of motivation. These ants leave pheromone on the round to indicate a favorable route that other colony members should take. The ways visited by the insects regularly are kept as set apart by the pheromone store while the ways seldom visited by the subterranean insects are lost due to the absence of pheromone store on that way
The specialists are independent substances and have capacity to adjust, participate and move astutely from one area to the next in the correspondence organization. Ant agents come in two varieties: Ants that move forward and ants that move back

LITERATURE REVIEW

A combinatorial optimization problem could be the optimization of network parameters for the WSN routing process in order to maximize the network's service life. Numerous specialists have as of late concentrated on the aggregate way of behaving of organic species, for example, subterranean insects as a similarity giving a characteristic model to combinatorial enhancement issues. Several ant-based routing algorithms have already been proposed. The vast majority of them depend on the idea of subterranean insect State Streamlining Calculation (ACO), which is a meta-heuristic methodology for taking care of computational issues in view of likelihood strategies.

Problem formulation

Due to the distinct characteristics that distinguish WSNs from other wired and wireless sensor networks, routing is a challenging task in WSNs. Wireless links are unreliable, sensor nodes may fail, and routing protocols must meet stringent energy-saving requirements. As a result, the routing procedure in wireless sensor networks is significantly different from that of conventional fixed network routing. Even though WSNs are used in a lot of different applications, they still have a few limitations, like a limited supply of energy and limited capabilities for computation and communication. Many end-to-end device and MANET routing schemes have been deemed unsuitable for WSNs as a result of these unique considerations. To ensure maximum network lifetime in sensor networks, energy consumption minimization is regarded

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as a major performance criterion. While considering energy preservation, steering conventions should be illustrated to accomplish adaptation to non-critical failure too in correspondence.

Objective

- The objective of the work is to provide a novel and adaptive intelligent routing scheme for wireless sensor networks.
- The major objective of sensor network researches is to maximize the network lifetime.

To achieve the shortest and optimal path between sourceand destination

PROPOSED WORK

A protocol that is based on the way ants forage for food has been proposed in this work. We have observed how ants return to the nest from their food source. The shortest distance from the nest is typically taken by the ants on their journey. Insects start from their home and go looking for food. At the point when a subterranean insect finds its food, it makes a trip back to its home in the very course that it came in. When these ants travel, they leave behind a substance called pheromone on the ground. Because pheromone is a volatile substance, its concentration gradually decreases. The path with the highest concentration of pheromone is chosen by other ants that detect this pheromone. Pheromone is also left behind by these ants as they return.

Since more ants would have traveled the shorter path than the other ones, the concentration of the pheromone there would be higher. An ant takes all of the paths equally likely at first and has no preference for which one to take. But after a certain amount of time, the ants would choose the path with the most pheromone concentration. Since there would have been more ants traveling this route than any other, it would be the shortest route and other path in a given time interval. The proposed ant based routing algorithm has several properties which makes it ideal for the above specified requirements.

The following is the proposed approach:

- Deploying the nodes is the first step.
- Forward ants and backward ants are the two types of nodes that are present.
- From the Ant Colony, the Forward ants travel to the food source.
- This process of searching continues until the food source is found.
- Presently In reverse insect specialists start venture towards insect settlement.
- When the Backward agents reach the Ant Colony, the shortest route to a food source will be taken by new ants.
- The shortest route from the source to the destination will be provided by this procedure.If any node in the path is faulty due to any reason, such as hardware failure or draining of energy. then the node immediately preceding the faulty node will wait for the Faulty Node's Route Clear Message.
- In the event that the message does not arrive, the data will be stored on the node that serves as the alternative shortest path.
- The second path will now be used for data communication.

EXPERIMENTAL RESULTS

In this section, the experimental results and simulations conducted in NS2 are used to examine the advantages of the proposed method. Because there is a reduction in energy use, the findings of the experiment are quite valid.

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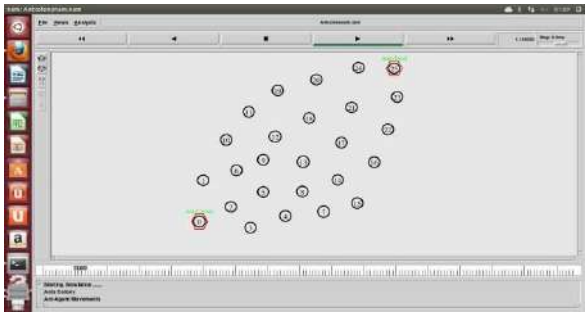
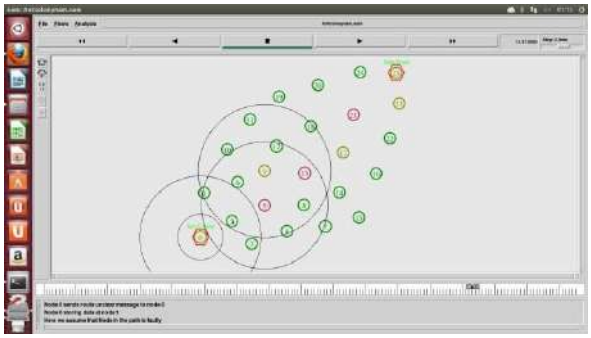


Fig. 1 shows the wireless sensor nodes in a network.The node-0 is taken as Ant Colony and node-25 is takenas the food source. The ant agents have to reach from node-0 to node-25 via shortest path.



In fig. 2 the forward ants are forwarded towardsthe food source. The routing is taking place.

CONCLUSION AND FUTURE WORK

In this work, a routing algorithm based on ant colony optimization has been proposed. The main objective of the work is to maintain maximum network life time while efficiently achieving data transmission. In WSN, the life time network is largely dependent on the density and rate of communications of sensors, which affect the battery level and the network. This arrangement further develops effectively the existence time organization of the WSN. The experimental results demonstrated that the algorithm produces excellent outcomes in various WSN scenarios. By selecting the appropriate WSN parameters, creating a routing network with multiple sink nodes, and altering the topology in such an energy-constrained environment, the proposed routing protocol can be successfully enhanced for high mobility nodes in subsequent research. In addition, the work can be examined in a real-world setting and its performance evaluated using a variety of scenarios.

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Emerging Sustainable Technology Needs: India's Solar PV Development

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Abstract:- *India is one of the top five countries in the world for solar power generation in the green energy revolution. Solar cells, often known as photovoltaic (PV) cells, are active photoelectric systems that convert light to energy. Using semiconducting materials and the photoelectric effect, small panels are created. When sunlight strikes the panel, the material, which is typically silicon with the possibility of other polycrystalline thin films, generates direct current. All across the world, PV cells are a success. Under typical test conditions, commercially available PV panels are roughly 22.5% efficient at converting sunlight into electricity, but they can still function at about 80% of their maximum capacity even under partly cloudy situations. India has access to solar radiation for more than 300 days, which is comparable to 3,000 hours of sunshine.*

Solar energy is being promoted as a means of achieving the planetary mission in applications like street-home lighting systems, solar lanterns, PV power plants, water heaters, solar cookers, agro-photovoltaic pumps, large solar arrays, and solar-powered portable lighting devices, rooftop panels, pedal-powered classrooms, green parks, green cities, standalone and grid structures, etc. Since land and building expenditures are not included, the capital investment in the establishment of a solar unit is not very high. The units' machinery is made in suppliers' or nearby engineering workshops. Installing the plants is possible in communities with a catchment for small-scale industries. The use of solar in developing, fabricating, producing, laying out, installing, operationalizing, and maintaining agro-systems is little supported by research and development, despite the fact that India has the second-largest rural agro sector in the world.

NISE, SEC, MHRD, and NGOs have put a lot of effort towards this research at ICAR Institutions. The lack of tangible effects, however, might be attributed to low risk tolerance, a lack of internal resources, and limited availability to solar energy in the regions where these entrepreneurs operate. The current state and future demands for technological advancements and management expertise in the areas of increased solar power extraction efficiency, increased fill factor, improved MPP tracking, value added techniques with applications, and general modernization of solar PV processing, storage, and marketing, etc. have been mapped and discussed in this presentation.

Index Terms — *Photovoltaic, Green energy revolution, agro-systems, solar power extraction efficiency, improved fill factor, MPP tracking.*

I- INTRODUCTION

The development and delivery of payload energy systems worldwide are centered on sustainability. Productivity despite difficulties in the social, economic, and environmental domains is referred to as sustainability. The utilization of RETs (Renewable Energy Technologies), which are crucial to worldwide development, determines the cornerstone of the current sustainable structure. In its broadest sense, sustainability refers to observing boundaries, being aware of how the economy, society, and environment are interconnected, distributing resources and opportunities fairly, and utilizing renewable energy sources. Although there are many RETs, including solar, wind, ocean, geothermal, biomass, and waste energy, solar has the largest energy potential because it is the most prevalent. The usage of solar appears to be increasing steadily by 20–25% in the investment sector, making it the largest contributor among RETs.

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It is employed in home heating and cooking. Solar PV generates power by utilising solar cell modules that absorb light and emit photons. Solar hydro uses water or perennial streams to produce energy and heat. PV flexibility is chosen on a commercial scale because it simplifies technology and facilitates straightforward production. PV is employed in grid applications that use battery banks and standalone residential structures that don't need battery storage.

Considering that they are environmentally benign and emission-free, PV systems offer safe investments. PV has several uses outside of just business and agriculture, including environmental sustainability on a personal level. Case studies show that India is successfully utilising its enormous solar potential for energy companies. Subsidised institutional partnerships with BHEL, Tata BP, and NGO's have acted as a stimulus for the expansion of solar PV. Numerous prospects for PV developers are presented by the Jawaharlal National Solar Mission (JNNSM) in India. India's fast expanding primary energy and electricity needs, the country's ongoing energy imbalance, the nation's excessive reliance on coal for electricity generation, and on oil and gas imports (amounting to 7% of its GDP) are just a few of the country's specific PV drivers.

Numerous categories can be used to categorise solar applications. Power supply generation and distribution are crucial when it comes to electricity. Small rooftop panels that connect to the grid to describe power utility over campuses are paralleled by solar energy and trigger power supply in residences. Agricultural solitary or Monedo solar pumps are used to water enormous farm grounds spread over vast areas or water distillation used for home purification. The portability of panels increases domestic applications in consumer goods significantly. Another selling point is the use of modern beauty crafts and electronic gadgets in lighting systems. Interesting new products on the market include backpacks, umbrellas, and clothing with solar panels integrated. Whether facing east or west, from hills to plains, solar energy is being captured in the form of greenhouses to produce fresh veggies all year round. In isolated places, solar chargers, regulators, inverters, projectors, and street lights serve as the structural support for illuminating terrace lands or fences. A direct connection between energy and resources is being brought about via solar cities and villages. In an effort to meet the ambitious goal of delivering 20,000 MW of grid-connected solar electricity by 2022, several initiatives are being evaluated. Along with this, efforts to lower the cost of electricity generation through solar tariffs are a new topic in R&D.

PRESENT STATUS AND CHALLENGES

The high pace of GDP growth in India has led to a high demand for energy, yet there is not enough supply to meet this need. being amongst sunny regions of the world receives 4 to 7 KWhr of solar radiation per square meter per day with 250 — 300 sunny days in a year. Even though India's installed power generation capacity was 905 MW as of March 31, 2012, as shown in Fig. 1, solar energy only makes up a very small portion of that capacity.

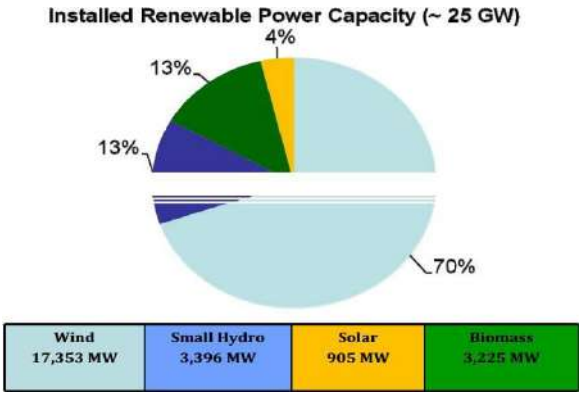

Fig. 1 Installed Renewable Energy Capacity

As seen from the distribution above, solar energy is not being used as effectively as it may be in India despite its abundance. As previously mentioned, the National Solar Mission is a significant project of the Indian government and state governments to support environmentally friendly growth utilising solar energy and address India's energy concerns. The promotion of solar energy technologies is one of JNNSM's primary goals. Grid tariff parity is the mission's goal by 2022. To achieve this, the mission will use the following strategies: 3 Large-scale utilisation, quick diffusion, and deployment at a scale that reduces

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costs; 4 R&D, Pilot Projects, and Technology Demonstration; and 3 Local manufacturing and support infrastructure. Figure 2 shows the plan devised by JNNSM to make photovoltaics the most significant elements of the nation's energy mix.

Application Segment	Target for Phase I (2010-13)	Cumulative Target for Phase 2 (2013-17)	Cumulative Target for Phase 3 (2017-22)
Grid solar power (large plants, roof top & distribution grid plants)	1,100 MW	4,000 - 10,000 MW	20,000 MW
Off-grid solar applications	200 MW	1,000 MW	2,000 MW
Solar Thermal Collectors (SWHs, solar cooking/cooling, Industrial process heat applications etc.)	7 million sq meters	15 million sq meters	20 million sq meters
Solar Lighting System	5 million	10 million	20 million

Fig. 2 Road map for JNNSM

Utilising PV architectures appropriate for India, the above plan's execution has already begun. Prior to 2013 data in India, 1,114 MW of solar power installations were made, bringing the total to 2,319 MW. By January 2014, OFF-grid structures totaling 200 MW had been provided by 2,208.36 MW of grid power PV systems. The implemented designs in Fig. 3-6 illustrate the various application segments indicated in the previous table.

Fig 3 -Grid Solar Plant System

Fig. 4 Rooftop Building Management System

Fig. 5 Solar Thermal Collectors

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Fig 6. - Solar Lighting Systems

All of the PV-powered devices shown above depend on the solar cells used to make the panels. Emerging trends suggest using thin film solar cells, like those used in India, in PV panels whose wafer width, cell efficiency, and more absorbent qualities give adaptable features in production processes. However, Table 1 lists problems for various categories of solar cells. It provides an overview of the many solar cell types used in the production of PV panels and the difficulties they provide.

Table1 - Solar cells types and challenges

S.N.	CATEGORY	TYPE	CHALLENGE
1	Silicon	Single crystalline	Manufacturing, Quality improvement
		Polly crystalline	
		Amorphous	Junction Multiplication
2	CompoundThin Film	III-V (GaAsInP)	Ban G control, Junction
		II-VI (CdTe/CdS Cu_2S/CdS)	J Multiplication
3	Organic	Pentacene Phthalocyanine Merocyanine	Structure, development of the device, multi-junction.
4	Photochemical	Dye sensitized	Development of thematerials
5	Inorganic	Quantum dots	Synthesis and preparation

There is insufficient production of solar cell panels. It is also necessary to justify terminology used to describe solar cells with high efficiency. Table 2 lists many terminology that must be understood in relation to solar cells.

Table2 Solar cells high efficiency managed parameters

S.N	PARAMETER	DESCRIPTION
1	Solar power extraction Efficiency	The ratio of maximum power to the product of the input light irradiance and the solar cell surface area.
2	Fill Factor	The ratio of maximum power delivered by panel to standard power conditions.
3	MPP (Maximum Power Point)	The operating point under which solar cell generates maximum power.

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Thus, only when the aforementioned three elements are adequately handled and combined into solar cell panels will the future need for PV be viewed as the most ideal exhaustless long-term source. Research is progressing on ways to encourage solar cells to produce more energy at a cheaper cost. It is possible to track out outstanding results by recognizing SWOT for the PV business.

SWOT ANALYSIS FOR PV INDUSTRY ININDIA

After reviewing numerous applications based on PV panels, the four main industry areas listed below can be used to determine the main obstacle to the successful completion of the sustainable standard. Below is a SWOT analysis of the Indian photovoltaic industry:

Strengths

India is likely to become a significant solar power in the future. 2. The Union Cabinet gives the go-ahead for 25 solar projects under India's SunShot programme. 3. In the Budget 2014–15, JNNSM is included with Ultra Mega Solar Power Plants in Rajasthan, Gujarat, Tamil Nadu, and Ladakh. 4. There is enough sunlight available and it can be used in settings where there is no sunlight. 5. Technology is scalable, proven, and requires little upkeep. 6. The availability of government incentives for growth and expansion, including soft loans.

Weaknesses

More infrastructure and subsidies for solar projects must be funded by the government. 2. High startup costs for a grid utility facility in terms of both capital and space. 3. Due to their need for substantial money, large businesses are often favoured. 4. Base load issues are brought on by distributed system designs. 5. Simulation designs for darkened circumstances in research and development projects are not adopted.

Opportunities

The government's ambitious goals for solar projects. 2. Easy statutory and project clearances for PV developers. 3. Thrust on Defense facilities connected to the grid. 4. Rooftop housing development in outlying locations as a priority sector with government funding. 5. To continuously keep an eye on solar programmes, the Association of Renewable Energy Agencies of States (AREAS) was established. 6. The Council on Energy, Environment and Water (CEEW) research organization creates marketable high-innovative green jobs through partnerships with public and private institutions and high-quality research.

Threats

New technology carries a high danger of becoming obsolete. 2. A drop in cash flow over the offseason. 3. Finding professionals with the necessary skills for the PV industries.

SOLAR MARKETING AREAS

ELECTRICITY GENERATION

PV captures solar energy and converts it to electricity using a tiny grid or a mega grid power plant. Rooftop or grid distribution are the divisions. Rooftop systems serve as a small power plant to supply the building's essential energy needs. They are linked to the Grid to improve performance. Here, wattage outputs of PV constructions are calculated using the number of panels. This method of electricity generation, which is distributed over a large power infrastructure, can compete to electrify an entire village as opposed to just a single solar home.

ELECTRIC APPLIANCES

Appliances like batteries, regulators, inverters and chargers for mobile phones, laptops, e-readers, tubes, mini emergency lights and electronic items run using solar panels. Solar street lights, solar lanterns, and CFLs are the most

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widely utilised types of solar lighting. Sox Lamps and solar-powered projectors are the major lighting fixtures used in modern structures. Billboards and advertising websites are both easily handled by these.

WATER SYSTEMS

Concerns about using water for drying, heating, and cooling arise from the inconsistency of timely water delivery in urban areas and non-direct supply in rural areas. The greatest alternatives to these circumstances are solar water heaters, water pumps, and sprinkler systems.

INDUSTRIAL SYSTEMS

Solar panels on top are used by the distilled water industry to distil water. Solar parabolic cookers are used in canteen catering for food preparation and baking. Solar-powered generator sets are used by small-scale packaging firms with limited supply needs. Pedalled bicycles and solar-powered electric automobiles are becoming more prevalent. On pedal-powered solar generators, clean classrooms and green schools are being prepared. In the vegetable and crop processing industries, refrigeration is also powered by solar panel technology.

COMMUNICATION TOWERS

Solar panels are placed in such a way on telecom towers, military ships at sea, and satellites for programming relay that the energy they capture is conveniently delivered for use. Compared to other modelling tools, Bharti Infratel currently has the most solar towers in India.

CONCLUSION

The constraints and opportunities of using solar energy in clean and environmentally friendly ways have been highlighted. The threats outlined must be properly tracked in order to revolutionize the reliance on solar energy. Global Pollution check and conservation of environment can be done by use of solar devices for balancing our lives.

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A Review Paper on Microwave Transmission using Reflector Antennas

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Abstract:- *The classical problem of optimization of beam-microwave power transfer systems is considered. The criterion for maximum power capture efficiency is a parabolic function of the distribution on the transmit antenna. Under such conditions, we find that the amplitude distribution is more uniform than the unconditional optimization. In this case, the radiated power of the transmitting antenna can be significantly increased by reducing the breaking power by up to 2%.*

Index Terms *— Photovoltaic, Green energy revolution, agro-systems, solar power extraction efficiency, improved fill factor, MPP tracking.*

I- INTRODUCTION

Microwave radiation can be forced through a specially designed wave shield. Microwave radiation can be scattered from the microwave antenna to the microwave beam or emitted into the environment, and the microwave energy can be collected by the microwave antenna. Microwave antennas are used to transmit and receive microwave radiation. Microwave antennas are usually an important component of microwave telecommunication structures. Microwave antennas are designed as broadband antennas or antennas for a single frequency band or frequency band. These devices usually consist of an open waveguide and a parabolic reflector or horn, and usually transmit a predetermined frequency along a predetermined path. Microwave antennas are usually made using reflectors of a predetermined shape mounted on glass to reflect microwaves. The structure and beams are supported by a frame made of tubes welded together or welded or nailed together.

MICROWAVE TRANSMISSION

Microwave broadcasting refers to the technology of transmitting information or power using radio waves with wavelengths easily measured in centimeters; this is called microwave. This part of the radio spectrum covers frequencies from about 1.0 gigahertz (GHz) to 30 GHz. This corresponds to a wavelength from 30 centimeters to 1.0 centimeters. Microwaves are widely used for point-to-point communications because their short wavelengths allow antennas of reasonable size to be directed into a narrow beam that can be aimed directly at a receiving antenna. This allows nearby microwave devices to use those frequencies without interfering with each other, such as low-frequency radio waves. Another advantage is that the high frequency of microwaves gives the microwave band a very large data-carrying capacity; It has 30 times the bandwidth of the radio spectrum below the microwave band.

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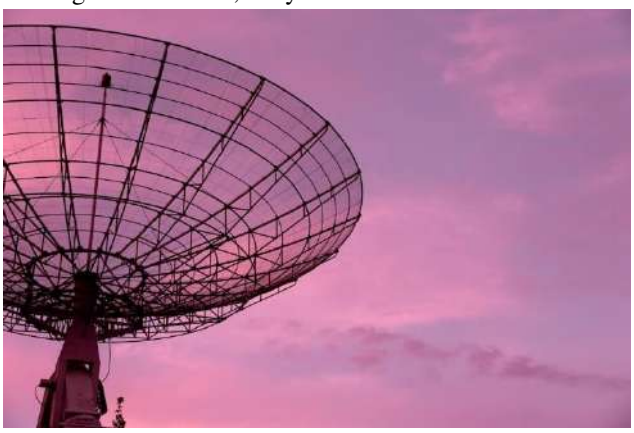
BASICS OF ANTENNA

An antenna device that converts electrical current into radio waves and vice versa. Usually used with radio transmitters or radio receivers. In a transmitter, the radio transmitter applies an oscillating radio frequency electrical current to the antenna terminal, and the antenna radiates energy from the current as electromagnetic waves. Reception, the antenna traps some electromagnetic wave power to produce a small voltage across the terminals, which is applied to the receiver for amplification.

Antennas can be used for both transmit and receive. Antennas are essential components of all equipment that uses radio. It is used in radio broadcasting, broadcast television, two-way radios, communication receivers, radar, cell phone and satellite communications, as well as other devices such as garage door openers, wireless microphones, Bluetooth enabled devices, wireless computers. RFID tags on networks, baby monitors and merchandise.



REFLECTOR ANTENNA

In recent years, with the advent of satellite television (TV), satellite dish reflectors or dish antennas have become more popular. However, antennas are often used in many radio and wireless applications at frequencies above 1 GHz where high performance RF antennas and narrow beam widths are required. In many professional applications these parabolic reflectors or antennas are also used for satellites. In radio astronomy, they are used in many microwave links and are commonly found in directional radio antennas and cell phone towers. All of these applications often require very high gain to receive very low level signals. This type of RF antenna design concentrates the available radiated power into a narrow beamwidth for transmission, ensuring that the available power spreads in the desired direction.

A satellite dish is typically used to direct microwaves into a narrow beam for point-to-point communications or radio

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positioning (radar). An antenna that guides microwaves using a parabolic reflector. To achieve a narrow beam width, the reflector must be larger than the wavelength of the radio wave. Due to their relatively short wavelengths, microwaves can exhibit desirable directional responses for sending and receiving quantitative sensations.

BASIC THEORY

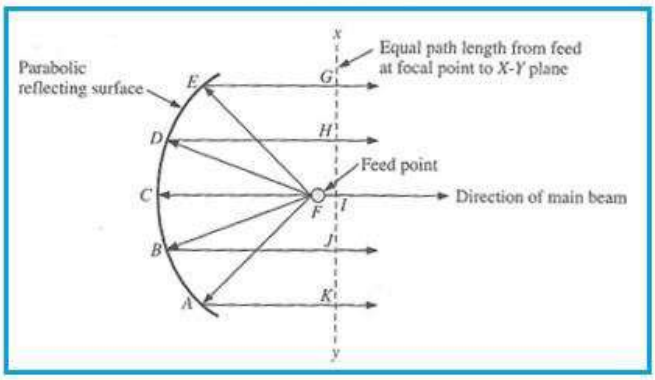
An RF antenna consists of a series of reflectors used to illuminate a parabolic reflector in a curved fashion. You can get very accurate rays in this image. Thus, the feed system forms the actual radiating part of the antenna, and the trough of the radiating parabola is only passive. There are several parameters and terminology that are important when considering a satellite dish antenna system.

- **Focal Point**: The focal point or focal point of a parabolic reflector is the point at which the incoming signal is focused. When reflected from this point, the signal bounces off the reflective surface and travels along a collimated beam, providing the desired gain and beamwidth.
- **Vertex: Vertex:** This is the lowest point in the center of the parabolic reflector**.**
- **Focal Length:** The focal length of a satellite dish is the distance from the focal point to the apex
- **Aperture:** The density of the parabolic reflector is the 'aperture' or the area it covers. For circular reflectors, this is defined as the diameter. This can be compared to the aperture of an optical lens.

FEED SYSTEMS

A satellite dish is built around that feed system. The design of the feeding system is central to the design of the entire parabolic reflector antenna system. There are two basic types of feed systems available for satellite dish antennas:

Focus-feeding system:
In the focus-feeding system, a radiation source is placed at the focal point of a parabola and illuminates a reflector. A satellite dish or parabolic antenna consists of reflective elements and can be a simple dipole horn antenna or a wave shield. This parabolic reflector is placed at the focal point of the surface. The energy of the radiating element is designed to illuminate the radiating surface. After the energy is radiated, it exits the antenna system in a narrow beam. You can make a lot of money this way. This is not always easy to achieve as it depends on the radiation used. Dipole elements are often used for low frequencies, while circular waveguides can be used for high frequencies. In fact, circular waveguides are one of the best light sources.



Cassegrain reflector system:
Here, radiation is directed from the center of the reflector to a hyperboloid reflector, which in turn reflects the

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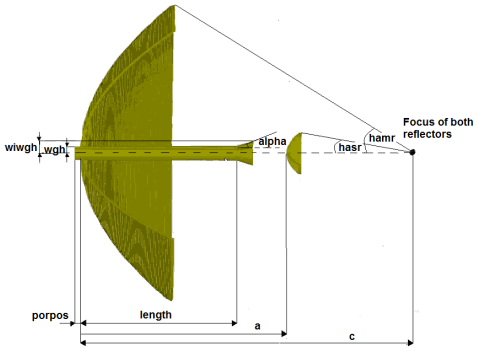
reflection back to a parabolic reflector. Therefore, radiation can be controlled more precisely. A Cassegrain feed system requires a second reflecting surface, but has the advantage that the total length of the strip antenna between the two reflectors is less than the length between the radiating element and the parabolic reflector. This is because there are reflections at the focal point of the signal that shorten the physical length. Depending on your system, this may be an advantage.

Most indoor systems use a small reflector in combination with a focal point. This is the simplest and most economical construction. This is the most common format for satellite TV programming. This antenna does not always look like a typical solid state antenna. For mechanical and manufacturing reasons, feeds are often off-center and part of the paraboloid is used off-center. This gives you a mechanical advantage. However, the principles are the same. Most indoor systems use a small reflector with a focal point connected to the feed. This is the simplest and most economical construction. This is the most common format for satellite TV programming. This antenna does not always look like a typical solid state antenna. For mechanical and manufacturing reasons, feeds are often off-center and part of the paraboloid is used off-center. This gives you a mechanical advantage. However, the principles are the same.



REFLECTOR ANTENNA GAIN

Reception, microwave links, and other satellite connections all benefit from parabolic reflectors. Parabolic mirror antennas are suitable for high gain. This antenna has very high gain at commonly used microwave frequencies and offers an excellent and reliable construction that can withstand rugged outdoor use and provide excellent performance. Most other antenna designs operate at this frequency. High-gain satellite dish antennas come in a variety of sizes. Most popular for satellite TV reception. However, dish antennas are used in many other applications. Parabolic reflector antennas are commonly used in microwave antennas for communications. The big ones are still on TV and have to send their signals to broadcast satellites, making performance a priority. Larger antennas can also be used for communications or space exploration applications. Some of these dish antennas are tens of meters apart. A common feature in all these examples is the gain of a parabolic antenna or the gain of a parabolic mirror. Larger antennas have more gain than dish antennas, but the performance of all these antennas is very important. There are several factors that affect the gain of a dish antenna. These factors include:

- The diameter of the surface of the dish antenna.
- Surface accuracy.
- Continuous surface lighting quality.
- The frequency or wavelength of the received or transmitted signal.

OPTIMIZING REFLECTOR ANTENNAGAIN

To optimally illuminate a contiguous area, the central lighting level should be higher than the sides. Optimal conditions are about 10-11 dB louder than the center light.

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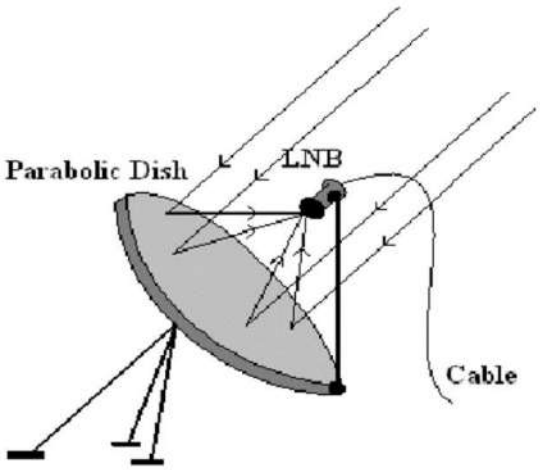

Ground antennas still form a major part of the overall system. In many ways, it's not as important as you might first think. Cable networks often work. If the pitch of the grating is small compared to the wavelength, it appears as a continuous area in the radio signal. Using a net reduces wind resistance, which is a huge benefit.

Microwave radio relay is a technology for transmitting digital and analog signals such as: B. Point-to-point long distance calls, television programs, and computer data along radio links. In microwave radio relay, a directional antenna transmits radio waves between two points on him, creating a stable radio link between two points.

Long chains of such links form transcontinental telephone and/or television communication systems. Because radio waves are confined to a straight path from antenna to antenna, they do not interfere with other microwave devices and nearby microwave links can use these frequencies. The antenna used must be highly directional ([[high gain]). This antenna is placed high up like a large radio tower to cover long distances. Common antenna types used in microwave radio systems are parabolic antennas up to 4 meters in diameter, dish antennas, and horn antennas. Highly directional antennas allow the available frequency spectrum to be used even over long distances.

CONCLUSION

Microwave links are often used to transmit signals in situations where laying cables is impractical. For example, if you need to connect two devices separated by a common road, regulations may restrict cables from running over or under the road. In such cases, a microwave connection is the ideal solution. Microwave systems are highly immune to atmospheric turbulence and immune to electronic eavesdropping. For this reason, microwave signals are often encrypted.

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ACKNOWLEDGEMENT

The advantage of a dish antenna is that most of the antenna structure (except the feed antenna) is non-resonant, so it can operate at more frequencies, i.e. broadband. To change the operating frequency, simply replace the feeder antenna with one that operates at the new frequency. Multiple parabolic antennas transmit and receive on multiple frequencies by connecting multiple feed antennas to a focal point. Satellite dish antennas are high-gain antennas for point-to-point communications, microwave relay links for transmitting telephone and television signals between nearby cities, wireless WAN/LAN links for data communications, and satellite and spacecraft communications antennas. is a telescope radio. Another important application is radar antennas that emit narrow radio beams to locate objects such as ships and planes. With the advent of home satellite TV satellite dishes, satellite dish antennas have become a ubiquitous feature of the modern landscape. A parabolic antenna has the highest gain. This means it can produce the narrowest beamwidth of any antenna type. Parabolic antennas are used in the high-frequency portion of the radio spectrum at UHF and microwave frequencies (SHF) because a narrow beam width must be longer than the wavelength of the radio waves using the parabolic reflector. The wavelength is about the same size and can be used sufficiently.

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Chapter No-12, PP. 71-75

Discrete Wavelet Based Image Identification Using Neural Network

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Abstract: - *This paper containing the information about the technology that we use for the image identification. The technology that we propose in this paper is face detection algorithm based on Discrete Wavelet Transform (DWT) using radial base function (RBF) neural network. Another technique that is DWT which is used to decompose the image into sub images. Here we have used the PCA technique called principal component analysis for extraction of relevant feature from the image. And, finally we proposed RBF neural network for face recognition.*

Keywords: *DWT, PCA technique, Face Recognition, RBF neural network.*

I- INTRODUCTION

In today world it become very important to identify the face of particular persons and store that data in database, so that when it needed it can be restored and verify. This is all in propose of security, reduction in crime and so many places. Face recognition system is basically used to create data for the identification of human face such as banking transaction, food distribution system, identity card and voting in electoral system. Face recognition system is using in information security, biometric system and in entertainment field. The technique that we propose in this paper is PCA technique called principal component analysis, which is used for extraction of relevant feature from the images. The properties of image is represented by PCA technique in numerically in the form of 0 and 1. PCA techniques reduces the size of the sample by extracting the differentiating information. The major steps for the face recognition process includes feature extraction, selection of training process, selection of suitable and sufficient number of training sample and accuracy assessment. Discrete wavelet transform (DWT) is used here to decompose the object images into sub band image. DWT reduces the feature space. It is applied on the discrete signal containing samples. DWT has advantages over fourier transform.

There are two classifiers :
Supervised and
Unsupervised

In supervised classification, user is required to collect samples of object. The collected data is divided into training samples and testing samples. The system is trained using training samples and once the system is trained the results are tested using the testing samples. The accepting of results depends on how accurately of faces are estimated. In unsupervised classification, without the providing of sample data, the results are based on the software analysis of

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an image. In this paper using DWT and PCA techniques over RBF artificial neural network, a content based object supervised classification has been developed.

DISCRETE WAVELET TRANSFORM

The Discrete Wavelet Transform (DWT) is a mathematical tool for analyzing and processing of signals. It decomposes a signal into a set of wavelets, which are functions that are localized in both time and frequency. The wavelet are scaled and translated versions of a single function, called the mother wavelet.
The DWT decomposes a digital signal into different sub bands so that the lower frequency sub bands have finer frequency resolution and coarser time resolution compared to the higher frequency sub bands. DWT is the basis of the new JPEG2000 image compression standard.
DWT provides a way to analyse signals at different scales or resolutions. It allows us to analyse high-frequency details and low-frequency trends of a signal separately. The DWT is widely used in signal and image processing applications, such as compression, denoising and feature extraction.
The DWT operates in a hierarchical manner, with each level of the transform producing a coarse approximation of the signal at lower resolution and a set of detail coefficients that capture the high frequency components. The transform can be computed efficiently using recursive algorithms, such as the mallet algorithm.
One important property of the DWT is its ability to provide a sparse representation of a signal Many signals have a majority of their energy concentrated in a few large coefficients, while the rest of the coefficients are small or even zero. This allows for efficient compression and denoising algorithms that only retain the most significant coefficients.

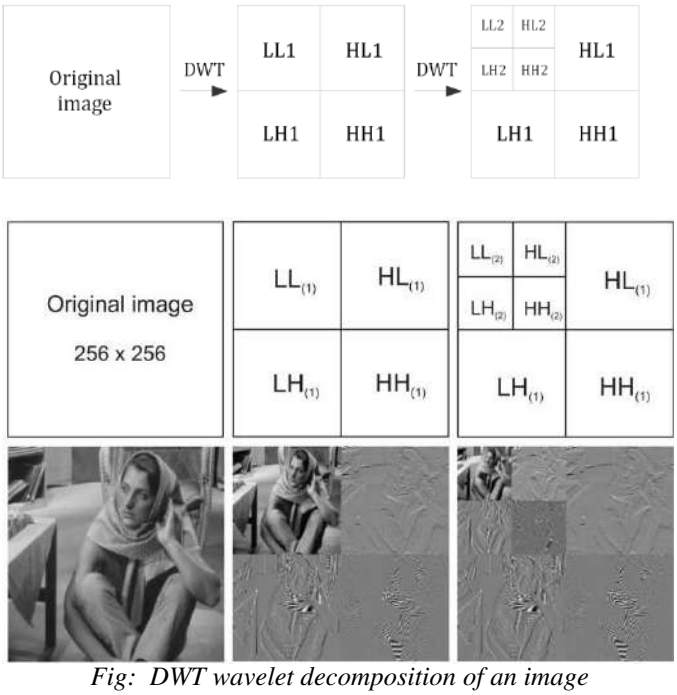

Fig: DWT wavelet decomposition of an image

PRINCIPAL COMPONENT ANALYSIS

Principal component analysis (PCA) is a statistical technique used to reduce the complexity of high-dimensional data by identifying the most important features or pattern in the data. It is a popular method for dimensionality reduction, as it helps to identify key features that explain most of the variation in the data.
PCA is based on the concept of covariance, which measures how two variables change together. By calculating the

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covariance between variables in a dataset, PCA can identify patterns and relationships between variables. These patterns are then used to construct new variables, called principal components, which are linear combinations of the original variables.

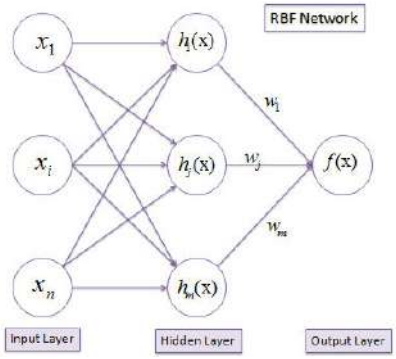
The first principal component explains the largest amount of variation in the data, while subsequent principal components explain as much of the remaining variation as possible. PCA generates a set of orthogonal vectors, called eigenvectors, that represent the principal components. The magnitude of each eigenvector corresponds to the amount of variation that is explains in the data.

PCA is widely used in many fields, such as biology, finance, and social sciences to analyse complex data and identify relevant features. It is also used in data visualization, as the reduced dimensionally makes it easier to plot and visualize large datasets.

RBF NEURAL NETWORK

A radial basis function (RBF) neural network is a type of artificial neural network used for function approximation and classification. It consists of three layers:

1. Input layer: Receives the input data.
2. Hidden layer: Contains radial basis functions, which transform the input data into a high-dimensional space.
3. Output layer: Produces the final output based on the transformed data.



$$f(x) = \sum_{j=1}^{m} w_j h_j(x)$$

$$h(x) = \exp\left(-\frac{(x-c)^2}{r^2}\right)$$

Fig: RBF Neural network

Each neuron in the hidden layer applies a radial basis function to the input data. These functions are centered on each neuron and have a bell-shaped curve. The output of each neuron depends on the distance between the input data and the center of the function. The RBF neural network has several advantages over other neural networks. It is simpler to design and train, and it requires fewer parameters. It is also less prone to overfitting and is more interpretable. However, it may not perform as well as other neural networks in some situations, especially when dealing with high-dimensional data.

PROPOSED METHODOLOGY

1. Image acquisition: The first step in face recognition methodology is to capture a clear and high-quality image of the face. This can be done using a camera or any other image capturing device.
2. Pre-processing: Pre-processing involves removing any background noise, scaling the image, and adjusting the contrast and brightness, which helps in improving the quality of the image.
3. Face detection: The next step is the automated detection of the face in the image. This is usually done using various algorithms like Haar cascade or the Viola-Jones algorithm.
4. Feature extraction: After face detection, the key features of the face like the size, shape and texture are extracted from the image. There are various feature extraction methods like Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA), and Local Binary Pattern (LBP).

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5. Face recognition: In this step, the similarity between the extracted features and the features stored in the database is compared using different techniques, like neural networks or distance-based methods.
6. Classification: The final step is to classify the image as a know or unknown face. This can be done by comparing the similarity score obtained in the previous step to a predefined threshold.
7. Updating database: The database is updated with the new face data if required. This helps in improving the accuracy of the recognition system over time.
8. Retraining the model: The model may need to be retrained occasionally to account for changes in the face and to improve the accuracy of the system.

FACE DATASET

A face dataset is a collection of images or videos that includes different individual's face with different expressions, poses, lighting conditions, and backgrounds. In face recognition, face datasets are used to train machine learning algorithms that learn to recognize faces with high accuracy. Some popular face datasets used for face recognition research include the Face Recognition Technology (FERET) dataset, the Multi-Attribute Facial Recognition (MAFR) dataset, the Labelled Faces in the Wild (LFW) dataset, and the YouTube Faces (YTF) dataset. These datasets contain thousands of images of faces captured under controlled and uncontrolled conditions to evaluate the performance of face recognition algorithms.

The dataset consists of images of three different persons like Singh, Wargiz and Watiya. From the available images of each object are used for the training of the network and rest are used for the testing and experimenting process. Some of the images of each object are shown in these figures.

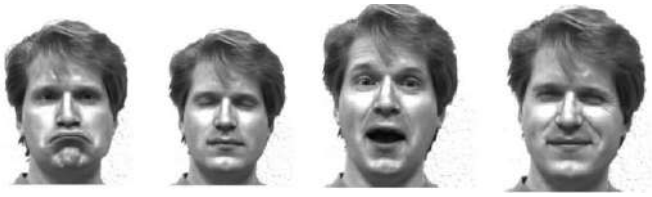

Fig: Singh's Image data set

Fig: Wargiz's Image data set

Fig: Watiya's Image data set

EXPERIMENT AND RESULT

In this section, the results of the face recognition are calculated and conveyed a experimental results of the methods that has been discussed in terms of confusion matrix. The techniques like RBF neural network, PCA techniques has been

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tested on a dataset created by own and images taken from several standard datasets. The datasets consist of three persons (Singh,Wargiz,Watiya).
Confusion matrix for the proposed method employing on feature set of object as discrete wavelet transform coefficients.

Table 1: Confusion Matrix

	Singh	Wargiz	Watiya
Singh	17	0	0
Wargiz	0	12	2
Watiya	1	0	18

Table 2: Class wise Accuracy Table

Name	Total sample	Success sample	Accuracy
Singh	17	16	94.1%
Wargiz	14	12	85.7%
Watiya	19	18	94.7%

CONCLUSIONS

The purpose of this paper is to convey the information or idea about the recognizing of face using discrete wavelet transform. This method is fast and reliable. The effort done in this paper is to suggest the best classification in the terms of accuracy using RBF neural network. The extracting of features using PCA technique is very fast and accuracy is very high. The overall accuracy of RBF neural network is 91.4% of the face recognition method.

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Chapter No-13, PP. 76-79

Conversion of Frequency to Voltage: Design and Implementation

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Abstract:- *The objective of this conversion is to change an oscillating signal's frequency into a matching voltage that can be carried out easily. This approach is used to correctly convert the frequency to voltage. This method is based on the straightforward differentiator, integrator, and divider approach. The output response of the design converter is precise and independent, with input-amplitude characteristics.*

I- INTRODUCTION

The frequency and voltage for a sinusoidal signal were related utilizing the available literature and fundamental laws in order to construct and simulate the frequency to voltage converter (FVC). Utilizing a variety of active and passive components, the entire circuit was created and then simulated with Microsim software. Here two very simple methods are proposed for frequency to voltage conversion.

I. Based on filtering and correction.

II. Using the Sample and Hold method.

The performance of the Microsim Designing Lab 8 software was compared to the previous methods by analysing different waveforms as well as controlling signals at various terminals inside the circuit. Additionally, digital and sinusoidal waveforms were tested on the circuit.

2 CIRCUIT DESCRIPTION

2.1 Rectification and Filtering Technique:

Fig: (1) shows the bock diagram of proposed FVC which comprised an R-C series network, amplifier, squaring circuit, rectifier and filter circuit With the application of the Ohm's to a series R-C circuit, as frequency of sinusoidal signal increases, the resistance remains constant
and reactance of capacitor decreases. As a result the voltage across the resistance becomes the function of frequency of the applied signal. So the voltage acrossthe series resistance can be written as: (i)

Hence as a sinusoidal signal is fed to the circuit, the voltage drop across the resistor will vary. Each time, a change in input signal frequency, will result a change in the voltage drop across the resistance. The signal across the resistance is further amplified, rectified with the technique of analog multiplication and filtered with the help of filter circuit. Finally we get avoltage proportion to the frequency of input signal

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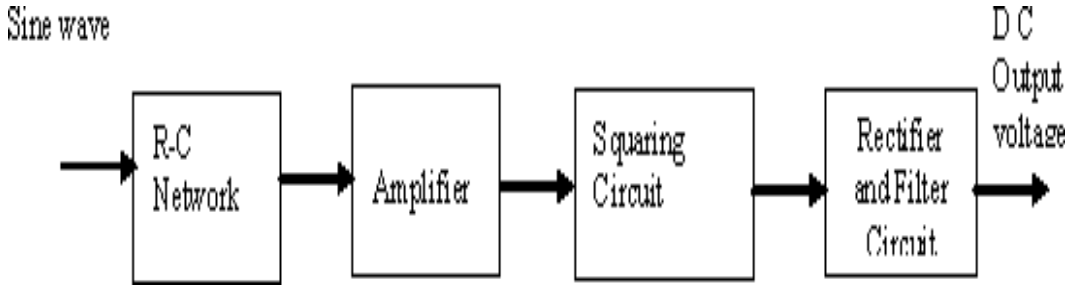

Fig: (1) Block diagram of Proposed FVC

The input to the squaring circuit is a sinusoidal signal. So at its output we get the squared signal. Which can be written as: - (ii) and (iii)

This equation (3) gives a signal which has the frequency equal to the twice the input frequency and its amplitude is varying from '0' to peak value sinusoidal. At no instance its amplitude is becoming negative. In other words we can say it is the rectification of the input. Also we can say it becomes pulsating D.C. This signal further filtered with the help of a diode, R-C filterand L-R filter. Finally we get the desired output voltage.

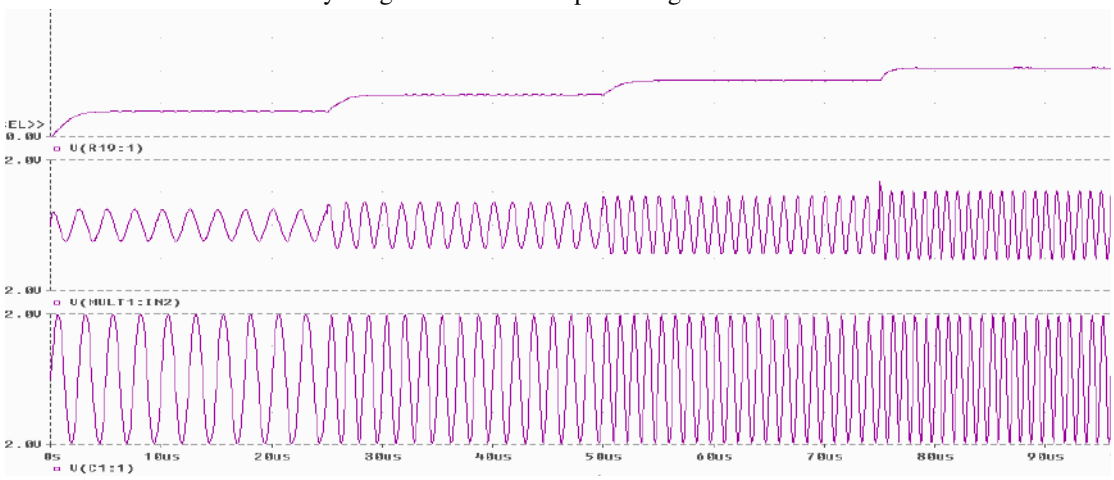

Fig :(2) Different waveform of proposed FVC

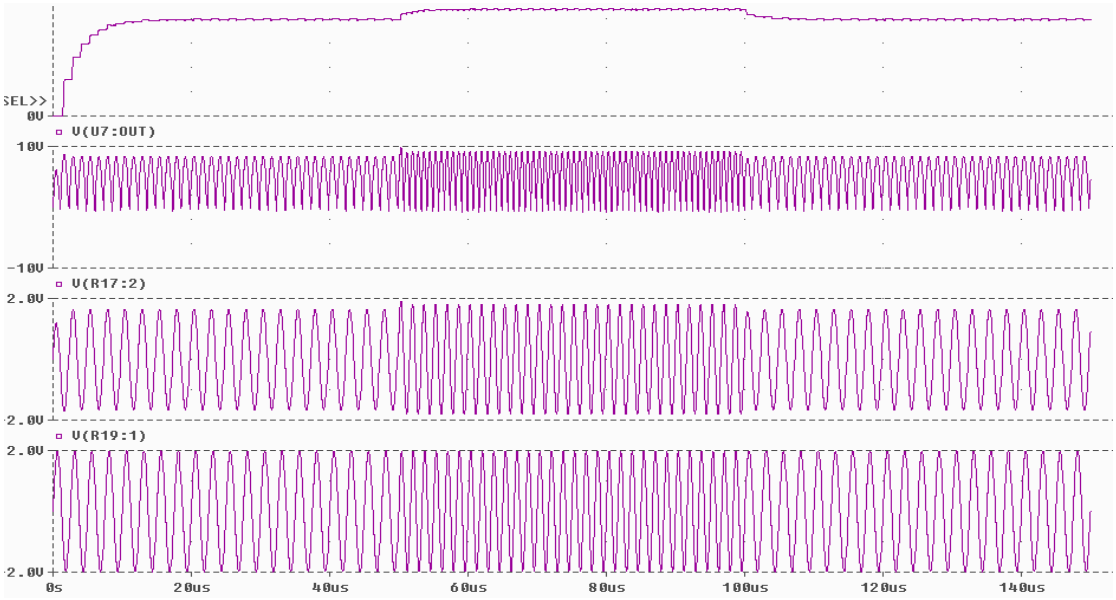

Fig :(4) Output & different waveform of Proposed FVCUsing S/H technique.

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3 BASED ON SAMPLE AND HOLDTECHNIQUE

The block diagram of proposed technique is given below in fig: (5). In this technique upto the stage of analog multiplication the circuit diagram is same as proposed by scheme (1), rectification and filtering technique. After that, as revealed from the equations (ii) and (iii), the R-C network and analog multiplier circuit does the amplitude modulation to the input signal proportional to change in frequency. So if samples are taken during each pulse at the output of multiplier circuit we can get the desired output. This is obtained byusing the sample and hold circuit

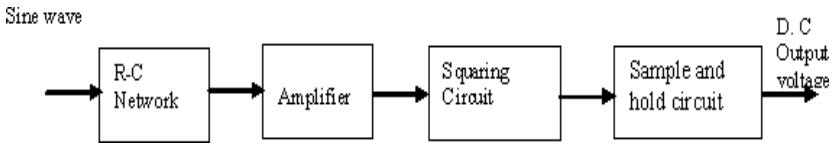

Fig: (5) Block diagram of Proposed FVC using S/Htechnique

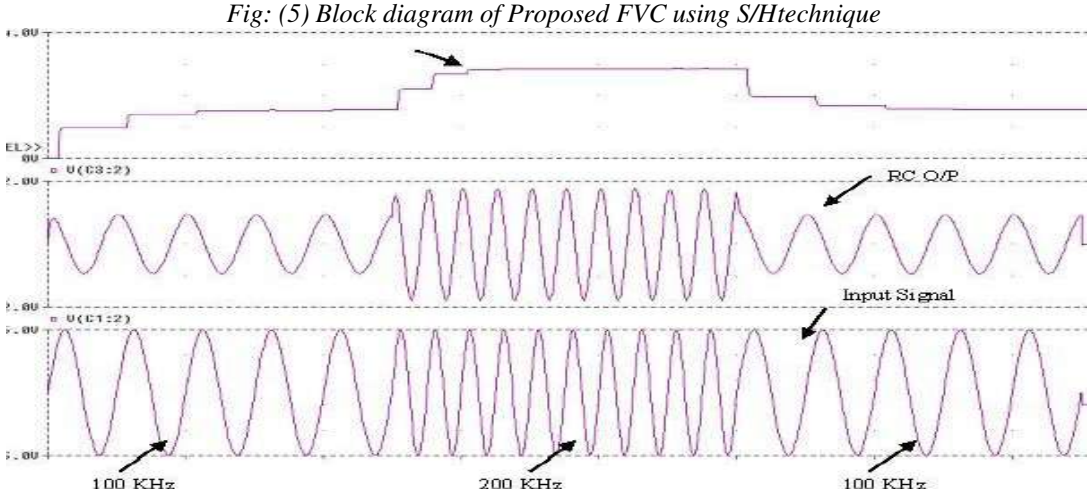

Fig :(6) Output & different waveform of proposed FVCUsing integration S/H technique.

4 PROPOSED FVC FOR DIGITAL INPUTSIGNALS:

The proposed circuit for FVC was tested on digital input and it reveals from the simulated waveforms that it function satisfactorily.

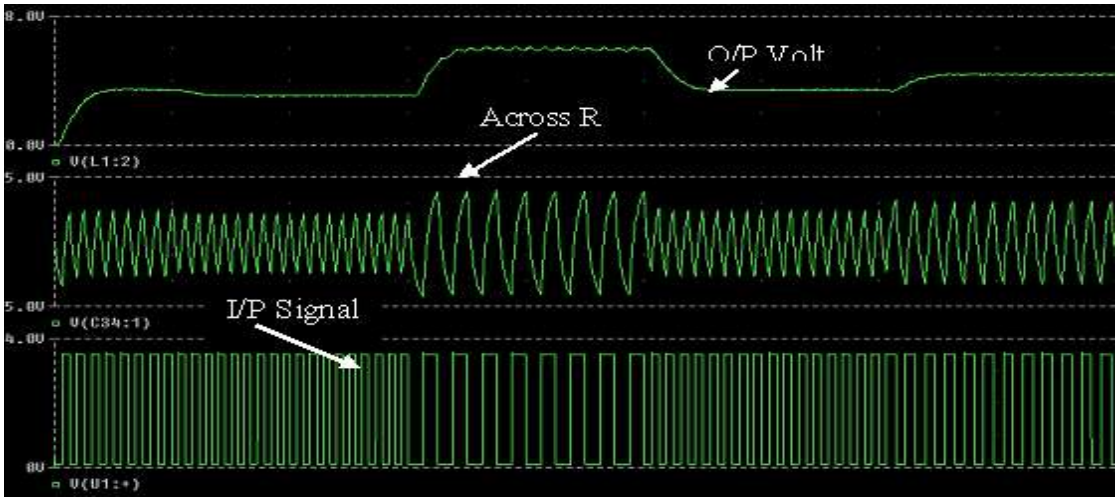

Fig: (7) Various signal for digital input signal forproposed FVC.

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Therefore from above three circuit diagram and waveforms, it reveals that our proposed FVC circuit is very simple and gives much better result with less rise time in compare to using existing integrator and counter types. Also operates on both digital and analog types of signals

5 CONCLUSION

The proposed FVC provides both accurate measurements and simple circuit configuration. Its performances using available commercial devices are tested by SPICE simulation. The simulation results are in significant agreement with thetheoretical.

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Identification of Discrete Wavelet Images Using a Neural Network

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Abstract *– In the present work, we put forward a method for face detection technique based on the Radial Base Function (RBF) Neural Network and the Discrete Wavelet Transform (DWT). The image is divided into smaller images using the DWT technique. For the purpose of extracting pertinent features from the image, we used the Principal Component Analysis (PCA) technique. We concluded by suggesting the RBF neural network for facial recognition.*
.

I -INTRODUCTION

In order to identify a human face for purposes like identity cards, voting in elections, financial transactions, and food distribution systems, among others, face recognition systems are utilized. Face recognition technology has several uses, including in the biometric system, information security, and the entertainment industry. In this study, we provide a Principal Component Analysis (PCA) method for extracting pertinent features from photos. Some picture characteristics are numerically represented by a feature. By removing the information that is most distinguishing, it also minimizes the size of the sample. The feature extraction, training technique selection, selection of an appropriate and adequate number of training samples, and accuracy assessment are the key steps in the face recognition process.

Decomposition of the object image into a sub-band image has been accomplished using discrete wavelet transform (DWT) [3]. It may lessen the Compared to the Fourier transform, it has an advantage.

Both supervised and unsupervised classifiers are available. In the process of supervised classification, the user must gather a sample of the objects. Training samples and testing samples are separated from the sample data [7]. Through the use of practise samples, the classification system is taught. The results are tested using the testing samples after the system has been trained. How precisely human faces are estimated will determine if the results are acceptable.

Without the user giving sample data, the software analyses an image to get the findings in unsupervised classification. Using DWT and PCA algorithms over an RBF artificial neural network, a content-based object supervised categorization system has been created in this paper.

II. DISCRETEWAVELETTRANSFORM

A strong technique for breaking down images into various sub-band images is the discrete wavelet transform [1]. The four parts of an image are LL, LH, HH, and HL putting level one 2-D DWT to use. The image's finest scale horizontal, vertical, and diagonal wavelet coefficients, respectively, are LH, HL, and HH, while LL is the a rough representation. Sequences of filters are used to implement the DWT. The input image is filtered by low pass and high pass analysis filters, respectively, as shown in Figure 1 [2]. The output is two times sub sampled. The signal is split into low- and high-frequency bands as a result of the analysis and synthesis procedure.

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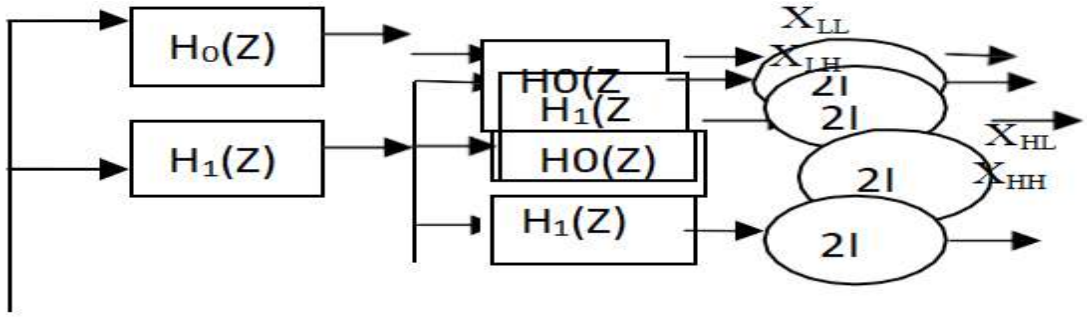

Figure 1: 2-D wavelet decomposition of an image

III- PRINCIPLE COMPONENT ANALYSIS

The goal of feature extraction is to remove the original data's most pertinent information and express it in a lower-dimensional space. A crucial step in the classification process for images is the extraction of key features [4]. Four categories [5]—visual characteristics, statistical features, algebraic features, and transform coefficient features—can be used to categorise the image features. Edges, curves, and texture are examples of visual features. One type of statistical visual characteristic is the histogram. The inherent qualities of the image are represented by the algebraic characteristics. The most well-known technique for extracting algebraic features is principle component analysis (PCA), which is based on Kohenen Leave (KL) transformation. PCA's goal is to minimise dimensionality while keeping as much unpredictability as possible [8]. A list of eigenvalues is provided by this process. A collection of eigenvalues and eigenvectors are provided by this approach. Only a small number of eigenvalues can accurately capture the most crucial aspects of the image. The widely known PCA method is employed for feature extraction. The computation of eigenvectors and eigen values, however, becomes impractical if the image is huge due to the size of the data vector and the covariance matrix.

IV-RBFNEURALNETWORK

An input layer, a hidden layer, and an output layer are the three layers of an RBF neural network. The outputs of the Gaussian transfer functions found in the hidden layer neurons are inversely proportional to the distance from the centre of the neuron [9].

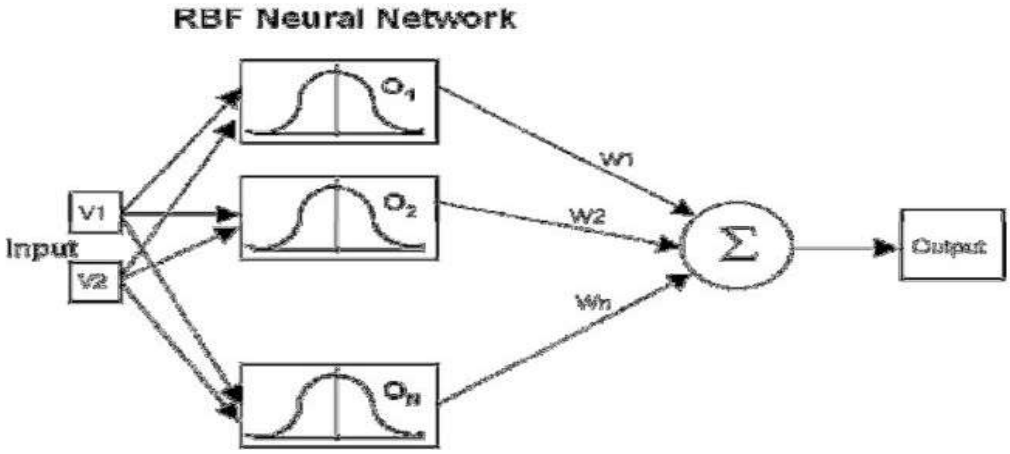

Fig:(2) RBF Neural Network

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1. Input layer - Each predictor variable has a single neuron in the input layer. By deducting the median, the input neurons standardize the value range. The hidden layer's neurons in turn get the values from the input neurons.
2. A set of functions that make up an arbitrary basis for the input patterns are provided by the hidden layers. The vector represents the radial centers, which are the concealed layers. In contrast to the linear transition from hidden unit space to output space, the transformation from input space to hidden space is nonlinear [10].
3. Summation layer - In the hidden layer, each neuron's output value is multiplied by a weight (W1, W2,...,Wn) before being transmitted to the summation layer, which combines the weighted values and displays the result as the network's output.

V- PROPOSED METHOD

A RBF artificial neural network has been used to create an image classifier. Objects in the provided image can be automatically found using the implemented method [6]. The approach is tested using only photos with a single item. The supplied image is first smoothed to get rid of the noise in it. The image is divided into sub band images by applying DWT after the smoothing procedure. To conduct facial recognition, the RBF neural network is fed the feature vector that was produced in this manner. The process is described in detail below.

- The picture input to a grayscale image
- Normalize the image's size
- Apply a Gaussian filter to smooth the image to reduce the noise contents in the image.
- Use a 2-D DWT to decompose the image into subband images.
- Next, extract features from the decomposed images.
- To extract the most relevant features, PCA is used.
- The features from the images are arranged in a vector called the feature vector, which is used as input to an RBF artificial neural network.
- Build an artificial neural network with input neurons according to the size of the feature vector. Train the RBFANN using the training samples.
- When training is over, the system is ready to perform classification. Now test samples are used to evaluate the performance of the ANN based classifier.

VI- FACE DATA SET

The dataset consists of images of three different persons like John, Marry, and Admina. Out of the available images of each object are used for the training of the network and rest are used for the testing and experimenting process. Some of the images of each object are shown in these figures.

Figure 3: Manbo's Image data set

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Figure 4: Peter's Image data set

Figure 5: Aisha's Image Data Set

VII - EXPERIMENTANDRESULT

This section reports the facial recognition's findings. In this part, we present an example using a confusion matrix of the experimental findings of the suggested approach. On a dataset made up of pictures we took ourselves and pictures collected from several standard datasets, the suggested facial recognition algorithm has been evaluated. There are three individuals in the dataset: John, Marry, and Adina.

Table 1 contains the confusion matrix for the suggested technique, which uses a discrete wavelet transform coefficient for each object's feature set. The findings of our evaluation of the Javed and Shah [11] and Farzem and Shirani [12] confusion matrices are presented in Tables 2 and 3, respectively [7].

Table1: Confusion Matrix [11]

	John	Marry	Admina
John	15	0	0
Marry	0	13	2
Admina	1	0	17

Table2: Class wise Accuracy Table

Name	Total sample	Success Sample	Accuracy
John	17	16	94.1%
Marry	14	12	85.7%
Admina	19	18	94.7%

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VII - CONCLUSIONS

This study aims to identify faces using discrete wavelet transform. This process is efficient and dependable. This research makes an effort to recommend the most accurate categorization using an RBF neural network. The PCA approach allows for extremely quick and accurate feature extraction. The RBF Neural Network's overall face recognition accuracy is 91.4%.

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Using a Secure Data Splitting and Embedding Algorithm, a New Approach to the Hiding of Information with the Least Significant Bits

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Abstract: - *According to the Secure Data Splitting Algorithm and the Data Embedding Algorithm, an improved Least Significant Bits (LSB) information hiding method has been proposed. On the basis of this, control monochromic images with peak signal-to-noise ratio (PSNR) and mean square error (MSE) will be used to manage quality. Therefore, our primary objective is to modify existing algorithms in order to propose and implement a novel stegano graphic technique for images. This method, which is based on LSB steganography, spreads a secret message across the entire image we took to ensure that the secret message cannot be extracted from the image. We can easily demonstrate that the proposed algorithm is difficult to decode when compared to other existing algorithms.*

Keywords: *LSB Algorithm, Visual cryptography, Steno image, splitting and Embedding Algorithm.*

I- INTRODUCTION

Digital images are the kind of carrier media that are used the most frequently on the Internet. The cover image or carrier image is a host image used to conceal secret data. The image that is produced as a result of the secret data being embedded into the cover image is referred to as the stage image. During data transmission, stego image quality can avoid suspicion. As far as the handling space, picture concealing plans can be delegated either spatial-area or recurrence space picture concealing plans. Strategies in the spatial space implant privileged information into cover pixels straightforwardly.

Least significant bits (LSB) substitution is one straightforward approach. Each cover pixel is transformed into the frequency domain using methods in the frequency domain. The transformed coefficients are then embedded with the secret data. In general, methods in the spatial domain have lower robustness but higher hiding capacities, and vice versa.

The secret has been embedded in digital images by previous image-hiding schemes; only those who possess the appropriate key can decipher the secret from the embedded image. There is nothing that can be done about it if more than one person wishes to reveal the secret.

Research Motivation

Because of the dominance of information technology in today's world, security has become an inseparable ssue. Cryptography is the study of mathematical techniques that are related to aspects of information security like data security, entity authentication, data origin authentication, confidentiality, and so on. However, cryptography is only one of the techniques that can provide information security. Visual cryptography is a novel approach to information security that employs a straightforward algorithm, similar to traditional cryptography. With this method, images, text, and other forms of visual information can be encrypted in such a way that the human visual system can decrypt them without the

need for complicated cryptographic algorithms. The secret image is encrypted into shares using this method, and stacking a sufficient number of shares reveals the image. Transparencies are typically used to present shares. The emerging field of Visual Cryptography (VC) and related security research are discussed in detail in this paper.

Digital image-based steganography has emerged as an important signal processing field in recent years. That is expected to some extent to the solid interest from the exploration local area. Sadly, there is not a comprehensive review of these evolving techniques in the literature due to the high volume of introduced techniques.
Every one of the current techniques for steganography center around the implanting procedure and give no thought to the pre-handling stages, like encryption, as they rely vigorously upon the traditional encryption calculations which clearly are not custom-made to steganography applications where adaptability, power and security are required. Andreas Westfield, a professor of steganography at Dresden University, asked experts in the field to investigate the crypto-stego interface, or the relationship between steganography and encryption.

A significant number of the ongoing techniques underestimate that strength to clamor, twofold pressure, and other picture handling controls are not needed in the steganography setting. As a result, their hidden data will be lost or unrecoverable in the warden passive attack scenario. Because its classification algorithms are not prominent, adaptive steganography, which aims to identify textural or quasi-textural areas for embedding the secret data, encounters a few issues on the decoder side. Due to the uniqueness and robustness of the detection algorithm, this thesis recommends texture detection in skin-tone areas.

Additionally, skin-tone regions always have chrominance values in the middle of the range, so the issue of underflow or overflow is automatically resolved. When looking for a good skin-tone detection algorithm, the various methods that are available either take a long time to implement or produce unacceptable false alarms. These algorithms frequently overlook the fact that luminance can help them perform better.

Research Objective

1 Study the Information Concealing procedures by utilizing Visual Cryptography strategies and their Noise and how to further develop PSNR.
2 Develop the basic procedure for Least Significant B it Algorithm (LSB).
3 Utilizing PSNR calculations, evaluate the effectiveness of the proposed methods in terms of the steago image's Visual Cryptography robustness.
4 Implement the LSB method to analysis of PSNR.
5 Algorithm results based on LSB method using MAT Lab Simulation.

Research Contribution

This examination work centers around the tradeoff investigation of information stowing away by involving visual cryptography for dim scale pictures utilizing Least Huge Piece (LSB) and configuration, execute and further develop PSNR utilizing Least Critical Piece (LSB) by proposing techniques for implanting and separating the advanced picture. This includes secure data extraction, attacks, and secret image embedding. The quietness and robustness of the proposed methods will be evaluated. Peak Signal to Noise Ratio (PSNR) calculations will be used to analyze the experimental performance of the proposed methods.
For robustness, Visual Cryptography employs a variety of algorithms or transformations, but we will employ the LSB method and calculate the PSNR..

Dissertation Organization

In Chapter 2, the Peak Signal to Noise Ratio was explained in addition to the background information and history of Visual Cryptography and Steganography. The Least Significant Bit (LSB) method for embedding secure data into a cover image is described in detail in chapter 3.These talk about the safe data-splitting and -embedding algorithms in

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Chapter 4. This chapter provides information about the simulation as well as analysis-related results in chapter 5. In chapter 6, we provided an explanation of the work's conclusion, which is analyzed in this thesis. Additionally, we suggested some possible future projects that could extend this research for academic works..

CRYPTOGRAPHY

The first documented use of cryptography in writing dates back to around 1900 B.C., when an Egyptian scribe used non -standard hieroglyphs in an inscription. Cryptography is the science of writing in secret code. A few specialists contend that cryptography showed up unexpectedly subsequent to composing was created, with applications going from discretionary notes to war-time fight plans. Therefore, it is not surprising that new forms of cryptography emerged shortly after widespread computer communications development. Cryptography is essential in data and telecommunications when communicating over any untrusted medium, including the Internet in particular.

The art of encoding messages so that they can't be read is called cryptography. This makes them secure. It is the study of utilizing arithmetic to encode and decode information. You can use cryptography to store sensitive data or send it across unsecure networks like the Internet so that no one but the intended recipient can read it. Cryptography is the science of protecting data, while cryptanalysis is the study of figuring out how to break secure communication. Old style cryptanalysis includes a fascinating blend of logical thinking, use of numerical devices, design finding, persistence, assurance, and karma. Attackers are another name for cryptanalysts. Cryptography and cryptology go hand in hand.

Cryptography is study of mathematical technique to provide the methods for information security. It provides such services like authentication, data security, and confidentiality. Visual cryptography is one of the techniques used in modern world to maintain the secret mass age transmission.
Visual cryptography is based on the images and is obtained by sending pixel information. Visual Cryptography schemes depend on sub-pixels and its complexity, computation, reliability, etc. The image consists of black and white, grayscale color images. Visual cryptography uses participate stipend secret in formation.

Visual Cryptography

A cryptographic method called "visual cryptography" makes it possible to encrypt images, text, and other types of visual data. to be encrypted in a way that makes it possible for humans (without computers) to decrypt it. Moni Naor and Adi Shamir created the initial visual cryptographic method in 1994. It included separating the picture into n shares so just somebody with all n offers could decode the picture by overlaying every one of the offers over one another. In practice, this can be accomplished by stacking each transparency on top of the others and printing each share on its own transparency. In their procedure n-1 offers uncovers no data about the first picture.
Essential visual cryptography depends on breaking of pixels into some sub pixels or we can express development of pixels. Two approaches for (2, 2) –Threshold VCS are depicted in Figure 2. The first approach demonstrates that each pixel is divided into two sub pixels in this particular figure. Let B represent the black pixel and T represent the transparent (white) pixel. Different transparency levels will be used to evaluate each share. The following combinations are obtained when the two transparencies are placed on top of one another: for the black pixel, BT+TB=BB or TB+BT=BB, and for the white pixel, BT+BT=BT. or TB+TB=TB. Similarly second approach is given where each pixel is broken into four sub pixels. We can achieve 4C2 =6differentcasesforthisapproach.

WORKING OF VISUAL CRYPTOGRAPHY

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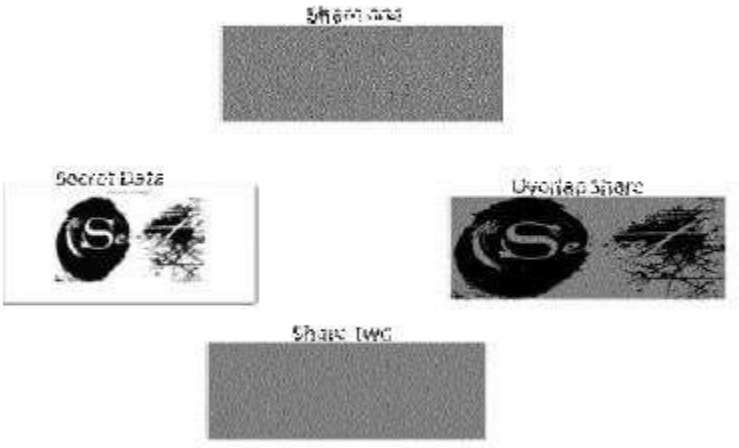

Figure2.2WorkingofVisualCryptography

The visual cryptography technique makes it possible to encrypt visual information in such a way that the human visual system can decrypt it. Stacking a sufficient number of shares reveals the encrypted images using this method, which divides an image into shares. Sub-pixel, error diffusion, Boolean operation, and other techniques are used in visual cryptography, which provides information security with a straightforward algorithm. Some cryptographic schemes can be used to encrypt visual information using this method, and human visual systems can decrypt it without using complicated cryptographic algorithms. It scrambles the mystery picture into shares and the stacking of adequate number of offers uncovers the first picture. Transparencies are typically used to show shares.

INFORMATIONHIDING

While each of the aforementioned cryptosystems has solved the issue of protecting information content's privacy, they have not safeguarded sender and recipient anonymity. In point of fact, the random nature of encrypted data appears distinct enough from typical communications to distinguish it. As a result, it perfectly reveals that the two parties are communicating using encryption. In other instances, merely leaking the existence of communication is sufficient to render the system inoperable. For instance, when drug dealers in the area hear encrypted police communications over mobile phones, they immediately stop and flee to other areas. In such cases plainly the police maintain that its correspondence should be stowed away from the medication hoodlums.Inanothercasewhensomevehiclestartsitsencrypted

communicationitsexactlocationcanbeimmediatelycalculated with two directional radars In network security thecorrespondingproblemiscalledthetracanalysisproblem.Informationhidingisnotonlyusedinmilitaryandpolicecontextsbuti tisalsoneededinthecommercialworld.Acompanyneedstoprotectitsvitalfinancialdocuments.Itcandosoforexamplebyprogram mingthewordprocessortohideits identification number in each electronic copy as well as hardcopiesofeverydocument.Laterifadocumentisfoundleakedtoanotherplacei.einthenewsmediaoratacompetingcompany the leakage can be traced back to its originator This isknownasthetracing traitors problem.

Threshold VCS

Na or and Shamir introduced visual cryptography for the first time in 1994. In their paper, they address the possibility of visual cryptography for edge structures. They make the assumption that the image is made up of black and white pixels and that each pixel has its own encryption key. In the n shares given to the participants, each image pixel appears. It is broken up into m sub pixels, each of which is either black or white. These subpixels are close enough to one another that the eye can easily average them to produce a certain shade of grey. This can be represented by an n m matrix: Only if the jth sub pixel in the ith share is black does S[i, j] equal 1. The number of ones in the Boolean OR of the m-vectors is proportional to the perceived grey level when the shares are combined representing the shares of each participant. The black

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and white areas of the image are determined by a rule of contrast based on three variables: a threshold value, a relative difference, and the number of sub pixels (referred to asthe pixel expansion).
Weise:

- ttodenotethethresholdvalue;
- αtodenotetherelativedifference;
- mtodenotethepixelexpansion.

The threshold value is a numeric alueforthepointat which black areas are distinct from white. The value α misthe

We give the following definition of a threshold VCS, by Na or and Shamir.ThephrasingistakendirectlyfromAtienese ,Blundo, De Santis, and Stinson .We use OR V to denote theboolean operation OR of a set of vectors withresult V. The Hamming weight w (V) is the sum of the elements in a booleanvectorV(alternatively,thenumberof1'sin V).
We can achieve this by using one of following access structur eschemes.

1. **(2,2)–**
   ThresholdVCS:Thisisasimplestthresholdschemethattakesasecretimageandencryptsitintotwodifferentsharesthat revealthe
   secretimagewhentheyareoverlaid.Noadditional
   information is required to create thiskind of accessstructure.
2. **(2, n) – Threshold VCS:** This scheme encrypts thesecret image into n shares such that when any two (ormore) of the shares are overlaid the secret image isrevealed. The user will be prompted for n, the numberofparticipants.
3. **(n, n) – Threshold VCS:** This scheme encrypts thesecret image into n shares such that only when all n ofthesharesarecombinedwillthesecretimageberevealed. The user will be prompted for n, the numberofparticipants.
4. **(k, n) – Threshold VCS:** This scheme encrypts these cretimageintonsharessuchthatwhenanygroupofat leastk shares are overlaid the secret image will be revealed. The user will be prompted fork,t hethreshold,and n ,th enumberofparticipants.

A visual sharing strategy called Color Visual Cryptography involves transforming the original color image into three distinct colors—red, green, and blue. When these shares are overlapping, three color components are obtained, which reveal meaningful visual information. These three components are converted into halftone images.

A visual cryptography plan can then be developed by picking partakes in the accompanying way:- On the off chance that the Pixel of the first parallel picture is white, haphazardly take similar example 0 out our pixels for the two offers. In order to make the pattern random, it is essential to select the patterns at random Choose a complementary pair of patterns from the same column if the original image has a black pixel.

ThealgorithmwhichisusedtosplitthesecureDataintotwodifferentshares is givenbelow:
(INPUT: Secret Data

OUTPUT: Two different secret shares of input data)

Step1:Start

Step 2 begins: closing figures, clearing variables, and clearing the output screen.

Step3: In the 256 x 256 standard, read input secret data or color secret images. If the image does not conform to this standard, it should be converted to the 256 x 256 standard and converted from RGB to Binary.

Step4: setting the width of each share to twice that of the secret data by initializing it with zeros for the pixel values.

Step5: finding all white pixel indexes, or pixel values, in the secret data, and storing the necessary values for each white pixel value in each share.

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Step6: locating all black pixel indexes, or pixel value zeros, in the secret data and storing the necessary values for each black pixel value in each share is what we do.

Step7: To verify the visual cryptography, connect these two shares.

Step8: Stop

PROPOSEDALGORITHM

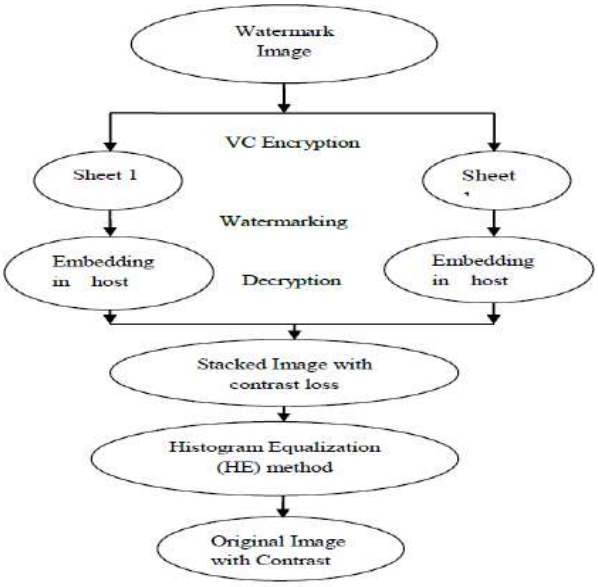

Figure 3. Flow graph of proposed scheme

CONCLUSION

Using a database of uncompressed gray scale images, we tested our new approach to LSB matching steganography detection in this paper. The principal benefits of our strategy are as per the following.

(1) We discover a novel discrimination rule for distinguishing the cover and stego images based on the properties of LSB matching that takes into account only the least two significant bit planes.
(2) The alteration rate is a dimensionless discriminator, so our method can be used to identify images of varying sizes.

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