PERFORMANCE OF ROUTING PROTOCOLS IN VEHICULAR NETWORKS BY THE VERTICAL HANDOFF STRATEGIES

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ABSTRACT

Wireless communication systems such as cellular networks, wireless local area networks (WLANs) and wireless broadband networks. Vehicular Heterogeneous Networks (VHNs) can be comprised of different wireless accessingtechnologies which may solely dedicated to vehicular communications or else are part of a wider public network, is a priority in the near future. The possibility to switch from one access technology to another based on performance, availability or economic reasons, while maintaining active connections, is called intertechnology or Vertical Hand off (VHO). Besides supporting extensive mobility of nodes, VHO would enable novel types of applications to be developed, especially in a vehicular network. The main objective is to minimize the transmission cost and transferring time of data for the routing protocols. We will consider heterogeneous networks which consist of the wide-area cellular networks interworking the WLAN. In this we will take the access points fixed positions, random positions, and also vehichle to vechile distance. In order to show that the performing of vertical handoff is at lower speeds it can be better for going to cellular networks at higher speeds. We further go studying the strategies in the different conditions. These can provide the instructions for performing the vertical handoff by considering the decision making which is based on the network characteristicsand also the user mobility.

Keywords: Vehicular Network, Vertical Handoff Strategies, Access Points

I. INTRODUCTION

The popularity of wireless communication systems can be seen almost everywhere in the form of cellular networks, WLANs, and WPANs. In addition, small portable devices have been increasingly equipped with multiple communication interfaces building a heterogeneous environment in terms of access technologies. The desired ubiquitous computing environment of the future has to exploit this multitude of connectivity alternatives resulting from diverse wireless communication systems and different access technologies to provide useful services with guaranteed quality to users. Many new applications require a ubiquitous computing environment capable of accessing information from different portable devices at any time and everywhere. This has motivated researchers to integrate various wireless platforms such as cellular networks, WLANs, and MANETs. Integration of different technologies with different capabilities and functionalities is an extremely complex task and involves issues at all layers of the protocol stack.

 ISBN: 978-81-931039-3-7

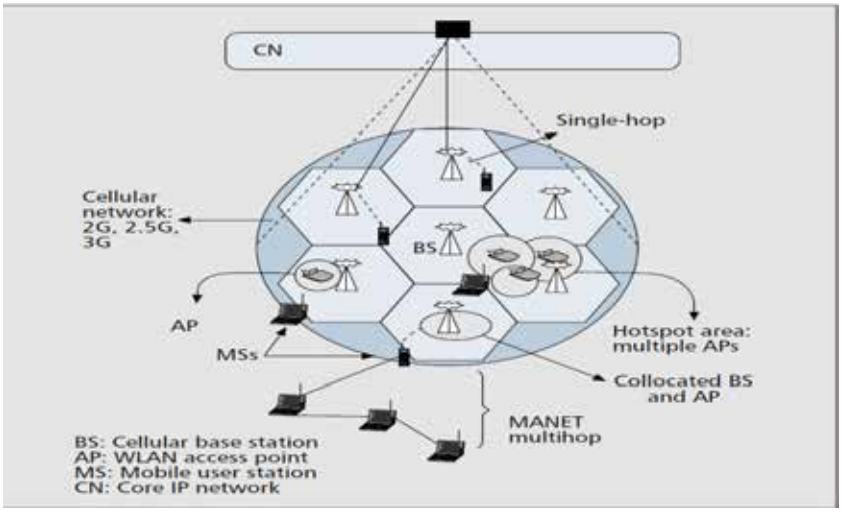

Fig. 1 Heterogeneous Network Architecture

The integration of cellular networks, WLANs, and MANETs is not straightforward due to various communication scenarios, different interface capabilities, and mobility patterns of MSs. Fixed network components, such as BSs and APs, can provide several services to MSs, including:

• Access to the Internet

• Interoperability of existing networks and future networks

• Support of handoff between different wireless access networks

• Resources control

• Routing discovery

• Security management

Both BSs and APs should have the capability of interoperability with each other, and also the possibility of integration with new emerging networks for supporting handoffs between them.APs and BSs also have the responsibility to manage and control radio resources for the MSs. In fact, frequency allocation becomes more complicated since different wireless technologies may possibly operate in the same frequency band, which makes coexistence mechanisms increasingly important. The high processing and power capacity of APs and BSs make them strategic components in selecting optimum routes between two MSs. Furthermore, the APs and BSs can implement load balance functionalities by switching connections from infrastructure mode to MANET mode, or diverting connections to a free neighboring BS or AP by multi-hop communication.

When it comes to VHNs, which have highly dynamic network topologies and highly variable environment conditions due to the inherent characteristics of high mobility vehicular communications, the VHO decision-making algorithms might be inefficient and ineffective. This inefficiency stems from the fact that in the design of the VHO decision making algorithms the mobility models of users including their movement trajectories and their velocities are often neglected. To emphasize the role of mobility pattern awareness, note that when traveling at high speeds, it is more likely that one user travels through several access technologies in a short span of time. Therefore, when legacy VHO decision making algorithms are being used, it is highly probable that handing off from a wide-coverage network to a newly emerged local-coverage network may be followed by another VHO back to the original network immediately afterwards resulting in too many VHOs. Since the procedure of a VHO involves a set of signaling functions and consequently imposes both VHO processing loads and signaling overhead to the network, unnecessary VHOs should be discouraged. Overloading the network

with signaling traffic in turn causes additional costs and longer transfer times incurred by delays of reconnecting the user to the new network. Another aspect of the mobility models that has been neglected in most previous studies is the fact that the movements of vehicles are confined by roadways, so that the directions of movements are highly constrained and only the network coverage along these directions of movements is of interest.

In this paper, we are going to minimize the data transfer time and also transmission cost in each routing protocol of the particular nodes, event-activated, and thus continuous-time, VHO decision making algorithm, that are based on the mobility profiles of users which includes the velocities. As the most existing solutions, the proposed approach which has deterministic and fully distributed in sensing of the vehicular users which will make the VHO decisions than the core network entities. Here vertical handoff decision making is a comprehensive at set of system models, infrastructure-based access technologies which are also known as Vehicle-to- Infrastructure, or V2I communications as well as in this scenarios both of the V2I and ad hoc communications between vehicles that are also known as Vehicle-to-Vehicle, or V2Vcomm'sthat are feasible. Furthermore, we can also obtain the performance of VHO decision making that are planned in WLANs for vehicular communications which are existing in certain areas, the set of location of access points are known a priority by the vehicular users, and also which can be extendedto the analysis in case of an open WLAN access points those vewhicles are randomly located. To our knowledge, we contribute the first mutual study of VHO decision making, and also addressing an comprehensive set of scenarios.

II. EXISTING SYSTEM

Each user provides the network with up to ten different inputs to assist the network in making a VHO decision based on its specific preferences. Half of the input values are weights describing the importance of VHO decision-making parameters including cost, security, power, network conditions and network performance to the user. The rest of the inputs are threshold values specifying allowable range of the VHO decision parameters. The available access networks are first characterized as acceptable if they satisfy the minimum cut-off criteria, and unacceptable otherwise, by using a non-compensatory Multi-Attribute Decision Making (MADM) algorithm. Then a compensatory MADM algorithm is used to calculate the rankings of the acceptable networks based on their costs, available bandwidths, allowed bandwidths, utilizations, delays, jitters, and packet losses

2.1 Disadvantages

- The VHO decision-making algorithms will be inefficient and ineffective.
- The mobility models of users including their movement trajectories and their velocities are often neglected.
- To emphasize the role of mobility pattern awareness, note that when traveling at high speeds, it is more likely that one user travels through several access technologies in a short span of time.

III PROPOSED SYSTEM

A distributed VHO decision-making algorithm which removes the need for deploying a data-processing and decision-making center in the core network and the packet traffic between the center and nodes. In this the distributed setting for every vehicle is based on the information initially that are loaded in its database and the inputs repeatedly updated by the network, will make VHO decisions. In this we also use routing protocols in

each and every moving mobile node by giving it in the data base of the system analysis.This also Provides that at the time instant in which the VHO decision is being made, data bits are required to be transmitted and given that both the WLAN and the cellular network are available to the vehicle, the VHO decision-making algorithm should decide which one to access depending on the user's preferences. These preferences can include minimization of the transmission cost or alternatively the transmission time. Note that even when the WLAN is prioritized over the cellular network, using the cellular network in areas that are not covered by the WLAN is inevitable.

3.1 Advantages

- VHO policies achieve time minimization and cost minimization.
- The speed of a communicating vehicle increases, the rate of VHOs increases.
- The vehicle spends less time in each WLAN coverage area transmitting less traffic to that AP.
- No VHO strategy applies only to a limited scenario of very high speed vehicles (around 35 m/s).

IV. ALGORITHM DESCRIPTION

4.1 VHO Decision-Making Algorithm with Fixed AP Inter-Distances

VHO decision-making algorithm which removes the need on deploying data-processing and decision-making center in core network and also packet traffic in between the center and nodes. In the distributed setting, each and every vehicle will be based on the information which is initially loaded in database and inputsare repeatedly updated by the network, which make VHO decisions.

4.1.1. Cost-Minimization Approach

Beginning with a set of simplify assumptions that can define the cost, but as we move forward, relaxes the assumptions and also can improve the function (1) which are accordingly can made the formulations more realistic (2). Assuming all the vehicles are equipped with both WLAN and cellular interfaces and also the allowable data rates which are announced by the WLAN and cellular at the time of decision-making. Further more, we also consider a highway vehicular communication scenario, where without a loss in the generality which can be confined our analysis in spatial domain to the moving vehicles direction.

$$c_1 - b * c_c \tag{1}$$

$$c_2 = N * \left(\frac{W}{v}\right) * r * c_w + \left(T - N * \left(\frac{W}{v}\right)\right) * r * c_c \tag{2}$$

4.1.2 Transmission-Time Minimization Approach

Under the circumstances, the vehicular user's that can be prefer which could be accessing the technology with the highest QoS metrics. Among the various QoS metrics, data rate can be considered of significant importance. The data rates can be offered by the WLAN and the cellular networs which are out of the user's control, which are choosing appropriate accessing network at any of the given points, the total transmission time of data bits can be minimized. Therefore, by using the same approach which are discussed in calculating costs(3), these vehicle can also calculate the transmission times which are needed for the transmission when the cellular network and WLAN plus cellular are used.

 ISBN: 978-81-931039-3-7

$$T_c = \frac{b_c}{r_c} \quad (3)$$

4.2 VHO Decision-Making Algorithm With Statistical AP Inter-Distances

IEEE 802.11-based WLANs will be extensively deployed in home and also in the offices around the world. The upstream accessing links of these networks are idle, they are used for providing service to vehicles. The possibility of using such an unplanned set of opening anWLANs in the terms of security and deployment which offer the services to an end users moving at vehicular speeds has already been studied. The open APs are independently deployed along on the roadsides and no vehicles have certain information about their placements, we can also assume the distances between all the consecutive APs which can follow negative exponential distribution. In other means, when the vehicle is moving with a fixed velocity, APs can show up its transmission range according to a Poisson arrival.

4.2.1. Cost-Minimization Approach

The objective is selecting the access network with the minimum cost (1) and (2), and the expected value which is used in decision-making.

4.2.2 Transmission-Time Minimization Approach

When the vehicle's preference is the access network resulting in the minimum transmission time, the decision making algorithm.Theperformance of the proposed technique of VHO decision-making algorithm in the case (3), an AP inter-distances are distributed with the fixed AP inter-distances case.

4.3 VHO Decision-Making with Enabled V2V Mode

The proposed VHO decision-making algorithm to include the scenarios where multi-hop V2V communications are also allowed between vehicles, in addition to V2I communications, in the architecture of the VHN. Using intermediate vehicles to relay data to APs via ad-hoc communications can alleviate the need for accessing the costlier cellular network when APs are out of range. Multi-hop ad hoc communication as a data transmission alternative in addition to cellular or WLAN plus cellular, the previous work employs ad hoc networking only as a means for forwarding data to the attachment points which have been pre-selected.

4.3.1 Calculation of Cost and Transmission Time

The computed ad hoc communication delayswhich can be satisfied application's delay requirement, the communication cost using only WLANs and also an ad-hoc communications, which areinterchangesd also called as WLAN plus ad hoc.

4.3.2 WLAN plus Cellular plus Ad Hoc

The inter-distances of APs in this they are not fixed and also they show up independently, the decision-making vehicle which cannot count on upcoming APs. Based on the distance to the other previousAP it also uses an ad-hoc communications for any smaller distances and cellular communications as for the longer distance.

V. FIGURES

Thefollowing figures are of simulation part and also the results of obtaining for the performing of an vehicular networks by considering the routing protocols which are of given for each and every moving mobile that can be used for getting the best performance of minimizing the transmit time and also the cost in which we can also measure many parameters by considering the vertical handoff strategies.

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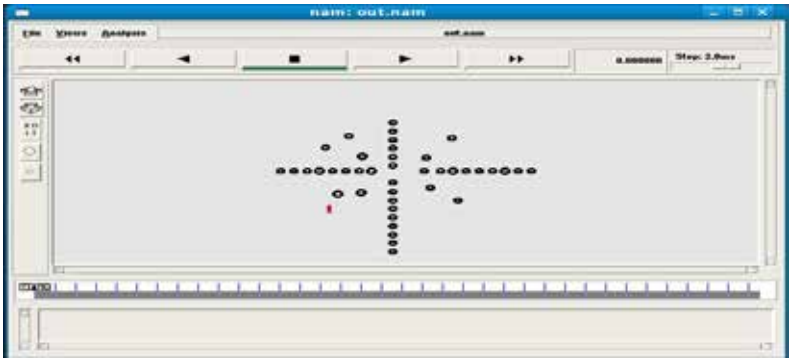

Figure.2 : This is the Created Structure In NS Tool Taking the Moving Nodes and Also AP's

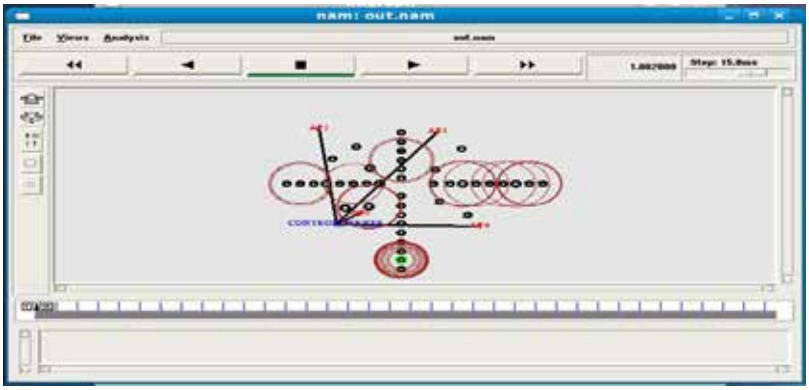

Figure.3: Movement of the Mobile Nodes and Accessing with the AP's

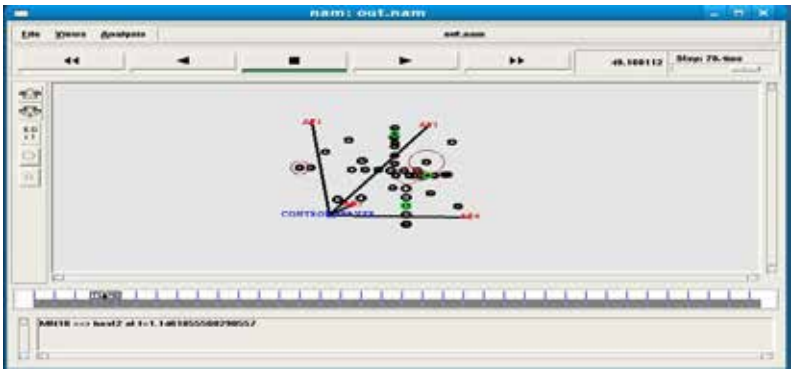

Figure.4 : The Mobile Nodes Hav Moved to the Different Location by Being in Contact with the AP's

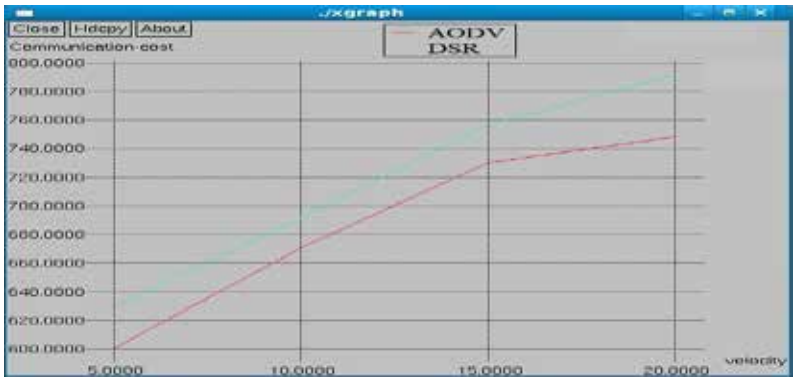

Figure.5 The Graph of the Minimization of Communication Cost Considering the Routing Protocols (AODV And DSR)

Figure.6 the Graph of Minimizing the Transmission Time Considering the Routing Protocols (AODV And DSR)

VI. CONCLUSION

The vehicular networking in a heterogeneous wireless networks in an environment is the choice of accessing thetechnology. VHO decision in generally that can be depend on several factors such as the available capacity of each and every access technology, the cost of transmitting traffic in the network and the speed of the vehicle. In this paper we have considered a vehicular heterogeneous network and also for every each moving node we hav specified the routing protocol so that we can get the better performance among themin comprised of WLAN and cellular systems. The minimizing the cost of traffic and transmission time by considering the routing protocols in every node that can be having the better performance of any other networking strategies we have considered in terms of transmission times and transmission costs. The better performance will be given by the AODV protocol so it is best for using in the networks. Future work we can also implement this in the upcoming networks like LTE and 4G networks so that it can also minimizing the traffic of the data and transmission time.

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 ISBN: 978-81-931039-3-7

A STUDY OF MACHINE TRANSLATION METHODS AND THEIR CHALLENGES

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ABSTRACT

Machine Translation methods are different and each has its own benefits and drawback. No translation tools can generate an exact version of source language but gives gist of information which can utilize to find the type of information contained n the source text. Sometimes, it is necessary to perform post-editing by in-house linguistic after generating translation output with translation engine. This work explains various approaches used in machine translation process such as Dictionary based, Rule based, Corpus Based and Hybrid Translation methods. This paper concludes with the assumption that no perfect translation systems exist, even though Hybrid method is better than that of all available methods because it combines the advantages of various translation methods.

Keywords: Machine Translation, Hybrid Machine Translation, Rule Based, Corpus Based, Statistical, Computational Linguistics, Language Translation

I. INTRODUCTION

The idea of language translation is developing currently that solves the issues of linguistic diversity. It is not possible to know and grasp all the languages within the world by human beings. Around 5000 languages present in the world that shows the need of language translation methods and its developments Researches within the field of language translation are exploring the possibilities of message transferring from one language to different. Government agencies and research institutes are providing initiatives to develop tools for machine-controlled text translation, which might be effective for international business communications into information professionals to improve their information services. Machine translation is the part of computational linguistics that studies the use of software tools to translate text or speech from one language (source language) to another (target language). Most recently, machine translation tools achieved translation excellence. Dictionary based machine translation was the first generation of automated language translation and it was purely based on electronic dictionaries. It translates the phrases but not sentences. Next, Rule Based Machine Translation (RBMT) systems, Corpus Based systems and Hybrid Machine Translation systems were developed. RBMT builds linguistic rules based on morphological, syntactic and semantic information related to source and target language. At the same time, Corpus Based systems generate translations from bilingual text corpora. Hybrid method is advanced method that combines the benefits of individual techniques to attain an overall better language translation.

 ISBN: 978-81-931039-3-7

II. WHERE WE ARE USING MACHINE TRANSLATION?

Language translation systems facilitate the individuals to communicate each other from different places so they can utilize the advantages of information and communication technology. Machine translation is widely employed in numerous applications and a few translation agencies including government agencies are supporting implementation of tools . Translation tools will primarily used for conducting research by reviewing foreign websites and articles. In addition, marketing, legal purposes, software localization, email translation for customer enquiries, website translation, manuals and documents translation, customer support, personal communication like travel reservations, managing assets abroad etc are possible with MT software.

III. MEASURES FOR SELECTING MACHINE TRANSLATION TOOLS

Accuracy and speed of translation are two main measures to evaluate the performance of MT tools. However linguistic quality and ease of integration with the existing tools are the indicators for evaluation. Linguistic quality means that translated output can take less time to post-edit and ease of integration supports better communication with translation management system .

IV. MACHINE TRANSLATION APPROACHES

Many machine translation approaches have already been developed for the natural languages as Sanskrit ,English Hindi, Spanish and other languages etc.

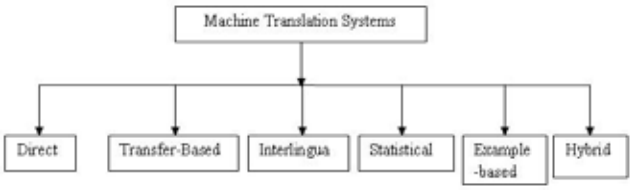

Figure 1- Different Approaches of Machine Translation System

V. RULE BASED MACHINE TRANSLATION (RBMT)

RBMT is called Knowledge Based Machine Translation that retrieves rules from bilingual dictionaries a grammars based on linguistic information about source and target languages. RBMT generates target sentences on the basis of syntactic, morphological and semantic regularities of each language. It converts source language structures to target language structures and it is extensible and maintainable as in [1]. There are three types of RBMT systems (Figure 2)

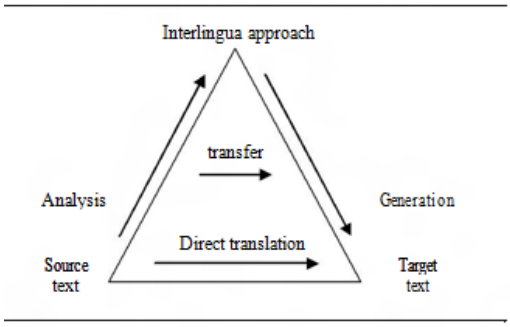

Figure 2- Different Methods of Rule Based Machine Translation

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5.1 Direct method (Dictionary Based Machine Translation)

Source language text are translated without passing through an intermediary representation. The words will be translated as a dictionary does word by word, usually without much correlation of meaning between them. Dictionary lookups may be done with or without morphological analysis. Anusaarka is the example of system that uses direct approach. Indian Institute of Information Technology, Hyderabad, develops it.

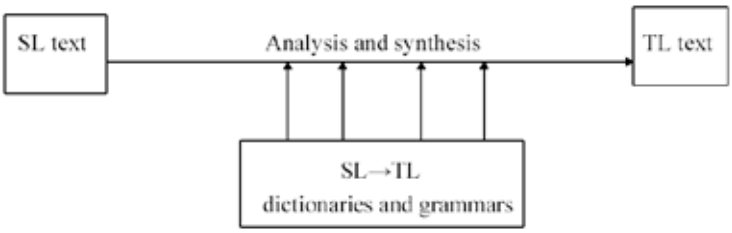

Figure 3- Dictionary Based Machine Translation System

5.2 Challenge with Dictionary Based Machine Translation

5.2.1 Language Divergence

Divergence is a common problem in translation between two natural languages. Language divergence occurs, when lexically and syntactically similar sentences of the source language are not translated into sentences that are similar in lexical and syntactic structure in the target language.

For example, consider the following English sentence (ES) and their Sanskrit translation(SS)

ES: She is in fear.

SS: Saa vibheti

. (She) (is in fear)

example has a structural variation The prepositional phrase is in fear" is translated by the verb vibhati This is an instance of a translation divergence.

5.3 Transfer Rules Based Machine Translation Systems

Morphological and syntactical analysis is the fundamental approaches in Transfer based systems. Here source language text is converted into less language specific representation and same level of abstraction is generated with the help of grammar rules and bilingual dictionaries. In the transfer approach of translation divergence, there is transfer rule for transforming a source language (SL) sentence into target language (TL), by performing lexical and structural manipulations Mantra is a transfer based tool which is a funded project of India Government.

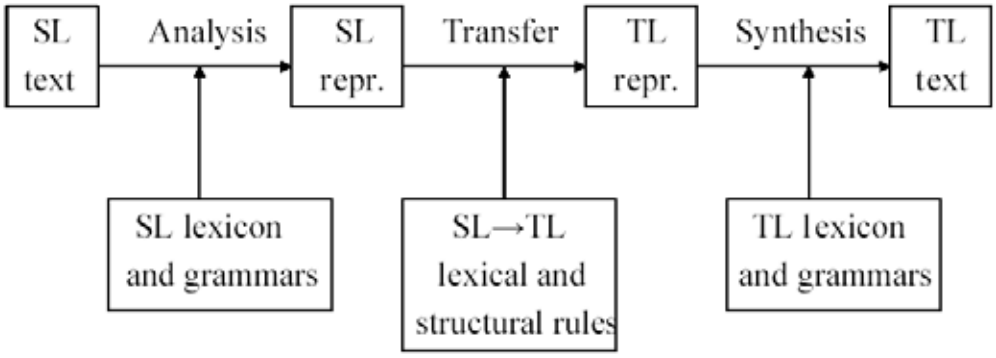

Figure 4- Different Methods of Rule Based Machine Translation

5.4 Transformation Process

5.4.1 Morphological Analysis

Surface forms of the input text are classified as

(a) Part-of-speech (e.g. noun, verb, etc.) and

(b) Sub-category (number, gender, tense, etc.)

5.4.2 Lexical Categorization

In any given text some of the words may have more than one meaning, causing ambiguity in analysis. Lexical categorization looks at the context of a word to try and determine the correct meaning in the context of the input

5.4.3 Lexical Transfer

This is basically dictionary translation the source language lemma (perhaps with sense information) is looked up in a bilingual dictionary and the translation is chosen.

5.4.4 Structural Transfer

While the previous stages deal with words, this stage deals with larger constituents

5.4.5 Morphological Generation

From the output of the structural transfer stage, the target language surface forms are generated.

5.4.6 Challenge with Transfer Rules Based Machine Translation

- Managerial phenomena: Managerial phenomena should be used only as a foundation and must be coupled with considerable work to apply a model-building approach.
- number of rules : The number of rules will grow drastically in case of general translation systems.

5.5 Interlingual RBMT Systems (Interlingua)

This model is indented to make linguistic homogeneity across the world. In this method, source language is translated into an intermediary representation which does not depends on any languages. Target language is derived from this auxiliary form of representation.

5.5.1 Challenge with Interlingual Rules Based Machine Translation

- handle exceptions:Hard to handle exceptions to rule for interlingual.
- number of rules : The number of rules will grow drastically in case of general translation systems. chanllenge is that the definition of an interlingua is difficult and maybe even impossible for a wider domain.

VI. CORPUS BASED MACHINE TRANSLATION

One of the main methods of machine translation is Corpus Based Machine Translation because high level of accuracy is achieved at the time of translation by this method. Large volumes of translations are presented after the development of corpus based system that is used in various computer-aided translation applications . Following is the different types of Corpus Based Machine Translation models.

6.1 Statistical Machine Translation (SMT)

Statistical models are applied in this method to create translated output with the assistance of bilingual corpora. The concept of Statistical Machine Translation comes from information theory. The important feature of this method is no customization work is required by linguists because the tool learns translation methods through statistical analysis of bilingual corpora.

6.2 Challenge with Statistical Based Machine Translation

- Sentence alignment: In parallel corpora single sentences in one language can be found translated into several sentences in the other and vice versa. Sentences. aligning can be performed through the Gale-Church alignment algorithm.
- [illegible] world training sets may override translations of, say, proper nouns. An example would be that "I took the train to Berlin" get smis-translated as "I took the train to Paris" due to an abundance of "train to Paris" in the training set.
- Data dilution: Data dilution is a statistical anomaly unique to a subset of natural language and has shown a negative impact on Machine Translation adoption for commercial use.
- [illegible] not translate "idiomatically".
- [illegible] differs. Some classification can be done by naming the typical order of subject (S), verb (V) and object (O) in a sentence and one can talk, for instance, of SVO or VSO languages.

VII. EXAMPLE BASED MACHINE TRANSLATION

This method is also called as Memory based translation in which set of sentences from source language is given and generates corresponding translations of target language with point to point mapping. Here examples are used to convert similar types of sentences and previously translated sentence repeated, the same translation is likely to be correct again . The main advantage of this model is it work well with small set of data and possible to generate output more quickly by train the translation program. Example based method is mainly used to translate two totally different languages like Japanese and English as in. It is not possible to apply deep linguistic analysis that is one of the main drawbacks of Example based engine. PanEBMT is an example of EBMT tool.

7.1 Challenge with Example Based Machine Translation

7.1.1 Parallel Corpora

EBMT is a corpus based MT, so this requires a parallel aligned corpus. The sources of machine readable parallel corpora are own parallel corpus of researchers, public domain parallel corpora. The EBMT system is generally to be best suited to a sublanguage approach and an existing corpus of translations can serve to define implicitly the sublanguage which the system can handle.

7.1.2 Size of Example Database

There is a question: How many examples are needed in the example database to achieve the best translation result? The quality of translation is improved as more examples are added to the database. There is some limit after which further examples do not improve the quality of translation..

7.1.3 Generalized Examples

In some systems, similar examples are combined and stored as a single “generalized” example. Brown for instance, tokenizes the examples to show equivalence classes such as “person’s name”, “date”, “city name” and also linguistic information such as gender and number. In Generalized Examples approach, phrases in the examples are replaced by these tokens, thereby making the examples more general.

Computational Problem: All the approaches of EBMT systems have to be implemented as software and significant computational factors influence many of them. One problem of such approaches, which

stores the examples as complex annotated structures, is the huge computational cost in terms of creation, storage and matching or retrieval algorithms

VIII. HYBRID MACHINE TRANSLATION (HMT)

HMT takes the advantages of RBMT and Statistical Machine Translation. It uses RBMT as baseline and refines the rules through statistical models. Rules are used to pre-process data in an attempt to better guide the statistical engine. Hybrid model differ in various ways.

8.1 Rules Post-Processed by Statistics

Rule based tool is used for translation at first. Statistical model is applied to adjust the translated output of rule based tool.

8.2 Statistics Guided by Rules

In this method, rules are applied to pre-process input that gives better guidance to statistical tool. Rules are also used to post-process the statistical output that caused to normalized output. This method has more flexibility, power and control at the translation time. DFKI-LT is an example of Hybrid Machine Translation Engine.

8.2.1 Challenge with HYBRID Based Machine Translation

- speech agreement mistakes.
- extra punctuation and
- wrong capitalization.

IX. DISCUSSION OF RESEARCH FINDINGS

Machine translation uses the method based on linguistic rules which convert source language to target language. Natural language understanding is the most important thing for the success of machine translation. As explained above different methods are available for automated machine translation. Type of technology chosen for machine translation is primarily depends on the source and target language pair. If customization is performed in regular basis, RBMT is better and it gives good result. But comparing with Corpus based and Hybrid method it is less efficient. Target language does not have rich morphology features it is good to use Corpus Based MT especially Statistical MT. When source and target languages are more complex, Hybrid MT is better to use because this combines the advantages of different approaches.

X. CONCLUSION

Machine Translation is an automated process within which computer software is used to convert text from one natural language to another. Translator ought to interpret the contents within the source text and build sentence structure of target language for translation. This process demands wide knowledge in grammar, structure of sentence and its meanings in the source and target languages. Machine Translation has an important role today in various applications such as customer management, documents translation, communications, software localization website translation etc. Dictionary Based, Rule Based, Corpus Based and Hybrid approaches are the main methods for machine translation. Each of these has its own advantages and limitations as explained above. It’s a proven fact that no two translation system can produce identical translations of same text in the same

language pair. Also it is necessary to perform post-editing for quality translations

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 ISBN: 978-81-931039-3-7

APPLICATION OF ARIMA MODEL USING SPSS SOFTWARE - A CASE STUDY IN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

This paper was an attempt to apply Auto-Regressive Integrated Moving Average (ARIMA) model in Supply Chain management (SCM) of fresh vegetables analysis using SPSS Software.The ARIMA methodology developed by Box and Jenkins was used in this paper. Time Series refers an ordered sequence of values of a variable at equally spaced time intervals. Time series occur frequently when looking at agricultural data applications. The analysis was carried out using time series data on the supply of fresh vegetables during the period from 2002 to 2011 which was collected from the office of the Deputy Directorate of Agri-business situated at Madurai, India. The analysis of monthly supply and price of vegetables data was used to find out seasonal pattern. The seasonal index for vegetable supply was highest in March and April and was lower in the November and December. The seasonal variation in vegetables price was high in the period of November to January and price low in March. It was further inferred that forecast value for the supply of fresh brinjal , Bhendi and Green Chilly was low in January'13 and it was high in December for these vegetables whereas in the forecasted value for the supply of fresh tomato and green chilly variations were found. The study suggested that cold storage capacities may be developed in the needy places to increase the benefits of consumers and farmers to increase the efficiency of Supply Chain Management.

Keywords: Auto-Regressive Integrated Moving Average model, Seasonal Index, SPSS software, Supply Chain Management, Time series analysis.

I. INTRODUCTION

Time series analysis accounts for the fact that data points taken over time may have an internal structure (such as autocorrelation, trend or seasonal variation) that should be accounted for. The usage of time series models are (i) obtaining an understanding of the underlying forces and structure that produced the observed data and (ii) fitting a model and proceed to forecasting, monitoring or even feedback and feed forward control.The modeling and forecasting procedures discussed in Identifying Patterns in Time Series Data involved knowledge about the mathematical model of the process. However, in real-life research and practice, patterns of the data are unclear, individual observations involve considerable error, and we still need not only to uncover the hidden patterns in

the data but also generate forecasts. The ARIMA methodology developed by Box and Jenkins (1976) allows to do enormous popularity in many areas and research practice confirms its power and flexibility.

The Box-Jenkins ARMA model is a combination of the AR and MA models.

$$X_t=\delta+\phi_1 X_{t-1}+\phi_2 X_{t-2}+\cdots+\phi_p X_{t-p}+A_t-\theta_1 A_{t-1}-\theta_2 A_{t-2}-\cdots-\theta_q A_{t-q} \quad (1)$$

where the terms in equation (1) have the same meaning as given for the AR and MA model.

A couple of notes on this model,

1. The Box-Jenkins model assumes that the time series is stationary. Box and Jenkins recommend differencing non-stationary series one or more times to achieve stationarity. Doing so produces an ARIMA model, with the "I" standing for "Integrated".
2. Some formulations transform the series by subtracting the mean of the series from each data point. This yields a series with a mean of zero. Whether you need to do this or not is dependent on the software you use to estimate the model.
3. Box-Jenkins models can be extended to include seasonal autoregressive and seasonal moving average terms. Although this complicates the notation and mathematics of the model, the underlying concepts for seasonal autoregressive and seasonal moving average terms are similar to the non-seasonal autoregressive and moving average terms.
4. The most general Box-Jenkins model includes difference operators, autoregressive terms, moving average terms, seasonal difference operators, seasonal autoregressive terms, and seasonal moving average terms. As with modelling in general, however, only necessary terms should be included in the model.

1.1. Two Common Processes

1.1.1. Autoregressive process

Most time series consist of elements that are serially dependent in the sense that you can estimate a coefficient or a set of coefficients that describe consecutive elements of the series from specific, time-lagged (previous) elements. This can be summarized in the equation:

$$X_t = \xi + \phi_1 * x(t-1) + \phi_2 * x(t-2) + \phi_3 * x(t-3) + \ldots + \varepsilon \quad (2)$$

Where in equation (2) ξ is a constant (intercept), and ϕ_1, ϕ_2, ϕ_3 are the autoregressive model parameters.

Put into words, each observation is made up of a random error component (random shock,) and a linear combination of prior observations.

1.1.2. Stationarity Requirement

Note that an autoregressive process will only be stable if the parameters are within a certain range; for example, if there is only one autoregressive parameter then is must fall within the interval of $-1 < \phi < 1$. Otherwise, past effects would accumulate and the values of successive x_t' s would move towards infinity, that is, the series would not be **stationary**. If there is more than one autoregressive parameter, similar (general) restrictions on the parameter values can be defined.

1.1.3. Moving Average Process

Independent from the autoregressive process, each element in the series can also be affected by the past error (or random shock) that cannot be accounted for by the autoregressive component, that is:

$$x_t = \mu + \varepsilon_t - \theta_{1t} - {}_1*_{(t-1)} - \varepsilon_t - \theta_2*_{(t-2)} - \varepsilon_t - \theta_3*_{(t-3)} \quad (3)$$

Where in equation (3) μ is a constant, and θ_1, θ_2, θ_3 are the moving average model parameters.

Put into words, each observation is made up of a random error component (random shock,) and a linear combination of prior random shocks.

1.1.4. Invertibility Requirement

Without going into too much detail, there is a "duality" between the moving average process and the autoregressive process (e.g., see Box & Jenkins, 1976; Montgomery, Johnson, & Gardiner, 1990), that is, the moving average equation above can be rewritten (*inverted*) into an autoregressive form (of infinite order). However, analogous to the stationarity condition described above, this can only be done if the moving average parameters follow certain conditions, that is, if the model is *invertible*. Otherwise, the series will not be **stationary**.

II. ARIMA METHODOLOGY

2.1. Auto- Regressive Moving Average Model

The general model introduced by Box and Jenkins (1976) includes autoregressive as well as moving average parameters, and explicitly includes differencing in the formulation of the model. Specifically, the three types of parameters in the model are: the autoregressive parameters (*p*), the number of differencing passes (*d*), and moving average parameters (*q*). In the notation introduced by Box and Jenkins, models are summarized as ARIMA (*p, d, q*); so, for example, a model described as (0, 1, 2) means that it contains 0 (zero) autoregressive (*p*) parameters and 2 moving average (*q*) parameters which were computed for the series after it was differenced once.

2.2. Identification

As mentioned earlier, the input series for ARIMA needs to be **stationary**, that is, it should have a constant mean, variance, and autocorrelation through time. Therefore, usually the series first needs to be differenced until it is **stationary** (this also often requires log transforming the data to stabilize the variance). The number of times the series needs to be differenced to achieve stationarity is reflected in the *d* parameter (see the previous paragraph). In order to determine the necessary level of differencing, you should examine the plot of the data and autocorrelogram. Significant changes in level (strong upward or downward changes) usually require first order non seasonal (lag=1) differencing; strong changes of slope usually require second order non seasonal differencing. Seasonal patterns require respective seasonal differencing (see below). If the estimated autocorrelation coefficients decline slowly at longer lags, first order differencing is usually needed. However, you should keep in mind that some time series may require little or no differencing, and that over differenced series produce less stable coefficient estimates.

At this stage (which is usually called *Identification* phase, see below) we also need to decide how many autoregressive (*p*) and moving average (*q*) parameters are necessary to yield an effective but still *parsimonious* model of the process (*parsimonious* means that it has the fewest parameters and greatest number of degrees of freedom among all models that fit the data). In practice, the numbers of the *p* or *q* parameters very rarely need to be greater than 2 (see below for more specific recommendations).

2.3. Estimation and Forecasting

At the next step (*Estimation*), the parameters are estimated (using function minimization procedures, see below; for more information on minimization procedures see also ***Nonlinear Estimation***), so that the sum of squared

residuals is minimized. The estimates of the parameters are used in the last stage (*Forecasting*) to calculate new values of the series (beyond those included in the input data set) and confidence intervals for those predicted values. The estimation process is performed on transformed (differenced) data; before the forecasts are generated, the series needs to be *integrated* (integration is the inverse of differencing) so that the forecasts are expressed in values compatible with the input data. This automatic integration feature is represented by the letter I in the name of the methodology (ARIMA = Auto-Regressive Integrated Moving Average).

2.4. Identification Phase

2.4.1 Number of Parameters to be Estimated

Before the estimation can begin, we need to decide on (identify) the specific number and type of ARIMA parameters to be estimated. The major tools used in the identification phase are plots of the series, correlograms of auto correlation (ACF), and partial autocorrelation (PACF). The decision is not straightforward and in less typical cases requires not only experience but also a good deal of experimentation with alternative models (as well as the technical parameters of ARIMA). However, a majority of empirical time series patterns can be sufficiently approximated using one of the 5 basic models that can be identified based on the shape of the autocorrelogram (ACF) and partial auto correlogram (PACF). Also, note that since the number of parameters (to be estimated) of each kind is almost never greater than 2, it is often practical to try alternative models on the same data.

1. One autoregressive (p) parameter: ACF - exponential decay; PACF - spike at lag 1, no correlation for other lags.
2. Two autoregressive (p) parameters: ACF - a sine-wave shape pattern or a set of exponential decays; PACF - spikes at lags 1 and 2, no correlation for other lags.
3. One moving average (q) parameter: ACF - spike at lag 1, no correlation for other lags; PACF - damps out exponentially.
4. Two moving average (q) parameters: ACF - spikes at lags 1 and 2, no correlation for other lags; PACF - a sine-wave shape pattern or a set of exponential decays.
5. One autoregressive (p) and one moving average (q) parameter: ACF - exponential decay starting at lag 1; PACF - exponential decay starting at lag 1.

2.5. Seasonal Models

Multiplicative seasonal ARIMA is a generalization and extension of the method introduced in the previous paragraphs to series in which a pattern repeats seasonally over time. In addition to the non-seasonal parameters, seasonal parameters for a specified lag (established in the identification phase) need to be estimated. Analogous to the simple ARIMA parameters, these are: seasonal autoregressive (ps), seasonal differencing (ds), and seasonal moving average parameters (qs). For example, the model (0,1,2)(0,1,1) describes a model that includes no autoregressive parameters, 2 regular moving average parameters and 1 seasonal moving average parameter, and these parameters were computed for the series after it was differenced once with lag 1, and once seasonally differenced. The seasonal lag used for the seasonal parameters is usually determined during the identification phase and must be explicitly specified. The general recommendations concerning the selection of parameters to be estimated (based on ACF and PACF) also apply to seasonal models. The main difference is that in seasonal

series, ACF and PACF will show sizable coefficients at multiples of the seasonal lag (in addition to their overall patterns reflecting the non seasonal components of the series).

III. SUPPLY CHAIN MANAGEMENT (SCM)

Marketing of agricultural produce is different and more challenging than many industrial products because of the perishability, seasonality and bulkiness. The very nature of small size of land holdings by the farmers, varied climatic conditions, production spread over wide geographical area, mainly in remote villages, diversified consumption pattern habits of the Indian consumers and poor Supply Chain (SC) infrastructure makes marketing for vegetables more complicated. At the same time, Indian consumers demand fresh vegetables. Thus SCM plays a crucial role in marketing vegetables. Supply Chain efficiency not only helps in increased production and per capita consumption, but also contributes to economic development of the country. As a result, SCM throws both challenges and opportunities in marketing of vegetables. Efficient SCM in marketing, not only increases the profitability and efficiency of retailers, but also adds value to different stakeholders like cultivators (farmers), consolidators and consumers. Consumption of vegetables is still far below the recommended level for effective health promotion and disease prevention in developed and developing countries

IV. METHODOLOGY

ARIMA model was applied using SPSS software in the time Series data on the supply of fresh vegetables during the period from 2002 to 2011.The data was collected from the office of the Deputy Directorate of Agri-business situated at Madurai, India. The particulars on the constraints in supply of fresh vegetables to the study area were collected from the farmers by conducting personal interview with 30 farmers. Research has shown the need to increase the supply of vegetables to support demand-generating interventions aimed at improving people's eating habits and reducing the risk of chronic disease. With this background, a pioneering attempt was made to assess the supply of fresh vegetables in the leading farmer market in Madurai district in India with the following specific objectives:

- To assess the price and supply of fresh vegetables in the study area
- To workout the seasonal index for major vegetables sold in the study area
- To forecast the price and supply of fresh vegetables in the study area and
- To identify the constraints in supply of fresh vegetables to the study area and to suggest the ways to overcome the problems in the supply of fresh vegetables.

4.1. Time Series Analysis Method used in the Estimation of Seasonal Index

The seasonality in the arrival of the major vegetables was examined with the help of monthly seasonal index. Monthly arrival pattern expressed in terms of monthly seasonal indices for Brinjal, Tomato, Bhendi, Small Onion and Green chilly showed variation over the period of months from 2002 to 2011. Seasonal Index is calculated by Moving Average method. The analysis of monthly supply and price of vegetables data was used to find out seasonal pattern..

The monthly data on vegetable supply and price for the period from 2002 to 2011 were used for forecasting the supply of fresh vegetables by ARIMA models using Box-Jenkins methodology.. The Box-Jenkins procedure is concerned with fitting a mixed Auto Regressive Integrated Moving Average (ARIMA) model to a given set of

data. The main objective in fitting this ARIMA model is to identify the stochastic process of the time series and predict the future values accurately.

4.1.1. Identification

Appropriate values of p, d and q are found first. The tools used for identification are the Autocorrelation Function (ACF), the Partial Autocorrelation Function (PACF) and the resulting correlograms and partial correlograms.

The general ARIMA (p, d, q) model is presented in simple form as:

$$j\ (B)\ \tilde{N}^d X_t = q\ (B)\ U_t \qquad (4)$$

Where B is the backshift operator defined by:

$$B^m X_t = X_{t-m} \qquad (m = 0,1,2 \ldots p) \qquad (5)$$

j (B) is autoregressive operator of order ‘ p’ defined by:

$$j\ (B) = 1 - j_1 B^1 - j_2 B^2 - \ldots - j_p B^p \qquad (6)$$

$\tilde{N}$ is the backward difference operator defined by:

$$\tilde{N} X_t = X_t - X_{t-1} = (1-B) X_t \qquad (7)$$

$\tilde{N}^d$ means the dth difference of the series values X_t, q (B) is the moving average operator of order ‘q’ defined by:

$$q\ (B) = 1 - q_1 B^1 - q_2 B^2 - \ldots - q_q B^q \qquad (8)$$

U_t is white noise process having a normal probability distribution with mean zero and variance s^2_u.

An example of ARIMA model is given below to clarify the general representation of the ARIMA (1,1,1) in explaining some features of the general ARIMA (p,d,q) model.

As could be seen in ARIMA(1,1,1) model where p=1, d=1, q=1

$j\ (B) = 1 - j_1 B^1$

$\tilde{N}^1 = (1-B)^1 = 1 - B$ and

$q\ (B) = 1 - q_1 B^1 = 1 - q_1 B^1$

Thus the model becomes,

$(1-j_1 B)\ (1-B)\ X_t = (1-q_1 B^1)\ U_t$

i.e. $(1 - j_1 B^1)\ (X_t - X_{t-1}) = U_t - q_1\ U_{t-1}$

i.e. $X_t - j_t X_{t-1} - X_{t-1} + j_t X_{t-2} = U_t - q_1\ U_{t-1}$

i.e. $(X_t - X_{t-1}) - j\ (X_t - X_{t-1}) = U_t - q_1\ U_{t-1}$

i.e. $W_t - j_1 W_{t-1} = U_t - q_1\ U_{t-1}$

j_1 and q_1 are the parameters of the model ARIMA (1, 1, 1).

Similarly j_i (i = 1,2,….p) and q_j (j = 1,2…q) are the parameters of the general ARIMA (p, d, q) model. j_i (i = 1,2…p) are the Autoregressive (AR) parameters and q_j (j = 1,2…q) are the moving average (MA) parameters.

V. RESULTS AND DISCUSSION

The results of the study are furnished below.

5.1. Seasonal Index

Seasonal supply and price indices of fresh vegetables are presented in TABLE 1and TABLE 2 respectively.

 ISBN: 978-81-931039-3-7

Table 1: Seasonal Index for Supply of Major Fresh Vegetables

Month	Seasonal factor(%)				
	Brinjal	Tomato	Bhendi	Small Onion	Green chilly
Jan	100.8	103.3	98.6	103.1	99.3
Feb	102.2	113.1	102.8	104.1	109.1
Mar	112.6	114.4	106.2	108.7	120.2
Apr	110.8	113.3	110.5	102.6	104.2
May	102.5	95.5	99.8	105.5	89.6
Jun	104.9	91.2	103	96.2	96.1
Jul	105.0	88.9	95.7	101.2	101.4
Aug	95.4	94.5	96.9	98.7	94.8
Sep	96.3	96	105.2	98.9	102.2
Oct	92.3	104.9	100	95.9	99.3
Nov	85.1	93.8	92.2	90.1	92
Dec	92.0	91.0	89.1	95.1	91.8

Table 2: Seasonal Index-Price for Major Fresh Vegetables

Month	Seasonal factor (%)				
	Brinjal	Tomato	Bhendi	Small Onion	Green chilly
Jan	107.5	89.8	105.9	92.5	92.6
Feb	107.3	60.1	96.9	90.5	79.4
Mar	93.0	46.3	91.1	89.2	68.9
Apr	99.0	64.2	94.0	96.2	94.2
May	103.5	131.0	98.7	108.4	115.0
Jun	90.9	143.3	99.1	110.5	121.3
Jul	67.2	145.2	100.0	99.2	119.3
Aug	80.1	88.3	100.0	86.6	99.7
Sep	92.2	84.7	94.6	83.0	104.5
Oct	99.7	95.4	104.6	105.5	96.2
Nov	129.1	127.3	108.2	123.9	106.6
Dec	130.4	124.5	106.9	114.5	102.4

It could be seen from the table that the seasonal index for vegetable supply was highest in March and April and was lower in the November, December. The seasonal variation in vegetables price was high in the period of November to January and price low in March. When supply was more in season period, the price was low and vice versa. The surplus of fresh vegetables could be for value addition. The farmers could get remunerative prices for their value added products.

5.2. Forecasting with ARIMA Model

For forecasting fresh vegetables supply and price, ARIMA model was used only after transforming the variable under forecasting into a stationary series. ARIMA models are developed basically to forecast the corresponding variable. To judges the forecasting ability of the fitted ARIMA model, important measure of the sample period forecasts accuracy was computed. The forecasts for supply and price of fresh vegetable during 2013 are presented in TABLE 3 and TABLE 4 respectively.

Table 3: Forecast for Supply of Fresh Vegetables (Kgs)

Month	Brinjal	Tomato	Bhendi	Small onion	Green chilly
Jan	1476.87	1146.17	925.48	2199.34	521.874
Feb	1482.07	1144.38	927.88	2193.88	524.214
Mar	1487.27	1141.90	930.25	2189.77	526.555
Apr	1492.47	1137.53	932.61	2186.80	528.895
May	1497.67	1131.58	934.96	2184.76	531.236
Jun	1502.87	1125.14	937.31	2183.49	533.576
Jul	1508.07	1119.20	939.65	2182.86	535.917
Aug	1513.27	1114.12	941.99	2182.77	538.257
Sep	1518.47	1109.62	944.33	2183.12	540.598
Oct	1523.67	1105.20	946.66	2183.83	542.938
Nov	1528.87	1100.49	949.00	2184.85	545.279
Dec	1534.00	1095.43	951.34	2186.12	547.620

It was inferred that forecast value for the supply of fresh brinjal , Bhendi and Green Chilly was low in January'13 and it was high in December for these vegetables. But a variation was found in the forecast value for the supply of fresh tomato and green chilly.

Table 4: Forecast for Price of Fresh Vegetables (Rs/Qtl)

Month	Brinjal	Tomato	Bhendi	Small onion	Green chilly
Jan	20.42	19.124	16.46	23.15	19.42
Feb	20.50	19.202	16.53	23.27	19.48
Mar	20.59	19.280	16.60	23.38	19.55
Apr	20.68	19.358	16.67	23.50	19.61
May	20.76	19.436	16.74	23.61	19.67
Jun	20.85	19.514	16.81	23.73	19.74
Jul	20.94	19.591	16.88	23.84	19.80
Aug	21.03	19.669	16.95	23.96	19.86
Sep	21.11	19.747	17.02	24.07	19.92
Oct	21.20	19.825	17.09	24.19	19.99
Nov	21.29	19.903	17.16	24.30	20.05
Dec	21.38	19.981	17.23	24.42	20.11

It was inferred that increasing trend in the forecast value for the price of fresh vegetables were found in the study area.

5.3. Constraints in Supply of Fresh vegetables

Garette's ranking technique was used to analyze the problem faced by the farmers in supplying fresh vegetables to the study area. A perusal of the table showed that most widely reported problem was the insufficient weighing

machine, sudden price fluctuation, insufficient stall facility and insufficient cold storage facility were reported by the farmers. The results were presented in the TABLE 5.

Table 5: Constraint Identification Using Garette's Ranking Method

S.No	Constraint	Mean Score	Rank
1	Insufficient of weighing machine	58.30	I
2	Sudden price fluctuation	39.87	II
3	Insufficient stall facility	22.87	III
4	Insufficient cold storage facility	17.93	IV
5	No standard grading procedure	5.77	V

VI. CONCLUSION

The inferences from the study are furnished below:

In Supply Chain Management of fresh vegetables, availability of fresh vegetables to consumers in good quality and correct quantity and in reasonable prices and insisted. Further the farmers should gain reasonable profit in selling their products in the markets. Here the study helped to identify surplus and deficit periods in the supply of fresh vegetables and the favorable price period for their crops. Accordingly the farmers can plan their vegetables production pattern.

The seasonal index for vegetable supply was highest in March and April and was lower in the November and December. The seasonal variation in vegetables price was high in the period of November to January and price low in March. It was further inferred that forecast value for the supply of fresh brinjal ,Bhendi and Green Chilly was low in January'13 and it was high in December for these vegetables whereas in the forecasted value for the supply of fresh tomato and green chilly variations were found.

The results paved the way for the following policy implications.

1) To increase the efficiency of Supply Chain Management, cold storage capacities may be developed in the needy places to increase the benefits of consumers and farmers.
2) Value addition techniques for fresh vegetables may be educated to the farmers to increase their income . Further availability value added vegetable products will satisfy the specific requirements of consumers as well. For that, necessary infrastructural facilities can be generated based on the intensity of vegetables cultivation area.
3) In the supply Chain management of fresh vegetables, good transport facilities and financial schemes and good marketing environment can be provided to the farming community to minimise the loss and to provide fresh vegetables throughout year to the consumers.

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FACE RECOGNITION USING NEURAL NETWORK WITH PCA–MBP ALGORITHM

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ABSTRACT

In this paper, a face recognition system for personal identification and verification using Principal Component Analysis (PCA) with Modified Back Propagation Neural Networks (MBPNN) is proposed. The dimensionality of face image is reduced by the PCA and the recognition is done by the MBPNN. The system consists of a database of a set of facial patterns for each individual. The characteristic features of PCA called "Eigen faces" are extracted from the stored images, which is combining with Modified Back-Propagation Neural Network for subsequent recognition of new images. Eigen faces are produced by transforming the pixels in an image to (x; y) coordinates and forming a matrix with the coordinates. The Eigen faces or the principal components of the faces are the eigenvectors of the matrix and it is the eigenvectors. These Eigen vectors are given as input to the neural networks which performs the recognition process. In this we studied the concepts, for better accuracy and minimization of errors; we introduced a Modified Back-Propagation (MBP) algorithm for Neural Network which leads an efficient and convenient result in Neural network for face recognition mechanism. Faces represent complex, multidimensional, meaningful visual stimuli and developing a computational model for face recognition is difficult. Face recognition from the images is challenging due to the wide variability of face appearances and the complexity of the image background. Neural based Face recognition is robust and has better performance.

Keywords---Eigen Values, Eigen Vector, Face Recognition, Modified Back-Propagation Neural Network, Modified Back-Propagation Algorithm, and Principal Component Analysis.

I. INTRODUCTION

Face Recognition play an important role in today scenario due to its applications, including security, person verification, internet transmission and computer entertainment. Face recognition is deified as the ability to recognize people given some set of facial characteristics. Todays, it has become a famous area of research in computer vision and image testing, mainly because we can find such recognition systems in objects of everyday life such as cellphones, security systems, laptops, PCs, etc. [1]. Face recognition is an interesting and successful application of Pattern recognition and Image analysis. Facial images are essential for intelligent vision-based human computer interaction. Face processing is based on the fact that the information about a user's identity can be extracted from the images and the computers can act accordingly. Face recognition is one of the few biometric methods that possess the merits of both high accuracy and low intrusiveness. It has the accuracy of a physiological way without being intrusive [2]. The difficulty of this problem stems from the fact that in their most common form (i.e., the frontal view) faces appear to be roughly alike and the difference between them are

quite subtle. Therefore, frontal faceimages form a very dense cluster in image space which makes it virtually impossible for traditional pattern recognition techniques to accurately discriminate among them with a high degree of success. Furthermore, the human face is not a different, rigid object. Certainly, there are various factors that cause the appearance of the face to vary. Face recognition is an efficient means of authenticating a person [3]. In this paper, a face recognition system for personal or image identification and verification using Principal Component Analysis (PCA) with Modified Back Propagation Neural Networks (MBPNN) is proposed. The dimensionality of face image is reduced by the PCA and the recognition is done by the MBPNN for face recognition. The system consists of a database of a set of facial patterns for each individual. The characteristic features of PCA called "Eigen faces" are extracted from the stored images, which is combining with Modified Back-Propagation Neural Network for subsequent recognition of new images. In this we studied the concepts, for better accuracy and minimization of errors; we introduced a Modified Back-Propagation (MBP) algorithm for Neural Network which leads an efficient and convenient output in Neural network for face recognition mechanism**.**

II. WORKING MODEL OF FACE RECOGNITION SYSTEM

The working principle of typical Face Recognition System is shown in figure 1.

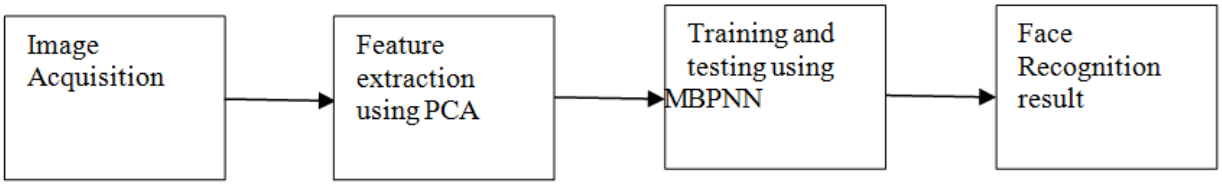

Fig.1. Generic Representation Of Face Recognition System

The Algorithm [4] & [5] for Face recognition using neural classifier is as follows:

a) Pre-processing stage –Images are made zero-mean and unit-variance.

b) Dimensionality Reduction stage: PCA - Input data is reduced to a lower dimension to Facilitate classification.

c) Classification stage - The reduced vectors from PCA are applied to train BPNN classifier to obtain the recognized image.

The issues of the design and implementation of the Face Recognition System (FRS) can be sub divided into two main parts. The first part is image processing and the second part is recognition techniques. The image processing part consists of face image acquisition techniques and the second part consists of the artificial intelligence which is composed by PCA and Modified Back Propagation Neural Network. Face image acquired in the first step by web cam, digital camera or using scanner is fed as an input to PCA, which converts the input image to low dimensional image and calculates its Euclidian distance. This Euclidian distance is then fed as an input to Modified Back-propagation Neural Network [6].

III. PRINCIPLE COMPONENT ANALYSIS

Principal component analysis (PCA) is a statistical procedure that uses an orthogonal transformation. The PCA approach is used to reduce the dimension of the data by means of datacompression basics and reveals the most effective low dimensional structure of facial patterns. This reduction in dimensions removes information that is

not useful and precisely decomposes the face structure which involves transformation of number of possible correlated variables into a smaller number of orthogonal (uncorrelated) components known as Principal Components. Each face image may be represented as a weighted sum (feature vector) of the Eigen faces, which are stored in a 1D array. The test Image can be constructed using these weighted sums of Eigen faces. When a test image is given, the weights are computed by projecting the image upon Eigen face vectors. The distance between the weighted vectors of the test image and that of the database images are then compared. Thus one can reconstruct original image with the help of Eigen faces So that it matches the desired image [6]

IV. PCA ALGORITHM

The algorithm [7] used for principal component analysis is as follows.

(i) Acquire an initial set of *M* face images (the training set) & Calculate the Eigen-faces from the training set, keeping only *M'* Eigen faces that correspond to the highest Eigen value.

(ii) Calculate the corresponding distribution in *M'*- dimensional weight space for each known individual, and calculate a set of weights based on the input image.

(iii) Classify the weight pattern as either a known person or as unknown, according to its distance to the closest weight vector of a known person.

Let the training set of images be G1, G2, GM. The average face of the set is defined by

$$\Psi = 1/M \sum_{i=1}^{M} \Gamma_i \qquad 1$$

Each face differs from the average by vector

$$F_i = G_i - Y \quad (i = 1 \ldots M) \qquad 2$$

The co- variance matrix is formed by

$$C = A.A^T \qquad 3$$

Where the matrix A is given by

$$A = [F_1 F_2 \ldots\ldots F_M] \qquad 4$$

This set of large vectors is then subject to principal component analysis, which seeks a set of *M* Orthonormal vectors *M u ....u* 1 .To obtain a weight vector W of contributions of individualEigen-faces to a facial image _, the face image is transformed into its Eigen-face componentsprojected onto the face space by a simple operation.

$$W_k = u^T_k F \qquad 5$$

For k=1... *M'*, where *M'* £ *M* is the number of Eigen-faces used for the recognition. The weights form vector W = [w1, w2,….wm] that describes the contribution of each Eigen-face in representing the face image _, treating the Eigen-faces as a basis set for face images. The simplest method for determining which face provides the best description of an unknown input facial image is to find the image *k* that minimizes the Euclidean distance ek.€$_k$

$$= \|(\Omega - \Omega_k)\|^2 \qquad 6$$

Where Wk is a weight vector describing the kth face from the training set. It is this Euclidean distance that is given as an input to the neural networks.

 ISBN: 978-81-931039-3-7

V. MODIFIED BACK-PROPAGATION NEURAL NETWORK

A MBP network consists of at least three layers of units: an input layer, at least one intermediate hidden layer, and an output layer. Commonly, units are connected in a feed-forward fashion with input units fully connected to units in the hidden layer and hidden units fully connected to units in the output layer.

The input pattern is presented to the input layer of the network. These inputs are propagated through the network until they reach the output units. This forward pass produces the actual or predicted output pattern. Because back propagation is a supervised learning algorithm, the desired outputs are given as part of the training vector. The actual network outputs are subtracted from the desired outputs and an error signal is produced. This error signal is then the basis for the back propagation step, whereby the errors are passed back through the neural network by computing the contribution of each hidden processing unit and deriving the corresponding adjustment needed to produce the correct output. The connection weights are then adjusted and the neural network has just "learned" from an experience. Once the network is trained, it will provide the desired output for any of the input patterns [8] & [9]. By using the Modified Back-Propagation Algorithm (MBP) achieve better accuracy and minimization of error in Neural Network which leads an efficient and convenient result in face recognition mechanism.

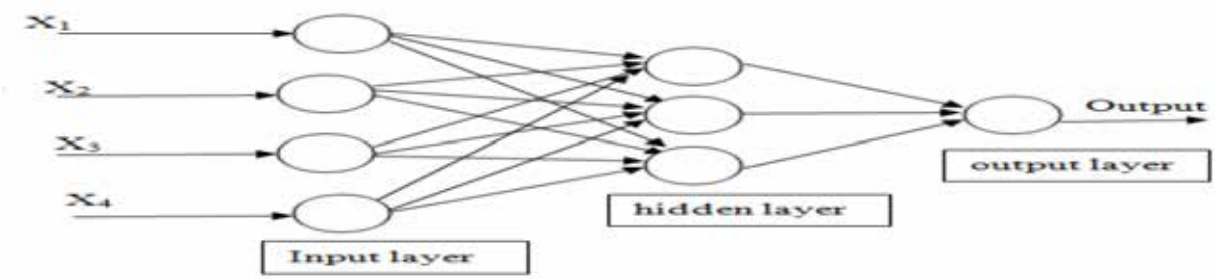

Fig.2 Multilayer Feed-Forward Neural Network

VI.MODIFIED BACK-PROPAGATION ALGORITHM

Assume a network with N inputs and M outputs. Let xi be the input to i_{th}neuron in input layer, Bj be the output of the j_{th} neuron before activation, yj be the output after activation, bj be the bias between input and hidden layer, bk be the bias between hidden and output layer, wij be the weight between the input and the hidden layers, and wjk be the weight between the hidden and output layers. Let η be the learning rate, δ the error. Also, let i, j and k be the indexes of the input, hidden and output layers respectively [8], [9]& [10].

The response of each unit is computed as:

$$Bj = \sum_{i=1}^{n} Xi*Wij \qquad 7$$

$$Yj = (1/(1+\exp(-Bj))) \qquad 8$$

Weights and bias between input and hidden layer updated as follows:

For input to hidden layer, for I = 1 to n,

$$Wij\ (t+1) = Wij\ (t) + \eta\ \delta jyi + \alpha * (wij\ (t) - wij\ (t-1)) \qquad 9$$

$$bj\ (t+1) = bj\ (t) + \eta\ \delta j + \alpha * ((bj\ (t) - bj\ (t-1)) \qquad 10$$

δj is the error between input and hidden layers and calculated as follows:

$$\delta j = yj * 1 - yj * \sum_{k} \delta k\ Wjk \qquad 11$$

Weights and bias between hidden and output layer updated as follows:

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For input to hidden layer, for j = 1 to n,

$Wjk\ (t+1) = Wjk\ (t) + \eta\delta kyj + \alpha * wjk\ (t) - wjk\ (t-1)$ 12

$bk\ (t+1) = (t) + \eta\ \delta k + \alpha * (bk\ (t) - bk\ (t-1)$ 13

δk is the error between, hidden and output layers and calculated as follows:

$\delta k = yk * (1-yk) * (\delta k - yk)$ 14

VII. FLOW CHART FOR EXPERIMENTATION

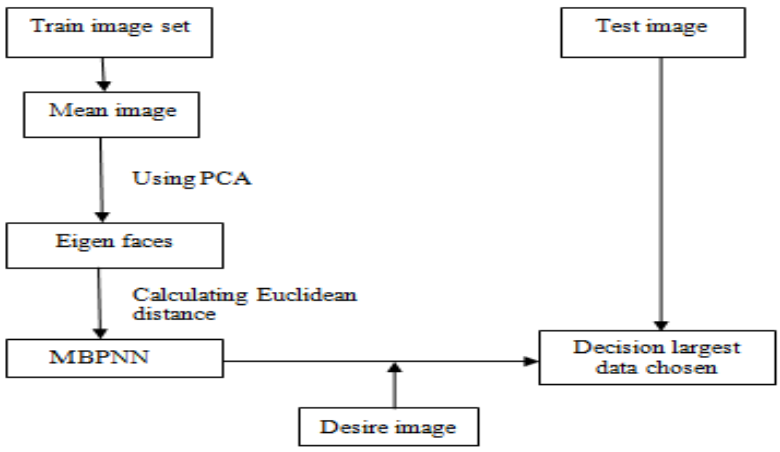

Fig.3 Complete Process of PCA And MBPNN Face Recognition System

VIII. RESULT

The effectiveness of the proposed face recognition method and the distance calculation algorithm are demonstrated using MATLAB. The face database consists of 90 images. Out of 90 images, 64 images are taken for training the networks. The number of epochs versus the squared error graph is shown in Figure 4.

Then the neural networks are tested with the remaining images. The MBPN Network accepts 2 unknown faces and it recognizes all the known faces. The combined model of PCA+MBPN recognizes all known faces and accepts 1 unknown face (false acceptance). The time consumption and the recognition rate are tabulated in Table.

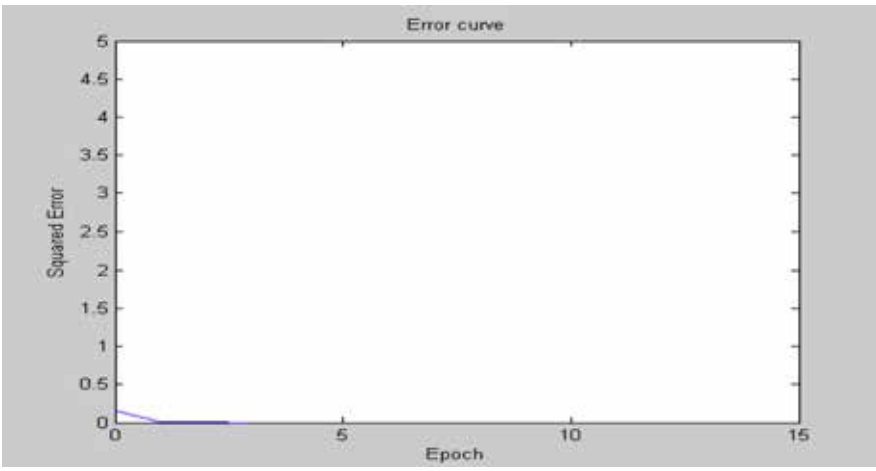

Fig. 4 Error Rate Versus Number of Epochs

COMPARISON OF PCA+MBP FRAMEWORK OVER BPN

Network	Total Images	Training +Testing time(in seconds)	False Acceptance	Recognition rate (in %)
BPN	90	3.6549	2	96.66%
PCA+MBPN	90	3.6492	1	98.88%

VIII. CONCLUSION

The result shows that the face recognition system using PCA for feature extraction and MBPNN for image classification and recognition provides a high accuracy rate and fast computation. By choosing PCA as the feature selection technique, the space dimension can be reduced. PCA combined with MBPNN works better than the individual PCA, done on the basis of the performance of the system which is measured by varying the number of faces of each subject in the training and test faces. The neural network model is used for recognizing the frontal or nearly frontal faces and the results are tabulated. A new neural network model combined with PCA and MBPN networks is developed and the network is trained and tested. This study shows that, recognition accuracy achieved by this method is very high. This method can be suitably extended for moving images and the images with varying background.

The neural networks aimed at providing artificial intelligence to the system. Neural networks using back propagation and principal component analysis is presented in this report for face recognition. It can be concludes that using the neural network approach illustrates the success of its efficient use in face recognition. The MBPNN algorithm is preferred over other neural network algorithms because of its unique ability to minimize errors. Modified Back-Propagation Neural Network (MBPNN) is found to be very accurate where recognition is required over other neural networks. Main advantage of this Modified Back-Propagation algorithm is that it can identify the given image as a face image or non-face image and then recognizes the given input image .Thus the back propagation neural network classifies the input image as recognized image.A new neural network model combined with MBPN and PCA networks is developed and the network is trained and tested. From these results, it can be concluded that, recognition accuracy achieved by this method is very high. This method can be suitably extended for moving images and the images with varying background.

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PARTICLE FILTER APPLIED IN AIRCRAFT TRACKING SYSTEMS

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ABSTRACT

Particle filtering techniques have captured the attention of many researchers in variety of fields like image processing and signal processing. The Kalman filter (KF) is one of the most widely used method for tracking and estimation. The basic KF is limited to a linear assumption. To overcome these limitations, Particle Filter (PF) has proposed lately which is a nonparametric filter and hence can easily deal with non linearity and non-Gaussian noises. Particle filtering is particularly useful in dealing with nonlinear state space models and non-Gaussian probability density functions. This paper presents new methods for efficient tracking in video sequences using particle filtering. The underlying principle of methodology is the approximation of relevant distributions with random measures composed of particles and their associated weights.

***Keywords**: Image Processing, Kalman Filter, Particle Filter, Tracking*

I. INTRODUCTION

Over the past 40 years many Kalman filtering techniques has developed for target tracking in a mess environment. A detailed explanation of Kalman filters has given by Anderson.B.D and J.B.Moore [1]. Target tracking has always been a challenging problem in image or signal processing. Although significant work has been done in this area by the research community, the problem is still considered challenging. Recent growth in adhoc wireless communications and sensor technology has given a new dimension to the sensor based tracking problem. Comaniciu.D, V.Ramesh and P.Meer [2] has proposed a method for real time tracking of a non rigid object observe from moving camera. Current applications of sensor based tracking include tracking of climatic conditions in remote places such as mountain slopes, activity tracking across sensitive areas such as defense and surveillance areas like airports. In this work, target tracking and detection problems are usually formulated using linear state space models with additive Gaussian noise. The complete statistics of linear Gaussian problems can be computed with Kalman filtering technique. Julier.S.J and J.K.Uhlmann [3] has developed and demonstrated a new linear estimator. Kalman.R.E [4] has developed a new approach to linear filtering problems. However in reality, problems involving target and object tracking require nonlinear models with non Gaussian noise. Nonlinear non Gaussian models would necessitate the adoption of a particle filtering technique. The basic idea behind particle filtering is to sample a continuous posterior density function of interest into a set of weighted particles. If the weights are chosen appropriately, then this weighted equivalent set of particles can very closely approximate the posterior density function (PDF).

II. PARTICLE FILTERING

The main task of particle filtering is to assign appropriate weights and update the weights as time progresses. N.Gordon, D.Salmond and A.F.M.Smith [5] has published a novel Approach to nonlinear or non-Gaussian Bayesian State estimation known as bootstrap filter, which provides the implementation of the Particle filters or Sequential Monte Carlo (SMC) methods used today. Arulampam.S, S.Maskell, N.Gordon, and T.Clapp [6] has explained the particle filters for on-line non-linear or non-Gaussian Bayesian tracking. Gustafsson.F et al [7] has explained how the particle filter can used to positioning for integrated navigation on aircraft and for target tracking. Problems dealing with particle filtering involve making inferences on the state vector $\mathbf{s}_t$, based on $\mathbf{z}_{0:t}$, the observations from time 0 to t. Using sequential importance sampling particle filters can approximate the posterior density function, regardless of the nature of the underlying model. The continuous density function is descretized by sampling the function. Sampling is performed by choosing an appropriate sampling function called the importance sampling function. The continuous density function is represented by sample sets. The selection of the sampling function is the major concept and the important condition for this concept is that the density function also sampling function must have the same support. The correctness of the particle filtering approach depends on proper particles selection. Another important feature of particle filtering is resampling, in which the weights that have a very low value are eliminated and replaced with weights that have a higher value. Resampling the particles allows the particles to represent the probability density function with greater accuracy. This step allows more particles or samples to focus on high prospect areas and less on low precedence regions and overall effect of this step is that the particles with high relative weights after the observation have a high probability of remaining in the set, possibly multiple times, and the particles with low weights have a high probability of being removed from the set. Fig. 1 shows the region of high density samples.

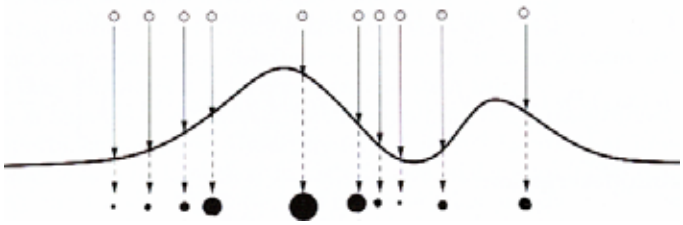

Fig. 1: Region of High Density Samples

With advancements in compression and video coding, image and video over wireless channels or sensor networks are gaining popularity. Image and video sensors include webcams, pan-zoom-tilt cameras, infra-red cameras, etc. These sensors capture the information from the environment where they are deployed. Visual data provides very rich information compared to other types of sensor data. Since image data is highly correlated, efficient correlation based tracking algorithms may be employed to increase the overall efficiency of the sensor network. The numerous advantages involved in using image and video sensors along with advances in adhoc network systems.

III. TARGET TRACKING USING PARTICLE FILTERING

Jepson.A, D.D.J.Fleet and T.El-Maraghi [8] has proposed a model used for motion based tracking the natural objects. Ikoma.N, N.Ichimura, T.Higuchi and H.Maeda [9] has explained the target tracking using particle filter. As per Carpenter.J, P.Cliord and P.Fearnhead [10] Kalman filter has provide effective solutions to linear Gaussian filtering problems. However, most non trivial systems are nonlinear. The non linearity can be

associated either with the process model or with the observation model or with both have introduced new approach called the extended Kalman filter (EKF). In EKF, the state transition and observation models need not be linear functions of the state but instead may be non linear functions. These non linear functions are used for calculating the predicted state from previous estimate and the predicted measurement from predicted state. Over the years EKF has led to a general consensus within the tracking and control community that it is difficult to implement and only reliable for systems that are almost linear on the time scale of the update intervals have developed a new linear estimator called unscented Kalman filtering (UKF).

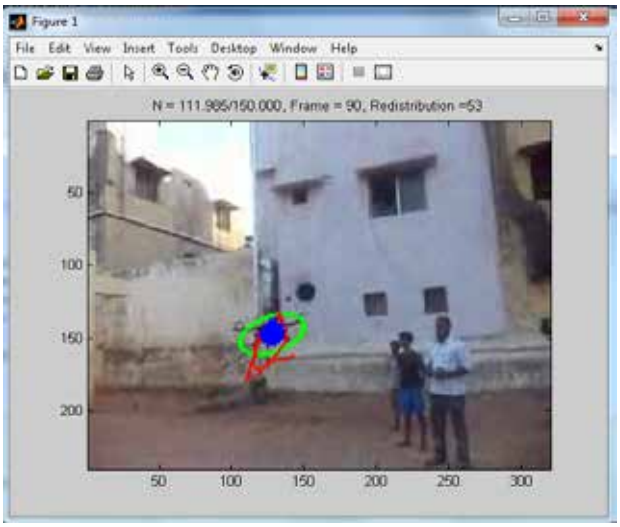

Fig. 2: Tracking Aircraft in Video Sequence Using MATLAB

Tracking targets is a very challenging and multi faceted problem. Various algorithms with varying levels of complexity are developed for this purpose. In this paper, the authors described and tested four maximum likelihood (ML) techniques that localize (or triangulate) a moving target and compare these methods with a linear least-squares approach through a number of simulations at various signal-to-noise levels. Multiple object tracking (MTT) deals with state estimation of an unknown number of moving targets. Addressing the problem of tracking multiple objects encountered in many situations by signal or image processing. In this paper a new method has proposed by extending the classical filter, in which the estimation of stochastic vector is achieved by a Gibbs sampler. Six of them are well known and widely used: the autonomous multiple model algorithms generalized pseudo-Bayesian algorithm of first order and of second order interacting multiple-model algorithm, Viterbi based MM algorithm and B-best-based MM algorithm. A.Averbuch, S.Itzkowitz, and T.Kapon [11] has compared the Viterbi-based and Interacting Multiple Model (IMM) algorithms for Radar target tracking. Reweighted interacting multiple model algorithm also considered, which was developed recently. The aim was to track a maneuvering target, e.g., a ship or an aircraft. The authors used a state-space representation to model this situation. The dynamics of the target was represented by a system model in continuous time, although a discredited system model was actually to be used in practice. The position of the target was measured by radar and the process described by a nonlinear observation model in polar coordinates. The authors proposed the use of heavy-tailed non-Gaussian distribution for the system noise to follow the rapid changes in motion of the targets. Consequently, the nonlinear non-Gaussian state-space model was used. A particle filter was used to estimate the target state of the nonlinear non-Gaussian model. Developed a framework using particle filters consisted of motion models and a general nonlinear measurement equation in position.

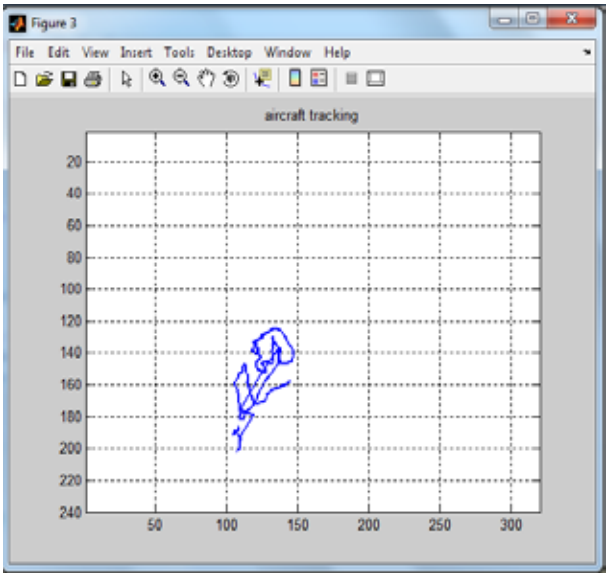

Fig. 3: Aircraft Tracking Path in 2-d Graph View

A general algorithm has presented based on marginalization, to estimate position derivatives by enabling KF. Based on simulations, the authors argued how the particle filter could be used for positioning based on cellular phone measurements. Recent approaches for tracking objects in video sequences have involved better algorithms and robust solutions. A particle filtering algorithm has introduced for tracking of appearances in images instead of using contours. An adaptive appearance model was used as the observation or the measurement model. The appearance model based on intensity was used instead of the model based on phase of intensity. The EM algorithm was used to update the appearance model adaptively from the obtained posterior density. Motion vectors have calculated from the current image block observations and new block to be selected from the next frame was obtained by using first order linear approximations. The number of particles selected was also adaptive. Prediction error is a measure of forecast quality. If the forecast error is high, then the noise is spread widely, forcing the model to cover large jumps in motion state. Thus, more particles are selected if the noise discrepancy is more. As the likelihood function, the standard multi dimensional normal density was used and occlusion detection was implemented by keeping track of the pixels obtained from the appearance model. The model update was stopped if occlusion has detected.

IV. PREDICTION USING PARTICLE FILTERING

Particle filtering is a sequential Monte Carlo technique that recursively computes the posterior probability density function using the concept of importance sampling. Doucet A, J. F. G. de Freitas, and N. J. Gordon [12] has explains the perfect Monte Carlo sampling method. It can be used to solve a state-space estimation problem that involves nonlinear state measurement models and non-Gaussian noise models. The classical solution to the state space estimation problem is given by the Kalman filter in which the state model and the measurement or the observation models are assumed to be linear, If it is nonlinear, then model has approximated to a linear model so that Kalman filter can be applied. The extensions of the Kalman filter include an extended Kalman filter and an unscented Kalman filter, in which the nonlinear term is approximated up to first order and second order terms. In KF approach, the underlying density functions are assumed to be Gaussian, hence, estimation of the mean and variance characterizes the complete density function. Real models for an application are generally

nonlinear and non-Gaussian. Mean and variance do not characterize the complete density function. In order to handle these cases, the complete density function is considered by its samples.

Hue.C, J.-P. Le Cadre and P.Perez [13] has proposed an extension of traditional particle filters where the assigned stochastic vector has projected by a Gibbs sampler. Prediction using particle filtering is presented in this section, followed by a detailed analysis of the sampling function. Let a system be denied by parameters represented by X_k and the observations be represented by Z_k. Let the state evolution be represented by

$$X_k = f_{k-1}(X_{k-1}, V_{k-1}) \quad (1)$$

Where f_k is a nonlinear function of the state, and v_{k-1} is an i.i.d noise sequence. Let the observation model be given by

$$Z_k = h_k(X_k, W_k) \quad (2)$$

Where h_k is a nonlinear function and h_k is an i.i.d observation noise.

The aim of prediction is to recursively estimate the State parameters X_k from the observations given in equation. The posterior density function over the State parameters, given by $p(X_k \;\; Z_k)$, gives the measure of the State parameters from the observations. This posterior density function is predicted using the Bayesian framework. It is assumed that the system follows a first-order Markov process. If the posterior density function $p(X_{0:k} \;\; Z_{0:k})$, is sampled and the samples $X_{0:t}$ are drawn from the importance function $p(X_{0:k} \;\; Z_{0:k})$, then weights denied in equation become

$$w_k = \frac{p(x_k, z_{1:k})}{p(x_k, z_{1:k})} \quad (3)$$

If the importance density function can be factorized as

$$p(x_{0:k}|z_{0:k}) = p(x_{0:k}|x_{0:k-1}, z_{0:k})\, p(x_{0:k-1}|z_{0:k-1}) \quad (4)$$

and if

$$x_{0:k}^m \sim p(x_{0:k}|z_{0:k}) \quad (5)$$

Prediction: Predict next state PDF from current estimate.

$$P(X_k \mid Z_{1:k-1}) = \int P(X_k \mid X_{k-1}) P(X_{k-1} \mid Z_{1:k-1}) dx_{k-1} \quad (6)$$

Update: Update the prediction using sequentially arriving new measurements.

$$P(X_k|Z_{1:k}) = \frac{P(Z_k|X_k) P(X_k|Z_{1:k-1})}{\int P(z_k|X_k) P(X_k|Z_{1:k-1}) dx_k} \quad (7)$$

Importance weight:

$$w_k = \frac{p(x_k, z_{1:k})}{p(x_k, z_{1:k})} \quad (8)$$

Weight update:

$$w_k^i \propto w_{k-1} \frac{P(Z_k|X_k^i) P(X_k^i|X_{k-1}^i)}{p(X_k^i|X_{k-1}^i, Z_k)} \quad (9)$$

Resampling is the next step to get the accuracy. This is the particle filter algorithm.

V. PERFORMANCE ANALYSIS

We consider a mock surveillance sequence of 450 frames to demonstrate the efficiency of the color-based particle filter. The system uses cameras to track a aircraft in a open space. The cameras are kept static without any zoom, pan or tilt and their relative exterior orientation is known. To illustrate the differences between the Kalman filter and our proposal we discuss a aircraft video sequences. The experiments have been processed with a Pentium dual core 2.30GHz PC under windows 7, using the RGB color space with 8 x 8 x 8 bins. Fig. 2 shows the tracking aircraft in video sequence using MATLAB. In the open space aircraft is flying, the results of the trackers are illustrated by the paths of the elliptic regions. The image size is 320 x 260 pixels and the initial elliptic search region contains 20 x 20 pixels. Finally, for the particle filter we processed N ¼ 75 samples. In this experiment we used the initialization method based on a known histogram. Both trackers are put into the 'initialization' mode and start tracking as soon as a aircraft enters their field of view.

When the aircraft later leaves the field, the corresponding tracker will return to the 'initialization' mode. The trackers handle the initialization successfully, even when the aircraft is appearing from different sides. To stabilize the tracker, Chellappa.R, S.Zhou, and B.Moghaddam [14] has proposed an observation model arising from an adaptive noise variance and adaptive number of particles. An improvement can be achieved by increasing the number of samples but this affects the computational performance. The particle filter predicts the search region similarly to the Kalman tracker but it can still track the aircraft. To increase the flexibility of the particle filter, it can be further enhanced by switching between multiple motion models. Huang.Y and P.Djuri [15] has projected a particle filtering detector to estimation of channel model coefficients, signal detection and channel tracking over flat Rayleigh fading channels. In particle filtering, the object location has to be estimated by calculating the mean value of the sample distribution. Accordingly, the accuracy of the tracker is dependent on the size of the sample set. By increasing the number of samples the discretization error can be decreased. The running time to process one frame depends mainly on the region size for all approaches as many color distributions have to be calculated. To reduce the number of iterations for the best object location the basic mean shift tracker was enhanced by a state prediction using Kalman filtering. If a Kalman filter is used to estimate the new location, the search regions of subsequent frames no longer need to overlap and the tracker is more likely to converge to the correct maxima in case of rapid movements. Fig. 3 shows the aircraft tracking path in 2-d graph view.

VI. FUTURE ENHANCEMENT AND CONCLUSION

Particle filtering is a widely used framework for visual object tracking that is highly extensible and offers the flexibility to handle non-linearity and non-normality in the object models. In future work, we plan to extend our approach to learn the parameters of more complex multi object tracking. . In future, new particle filter-based approaches have been proposed to solve difficult multi object tracking problems. This paper presents a particle filter for aircraft tracking in video sequences. The experimental results from real video sequences show its reliable performance. The proposed algorithm runs comfortably in real time with 15 frames per second without any special optimization on a normal 800 MHz PC. The algorithm is characterized with low computational complexity and is able to cope with partial occlusions and recover after temporary loss. The tracker can efficiently and successfully handle non-rigid and fast moving objects under different appearance changes.

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 ISBN: 978-81-931039-3-7

WIRELESS LIBRARY BOOK CATALOG SYSTEM

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ABSTRACT

In this project we demonstrate the idea of advance wireless library system with the help of touch panel. In this project we demonstrate the transmitter and receiver circuit. When any person wants to issue the book than system demand for student id, student semester and book index no. If any person sends the complete detail than system issue the book and display in LCD. The transmitter will be at the issuing section and the receiver will be with the operator in the library. There are LCD provided on both transmitter and the receiver to display the information provided to the operator. Touch pad will be provided to enter the data. This data includes the student ID given to the student, semester of that particular student and book ID which is to be issued. When any student wants to issue the book than system demand for student id, student semester and book index number. These details about the student will be entered with the help of touch pad by the student. If any student sends the complete detail than system issue the book and display in LCD. This information will be shown to the student and to the operator on LCD at the transmitter and receiver respectively. The operator will provide the issued book of the selected semester to the student.

Keywords: Microcontroller, Lcd, Interface, Wireless Network, Touch Panel, Transmitter, Receiver

I. INTRODUCTION

The project mainly aims in designing completely automated books catalog system in library with the help of touch screen sensor and a graphical LCD to control and provide a user-friendly environment of the user to register the selected the book effectively through wireless. The library catalog will be displayed automatically on the GLCD display and we can directly select the book with the help of touch screen.

Touch screens provide fast access to any and all types of digital media, with no text-bound interface getting in the way. Faster input can mean better service. Using a touch interface can effectively increase operator accuracy, reduce training time, and improve overall operational efficiencies, a properly designed touch interface can improve each operator's accuracy. Touch screens are practical in automation, which has become even simpler with touch screen technology. Owners familiar with the icon system appreciate touch screens that make automation systems user friendly.

The device consists of a microcontroller, which is interfaced with the input and output modules, the controller acts as an intermediate medium between both of them. So the controller can be termed as a control unit. The input module is nothing but a touch screen sensor, which takes the input from the user and provides the same to the microcontroller. The output module is the RF module. The controller also takes the responsibility to display the book catalog information on the graphical LCD. At the receiving end the selected books will be displayed on GLCD.

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II. MODE OF PROJECT

2.1transmitter Mode

In this mode we select the student id, semester, book index with the help of touchpad that interface to ADC and DAC connect to microcontroller. This information send with the help of RF module with encoder system 435 MHz FSK modulation.

2.2 Receiver Mode

Inreceiver mode we receive the all information in form of frequency that decode in BCD form and given to microcontroller and issue the book and respective message display in LCD.

III. ARCHITECTURE

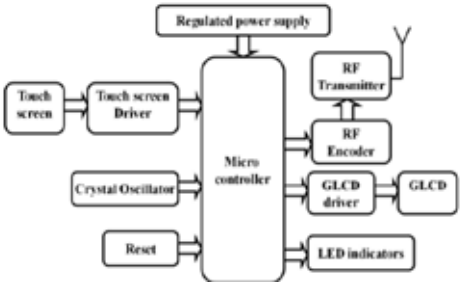

Figure 1 Transmitter

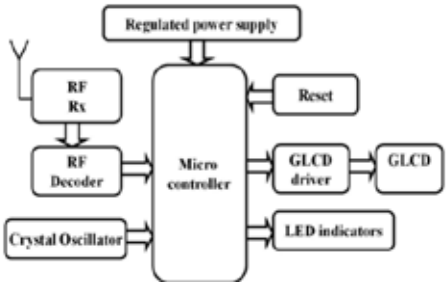

Figure 2.Receiver

IV. ELECTRICAL SYSTEM

4.1Microcontroller (AT89S52)

Here the microcontroller AT89S52 is used instead of AT89C52. Both are different in many ways. AT89S52uses In-system programming via its 6,7,8,9 pins whereas AT89C52 uses parallel programming with an external In-system programmer. The In-system programming helps to program the microcontroller after the installation. The other difference is that AT89S52 uses 4-5V voltage and AT89C52 uses 4-5V and 12V voltage. The AT89S52 works with 33MHz frequency and AT89C52 works with 24MHz frequency. So the frequency range of working of AT89S52 is far better and good than AT89C52.

AT89S52 has a Watch Dog Timer and AT89C52 don't have one. The Watch Dog Timer checks for the malfunctions in the microcontroller. After a fixed time period the timer restart the system and make the corrections. The system sends a signal to reset the timer and postpone the restart. A multistage Watch Dog Timer is a known timer used in computers. It has many stages and with a transection from one stage to other stage it checks for the malfunction and makes a correction. AT89S52 has 8K bytes of Flash memory and a RAM of 256 Bytes. It supports both, the parallel programming and the In-system Programming. Its processing time is less and it makes it fast in comparison to AT89C52.

4.2. Liquid Crystal Display

LCD's typically have 14 data pins and 2 for the LED backlight. Character LCDs use a standard 14-pin interface and those with backlights have 16 pins. There may also be a single backlight pin, with the other connection via Ground or VCC pin. The two backlight pins may precede the pin 1.The nominal backlight voltage is around 4.2V at 25˚C using a VDD 5V capable model. Character LCDs can operate in 4-bit or 8-bit mode. In 4 bit mode,

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pins 7 through 10 are unused and the entire byte is sent to the screen using pins 11 through 14 by sending 4-bits at a time.

4.3. Radio Frequency Transmitter

This wireless data is the easiest to use, lowest cost RF link. Use these components to transmit position data, temperature data, and even current program register values wirelessly to the receiver. These modules have up to 500 Ft. range in open space. The transmitter operates from 2-12V.

4.4. Radio Frequency Receiver

This receiver type is good for data rates up to 4800bps and will only work with the 434MHz to 315 MHz transmitter. Multiple 434MHz or 315MHz receivers can listen to one 434MHz transmitter or 315 MHz transmitter. The receiver is operated at 5V.

4.5 RF Module

The TWS-434 and RWS-434 are extremely small, and are excellent for applications requiring short-range RF remote controls. The transmitter module is only 1/3 the size of a standard postage stamp, and can easily be placed inside a small plastic enclosure.

4.5.1 Encoder

The transmitter output is up to 8mW at 433.92MHz with a range of approximately 400 foot (open area) outdoors. Indoors, the range is approximately 200 foot, and will go through most walls. The TWS-434 transmitter accepts both linear and digital inputcan operate from 1.5 to 12 Volts-DC and makes building a miniature hand-held RF transmitter very easy. The TWS-434 is approximately the size of a standard postage stamp.

4.5.2 Decoder

The receiver also operates at 433.92MHz and has a sensitivity of 3uV. The RWS-434 receiver operates from 4.5 to 5.5 volts-DC and has both linear and digital outputs. The RWS-434 is approximately the size of a standard postage stamp.

4.6 Power Supply

This project works on the two voltages as its requirement, 5V and 12V. To have these voltage levels the following circuit is used as the regulated power supply. There is a rectifier first which converts the 220V to the pulsating DC of 12V. Transformer and diodes are used in the rectifier. As this DC voltage is in pulsating form, we have to convert it in pure DC without any fluctuations. We used an IC 7805. This converts the 12V to 5V DC. To reduce the fluctuations we used the electrolyte capacitors. The LED is used to indicate the 5V at the output.

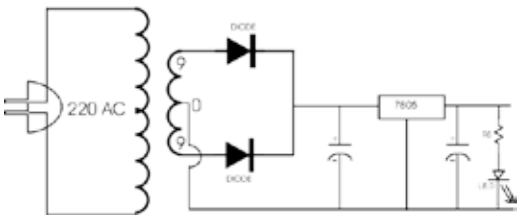

Figure 3. Circuit diagram of Power Supply

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4.7. Touch Screen Technology

A touchscreen is an electronic visual display that can detect the presence and location of a touch within the display area. The term generally refers to touching the display of the device with a finger or hand. Touch screens can also sense other passive objects, such as a stylus. In other words, a touchscreen is any monitor, based either on LCD (Liquid Crystal Display) or CRT (Cathode Ray Tube) technology that accepts direct on screen input. The ability for direct onscreen input is facilitated by an external (light pen) or an internal device (touch overlay and controller) that relays the X, Y coordinates to the computer. The touchscreen has two main attributes. First, it enables one to interact directly with what is displayed, rather than indirectly with a cursor controlled by a mouse or touchpad. Secondly, it lets one do so without requiring any intermediate device that would need to be held in the hand. Touchscreen technology has the potential to replace most functions of the mouse and keyboard. The touchscreen interface is being used in a wide variety of applications to improve human computer interaction. As the technology advances, people may be able to operate computers without mice and keyboards. Because of its convenience, touch screen technology solutions has been applied more and more to industries, applications, products and services, such as Kiosks, POS (Point-of-Sale), consumer electronics, tablet PC, moderate to harsh Machine Control, Process Control, System Control/Office Automation and Car PC, etc.

4.8 Touch sensor

Touch sensors are finding their way into many applications, from mobile phones to remote controls and appliance control panels. Mechanical button and switch replacement continues to be implemented in a wide variety of applications. Touch sensors with simple linear or rotational sliders, rotary wheels and touch pads offer significant advantages for more intuitive user interfaces. They are more convenient to use without moving parts and provide increased reliability. Using touch sensors allows the designer greater freedom, while reducing overall system cost. The consumer can now enjoy a more appealing, intuitive interface often with a more contemporary look.

Free scale's touch sensors are designed to detect touch and even the presence of objects without relying on physical contact. Touch sensors can support multiple electrodes, where several different applications can be controlled by one sensor. By multiplexing the electrodes, the single sensor becomes an extension for detection at multiple points. For example, capacitive touch sensors are user interface controllers that manage multiple configurations of touch pads, sliders, rotary positions and mechanical keys. Free scale offers a broad portfolio of touch sensors as both standard products and software solutions for applications ranging from gaming controllers to occupant detection. Target markets include consumer, appliance, automotive, industrial, medical electronics and networking.

1) Features

- Multiple electrode configurations
- Voltage operation range of 1.8 V–18V Analog or digital (I2C) interface.
- Minimal software integration.
- Rotary wheel, linear sliders and touch pad options.
- Temperature ranges from -40ºC to +110ºC.

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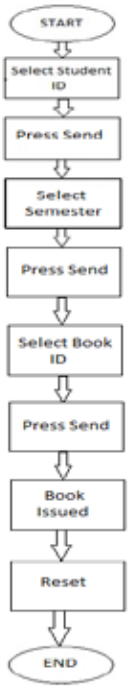
2) Advantages

- Touch screen based user-friendly interfacing.
- Low power consumption.
- Registration of books in the library becomes simple.
- Long life.
- Highly sensitive.

V. WORKING

The working of the project is quite simple and convenient as per the requirement. The transmitter is fixed at the entry section of the library. The receiver is placed in the library where the operator is noting down every activity. Every student has given an ID. He has to enter the ID at the transmitter through the touch pad. After that the semester is to be selected by the student. Then the book number should be entered in order to issue the book. This information is transmitting to the receiver and the operator is reviewing them. He will note down this information and provide the book to the student.



Flow Chart

There is also a future aspect of this project. We can make the facial recognition at the side of entry. This will reduce the unauthorized attempts to issue the book. We also can initialize a locking mechanism which can be unlocked by entering the individual code given to every student. The door at the entry will only open if both the facial recognition and the code entered are good. We also can use a printer to maintain the record of each book issued. We are also thinking about the conveyer belt through which the book will move down to the student from the shelf.

VI. CONCLUSION

Test is found that this system is highly effective and it is efficient in selecting book directly from library. Touch screens provide fast access to any and all types of digital media, with no text-bound interface getting in the way. The need of an operator is reduced with this project. This project also gives attention to the concept of self service. Faster input can mean better service. The sole aim of this project is to make the process of book issuing more interesting and secure. This also facilitates the student to maintain the record as per the requirements.

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 ISBN: 978-81-931039-3-7

INSOMNIA: A MEDICAL SLEEP DISORDER

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ABSTRACT

Insomnia is common problem in general population nowadays. It caused by various factors such as medication, stress, jet lag or negative emotions. Studies have shown that people with insomnia suffer from more symptoms of anxiety and depression than people without insomnia. One showing drop in quality of work may be misapprehended as idleness or lack of enthusiasm.

Keywords: Insomnia, Sleep Onset, Sleep Maintenance, Chronic Insomnia

I. INTRODUCTION

Sleep is an element of everyone's daily life, and is a biological prerequisite in achieving adequate routine. Its disorder are among the most important health problems that go unreported, with consequences that involves growth. One of these disorders is insomnia.

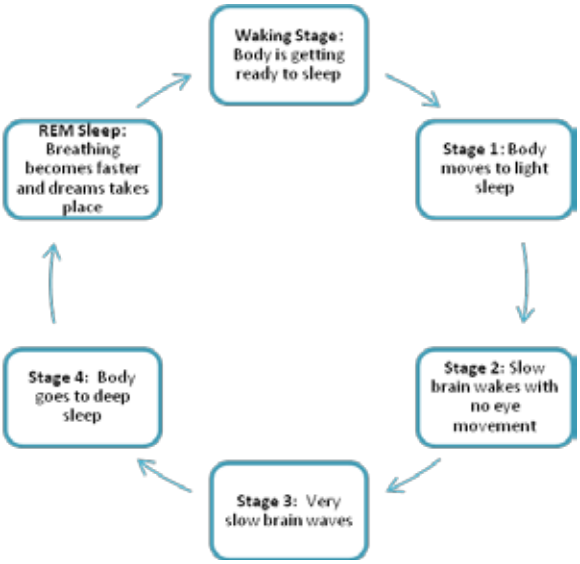

Figure 1: Sleep Stages

Insomnia is defined as difficulty in falling asleep and staying asleep. A person suffering from insomnia wakes up frequently during the night or wakes up early and feels exhausted, slow and not refreshed, with a helplessness to concentrate. It is also one of the important causes of daytime sleepiness. It is also, together with pain and fatigue, the most common disorder among all of us. Though insomnia is a widespread condition in our society, both doctors and patients are lacking in the knowledge about it. There are also no generally accepted standards of treatment.

Sleepless nights happen to everyone. Many scientists and most of the society think of insomnia as a natural reaction of the organism to tension or noise. The effects of insomnia can also include irritable mood and opinion and an increased possibility of accidents while driving or working with machines.

 ISBN: 978-81-931039-3-7

II. CLASSIFICATION OF INSOMNIA

2.1 According to Source

- **Primary insomnia:** When insomnia has no known cause and is not easily identifiable, the condition is called primary insomnia.
- **Secondary or comorbid insomnia:** This occurs when the sufferer has sleep problems because of something else, such as a health condition like asthma, depression, arthritis; pain; use of medication; or use of alcohol.

2.2 According to Sleep Pattern

- **Sleep-onset insomnia**: When the sufferer takes a long time to get to sleep, but can sleep through the night once sleep starts
- **Sleep-maintenance insomnia:** When the sufferer wakes frequently during the night and sleep is uneven

2.3 According to Duration

- **Transient insomnia:** Lasting less than a week. This is the most common and widespread form among the population
- **Acute insomnia:** Lasts between one and four weeks. It is related to stress factors, but more longer-lasting than for transitory insomnia.
- **Chronic insomnia:** Lasts for four or more weeks and may be due long-term physical or psychiatric illness or it may be due to no cause.

III. CAUSES OF INSOMNIA

Causes of insomnia can include:

- Significant life stress.
- Illness.
- Emotional or physical discomfort.
- Difficulty in managing negative emotions.
- Environmental factors like noise, light or temperatures (hot or cold) that interfere with sleep.
- Some medicines (for example those used to treat colds, allergies, depression, high blood pressure and asthma) may interfere with sleep.
- Anxiety
- Interferences in your normal sleep routine (such as jet lag or switching from a day to night shift).
- Depression.
- Chronic stress.
- Fear of sleep
- Pain or discomfort at night.

IV. SYMPTOMS OF INSOMNIA

- difficulty falling asleep
- waking during the night and being unable to return to sleep

- feeling not rejuvenated upon waking
- daytime sleepiness
- irritability or anxiety

V. DIAGNOSIS OF INSOMNIA

Because only one third of patients reported their sleep problems to physician (Szelenberger & Skalski, 1999, Pentor 2000), hence the first and foremost task in the diagnostic process is to find patients with sleep disorders. The most important diagnostic tool is the study of sleeping pattern; a sleep log must be created where information regarding sleep must be present. It is therefore recommended that the questions about the quality of sleep and mood in the morning are a regular part of every medical interview. Patients with insomnia should go immediately to their general practitioners and begin the correct treatment.

VI. TREATMENT OF INSOMNIA

In any case, if sleep problems persist for longer than 2-3 weeks and begin to negatively impact on functioning during the day, be sure to seek medical advice.

In the case of acute or short-term insomnia, especially in those prone to insomnia, it is necessary to take treatment as soon as possible. The patient places the sleeping pill, near the bed and reaches for it when cannot sleep. This treatment protects the patient against the occurrence of factors effect insomnia and prevents against the development of chronic insomnia. The use of medication for a short period is the simplest way.

In chronic insomnia, hypnotics are the drugs used for the treatment (no longer than 2-4 weeks). Additionally these drugs must be used for the short duration of time or else may lead to other side effects. The primary method of treatment for chronic insomnia is behavioural therapy.

VII. CONCLUSION

Research suggests that insomnia is a condition of hyperarousal caused by a relative shift in the balance of activity of the sleep-promoting and wake-promoting systems towards an increase in activity in wake-promoting systems. Insomnia is not a symptom of other disorders, but it is secondary to other medical conditions.

Insomnia occurs in 30–45% adults, and its prevalence is about 1.5–2 times more common in females than males. Much research is done by the researchers of western countries but little to none research is done in the Asian countries. Indian figures are unfortunately not known, but in the United States (US) alone, almost 60 million people complain of insomnia

About 50% of the elderly population report insomnia. Though insomnia is a common symptom of depression, there is increased duration of depression and deterioration. Severe insomnia leads to three times increase risk of hypertension

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 ISBN: 978-81-931039-3-7

DEVICE CONTROL AND MONITORING USING PLC

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ABSTRACT

PLC (Programmable Logic Controller)is playing very important role now days in industries because of its simplicity and robustness. It is used to control many mechanical movements of the heavy machines or to control the voltage and frequency of the power supplies.

Today's world of automation and industries, you have many cost effective control solutions that allow for advanced computer based and remote control. With these advanced control solutions comes with gigabytes of process data that can be utilized for quality control, process optimization and maximizing equipment capacity.

I. INTRODUCTION

The process control system is made up of a group of electronic devices that provide stability, accuracy and eliminate harmful transition statuses in production processes. Operating systems can have different arrangements and implementation, from energy supply units to machines. As technology quickly progresses, many complex operational tasks have been solved by connecting programmable logic controllers and a central computer. Beside connections with devices (e.g., operating panels, motors, sensors, switches, valves, etc.) possibilities for communication among instruments are so great that they allow a high level of exploitation and process coordination. In addition, there is greater flexibility in realizing a process control system. Each component of a process control system plays an important role, regardless of its size. For example, without a sensor, the PLC wouldn't know what is going on during a process. In an automated system, a PLC controller is usually the central part of a process control system. With the execution of a program stored in program memory, PLC continuously monitors status of the system through signals from input devices. Based on the logic implemented in the program, PLC determines which actions need to be executed with output instruments. To run more complex processes it is possible to connect more PLC controllers to a central computer or a master computer.

PLC or programmable controller is a advance electronic microprocessor based device used to monitor and control external devices, such as control of machinery on factory assembly lines, amusement rides, or lighting fixtures. PLCs are used in many industries and machines. Unlike general-purpose the subject invention pertains to facilitating communication between industrial computers, the PLC is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibrationandimpact. Programs to control machine operation are typically stored in battery-backed or non-volatile memory. A PLC is an example of a real time system since output results must be produced in response to input conditions within a bounded time, otherwiseunintended operations will result.

1.1 Programmable Controllers History

In 1969 the first programmable controller was developed. These early controllers met the original specifications and opened the door to the development of a new control technology.

First PLCs offered relay functionality and replaced the original hardwired relay logic, which used electrically operated devices to mechanically switch electrical circuits. They met the requirements of modularity, expandability, programmability, and ease of use in an industrial Environment. These controllers were easily installed, used less space, and were reusable. The controller programming, although a little tedious, had a recognizable plant standard: the ladder diagram format. By 1971 PLC had spread to other automation industries such as food and beverage, metals and manufacturing, pulp and paper.

II. BASIC PLC HARDWARE ARCHITECTURE

The basic architecture of a PLC consists of main components-the processor module, the power supply, and the I/O modules. The processor module consists of the central processing unit (CPU) and memory. In addition to a microprocessor, the CPU also contains at least an interface to a programming device and may contain interfaces to remote I/O and other communication networks. The power supply is usually a separate module, and the I/O modules are separate from the processor. The types of I/O modules include discrete (on/off), analog (continuous variable), and special modules like motion control or high-speed counters. The field devices are connected to the I/O modules.

Depending on the number of I/O and the particular PLC processor, the I/O modules may be in the same chassis as the processor and/or in one or more other chassis. Up until the late 1980s, the I/O modules in a typical PLC system were in chassis separate from the PLC processor. In the more typical present-day PLC, some of the I/O modules are present in the chassis that contains the processor. Some PLC systems allow more than one processor in the same chassis. Smaller PLCs are often mounted on a DIN rail. The smallest PLCs (often called micro-PLCs or nano-PLCs) include the power supply, processor, and all of the I/Os in one package. Some micro-PLCs contain a built-in operator interface panel. For many micro-PLCs, the amount of I/O is limited and not expandable.

III. FEATURES OF P L C

PLC control system is that it regards PLC as control key component, utilize special I/O module to form hardware of control system with a small amount of measurement and peripheral circuit, to realize control to the whole system through programming.

3.1 High Reliability

Strong anti-interference quality and very high reliability are the most important features of PLC. In order to make PLC work stably in strong interferential circumstance. Many techniques are applied in PLC. Software control instead of relay control mode can decrease faults which are brought about by original electric contact spot outside working badly. Industrial grade components made by advance processing technology can resist interferences, and self diagnosis measures of watchdog circuit for protecting memory can improve performance of PLC greatly.

3.2 Good Flexibility

There are several programming languages for PLC including ladder diagrams SFC, STL, ST and so on. If operator can master only one of programming languages, he can operate PLC well. Every who want to use PLC has a good choice. Based on engineering practice, capacity and function can be expanded by

expanding number of module, so PLC has a good flexibility.

3.3 Quality of Strong Easy-Operating

It is very easy to edit and modify program for PLC by computer offline or online. It is very easy to find out where the fault line by displaying the information of fault and function of Self Diagnosing Function, and all these make maintenance and repair for PLC easier. It is very easy to configure PLC because of modularization, standardization, serialization of PLC.

3.4 SCADA

The word SCADA usually refers to centralized systems which monitor and control entire sites, or complexes of systems spread out over large areas (anything between an industrial plant and a country). Most control actions are performed automatically by Remote Terminal Units ("RTUs") or by Programmable Logic Controllers ("PLCs").Host control functions are usually restricted to basic overriding or supervisory levelintervention. For example, a PLC may control the flow of cooling water through part of an industrial process, but the SCADA system may allow operators to change the set points for the flow, and enable alarm conditions, such as loss of flow and high temperature, to be displayed and recorded. The feedback control loop passes through the RTU or PLC, while the SCADA system monitors the overall performance of the loop.

Data acquisition begins at the RTU or PLC level and includes meter readings and equipment status reports that are communicated to SCADA as required. Data is then compiled and formatted in such a way that a control room operator using the HMI can make supervisory decisions to adjust or override normal RTU (PLC) controls. Data may also be fed to a Historian, often built on a commodity Database Management System, to allow trending and other analytical auditing. SCADA systems typically implementdistributed database, commonly referred to as a tag database, which contains data elements called tags or points. A point represents a single input or output value monitored or controlled by the system. Points can be either "hard" or "soft". A hard point represents an actual input or output within the system, while a soft point results from logic and math operations applied to other points. (Most implementationsconceptuallyremove the distinction by making every property a "soft" point expression, which may, in the simplest case, equal a single hard point.) Points are normally stored as value-timestamp pairs: a value and the timestamp when it was recorded or calculated. A series of value-timestamp pairs gives the history of that pointIt's also commontostore additional metadata with tags, such as the path to a field device or PLC register, design time comments, and alarm information.

IV. HUMAN MACHINE INTERFACE

Human-Machine Interface or HMI is the apparatus which presents process data to a human operator, and through which the human operator controls the process.

An HMI is usually linked to the SCADA system's databases and software programs, to provide trending, diagnostic data,andmanagement information such as scheduled maintenance procedures, logistic information, and detailed schematics for a particular sensor or machine, and expert- system troubleshooting guides. This means that the operator can see a schematic representation of the plant being controlled. For example, a picture of a pump connected to a pipe can show the operator that the pump is running and

how much fluid it is pumping through the pipe at the moment. The operator can then switch the pump off. The HMI software will show the flow rate of the fluid in the pipe decrease in real time. Mimic diagrams may consist of line graphics and schematic symbols to represent process elements, or may consist of digital photographs of the process equipment overlain with animated symbols.

The HMI package for the SCADA system typically includes a drawing program that the operators or system maintenance personnel use to change the way these points are represented in the interface. These representations can be as simple as an on-screen traffic light, which represents the state of an actual traffic light in the field, or as complex as a multi-projector display representing the position of all of the elevators in a skyscraper or all of the trains on a railway.

An important part of most SCADA implementations are alarms. An alarm is a digital status point that has either the value NORMAL or ALARM. Alarms can be created in such a way that when their requirements are met, they are activated. An example of an alarm is the "fuel tank empty" light in a car. The SCADA operator's attention is drawn to the part of the system requiring attention by the alarm. Emails and text messages are often sent along with an alarm activation alerting managers along with the SCADA operator

V. ADVANTAGES OF PLC

In industries that exist right now, the presence of PLC is necessary especially to replace the wiring or cabling systems that previously were used in controlling a system. By using the PLC will get many benefits which are as follows:

5.1 Flexible

In the past, each different electronic device controlled by each controller. Suppose ten machines require ten controllers, but now with only one tenth PLC machine can be run with each program.

5.2 Changes and Error Correction System Easier

If one system will be modified or corrected, the change is only done on the programs contained in computers, in a relatively short time, after that it downloaded to the PLC. If not using a PLC, for example relays the amendments made by altering the wiring cables. This course takes a long time.

5.3 Number of Contacts Many

Number of contacts held by the PLC on each coil is more than the contacts held by a relay.

5.4 Cheaper

PLC is capable of simplifying a lot of cabling compared to a relay. So the price of a PLC at a price cheaper than some fruit relay capable of doing the wiring for the same amount with a PLC. PLC includes relays, timers, counters, sequencers, and other functions.

5.5 Operating Speed

PLC operation speed is faster than the relay. Speed PLC scan time is determined by its in units of milliseconds.

5.6 Resistant Character Test

Solid state devices are more resistant than the relay and test mechanical or electrical timers. PLC is a solid state device that is more resistant test.

5.7 Simplifies the Control System Components

The PLC also have counters, relays and other components, so it does not require components such as additional. Use of relays requires counters, timers or other components as additional equipment.

5.8 Documentation

Printout of the PLC can be directly obtained and do not need to see the blueprint of his circuit. Unlike the printout relay circuit cannot be obtained.

5.9 Security

Changing the PLC cannot be done unless the PLC is not locked and programmed. So there is no unauthorized person can change the PLC program for a PLC is locked.

5.10 Can make Changes By Reprogramming

Since the PLC can be programmed quickly reset the production process that mixes can be completed. For example part B will be executed but sections of A is still in the process, the process in section B can be re-programmed in seconds.

VI. DISADVANTAGES OF PLC

1. Because it is a new technology, so that should require training.
2. Some applications that perform a single function, is not efficient in the use of PLC.
3. Limited usage environments, high temperatures and harsh vibrations can disrupt electronic equipment on the PLC.
4. Need extra security equipment such as really.
5. PLC is not considered necessary when applied to industrial systems that do not need to change the wiring.

6.1 Applications of PLC

There are many various applications of PLC in all industries whish are as below

1. Monitoring
2. Control
3. Configuration/Programming
4. Data Logging

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 ISBN: 978-81-931039-3-7

PERIODIC LIMB MOVEMENT (PLM): A MEDICAL SLEEP DISORDER

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ABSTRACT

The study of sleep disorder describes the disorders or diseases that a person suffers from, when he/she is suffering from any of them. In the following paper we have discussed the same. The specific disorder discussed below is the Periodic Limb Movement (PLM). As the name suggests, PLM is the periodic movement of the lower part of leg during the sleep hours of an individual. It takes place at some specific interval of time. The same can be diagnosed by polysomniography. The studies have revealed the fact that PLM cannot be cured completely, but the medication can be continued for relief.

Keywords: Sleep Disorder, Types of Sleep Disorder, Periodic Limb Movement (PLM)

I. INTRODUCTION

A sleep disorder is a physical and psychological condition or disturbance of sleep and wakefulness caused by abnormalities that occur during sleep or by abnormalities of specific sleep mechanisms. Although the sleep disorder exists during sleep, recognizable symptoms manifest themselves during the day. Accurate diagnosis requires a polysomnogram, widely known as a “sleep test.” It is estimated that some 40 million Americans suffer from chronic, long-term sleep disorders. Another 20 to 30 million Americans suffer from some kind of sleep disorder on an irregular basis.

It is estimated that some 40 million Americans suffer from chronic, long-term sleep disorders. Another 20 to 30 million Americans suffer from some kind of sleep disorder on an irregular basis. The movements typically involve the legs, but upper extremity movements may also occur. Movements occur periodically throughout the night and can fluctuate in severity from one night to the next. They tend to cluster in episodes that last anywhere from a few minutes to several hours. These movements are very different from the normal spasms, called hypnic myoclonia, that we often experience initially while trying to fall asleep.

II. SLEEP DISORDER

A sleep disorder, or somnipathy, is a medical disorder of the sleep patterns of a person or animal. Some sleep disorders are serious enough to interfere with normal physical, mental, social and emotional functioning. Polysomnography and actigraphy are tests commonly ordered for some sleep disorders. Disruptions in sleep can be caused by a variety of issues, from teeth grinding (bruxism) to night terrors. When a person suffers from difficulty falling asleep and/or staying asleep with no obvious cause, it is referred to as insomnia.

Sleep disorders are broadly classified into dyssomnias, parasomnias, circadian rhythm sleep disorders involving the timing of sleep, and other disorders including ones caused by medical or psychological conditions and sleeping sickness. Some common sleep disorders include sleep apnea (stops in breathing during sleep),

 ISBN: 978-81-931039-3-7

narcolepsy and hypersomnia (excessive sleepiness at inappropriate times), cataplexy (sudden and transient loss of muscle tone while awake), and sleeping sickness (disruption of sleep cycle due to infection). Other disorders include sleepwalking, night terrors and bed wetting. Management of sleep disturbances that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

The most common sleep disorders include:

- Bruxism: Involuntarily grinding or clenching of the teeth while sleeping.
- Delayed sleep phase disorder (DSPD): inability to awaken and fall asleep at socially acceptable times but no problem with sleep maintenance, a disorder of circadian rhythms. (Other such disorders are advanced sleep phase disorder (ASPD), non-24-hour sleep–wake disorder (non-24) in the sighted or the blind, and irregular sleep wake rhythm, all much less common than DSPD, as well as the transient jet lag and shift work sleep disorders.)
- Hypopnea syndrome: Abnormally shallow breathing or slow respiratory rate while sleeping.
- Idiopathic hypersomnia: a primary, neurologic hypersomnia, which shares many similarities with narcolepsy.
- Insomnia disorder: Chronic difficulties in falling asleep and/or maintaining sleep when no other cause is found for these symptoms.
- Kleine–Levin syndrome: characterized by persistent episodic hypersomnia and cognitive or mood changes (rare)
- Narcolepsy: Excessive daytime sleepiness (EDS) often culminating in falling asleep spontaneously but unwillingly at inappropriate times. Also often associated with cataplexy, a sudden weakness in the motor muscles that can result in collapse to the floor.
- Night terror: sleep terror disorder, an abrupt awakening from sleep with behaviour consistent with terror.
- Nocturia: A frequent need to get up and urinate at night. It differs from Enuresis, or bed-wetting, in which the person does not arouse from sleep, but the bladder nevertheless empties.
- Parasomnias: Disruptive sleep-related events involving inappropriate actions during sleep; sleep walking and night-terrors are examples.
- Periodic limb movement disorder (PLMD): Sudden involuntary movement of arms and/or legs during sleep, for example kicking the legs. Also known as nocturnal myoclonus. See also Hypnic jerk, which is not a disorder.
- Rapid eye movement sleep behaviour disorder (RBD): Acting out violent or dramatic dreams while in REM sleep, sometimes injuring bed partner or self (REM sleep disorder or RSD)
- Restless legs syndrome (RLS): An irresistible urge to move legs. RLS sufferers often also have PLMD.
- Sleep apnea, obstructive sleep apnea: Obstruction of the airway during sleep, causing lack of sufficient deep sleep, often accompanied by snoring. Other forms of sleep apnea are less common. When air is blocked from entering into the lungs, the individual unconsciously gasps for air and sleep is disturbed. Stops of breathing of at least ten seconds, 30 times within seven hours of sleep, classifies as apnea. Other forms of sleep apnea include central sleep apnea and sleep-related hypoventilation.
- Sleep paralysis: is characterized by temporary paralysis of the body shortly before or after sleep. Sleep paralysis may be accompanied by visual, auditory or tactile hallucinations. Not a disorder unless severe. Often seen as part of narcolepsy.

- Sleepwalking: Engaging in activities that are normally associated with wakefulness (such as eating or dressing), which may include walking, without the conscious knowledge of the subject.
- Somniphobia: A cause of sleep deprivation. Somniphobia is a dread/ fear of falling asleep or going to bed. Signs of illness include anxiety and panic attacks before and during attempts to sleep.
- Situational circadian rhythms sleep disorder: shift work sleep disorder (SWSD). Jet lag was previously included here, but it doesn't appear in DSM-5 (Diagnostic and Statistical Manual of Mental Disorders).

Treatments for sleep disorders generally can be grouped into four categories:

- Behavioural and psychotherapeutic treatment.
- Rehabilitation and management.
- Medication.
- Other somatic treatment.

None of these general approaches is sufficient for all patients with sleep disorders. Rather, the choice of a specific treatment depends on the patient's diagnosis, medical and psychiatric history, and preferences, as well as the expertise of the treating clinician. Often, behavioural/psychotherapeutic and pharmacological approaches are not incompatible and can effectively be combined to maximize therapeutic benefits. Management of sleep disturbances that are secondary to mental, medical, or substance abuse disorders should focus on the underlying conditions.

III. TYPES OF SLEEP DISORDER

- Dyssomnias - A broad category of sleep disorders characterized by either hypersomnia or insomnia. The three major subcategories include intrinsic (i.e., arising from within the body), extrinsic (secondary to environmental conditions or various pathologic conditions), and disturbances of circadian rhythm.
- Insomnia: Insomnia is often a symptom of a mood disorder (i.e., emotional stress, anxiety, depression) or underlying health condition (i.e., asthma, diabetes, heart disease, pregnancy or neurological conditions).
- Primary hypersomnia. Hypersomnia of central or brain origin.
- Narcolepsy: A chronic neurological disorder (or dyssomnia), which is caused by the brain's inability to control sleep and wakefulness.
- Idiopathic hypersomnia: a chronic neurological disease similar to narcolepsy in which there is an increased amount of fatigue and sleep during the day. Patients who suffer from idiopathic hypersomnia cannot obtain a healthy amount of sleep for a regular day of activities. This hinders the patients' ability to perform well, and the patient has to deal with this for the rest of their lives.
- Recurrent hypersomnia - including Kleine–Levin syndrome
- Posttraumatic hypersomnia
- Menstrual-related hypersomnia
- Sleep disordered breathing (SDB), including (non exhaustive):

IV. PERIODIC LIMB MOVEMENT (PLM)

Periodic limb movement (PLM), also known as nocturnal myoclonus, is a condition where a sleeper moves limbs involuntarily during sleep, thus disrupting normal sleep patterns. Limb movements usually occur at periodic intervals from 20-40 seconds apart, mainly during the first half of the night, and only during non-REM

sleep (during REM sleep, any movement is overridden by the muscle Antonia or paralysis that accompanies that stage of sleep). These movements are associated with partial arousals or micro-awakenings, although the sufferer is usually unaware of the limb movements or even of the frequent sleep disruptions. The involuntary kicking during sleep that most often characterizes PLM causes sleep disruption for both the sleeper and, perhaps to an even greater extent, their sleeping partner.

Unlike Restless Leg Syndrome (RLS) where the sufferer voluntarily moves limbs to dispel an uncomfortable feeling, and which tends to occur mainly during resting waking hours, PLM movement actually occurs during sleep itself and is completely **involuntary**, with the sufferer usually not even being aware of the movement. However, the two conditions are linked to some extent, and 80% of RLS sufferers also report PLM (although the reverse association is much weaker). Both PLM and RLS are much more common in older people, affecting up to a third of all over-60s by some estimates, and the two disorders are often talked about together and conflated, although they are quite separate complaints. There are also some possible associations with REM sleep behaviour disorder and narcolepsy.

PLM movements occur as a result of a sudden contraction of one or more muscle groups, but the root causes remain unknown. Many **Parkinson's disease** patients also suffer from PLM, so it is hypothesized that a lack of dopamine may be involved. Other contributing factors include shift work, coffee, stress and exercise just before bedtime. **Treatment** of PLM typically includes the elimination of these contributing factors as far as possible and pharmacological treatment with the same drugs as are used with Parkinson's disease.

The exact cause of PLMS is still unknown. Scientists believe that the underlying mechanisms probably involve factors in the nervous system, although studies have not revealed any consistent abnormalities. PLMS are not considered medically serious. They can, however, be implicated as a contributing factor in chronic insomnia and/or daytime fatigue because they may cause awakenings during the night. Occasionally, PLMS may be an indicator of a serious medical condition such as kidney disease, diabetes or anaemia.

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4.1 The Symptoms of PLM

Symptoms of PLM are usually leg movements with the extension of the big toe in combination with a partial flexing of the ankle, knee, or hip. Movement of the legs is more typical than movement of the arms. It can often cause a partial or full brief awakening, resulting in fragmented sleep. Patients are frequently unaware of these movements

4.2 Treatment of PLM

Generally, there are several classes of drugs that are used to treat PLM. These include drugs closely related to those that treat Parkinson's disease, anticonvulsant medications, benzodiazepines, and narcotics. Current treatment recommendations consider the anti-Parkinson's type medications as a first line of defence. Medical treatment of PLM often significantly reduces or eliminates the symptoms of these disorders. There is no cure for PLM and medical treatment must be continued to provide relief.

V. CONCLUSION

A sleep partner may observe PLM, which often affects the partner before the person knows of his or her behaviour. In other cases, the diagnosis is made with the use of an overnight polysomnogram (a test that records bodily functions during sleep). This test is often used to assess the cause of daytime sleepiness or recurrent awakenings from sleep. Blood work may be done in order to test iron status, folic acid, vitamin B12, thyroid function, and magnesium levels.

The causes of PLM are unknown. However recent research has shown that people with a variety of medical problems, including Parkinson's disease and narcolepsy, may have frequent periodic limb movements in sleep. PLM may be caused by medications, most notably, antidepressants.

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 ISBN: 978-81-931039-3-7

NARCOLEPSY SLEEP DISORDER

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ABSTRACT

Narcolepsy is NEUROLOGICAL DISORDER in which there is a loss of ability of brain to regulate the sleep and wake cycles in normal way. Narcoleptic people experience frequent daytime sleepiness in excess, compared to how non-narcoleptics feel that after 24 to 48 hours of sleep deprivation. Narcoleptic people normally experience the REM stage of sleep within about 5 minutes after sleep, as compared to non-narcoleptics who do not experience REM in the first hour or so of a sleep cycle until after a period of slow sleep cycle unless they are very much sleep deprived.

I. INTRODUCTION

Sleep is essential and vital element of one's life, and it is a necessary factor for normal behaviour of one's living. Its disorder are among the most important health problems that go unreported, with consequences that involves growth. There are various health problems related to sleep disorders . One of them is Narcolepsy.These several problems are related with sleep stages .

There are two stages of sleep:

1) **NREM:** Breathing becomes faster and dreaming starts in this stage .
2) **REM :** Initial sleep stage without dreaming .

   REM further classified into

- **Stage S0:** Body is getting ready for sleep.
- **Stage S1:** Body moves to light sleep and relaxed behaviour of body.
- **Stage S2:** Slow brain wakes with no eye movement
- **Stage S3:** Very slow brain waves and relaxed sleep.
- **Stage S4:** Body goes to deep sleep

Daytime sleepiness in excess often resulting in falling asleep spontaneously but unwillingly at inappropriate locations and times.People with narcolepsy experience frequent daytime sleep in excess as comparable to how non-narcoleptics what they feel after that of 24 to 48 hours of sleep deprivation, as well as disturbed nocturnal sleep which often is confused with Narcolepsy.

II. SIGNS AND SYMPTOMS

The main two reasons for narcolepsy are:

2.1 Excessive Daytime Sleepiness

Narcoleptic person is likely to become drowsy and feels asleep, at inappropriate times and places, or just be very tired throughout the day. Narcoleptics are not able to have the normal amount of deep sleep that healthy people have – they don't have "over-sleeping"but inspite they have their entire lives in a constant state of severe sleep deprivation. Daytime naps may occur with little time and they are often physically irresistible.

These naps can occur several times a day. Drowsiness may occur for prolonged periods of time or simply never cease.

2.2 Abnormal REM Sleep

Narcoleptics are unique in that they enter into the REM phase of sleep in the beginnings of sleep, even when sleeping during the day.

This has several consequences. Night time sleep do not include as much deep sleep, so the brain tries to cover it up during the day. People with narcolepsy have drowsiness and falls asleep at uncertain moments . People with narcolepsy fall quickly into what appears to be very deep sleep, and they wake up suddenly and can be disoriented when they do. They have very vivid dreams, which they often remember in great detail. People with narcolepsy may dream even when they only fall asleep for a few seconds. Along with vivid dreaming, people with narcolepsy are known to have audio or visual hallucinations prior to falling asleep.

III. CAUSES OF NARCOLEPSY

OREXIN-A is a hormone associated with this disease. People with narcolepsy often have a reduced number of neurons that produce this protein.

But the cause of narcolepsy was not clear for many years after its diagnosis, then also scientists had discovered conditions that seemed to be linked with an increase in one's risk of having this disorder. Evidently, there appeared to be a strong link between narcoleptic individuals and some genetic conditions. One factor involved with an individual to narcolepsy is CHROMOSOME 6 known as the HLA complex. There seemed to be a similarity between narcoleptic individuals and certain variations in HLA genes, although it was not required for the condition to occur.

Certain variations in the HLA complex were shown to increase the risk of an auto –immune response to produce proteins in neurons inside the brain. The protein produced, is OREXIN, responsible for control of sleep patterns. Of the billions of cells in the human brain only about 10,000 to 20,000 cells produce orexin proteins. Low levels of this hormone is shown to be associated with disease .

IV. DIAGNOSIS

Diagnosis is in a way easy when all the symptoms of narcolepsy are present, but if the sleep attacks are different and narcolepsy is mild or absent, diagnosis is rather more difficult. Three tests that are commonly used in diagnosing narcolepsy are the

1) Polysomnogram,
2) Multiple sleep latency test (MSLT),
3) Epworth sleepiness scale.

These tests are usually performed by sleep specialist.

The polysomnogram involves continuous recording of sleep brain waves and a number of nerve and muscle functions during nighttime sleep. When taken, narcoleptic people fall asleep rapidly, enter REM sleep early, and may often awaken during the night.

The Epworth Sleepiness Scale is a brief questionnaire that is administered to determine the likelihood of the presence of a sleep disorder, including narcolepsy.

For the multiple sleep latency test, a person is given a chance to sleep every 2 hours during normal wake times. The patient is taken in usually for an overnight sleep study. This test measures the degree of daytime sleepiness and also detects how soon REM sleep begins.

Recent research has also revealed the possibility of measuring hypocretin levels in a patient's with narcolepsy, with abnormally low levels serving as a strong indicator of the disorder. This test is useful when MSLT results are difficult to interpret.

Treatment

Patients with narcolepsy can be substantially helped, but not cured. Treatment is given to the individual, based on symptoms. The time required to achieve optimal control of symptoms is highly variable, and may take several months or longer. Medication adjustments are frequently necessary, and complete control of symptoms is seldom possible. While oral medications are the mainstay of formal narcolepsy treatment, lifestyle changes are also important.

The main treatment of excessive daytime sleepiness in narcolepsy is central nervous system stimulants such as

- methylphenidate,
- amphetamine,
- methamphetamine,
- modafinil (Provigil), a new stimulant.

Other medications used are codeine and selegiline.

Another treatment option is sodium oxybate. It can be used for narcolepsy associated with narcolepsy and excessive daytime sleepiness associated with narcolepsy.

V. CONLUSION

Narcolepsy is a excessive sleepiness disorder which is generally caused due abnormal REM sleep stage in individual .It is found to be one of the reason why some people fall drowsy and fall asleep during day time also. There are several people who are having this problem but they don't take it seriously and thus this disease is not diagnosed and cured properly in many of the persons.

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