3.3.2 Number of Research Papers per Teachers in the Journals during the Academic Year 2015-2016

Title of Paper	Name of the Author/s	Department of the Teacher	Name of Journal	ISSN Number
Advanced Automated Module for Smart and Secure City	Dr.M. Venkatesan	CSE	Procedia Computer Science, Elsevier	1877-0509
Trust Based Detection of Malicious Nodes In Wireless Networks	Dr.M.Venkatesan	CSE	International Journal of Advanced Research in Computer Engineering & Technology	2278 – 1323
Secured Session Based Profile Caching for E-Learning Systems Using WiMAX Networks	Dr.B.Kalaavathi	CSE	International Journal of Computer, Electrical, Automation, Control and Information Engineering	9195-0263
Security Enhancement Using Cache Based Re-authentication in WiMAX Based E-Learning System	Dr.B.Kalaavathi	CSE	Hindawi Publishing Corporation The Scientific World Journal	1537-744X
Secured Session Based Authentication Protocol for E-Learning using WiMAX Networks	Dr.B.Kalaavathi	CSE	International Journal of Advancements in Computing Technology(IJACT)	2005-8039 2233-9337
Review on Security Issues In WiMAX Networks for E-Learning	Dr.B.Kalaavathi	CSE	International Journal of Computer Science and Mobile Applications	2321-8363
Survey on Handover Security Issues in WiMAX Networks	Dr.B.Kalaavathi	CSE	World Academy of Science, Engineering and Technology,International Journal of Computer, Electrical, Automation, Control and Information Engineering	1000-3801

Estimating theVideo Watermark Quality using SVD	Dr.B.Kalaavathi	CSE	International Journal of Applied Engineering Research	0973-9769
Reserving Room before Encryption for Reversible Data Hiding with Scan Encryption	Dr.B.Kalaavathi	CSE	International Journal of Applied Engineering Research	0973-9769
An Optimized User Behavior Prediction Model Using Genetic Algorithm on Mobile Web Structure	Dr.B.Kalaavathi	CSE	KSII Transactions On Internet And Information Systems	1976-7277
Regional Firing Characteristic of PCNN Based Multimodal Medical Image Fusion In NSCT Domain	Dr.B. Kalaavathi	CSE	International Journal of Biomedical Engineering and Technology	1752-6418 1752-6426
Survey on Fastraq vs Hive In Big data Environments	Dr.B. Kalaavathi	CSE	International Journal of Applied Engineering Research	0973-4562
Dynamic Proofs of Retrievability Scheme In Cloud Computing	Mr. M. Jawahar	CSE	International Journal on Applications in Information and Communication Engineering	2394-6237
Efficiency Improvement in Classification Tasks using Naive Bayes Tree and Fuzzy Logic	Mr.M.Jawahar	CSE	International Journal for Trends in Engineering & Technology	2349 – 9303
A Novel Approach For Energy efficient Reliable Routing Using Tabu In Wireless Ad Hoc Networks	Dr.K.Gowsic	CSE	International Journal of Emerging Technology in Computer Science & Electronics	0976-1353
On Demand Security for Personal Health Record in Cloud Computing	Mr.V.Prakasham	CSE	Journal of Computer Science and Applications	2231-1270
Data Cleaning and Assimilating on Uncertain XML	Mr.P.Krishna Sankar	CSE	International Journal of Applied Engineering Research(IJAER)	0973-4562

Survey on Fastraq vs Hive In Big data Environments	Mrs.S.Hamsareka	CSE	International Journal of Applied Engineering Research	0973-4562
Data Cleaning and Assimilating on Uncertain XML	Mr.T.Rajan	CSE	International Journal of Applied Engineering Research(IJAER)	0973-4562
Analysis and Design of Single Switch Hybrid Step-Up Converter	Dr.R Jeyabharath	EEE	Circuits and Systems	2153-1285 2153-1293
A Single Phase High Efficient Transformerless Inverter for PV Grid Connected Power System Using ISPWM Technique	Dr.R.Jeyabharath	EEE	International Journal of Applied Engineering Research	0973-4562
Safety and Security In RFID Based Multilevel Vehicle Parking System	Dr.R Jeyabharath	EEE	International Journal of trend in Research and Development	2394-9333
An Improved Direct Torque Control Using Intelligent Technique for Switched Reluctance Motor Drive	Dr.R Jeyabharath	EEE	South Asian Journal of Engineering and Technology	2454-9614
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Automated Boundary Detection and Measurement of Common Carotid Artery Attributes using Transversal B –mode Ultrasound Images	Mr. R.Nandakumar	ECE	Australian Journal of Basic and Applied Sciences	1991-8178
Indian License Plate Detection and Recognition Using Morphological Operation and Template Matching	Ms. W.Deva Priya	ECE	International Journal of Computer, Electrical, Automation, Control and Information Engineering	2010-3778
CFD Analysis of Flat Plate Solar Collecter for Heat Transfer Enhancement Using Various Insets	Mr. R.Vasanthakumar	Mechanical	International Journal of Applied Engineering Research (IJAER)	0973-4562
Heat Transfer Analysis in Internally Grooved Tubes	Mr. A.Premkumar	Mechanical	AGU International Journal of Engineering & Technology	2455-0442
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An Analysis of Energy Efficiency of Leach Protocol In Wireless Sensor Network	Dr. P.Meenakshi Devi	Information Technology	International Journal Of Inventions in Computer Science and Engineering	2348-3539

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Edge Regular Property of Alpha Product, Beta Product and Gamma Product of Two Fuzzy Graphs	N. Kumaravel.	Mathematics	IOSR Journal of Mathematics	2319-765X 2278-5728
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Influence of Zn doping on Structural, Optical and Photocatalytic activity of WO3 Nanoparticles by a Novel Microwave Irradiation Technique	Mr.D.Madhan	Physics	Journal of Materials Science: Materials in Electronics	0957-4522

Effect of Tungsten (W6+) Metal Ion Dopant On Structural, Optical And Photocatalyticactivity of SnO2 Nanoparticles By A Novel Microwave Method	Mr.D. Madhan	Physics	Journal of Materials Science: Materials in Electronics.	1573-482X
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Advanced Automated Module for Smart and Secure City

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ABSTRACT

Population growth, enormous level of industrialization and urbanization, especially in cities, are constantly pushing-in the infrastructure and creating a jostling situation for consumption of resources, which areafter all in limited quantity. Thus indirectly leading to follow-up ill practices (i.e. power theft: in order to meet power demands) and uncomfortable situation (such as over crowded roads due to heavy population, utilising automobiles). Thus, in order to subdue the above stated problem wearer proposing a solution using intellect and modern technology by means of Automation and Information Engineering. This article deals with smart and secure city, where a framework is proposed to secure the resources (Electrical Energy), meet comfortable driving experience (by means of Advanced traffic channelling) and creating a safe and secure environment for all (by installing Camera based Security system). A smart city (also smarter city) uses digital technologies or information and communication technologies (ICT) to enhance quality and performance of urban services, by carrying out the track of ill practices such as Power theft and maintain security in public places. Also enabling us in providing better control over heavy traffic through diversion and channelling of traffic. The best part of proposed module is that it is centralised, thus controlled and managed over a single base station. Here all the peripherals of system module are into communication, and can be controlled as well as reports can be maintained. The objective of this framework is to stop the draining of resources and improve standard-of-living of city by delivering better services in various domains that are automation based.

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Trust Based Detection of Malicious Nodes in Wireless Sensor Network

K.Sumathi[1], Dr.M.Venkatesan[2]

Abstract: The rapid growth of wireless sensor networks, it becomes a promising and one of the most interesting field in last few years. The wireless sensor networks are used in lot of applications. To ensure the security of the sensor network, the detection of malicious packet drop is very important compare to all other attacks. For this the proposed scheme describes the efficient algorithm to detect the malicious packet droppers by exponential trust. This algorithm is also depends on the maximum energy of cluster head, it leads to efficient use of clustering nodes as well as detecting a malicious nodes and creating a alert message to all other nodes in the network.

Index Terms- Wireless sensor network, malicious node, trust, cluster head.

I. INTRODUCTION

The continue changes in the Technologies, the wireless sensor network plays a vital role in our day to day life. The Wireless sensor network consists of spatially distributed autonomous sensors to monitor the environmental conditions like temperature, vibration, sound, pressure etc. Wireless sensor networks used in numerous real-time applications such as home automation, robot control, disaster relief, environment monitoring, sea labs, battlefield surveillance and automatic manufacturing. The wireless sensor network consists of low power processor, tiny memory, radio frequency module, sensing devices and limited powered batteries. The Fig1. Shows the Wireless sensor network Architecture. It consists of the following components.

Sensor Node: A sensor node is the most important component of WSN. The Sensor node does a multiple roles in a network, such as sensing; storing a data; routing a data to the next sensor; and processing the data.

Clusters: Clusters are the organizational horizontal unit for WSNs. The dense nature of these networks requires the need for them to be broken down into clusters to simplify tasks such a communication.

Cluster heads: Cluster heads are the organization leader of a cluster. The sensor node with maximum energy is chosen as Cluster heads. They often are required to organize activities in the cluster. The cluster heads are acting a watch dog in this paper. The cluster heads are updated periodically.

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

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

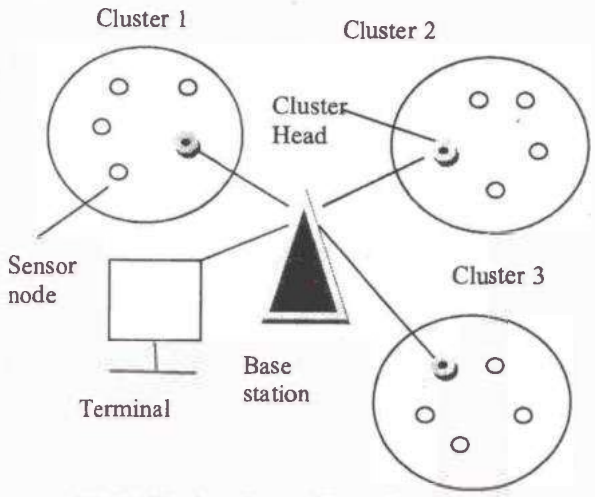

Fig 1. Wireless Sensor Network Architecture

The hierarchies of the Wireless sensor network's.[2] components are represented in Fig 2. In this Base station are at the level 1, Cluster Heads are at level 2 and individual cluster are at level 3

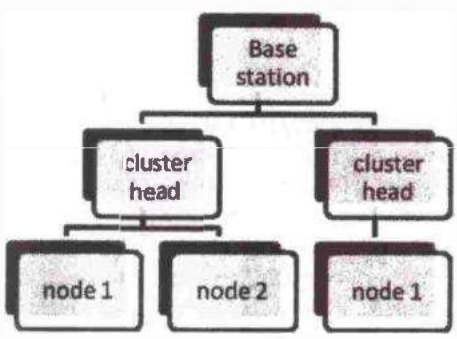

Fig 2. Hierarchy of Wireless sensor network

II. NEED FOR SECURITY IN WSN

The wireless sensor network are used in number of real time applications due do its wireless communications. The Wireless channel can be easily accessed by any one and any

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Secured Session Based Profile Caching for E-Learning Systems Using WiMAX Networks

R. Chithra, B. Kalaavathi

***Abstract*—**E-Learning enables the users to learn at anywhere at any time. In E-Learning systems, authenticating the E-Learning user has security issues. The usage of appropriate communication networks for providing the internet connectivity for E-learning is another challenge. WiMAX networks provide Broadband Wireless Access through the Multicast Broadcast Service so these networks can be most suitable for E-Learning applications. The authentication of E-Learning user is vulnerable to session hijacking problems. The repeated authentication of users can be done to overcome these issues. In this paper, Session based Profile Caching Authentication is proposed. In this scheme, the credentials of E-Learning users can be cached at authentication server during the initial authentication through the appropriate subscriber station. The proposed cache based authentication scheme performs fast authentication by using cached user profile. Thus, the proposed authentication protocol reduces the delay in repeated authentication to enhance the security in E-Learning.

***Keywords*—**Authentication, E-Learning, WiMAX, Security, Profile caching.

I. Introduction

WiMAX enables wireless broadband access with better quality of service. The broadcast multicast feature of WiMAX [1], [2] enables the E-Learning users to use to service of these networks. In WiMAX, the E-Learning users are connected to the WiMAX base station. The Access Service Network has a group of Base station. These base stations are controlled by the Access Service Network Gateway. The Connectivity Service Network consists of Authentication Authorization Accounting (AAA) server and it enables internet connectivity suitable for connecting with the E-Learning server for E-learning.

The Extensible Authentication protocol uses Privacy Key Management Protocol to carry over the authentication messages. In the initial ranging process, the subscriber station of E-learning user establishes Primary Management Connection with the base station. The Users must be authenticated by the AAA server. It uses the Privacy Key Management Protocol (PKM) for the secure distribution of authentication key (AK) between the communication network and the E-Learning user.

The authentication protocols such as PKM v1 and PKM v2 is used for authenticating the users in WiMAX. The message exchange using PKM v1 and PKM v2 protocol [3] in WiMAX is susceptible to attacks such as Rouge base station attack, Man in the Middle attack, Replay attack, Denial of Service attack [8]. The Extensible Authentication Protocol using PKMv2 for E-Learning is susceptible to security issues [6], [7].

The open source E-Learning system such as MOODLE is insecure in session management, authentication, and confidentiality. This leads to security problems such as Session hijacking, Man in the Middle attack. In Session Hijacking, a malicious user after acquiring the user login credentials can use the services of the user using another browser in the same system or in different system. To ensure security in E-Learning, the users of WiMAX based E-Learning system are requested to perform repeated authentication. The Secured Session Based Authentication protocol [9] overcomes the security issues in authentication; this protocol requires full authentication procedure to be followed during each repeated authentication process to overcome the session hijacking problem. Using this protocol each user has to request for authentication by forwarding authentication messages during each re-authentication process.

The proposed scheme overcomes security issues in E-Learning with reduced delay using profile caching at the authentication server. In this scheme, the user profile credentials after the successful initial authentication are cached at AAA server to enable faster authentication. The following section represents the architecture of the proposed system.

II. Existing Authentication Protocols

A. Authentication Using PKM v1

The WiMAX base station accepts the subscriber station information and uses the Privacy Key Management Protocol for authentication. The subscriber station uses X.509 digital certificates during initial communication with the Base Station (BS). In IEEE 802.16d, the base station authenticates the subscriber station using the Privacy Key Management Protocol (PKM v1) [4]. The message exchange in PKM vi is represented as:

- Message1:SS → BS:Cert(SS.Manufacturer)
- Message2:SS → BS:Cert(SS) | Capabilities | BCID
- Message3:BS → SS:KU_{ss}(AK) | SeqNo | Lifetime | SAIDList

where Cert(SS, Manufacturer) is the X.509 certificate of SS's manufacturer, and Cert(SS) is Subscriber Station's X.509

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Security Enhancement Using Cache Based Reauthentication in WiMAX Based E-Learning System

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Secured Session Based Authentication Protocol for E-Learning using WiMAX Networks

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Abstract

E-Learning enables the users to learn at anywhere at any time. In E-Learning systems, authenticating the E-learning user has security issues. The usage of appropriate communication networks for providing the internet connectivity for E-learning is another challenge. WiMAX networks provide Broadband Wireless Access through the Multicast Broadcast Service so these networks can be most suitable for E-learning applications. The credentials of E-Learning users can be used during the initial authentication of the user through the appropriate subscriber station. The authentication protocol in WiMAX is susceptible to security problems. In this paper a novel authentication protocol, Session Based Authentication Protocol for E-Learning users of WiMAX networks is proposed. This protocol focuses on enhancing the security during authentication of E-Learning users. Even though the system requires computation between the authentication server and the E-learning user, authentication delay of the proposed protocol is 30% reduced when compared with the existing authentication protocol.

Keywords: *Authentication, E-Learning, WiMAX, Security.*

1. Introduction

WiMAX enable the deployment of Wireless Metropolitan Area Networks with better quality of service[1][2].These networks provide broadband wireless access service with Line of Sight (LOS) and Non Line-Of-Sight (NLOS) operating at 10-66 GHz and 2-11GHz bands respectively[1][2]. The Broadcast Multicast feature of WiMAX supports the E-Learning applications in these networks. In WiMAX the E-Learning users are connected with the WiMAX base station. The Access Service Network has a group of Base station. These base stations are controlled by the Access Service Network gateway. The connectivity service network consists of authentication server and it enables internet connectivity suitable for connecting with the E-learning server for E-learning.

E-Learning In the initial ranging process the subscriber station of E-learning user establishes Primary Management Connection with the base station. The Users must be authenticated by the Authentication Authorization and Accounting (AAA) server. It uses the Privacy Key Management Protocol (PKM) for the secure distribution of authentication key(AK) between the communication network and the E-Learning user.

The authentication protocols such as PKM v1 and PKM v2 is used for authenticating the users in WiMAX. The message exchange using PKM v1 and PKM v2 protocol[3] in WiMAX is susceptible to attacks such as Rouge base station attack, Man in the Middle attack, Replay attack, Denial of Service attack[8].The Extensible Authentication Protocol using PKMv2 for E-Learning is susceptible to security issues[6][7].

The Revised PKM Protocols even though uses timestamp; it may be changed by the malicious user so it cannot be used to provide the message integrity. So this protocol is also susceptible to attacks.

The proposed scheme overcomes security issues in Privacy Key Management Protocol using both timestamp as well as nonce in the same message to provide enhanced security suitable for authenticating the E-Learning users.

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REVIEW ON SECURITY ISSUES IN WiMAX NETWORKS FOR E-LEARNING

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Abstract

WiMAX (Worldwide Interoperability for Microwave Access) is a wireless broadband technology, which supports point to multi-point (PMP) broadband wireless access. WiMAX Networks provides wireless communications with high quality of service. In the E-Learning System using WiMAX networks, the users of the subscriber station must be authenticated. The authentication in WiMAX is performed using Extensible Authentication Protocol. The EAP protocol based on Privacy Key Management in WiMAX is susceptible to security problems. In this paper the security mechanisms for authentication, encryption, and availability and its potential threats for E-Learning Systems is analyzed.
Keywords: WiMAX, E-Learning, Authentication, security, Extensible Authentication Protocol

1. Introduction

WiMAX is a telecommunication technology which offers high data transfer rates, high throughput and long distance connectivity coverage. IEEE standards for WiMAX such as IEEE 802.16d for fixed WiMAX, IEEE 802.16e for mobile WiMAX and IEEE 802.16j for mobile multi-hop relay based network. In WiMAX some of the management messages are not encrypted or even unencrypted to keep it simple and easy and some of them are, Traffic indication message to wake up MS, Neighbor advertisement message to tell MS about neighboring BS for handover purpose, Power control message, Ranging request message when MS is trying to find connection to BS. Security is always important in data networks, but it is mainly critical in wireless networks such as WiMAX. Security threats are a problem that needs more research in order to find solutions to these threats, fact that will help WiMAX to become a successful and reliable technology.

WiMAX uses Key Management Protocol for authentication. PKM protocol is included in the IEEE 802.16 security sub-layer [1] within the 802.16 MAC layer to perform two functions [4]. PKM protocol provides secure key material distribution between SS and BS. It also enables BS to enforce access control over network services. It also used to define, manage and distribute the keys among the network entities to maintain the data secrecy . IEEE 802.16 has an efficient and power saving mechanism called Multicast and Broadcast service (MBS) to distribute data to more number of SS in the network simultaneously. This feature of WiMAX networks supports for E-Learning.

2. WiMAX Network Architecture for E-Learning

The entities of WiMAX network involved in E-Learning are NAP(Network Access Provider),Network services provider(NSP),Application service provider(ASP).The Network Access Provider owns and operates on ASN(Access Service Network). ASN consists of two or more BS(Base Station) controlled by ASN-GW(ASN-Gate Ways).The Network services provider (NSP) which constructs Connectivity Service Network(CSN), which supply Internet Protocol(IP) connectivity and WiMAX bandwidth services to SS(Subscriber Station). CSN comprises Authentication, Authorization and Accounting (AAA) server to execute authentication, access control and accounting functions.

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Survey on Handover Security Issues in WiMAX Networks

R. Chithra, B. Kalaavathi, K. S. Aruna Shivani

***Abstract*—**Worldwide Interoperability for Microwave Access, is a broadband technology, which can effiectively transmit a data across a group of users using Multicast and Broadcast Service. WiMAX belongs to a fiamily of (IEEE 802.16) standards and is evolving as a fourth generation technology. WiMAX is the next generation technology that offiers wireless access over long distances. MBS zone, which is a group of base stations that are broadcasting the same multicast packets which defines Multicast and Broadcast services. Handover is a process of transferring an ongoing call or data session from one channel connected to the core network to another channel. The handover causes authentication, delay, packet loss, jitter that mainly affiects the communication. In this paper, we present a survey on handover security issues in WiMAX.

***Keywords*—**WiMAX, Handover, Multicast and Broadcast Security.

I. Introduction

WiMAX is termed (World Wide Interoperability for Microwave Access) of fixed and mobile broadband wireless standards. The main objective of the WiMAX network is to support number of users enable broadband connection with each other [13]. WiMAX provides two wireless services such as non-line-of-sight and line-of-sight. The WiMAX networks enable the interoperability between the different products for fixed WiMAX, it provides a Broadband Wireless Access (BWA) with a network coverage of up to 50km and 5-15km [1] for mobile stations. In mobile WiMAX, it is crucial to change the Base Station (BS), then it has to set up new connection every time. Fixed WiMAX does not support handover, whereas in IEEE 802.16e it allows portability, simple mobility which is meant for specified separate handover mechanism [4], [28]. In IEEE 802.16e, the changes had been made in BS to MSS every time when the users move out of the transmission range. In fixed WiMAX there is no movement or replacement has been made to the subscriber, it is always a fixed one [33]. There are several improvements and advancement in the IEEE 802.16e standard and they are formally termed as Mobile WiMAX [7], [34]. As it is infrastructure less it has been used in military, civil deployment areas because it gives assurance not only to the deployed nodes, which are in communication, but also to the nodes which are not able to receive the GPS signal. To enhance the capacity, the WiMAX is feasible to replace the candidate for cellular phone technologies such as GSM and CDMA [14], [35].

The wireless communication protocols are prone to number of attacks due to radio transmission [16], [32] that mainly cause various damages to the networks. WiMAX has several security challenges they are confidentiality, integrity, authentication, encryption and availability. Confidentiality is an important factor in the WiMAX network, the information exchanging between the subscriber stations in view of the fact that has an adversary having the appropriate equipment may eavesdrop on the communication in which the third party are not easily retrieve the information. In insecure networks the there is a danger in exchanging the information that can be easily altered that results in integrity, since the lack of integrity would result in many problems. Integrity controls are used as a safe tool to keep the information without any altered manner in any unexpected way [15]. The authentication in the general case provides the principles in 802.16 networks that has to be certified with X.509, while using the X.509 certificates, an attacker to parody the identity of legitimate subscribers and survive the ample protection against the theft of service. In WiMAX authentication mechanism, Privacy Key Management (PKM) protocol that lack behind the base station (BS) or service provider authentication. This makes the WiMAX networks vulnerable to man-in-middle attacks, exposing subscribers to various confidentiality and availability attacks. Encryption in WiMAX supports the advanced encryption standard (AES) cipher; it's given that strong support for confidentiality of data traffic. The availability which deals with the deployments in the WiMAX networks, an attacker to use readily obtainable tools to jam the spectrum and it is logically simple.

There are numerous prospective attacks in WiMAX security; they are rouge base stations, DOS attacks and man-in-middle attacks [2]. At some point of time Denial of Service (DOS) occurs in the base station during the Privacy Key Management (PKMv2) authentication mechanism due to heavy public key computational load [16], [17]. Man-In-the-Middle attacks are possible during the SS for their basic capability negotiation [16], [18].

WiMAX network, which generally has an uplink and downlink signal. The uplink signal is, when a user sends a data from a subscriber device to a base station the base station broadcast the wireless signal into a channel which is called uplink and the base station transmit the same or another user is called downlink [13]. For wireless medium security support is

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Estimating The Video Watermark Quality Using SVD

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Abstract

Watermarking is a process of steganography or embedding process. It is mainly proposed for copy right protection, data security, and data hiding, etc. Evaluating the quality of image and video is a critical importance in today's video broadcasting, transmission control, and e-commerce, because quality is a key determinant of customer satisfaction. Estimating the video quality under different distortion is important in evaluation of the effectiveness or performance of watermarking and extraction on using image processing algorithms. Here the video file is converted into frames and the watermark image is embedded into the any one of the frame as well as in all the frames. The embedding process is done using SVD, again the frames are converted into video file and it is transmitted. In the receiver side watermark image is extracted from the video. Finally the quality of both video and watermark data is estimated by using quality metrics MSE, PSNR, wPSNR, JND, SSIM under different distortion. All tests and experiments are carried out using MATLAB.

Keyword: Video watermarking, singular value decomposition (SVD), Quality, MSE, PSNR, SSIM, wPSNR, JND.

Introduction

The attractiveness of Internet way in has enabled the wide spread of digital multimedia contents in the form of text, image, video and audio. But, it also makes illegal copying and sharing easier. Researchers from both the industry and the academy have been frustrating to address this dilemma by watermarking techniques. Watermarking, as a probable weapon beside piracy, embeds rights information into

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Reserving Room before Encryption for Reversible Data Hiding with Scan Encryption

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Abstract

Nowadays, more attention turn towards reversible data hiding (RDH) in encrypted images, as because it upholds the outstanding property that the original image can be recovered without any loss after hidden information is taken out while protecting the secrecy of the image content. All former methods implant data by vacating room from the encrypted images that may lead to some errors while extracting the data as well as while restoring the image. In this paper, a novel method has been proposed with reserving room before encryption with a traditional RDH algorithm, and a hybrid approach called as Image Encryption using SCAN patterns and carrier images for encryption. Hence, it is easy for the data hider to reversibly embed data in the SCAN encrypted image. The suggested method can achieve real reversibility, that is, extracting the data and recovering the image are free of any error and the resulting encrypted image is found to be more distorted in hybrid technique. Experimental results show that this novel method can embed more than 10 times as large payloads for the same image quality as the previous methods, such as for PSNR =40 dB.

Keywords: Reversible data hiding, SCAN patterns, Image encryption.

1. INTRODUCTION

Reversible Data Hiding (RDH) is a technique, where the original image can be recovered without any loss after the hidden data is extracted. This important technique finds its application in the areas of medical imagery, military imagery and law

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Regional firing characteristic of PCNN-based multimodal medical image fusion in NSCT domain

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Abstract: Image fusion is the process of combining images from different sources to obtain better situational awareness. The objective is to combine the most relevant information from source images into composite image. In this paper, a regional firing intensity (RFI) is defined, which is based on statistical characteristic in local window of neuron firing times when pulse coupled neural networks (PCNN) is utilised in the image fusion. A novel image fusion algorithm based on regional firing characteristic PCNN (RFC-PCNN) is proposed and RFI is considered as a determination to select the coefficients from NSCT-based MSR of source images. The proposed algorithm is suitable for increasing the fusion quality of brain tumour medical image fusion, and also it removes the artefact effect in fused image. The experimental results show that the proposed method is better than other fusion methods and increases the quality of the fused image.

Keywords: medical image fusion; DWT; NSCT; RFC-PCNN; PSNR.

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SURVEY ON FASTRAQ VS HIVE IN BIGDATA ENVIRONMENTS

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ABSTRACT:

Big data is a broad term for huge data sets that traditional data processing applications are inadequate. Big data analysis can discover trends of various social aspects and their preferences of individual everyday behaviors .The main challenging factor is processing large amount of data within a time period. The query processing time is increased then the network communication cost and local files scanning cost can be increased simultaneously. In our existing system they use hive in range aggregate query but this could provide inaccurate results in big data environments .To overcome this limitations we propose a new technique called FASTRAQ- Range Aggregate Queries. FastRAQ first divides big data into different independent partitions with a balanced partitioning algorithm, and then generates a local estimation for each partition. If a range-aggregate query request arrives, FastRAQ obtains the result directly by summarizing local estimates from all partitions. Fast Range Aggregate Queries has time complexity of 0(1) for data updates. FastRAQ provides range-aggregate query results within a time period that are lower than that of Hive, while relative error is less than 3 percent within the given confidence time interval.

Key Terms: FASTRAQ, Hadoop, HDFS, MapReduce,Hive.

I .INTRODUCTION

Big data is a buzzword or huge dataset used to describe a massive volume of both structured and unstructured data. Big data is so large and this can be difficult to process using traditional database and software techniques. The most enterprise circumstance the volume of data is too big or it moves too fast or it exceeds current processing capacity. In contempt of these problems, big data has the prospective to help in many industries or companies to improve operations and make faster, more intelligent decisions.

Big data needs exceptional technologies to efficiently process large quantities of data within endurable elapsed times. The suitable technologies are crowd sourcing, data fusion and integration, genetic algorithms, machine learning, natural language processing(NLP), signal processing, simulation, time series analysis and visualization. Multidimensional big data can also be represented

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Dynamic Proofs Of Retrievability Scheme In Cloud Computing

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Abstract— In the recent years cloud storage brought many interesting security issues to user attention. Two efficient storage integrity protocols Proofs of Retrievability (PoR) and Provable Data Possession (PDP) are mainly used. The first proposals worked for static or limited dynamic data, whereas later proposals enabled fully dynamic data integrity and retrievability. The DPoR framework encapsulates all known DPoR schemes as its special cases that enable even better performance than the existing solutions. The audit bandwidth for DPoR that is independent of the data size, and the client can greatly speed up updates with O (lpn) local storage (where n is the number of blocks, and l is the security parameter), which corresponds to less than 3 MB for 10 GB outsourced data, and can easily be obtained in today's smart phones, let alone computers.

Key Words: Retrievability, Provable Data Possession, security, cloud computing.

I. INTRODUCTION

The outsourcing of storage data through the cloud (e.g., Google Drive, Amazon S3, Microsoft One Drive), brings advantages such as cost saving, global access to data, and reduced management overhead. The important disadvantage is that the data owner (client), by outsourcing his data to a cloud storage provider (server), loses the direct control and maintenance over his data. So the client expects having an authenticated data storage and guaranteed retrievability. The former means that the client wants each storage data access to return the correct value; i.e., a value that is the most recent version of data that has been written by the client. The latter means that the client wants to make sure that their data is retrievable. These authenticity and retrievability checks should be much more efficient than downloading the whole data.

A simple mechanism to provide an authenticated storage is to compute a digest (e.g., hash, MAC, or signature) of data and keep it locally after transferring the data to the server (or in case of a MAC or signature, the key is kept locally, while the tags can be stored at the server). But, the client needs to download the whole data and check it against the locally-stored digest to investigate the authenticity of their data, which is prohibitively given current trends of outsourcing tens of gigabytes of data.

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II.RELATED WORK

PoR was first proposed by Juels and Kaliski [19] for static data. The data is erasure-coded and encrypted. Then, a set of sentinel blocks are appended, the result is permuted randomly, and outsourced. The sentinel blocks are used to check authenticity with high probability, and in case of any unauthorized manipulation, the erasure-correcting code will help recover the original data. Juels and Kaliski's PoR supports only a limited number of challenges.

The first really dynamic PoR scheme with full security definition and proof was proposed by Cash et al. [9]. The scheme has constant client storage and polylogarithmic communication and computation. As a building block,they use an ORAM satisfying a special property called next-read-pattern-hiding. Although it achieves asymptotic efficiency, ORAM is a complicated and heavy cryptographic primitive that is (currently) not practically efficient.

Chandran et al. [10] proposed a locally updatable and locally decodable code, and used it to construct a dynamic PoR scheme. They erasure-code the data, and store it remotely inside a hierarchical authenticated data structure similar to ORAM in nature. Later updates are also erasure-coded and stored in the same data structure. Reading through that structure requires O(n) cost, hence, they store the plain data and subsequent updates in another similar structure to support read operations efficiently.

Shi et al. proposed a dynamic PoR scheme similar to [10], using the fast incrementally-constructable codes to achieve efficiency. Later, they improved their scheme by outsourcing some part of computation to the server, reducing the communication and client computation. Using the introduced homomorphic checksum, the client only performs the computation on these checksums, leaving computation on data itself to the server.

III. PROPOSED SYSTEM

Erasure-Coded Authenticated Log is a log store plays an important role in the scheme. It is a special authenticated data structure (ADS) that inspects integrity and guarantees retrievability of the logs, which in turn, guarantee retrievability of the outsourced data. The ECAL first erasure-codes the logs (to guarantee retrievability), and garbles the result (e.g., by encrypting the blocks and permuting them randomly) to make locating any part of the original data difficult for the server. Finally, it provides authenticity using a homomorphic tag. Any scheme supporting retrievability and

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Efficiency Improvement in Classification Tasks using Naive Bayes Tree and Fuzzy Logic

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Abstract—ForImproving the classifications accuracy rates for Naive Bayes tree (NBTREE) and Fuzzy Logic for the classification problem. In our first proposed NBTREE algorithm, due to presence of noisy inconsistency instances in the training set its may because Naïve Bayes classifiers tree suffiers from over fittings its decrease accuracy rates then we have to compute Naïve Bayes tree algorithm (NBTREE)to remove the unwanted noisy data from a large amount of training dataset. Then our second the proposed fuzzy logic algorithm, we apply Naïve Bayes tree (NBTREE) to select alsoa more important subset of features for the production of Naive assumption of class conditional independence, to improve extract valuable training dataset and we verified the performances of the two proposed algorithm against those the existing systems are Naïve Bayes tree induction and Fuzzy logic classification individually using the classification accuracy validation. Thus result may cause that identity the most sufficient attributes for the explanation of instances and accuracy rates has to be improved.

Index Terms— Classification, Naïve Bayes tree (NBTree), Fuzzy Logic, Decision tree induction, Naïve Bayes Classifiers, Preprocessing.

1 INTRODUCTION

Classification is an important task in data mining .Currently, classification as have huge training data set are available, and thena big interest for developing classifiers that allow the handlingkind of datasets in a reasonable time.

There is another technique for reducing the number of attributes used in a tree–*pruning*. Two types of pruning:

a. Pre-pruning (forward pruning)

b. Post-pruning (backward pruning)

a. **Post -pruning** waits until the full decision tree has built and then prunes the attributes. Two techniques:

   a. Sub tree Replacement

   b. Sub tree Raising

b. **Pre -pruning,** we decide during the building process when to stop adding attributes (possibly based on their information gain)

2 RELATED WORKS

2.1 Chandra and Varghese (2009) The G-FDT tree used the Gini Index as the split measure to choose the most appropriate splitting attribute for each node in the decision tree. Inspired by performance and unambiguousnessreflections, we propose a new node intense measure in this paper ,we show that the proposed measure is convex and well behaved. Our results over a large number of problems indicate that the quantity results in smaller trees in a large quantity of the cases without any loss in classification accuracy.

2.2 LEE et.al (2010)A Naïve Bayes classification enhancing technique. The development is seen in terms of an improvement in the classification accuracy and is realized through applying unique weighting factors to each category based on the number of documents that are annotated to them. The results from our experiments show that the weighting factor capacityis presented and described as has improved a classification accuracy of the ordinary Naïve Bayes classification method.

2.3 LEVENT et.al (2011) The Naïve Bayes method, which is the simplest form of a Bayesian network, is a popular data mining method that has been applied to many domains, including intrusion detection. The method's simplicity trusts on the assumption that all of the features are independent of each other. The HNB method, which eases this assumption, has stayedeffectively applied to web mining.

$$p(h|d)=\frac{P(d|h)P(h)}{P(d)}$$

$P(h)$: prior belief (probability of hypothesis h before seeing any data)
$P(d|h)$: likelihood (probability of the data if the hypothesis h is true)
$P(d)=\sum_h P(d|h)P(h)$:data evidence (marginal probability of the data)
$P(h|d)$: posterior (probability of hypothesis h after having seen the data d)

3 EXISTING SYSYTEM

Hybrid mining algorithms for improve the classifications accuracy rates of decision tree (DT)and Naive Bayes (NB) classifiers for the classification of multi-class problems in medical dataset. Naïve Bayes (NB) and Decision (DT) classifiers for the automatic analysis and classification of attribute data from training course web pages.

I. Decision tree induction
II. Naive Bayes classification

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A NOVEL APPROACH FOR ENERGY EFFICIENT RELIABLE ROUTING USING TABU IN WIRELESS AD HOC NETWORKS

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Abstract: **Wireless sensor network often used in a challenging application where data transmission is daunting. In order to improve the reliability of the data transmission two novel energy-aware routing algorithms for wireless ad hoc networks called Signal Interference Noise Ratio (SINR) and TABU energy routing has been proposed in this work. SINR addresses some parameters like energy-efficiency, reliability and operation of network. It deliberates the energy consumption and the remaining battery energy of nodes as well as quality of links to find energy-efficient and reliable routes that increase the operational lifetime of the network. TABU on the other hand, is an energy-efficient routing algorithm which finds routes minimizing the total energy required for end-to-end packet traversal. RMER and RMECR are proposed of networks in which either hop-by-hop or end-to-end retransmissions ensure reliability. This makes SINR an elegant solution to increase energy-efficiency, reliability and lifespan of wireless ad hoc networks.**

Index Terms: **Wireless sensor networks, SINR, TABU, RMER**

I. INTRODUCTION

Wireless Ad Hoc Networks (WANET) are ideal candidates for applications to report detected events of interest such as military surveillance and forest fire monitoring. A Wireless Sensor Network comprises battery-powered senor nodes with extremely limited processing capabilities. A sensor node wirelessly sends messages to a base station via a multi-hop path. Energy-Efficient routing is an effective mechanism for reducing energy cost of data communication in wireless ad hoc networks. Routes are discovered considering the energy consumed for end-to-end (E2E) packet traversal. It should not result in finding less reliable routes or overusing a specific set of nodes in the network. Energy-efficient routing networks is neither complete nor efficient without the consideration of reliability of links and residual energy of nodes. Find reliable routes can be enhance quality of the service for networks. To be considering the residual energy of nodes in routing can avoid nodes from being overused and can eventually lead to an increase in the operational lifetime of the network.

During the last decade, various routing algorithms have been proposed aiming at increasing energy-efficiency, reliability and the operation of wireless ad hoc networks. It can broadly group them into three categories.

The first category includes algorithms that consider the reliability of links to find more reliable routes. For instance, De Couto et al. introduced the notion of expected transmission count (ETX) to find reliable routes that consist of links requiring less number of retransmissions for lost packet recovery. Although, some routes may consume less energy to require less number of retransmissions. They does not minimize the energy consumption for E2E packet traversal. Furthermore, consider a higher priority for reliability of routes may result in overusing some nodes. Few links are more reliable than others links will frequently be used to forward packets. Nodes along these lines will then fail quickly and they are forward many packets on behalf of other nodes.

The second category includes algorithms that aim at finding energy-efficient routes. These algorithms do not consider the remaining battery energy of nodes to avoid overdoing of nodes even though some of them, namely address energy-efficiency and reliability together. Many routing algorithms include energy efficient algorithms proposed have a major drawback. They does not determine the actual energy consumption of nodes to discover energy-efficient routes. They are declare the transmission power of nodes (the output power of the power amplifier) neglecting the energy consumed by processing elements of transmitters and receivers. Consider a energy cost of a path by these algorithms is only a fraction of the actual energy cost of nodes for transmission along a path. They are negatively affects energy-efficiency, reliability and operational of the network altogether.

The third category includes algorithms that try to prolong the network lifetime by finding routes consisting of nodes with a higher level of battery energy These algorithm does not address the other two aspects such as reliability and energy-efficiency. Discover routes of these algorithms may neither be energy-efficient nor reliable. This can be increase the overall energy consumption in the network. Thus, the lifetime of network may be reduced.

1.2Problem Statement

A malicious node just reiterates all the outgoing routing packets from a valid node to forge the latter node's identity. The malicious node then uses this fictitious identity to participate in the network routing, dislocate the network traffic. Even if the malicious node cannot be directly overhear the valid node's wireless transmission. It can be

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http://www.irphouse.com

On Demand Security For Personal Health Record In Cloud Computing

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Abstract

Cloud computing is used broadly in several services that maintain Personal Health Record (PHR). It is a patient health-centric model for data exchange in cloud. Personal Health Record (PHR) is often keeping in a third party server i. e. cloud server. The major problems raised in existing approaches are fine–grained access, cryptographically access control, measurability in key management and effective on-demand user revocation. We would like to provide the secure sharing of patient health information in PHR data. This paper predominantly considers the multi-owner scenario and divides the user in PHR system into multiple security domains that greatly reduces the key management issues. A high degree of patient privacy is enriched at the same time by developing Multi-Authority Attribute based mostly cryptography (MA-ABE). We have to improve the security of Personal Health information and set access privileges for every PHR data. Before taking a key to decipher the PHR record in multiple owner scenarios it must raise some security queries on PHR owner.

Keywords: Cloud Computing, Fine-grained access control, Public Health Record System, Attribute Based Encryption, data privacy, Multi-Authority Attribute Based Encryption, AES File Encryption.

I. INTRODUCTION

Personal Health Record (PHR) concept has emerged in recent years for secure sharing of patient-centric model of health information in cloud. We can say that it is a patient

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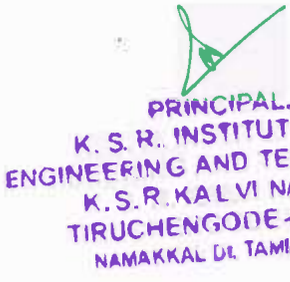

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SURVEY ON FASTRAQ VS HIVE IN BIGDATA ENVIRONMENTS

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ABSTRACT:

Big data is a broad term for huge data sets that traditional data processing applications are inadequate. Big data analysis can discover trends of various social aspects and their preferences of individual everyday behaviors .The main challenging factor is processing large amount of data within a time period. The query processing time is increased then the network communication cost and local files scanning cost can be increased simultaneously. In our existing system they use hive in range aggregate query but this could provide inaccurate results in big data environments .To overcome this limitations we propose a new technique called FASTRAQ- Range Aggregate Queries. FastRAQ first divides big data into different independent partitions with a balanced partitioning algorithm, and then generates a local estimation for each partition. If a range-aggregate query request arrives, FastRAQ obtains the result directly by summarizing local estimates from all partitions. Fast Range Aggregate Queries has time complexity of 0(1) for data updates. FastRAQ provides range-aggregate query results within a time period that are lower than that of Hive, while relative error is less than 3 percent within the given confidence time interval.

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Analysis and Design of Single Switch Hybrid Step-Up Converter

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Abstract

A Single-Switch Hybrid Step-up Converter with high voltage gain, which is suitable for renewable energy system, is proposed in this paper. The proposed converter consists of one switched diode-inductor cell and a capacitor. While switching, both are charged in parallel from the input source and discharged in series to the output. In order to obtain extra voltage gain at lower duty cycle, the voltage multiplier cell is integrated with the proposed converter. The main advantages of the converter are high voltage gain, reduced voltage stress, simple structure and low output voltage ripples. The operating principle and steady state theoretical analysis are presented. A 250 W prototype converter is implemented with 12 V input and 120 V output to verify the design and analysis of this converter and it has an efficiency of over 90% in all operations.

Keywords

DC-DC Power Conversion, Switched-Inductor, Step-Up Converter, Voltage Multiplier

1. Introduction

A hefty and viable economic growth in India is engaging a great demand for energy resources. There is a risk of growing in import of oil and coal in future, which leads to an increase in problems for energy security. In India, a large proportion of people still live without access to electricity and other forms of commercial energy. More than 50% of the population in India has little or no energy for life and living. In order to overcome the above said problems, development of renewable energy sources is a good solution. The power generation through photovoltaic panels, and fuel cells bring advantages like diversification of energy sources, increased distributed generation and also supplies electrical energy to isolated areas [1]. Various applications such as uninterrupted

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A SINGLE PHASE HIGH EFFICIENT TRANSFORMERLESS INVERTER FOR PV GRID CONNECTED POWER SYSTEM USING ISPWM TECHNIQUE

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Abstract- Maximum power point tracking control based PV system is analyzed in this paper along with grid connection. Eliminating the leakage current is the significant issues for transformerless inverter in grid connected photovoltaic systems applications.An improved single phase inverter topology is presented to completely eliminate the common mode leakage current. The improved transformerless inverter can prolong the same low input voltage as the full bridge inverter and completely eliminates the common mode leakage current. The harmonic contents in the output power are minimized by inverted sine PWM technique and parabolic prediction technique is applied for tracking the maximum power. The high efficiency and suitable thermal design are achieved by the decoupling of two additional switches connected to the dc side of the inverter. The software model has been designed using MATLAB/SIMULINK.

Keywords - Transformerless inverter, Photovoltaic (PV) systems, inverted sine carrier pulse width modulation (ISPWM), Common mode leakage current, Maximum power point tracking.

I INTRODUCTION

A renewable energy source has become a vital role to the total energy production. Photovoltaic inverter has become more prevalent within both private and commercial circles. The grid connected photovoltaic systems particularly the low power single phase systems, is for its small size, high efficiency, light weight and low expenditure grid connected inverters. Line frequency or high frequency isolation transformers are employed by the commercial PV inverter. Transformer less topology eliminates the line frequency transformer from grid connected PV system. This results in reduced cost, physical size and weight of the inverter. The other advantage is an increase in the overall power efficiency and higher power density [1]-[6]

However the elimination of the transformer generates confront, which the PV system has to mitigate. When a galvanic connection between the grid and PV array is made a common mode voltage exists and generates common mode current [7]-[12]. The common mode leakage current may produce electromagnetic interference, grid current distortion and additional losses in the system [7] ,[13]. Half bridge inverter or the full bridge inverter with unipolar sinusoidal pulse width modulation is employed conventionally to avoid the common mode leakage current. For 220 V_{ac} applications half bridge inverter requires a high input voltage which is greater than than 700V. The full bridge inverter requires half of the input voltage required by the half bridge topology, which is about 350V for 220V_{ac} applications.

II BLOCK DIAGRAM

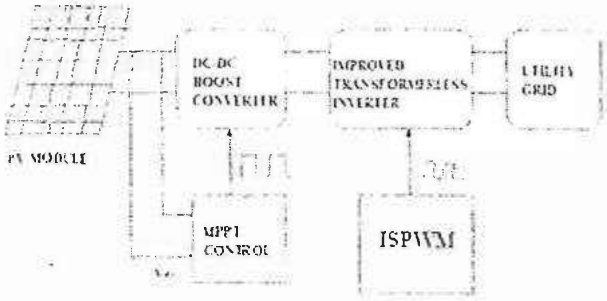

Figure 1.1 block diagram of the proposed system

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Safety and Security in RFID Based Multilevel Vehicle Parking System

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Abstract- This project has been implemented to reduce the excess use of land space which is already very scarce in metro cities. Different types of vehicle parking are applied worldwide namely Multi-level Automated Car Parking, Automated Car Parking System, and Rotary Parking System. The present project work is aimed to develop a scale down working model of a car parking system for parking cars within a large parking area. The chain and sprocket mechanism is used for driving the parking platform. This total prototype is powered by a D.C motor. The RFID system is used for park the cars automatically in the multilevel parking area. It can identify the vehicle with no tag, invalid tag and then restrict the entry of that vehicle. Dijkstra's shortest path algorithm is used for retrieve the car from the multilevel parking system which ensures time saving.

Keywords: *Multilevel Vehicle Parking, RFID Tag, Dijkstra's Algorithm.*

I. INTRODUCTION

Multilevel vehicle parking system is essential especially in regions facing space shortages, also in areas which cater huge crowds. Multi- level car parks offer greatest possible flexibility for the realization of optimum parking solution. Multi-level car parks offer provide a fast parking process in which the driver does not have to maneuver his car on each level. The advanced automatic parking systems are extraordinarily well designed tested and constructed. They are being used worldwide in totally automated locations, where speed and reliability is critical.

The advantages are clear. The systems are scalable and adapt to virtually any architectural foot print. They hold as many as twice any vehicles as similarly sized conventional garages. Although the Multilevel parking system facilitated parking to a great extent but to increase the security of parked vehicles as well as to reduce the manual work and time consumed during parking, a technique is introduced with this system named RFID. Time and cost are two important factors of human life, whether for an individual or a business. We have to spend much time to retrieve the car from multilevel vehicle parking system it comes in ground position. Dijkstra's shortest path algorithm is used for retrieve the car from the multilevel parking system which ensures time saving. This algorithm works a priority based Executing operation for the given input.

II. PRESENT PARKING SOLUTIONS

A. Integrated Car Parking Solution

Consider the following diagram figure 1, Customize application suitable for various types of landscapes and buildings Structures available below the ground. Ease control by soft touch on the operation panel screen.

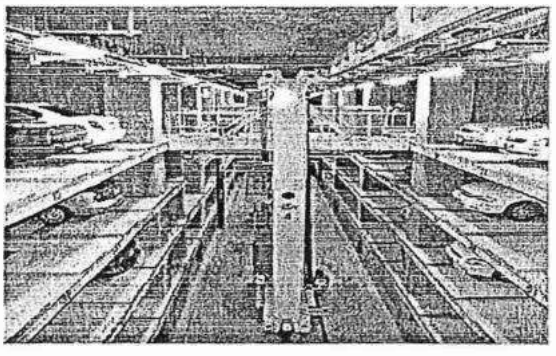

Figure 1: Integrated Car Parking Solutions

When a vehicle stops in front of the entrance, automatically door opens and trolley transfers the vehicle to parking cell. Misleading of this solution is it should be undergrounded. By this investment increases and lot much space utilization is to be made.

B. Automated Car Parking

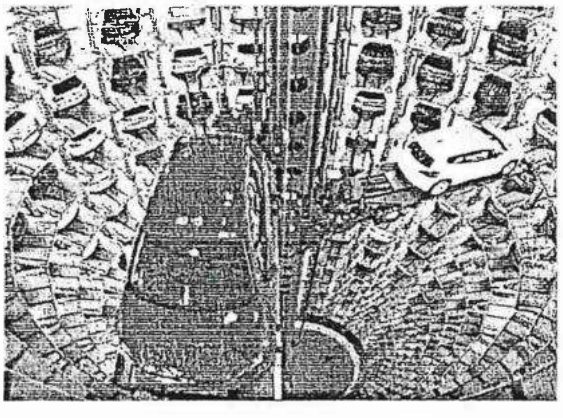

Figure 2: Automated Car Parking

Consider the following diagram figure 2, the driver will pull the car onto a computer- controlled pallet, turn it off, and get out. The pallet is then lowered into the abyss of parking spaces, much like a freight elevator for cars, except it can also move sideways, not just up and down. There's an array of laser sensors that let the system know if the car doesn't fit on the pallet (although it's big enough to fit a mid-sized SUV),. The system retrieves the car when the driver returns, although this might take some time and creative manoeuvring. Cars are parked two deep in some spots, so a specially tailored software system has to figure out the logistics of shuffling the various vehicles around as needed to

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An Improved Direct Torque Control Using Intelligent Technique for Switched Reluctance Motor Drive

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Abstract

In the direct torque control of switched reluctance motor, flux and torque are controlled directly by the selection of switching vector. However, the selected vector is not always the best one. In this paper Fuzzy logic approach is used to select the switching vector hence the torque and flux ripple is reduced and also no flux dropping caused by sector changes. This new technique implemented in real time with low cost DSP controller can give fast torque response.

Click here to enter text.

Keywords: Direct torque control, Flux control, Fuzzy control, Switched Reluctance Motor.

Reviewed by: ICETSET'16 organizing committee

I. INTRODUCTION

Switched reluctance motor, the doubly salient, singly excited motor has simple and robust construction. Although, the induction motor is still the workhorse of the industries, the promising feature of the high torque to mass ratio, high torque to inertia ratio, low maintenance, high specific output and excellent overall performance of SRM make it an efficient competitor for ac drives. The simplified converter topology and switching algorithm due to the unipolar operation avoiding shoot through faults makes SRM advantageous in applications of aerospace, which require high reliability. Also it finds wide application in automotive industries, direct drive machine tools etc [1].

However, significant torque ripple, vibration and acoustic noise are the main drawbacks of SRM to achieve high performance. As the control of SR motor is being the recent trend of research, schemes were developed involving linear and non-linear models to control torque ripple [2], [12]. But due to inaccuracy in linear models and complexity involved in non-linear control, the Direct Torque Control (DTC) was proposed which provided simple solution to control the motor torque and speed and minimized torque ripple.

There are two types of instantaneous electromagnetic torque controlled drives used for high performance applications

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Ann Based Regenerative Braking System of Electric Vehicle

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KSR Institute for Engineering and Technology, Tamil Nadu, India

Abstract - Regenerative Braking System (RBS) can increase energy usage efficiency and can extend the driving distance of Electric Vehicles (EVs). Brushless DC (BLDC) motors are ideally suitable for EVs. In the proposed work, BLDC motor control utilizes the Artificial Neural Network for the distribution of braking force. During the braking period, the proposed method only changes the switching sequence of the inverter to control the inverse torque for returning the braking energy to the battery. Since the braking kinetic energy is converted into the electrical energy and is returned back to the battery. Further the simulation results are analyzed under the environment of MATLAB and Simulink. In comparison to other solutions, the new solution has better performance in regard to realization, robustness, and efficiency because ANN gives high accuracy and better results.

Keywords - *Brushless Dc (BLDC) Motor, Artificial Neural Network (ANN), Regenerative Braking System (RBS), Electric Vehicles (Evs).*

I. INTRODUCTION

Now the EVs are attaining more attention than conventional Internal Combustion Engine (ICE) vehicles. The electric vehicles are hopeful substitute to ICE vehicles by the emerging technology of motor and battery. EVs performance is become comparably better than that of ICE vehicles. It is not possible to recycle the brake energy by RBS in ICE vehicles.

Regenerative Braking is the process of feeding energy from the drive motor back into the battery during the braking process, when the vehicle's inertia forces the motor into generator mode. In this mode, the battery is considered as a load, thereby providing a braking force to EVs. When the vehicle's brake is pressed, the motor will operate as generator and the electrical energy is fed back to the battery instead of being wasted.

II. BLDC MOTOR AND ITS CONTROL

A. *BLDC Motor*

BLDC motors also known as Electronically Commutated Motors (ECMs) are synchronous motors that are powered by a DC electric source via through an integrated inverter/switching power supply, which produces an Alternating Current (AC) electric signal to drive the motor.. Additional sensors and electronics control the inverter output amplitude waveform and frequency (i.e. rotor speed). BLDC motors are ideally suitable for EVs because of their high power densities, and low maintenance.

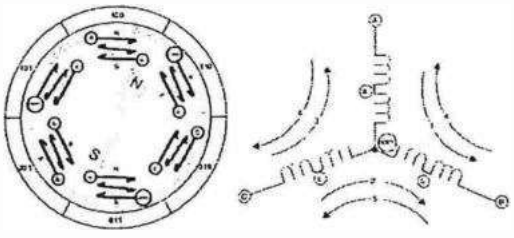

Figure 1: Y Connected BLDC Motor Construction

BLDC motor is a type of synchronous motor. It means that the magnetic field generated by the stator and the rotor rotation are at the same frequency. BLDC motors do not experience the "slip" which is normally seen in induction motors. As shown in Figure 1, in a BLDC motor. permanent magnets are mounted on the rotor, with the armature windings being fixed on the stator with a laminated steel core. BLDC motor parts as shown in Fig 2.

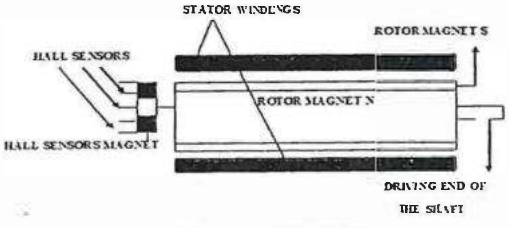

Figure 2: Parts of BLDC Motor

B. *BLDC Motor Control*

In brushless motor, the commutation is achieved electronically by controlling the conduction of switches in the arm of inverter bridge. To control the BLDC motor the position of rotor must be determined which decides the commutation. The voltage vector of BLDC motor is divided into six, which is an correspondence with the Hall Effect sensors signal, as shown in Figure 3. The corresponding hall signals are given to the controller which generates gate signals. These Pulse Width Modulation (PWM) signals are given to the switches in the inverter which supplies the stator winding.

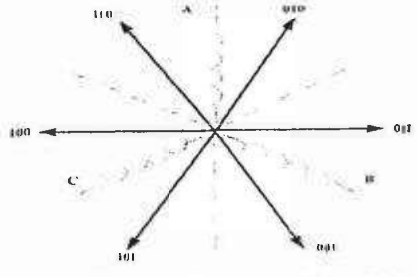

Figure 3: Six Sectors of the BLDC Motor Voltage Vector

The basic drive circuit for a BLDC motor is shown in Figure 4. Each motor lead is connected to high-side and

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New Single Phase Bridgeless CUK Converter Topology for Power Factor Enhancement Based on Fuzzy Logic Control*

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A new single phase bridgeless power factor correction (PFC) converter derived from CUK topology is proposed. In this new CUK converter, the absence of the front end diode bridge results in the less switching and conduction losses compared to the conventional PFC converter. The current flow in the proposed converter configuration has only two semiconductor switches and it results in less conduction loss during each interval of the switching cycle. It offers less input current ripple, less electromagnetic interference (EMI) and also protection against the starting inrush current. It is mostly preferred compared to the other PFC topologies since it has both continuous input and output currents with a reduced current ripple. The proposed converter uses the simple control strategy and is made to work in the discontinuous conduction mode (DCM) to achieve almost a unity power factor. It also offers zero current turn ON and turn OFF for power switches. The performance of the proposed PFC converter is tested in MATLAB/SIMULINK environment with fuzzy logic controller (FLC). The simulation results of the proposed new CUK PFC converter validate the effectiveness of FLC in power factor enhancement.

Keywords: CUK bridgeless topology; fuzzy logic controller (FLC); power factor correction (PFC).

1. Introduction

In recent years, the choice of research have been increasing in power factor correction (PFC) circuits for low and medium power applications inorder to improve the power factor and to maintain the power quality at the utility. Several regulations and

*This paper was recommended by Regional Editor Piero Malcovati.
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Scientific Research Publishing

Analysis and Design of Single Switch Hybrid Step-Up Converter

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Abstract

A Single-Switch Hybrid Step-up Converter with high voltage gain, which is suitable for renewable energy system, is proposed in this paper. The proposed converter consists of one switched diode-inductor cell and a capacitor. While switching, both are charged in parallel from the input source and discharged in series to the output. In order to obtain extra voltage gain at lower duty cycle, the voltage multiplier cell is integrated with the proposed converter. The main advantages of the converter are high voltage gain, reduced voltage stress, simple structure and low output voltage ripples. The operating principle and steady state theoretical analysis are presented. A 250 W prototype converter is implemented with 12 V input and 120 V output to verify the design and analysis of this converter and it has an efficiency of over 90% in all operations.

Keywords

DC-DC Power Conversion, Switched-Inductor, Step-Up Converter, Voltage Multiplier

1. Introduction

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World Academy of Science, Engineering and Technology
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Vol:9, No:5, 2015

Analysis of Direct Current Motor in LabVIEW

E. Ramprasath, P. Manojkumar, P. Veena

Abstract—DC motors have been widely used in the past centuries which are proudly known as the workhorse of industrial systems until the invention of the AC induction motors which makes a huge revolution in industries. Since then, the use of DC machines has been decreased due to enormous factors such as reliability, robustness and complexity but it lost its fame due to the losses. In this paper a new methodology is proposed to construct a DC motor through the simulation in LabVIEW to get an idea about its real time performances, if a change in parameter might have bigger improvement in losses and reliability.

Keywords—Direct Current motor, LabVIEW software, modelling and analysis, overall characteristics of Direct Current motor.

I. Introduction

AN Induction motor is commonly known as the work horse of an industry owing to the robust nature, rugged construction and reliable operation. DC motors in the industrial plants have been replaced with robust and less complex AC induction motors and the speed control technique was achieved after the invention of the semiconductor devices. Nowadays, PWM techniques widely used to control the induction motor. When the power electronics started to boom the accurate speed control of induction motors are possible which pays a path to eliminate the use DC machines and the boom of induction motor started. These equipments have been designed and manufactured in such a robust way that some of them are still working and used in the production industries such as in metal industries. A particular configuration, the compound DC motor was widely used, for example for lifting where sudden rejection of load occurs [1].

There are different types of DC Motor they are widely classified into two types they are Self-Excited and Separately Excited motors [2]. Normally Self-Excited motor are does not need an additionally supply to the rotor but in the case of separately excited motors there should be a two different supply, one is to the armature and the another one is to the field winding. Both must be separately excited,but in the case of self-Excited motor they are classified into three types according to the types of connections. DC Series motor, DC shunt motor and DC Compound motor [3].

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P. Veena is with the Electrical Engineering Department, KSR Institute for Engineering and Technology, Anna University Chennai, Tamil Nadu, India.

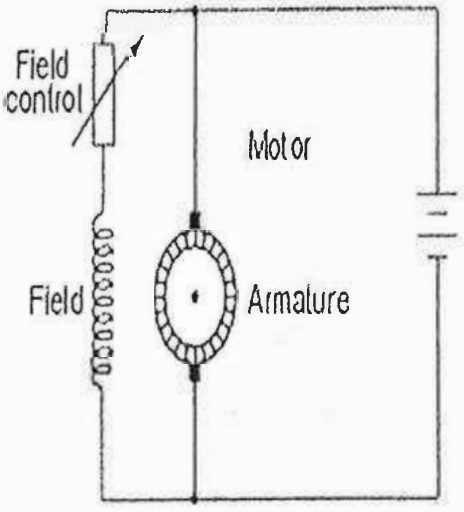

Fig. 1 Equivalent circuit parameters of direct current motor

II. Test for Direct Current Motor

A. No-load Test

This test is performed to determine the no load input of the DC motor, no load current of the DC motor and no load power losses, can be found using this no load test of the motor. How the no load torque affects the machine performance, This test is performed by applying different values of applied voltage which will be below and above of the rated voltage of DC motor without connecting to the external load [4].

B. Full-load Test

Full load test is also known as the short circuit load test which are performed to determine the short circuit current of the motor (I_{sc}) with rated voltage applied to the field. The locked rotor test on the Direct Current motor is done by holding the armature of the motor mechanically from turning in any direction, and applying a voltage which is below the rated voltage to the armature [5].

III. DC Motors

This characteristic is also known as electrical characteristic. Torque is directly proportional to armature current and flux. In DC series motors, field winding is connected in series with armature. Thus, before magnetic saturation of the field, flux Φ is directly proportional to Ia Therefore, before magnetic saturation $Ta \propto Ia^2$. At light loads, Ia as well as Φ is small and hence the torque increases as the square of the armature current [6].

In case of DC shunt motors the field flux Φ to be constant. Though at heavy loads, Φ decreases in a small amount due to

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Induction Motor Characteristics Study using Laboratory Instrument Engineering Workbench

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Abstract

Induction motor characteristics are complex to study, so in order to simplify its complexity modelling of induction motor will be useful. Proposed paper dealt with the simulation of induction motor based on the mathematical expression using the graphical user interface software. Laboratory Virtual Instrument Engineering Workbench (LabVIEW) software is used for modelling the induction motor and helps in analyzing the performance characteristics of a machine. After the invention of special electrical machine the research in induction motor starts to decreases but it is the widely used motor in industries. The study about induction motor characteristics became complex after the incorporation of power electronic switches such as thyristor, diodes, GTO, and MOSFET. Induction motor characteristics can be studied and modelled with the help of numerous softwares such as Finite Element Analysis and Laboratory Virtual Instrument Engineering Workbench.

Keywords: *induction motor, modelling, characteristics, simulation, LabVIEW.*

1. Introduction

Induction motor designing isderived based on the mathematical equation which is quite complex in nature, because equation whose terms are second order degree and more over it is a strongly coupled system. The input and output variable relationship is almost complex because there are multiple relationship between the parameters affecting them, find an appropriate parameter is difficult. Modelling the simulation of induction motor physically is hard due to factor of inbound relationship affecting them. Most common software employed for modelling and analysis are PSpice, Finite Element Analysis commonly are known as FEM analysis which analysis the flux revolving around the motor and to find out the un equal distribution of fluxes in induction motor, Matrix Laboratory and Laboratory Virtual Instrument Engineering Workbench are the software which are completly based on the graphical programming languages. software rather than is, are created based on the text lines such as C &C++.

LabVIEW software is fully based on the graphical programming environment. LabVIEW software has a dynamic nature which contributes to this real time tracking or processing the data. The changes in this parameter can be can be observed continuously without any run time interruption. Dynamic analyzing is established based on both the mathematical and physical model. Normally equivalent circuit of transformer resembles the equivalent circuit of induction motor based on the construction equalities, where the airgap between the stator and rotor in the induction motor differentiate from the transformer. LabVIEW software of following qualities such as multi-dimensional plots, xy graphs, report generation in excel, word makes this software accessible and has a unique feature, which simplifies the simulation process.

Induction motor are analysed using the dynamic and steady state analysis are normally difficult to compute so modelling a induction motor using mathematical model helps to eliminate the further consequences.The real time engine in LabVIEW helps to simulate a induction motor with the real time capability To simulate a motor like a real time motor the both should share the identical parameters.So the determination of parameters must be accurate for carrying out induction motor characteristics analysis. Machine performance changes according to the coupled system inertia, so a small negligible changes contributes to the change in the load torque. Motor constancy changes rapidly, if the motor inertia and load torque of that motor changes rapidly. Identifying faults in electric motor using LabVIEW is growing research area

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Induction Motor Analysis Using LabVIEW

E. Ramprasath, P. Manojkumar, P. Veena

Abstract—Proposed paper dealt with the modelling and analysis of induction motor based on the mathematical expression using the graphical programming environment of Laboratory Virtual Instrument Engineering Workbench (LabVIEW). Induction motor modelling with the mathematical expression enables the motor to be simulated with the various required parameters. Owing to the invention of variable speed drives study about the induction motor characteristics became complex. In this simulation motor internal parameter such as stator resistance and reactance, rotor resistance and reactance, phase voltage, frequency and losses will be given as input. By varying the speed of motor corresponding parameters can be obtained they are input power, output power, efficiency, torque induced, slip and current.

Keywords—Induction motor, LabVIEW software, modelling and analysis, electrical and mechanical characteristics of motor.

I. Introduction

AN induction motor is commonly known as the work horse of an industry owing to the robust nature, rugged construction and reliable operation. When an alternating current is provided to the secondary winding circuit of the induction motor it produces the revolving magnetic flux around the stator. Air gap acts as the dielectric medium which separates the rotor from the stator without having any physical contact. This revolving magnetic flux cuts the rotor windings axially as a result it produces an induced electromotive force in the rotor which is sinusoidal in nature. In a squirrel cage induction motor the end rings are short circuited, which provides the path for the induced current to flow across the rotor windings. The current induced in the rotor starts to circulate which produces a magnetic field in a direction opposite to the cause [1].

Production of torque is owing to the fundamental interaction between these two counter balancing magnetic fields due to the applied voltage to the stator. The torque characteristics of an induction motor are suitable for a variety of industrial applications such as pumps, fans, prime movers, blowers etc. Induction motor is available with speed vs torque characteristics suitable for a variety of industrial applications. Squirrel cage induction motors have higher efficiency and less maintenance when compared to the wound rotor induction motor when compared to the wound rotor induction motor because it have higher losses due to externally connected resistances in order to reduce the losses in wound rotor motor the slip power recovery technique was to reduce the losses [2].

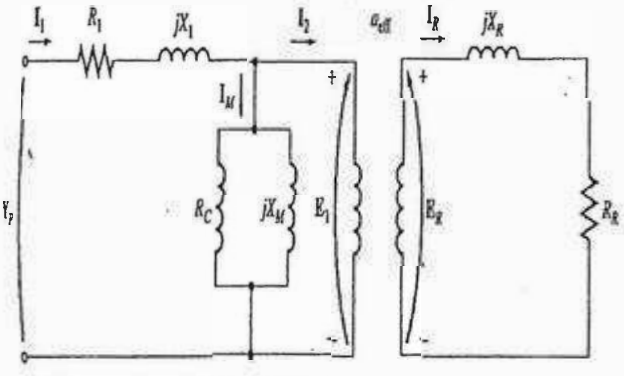

Fig. 1 Equivalent circuit parameters of an induction motor

II. Test for Induction Motor

A. The DC Test for Induction Motor

This test is called the de resistance test. For this test a dc voltage is applied to the stator windings of the motor. There is no induced voltage in the rotor circuit due to de current therefore no resulting rotor current. Even the reactance of the motor is zero at direct current. Therefore, quantity limiting of current is the motor stator resistance which can be determined.

B. No-load Test

This test is performed to determine the no load input, no load current I_o, no load power factor, windage losses, friction losses, no load core losses, no load resistance and reactance can be found using this no load test of the motor. This test is performed by applying different values of applied voltage which will be below and above of the rated voltage of induction motor without connecting to the external load. The test is performed at rated frequency and with balanced poly-phase voltages applied to the stator terminals and will have a very small amount of slip power [3].

C. Locked-Rotor Test

Locked rotor test is performed to determine the short circuit current of the motor (I_{sc}) with rated voltage applied to the stator, short circuit power factor of the motor, total equivalent resistance and reactance of the motor as referred to stator. The locked rotor test on the induction motor is done by holding the shaft of the motor mechanically from turning in any direction, and applying a voltage which is below the rated voltage to the stator [4].

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An Improved Direct Torque Control Using Intelligent Technique for Switched Reluctance Motor Drive

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Abstract

In the direct torque control of switched reluctance motor, flux and torque are controlled directly by the selection of switching vector. However, the selected vector is not always the best one. In this paper Fuzzy logic approach is used to select the switching vector hence the torque and flux ripple is reduced and also no flux dropping caused by sector changes. This new technique implemented in real time with low cost DSP controller can give fast torque response.

Click here to enter text.

Keywords: Direct torque control, Flux control, Fuzzy control, Switched Reluctance Motor.

Reviewed by: ICETSET'16 organizing committee

I. INTRODUCTION

Switched reluctance motor, the doubly salient, singly excited motor has simple and robust construction. Although, the induction motor is still the workhorse of the industries, the promising feature of the high torque to mass ratio, high torque to inertia ratio, low maintenance, high specific output and excellent overall performance of SRM make it an efficient competitor for ac drives. The simplified converter topology and switching algorithm due to the unipolar operation avoiding shoot through faults makes SRM advantageous in applications of aerospace, which require high reliability. Also it finds wide application in automotive industries, direct drive machine tools etc [1].

However, significant torque ripple, vibration and acoustic noise are the main drawbacks of SRM to achieve high performance. As the control of SR motor is being the recent trend of research, schemes were developed involving linear and non-linear models to control torque ripple [2], [12]. But due to inaccuracy in linear models and complexity involved in non-linear control, the Direct Torque Control (DTC) was proposed which provided simple solution to control the motor torque and speed and minimized torque ripple.

There are two types of instantaneous electromagnetic torque controlled drives used for high performance applications

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Indian License Plate Detection and Recognition Using Morphological Operation and Template Matching

W. Devapriya, C. Nelson Kennedy Babu, T. Srihari

Abstract—Automatic License plate recognition (ALPR) is a technology which recognizes the registration plate or number plate or License plate of a vehicle. In this paper, an Indian vehicle number plate is mined and the characters are predicted in efficient manner. ALPR involves four major technique i) Pre-processing ii) License Plate Location Identification iii) Individual Character Segmentation iv) Character Recognition. The opening phase, named pre-processing helps to remove noises and enhances the quality of the image using the conception of Morphological Operation and Image subtraction. The second phase, the most puzzling stage ascertain the location of license plate using the protocol Canny Edge detection, dilation and erosion. In the third phase, each characters characterized by Connected Component Approach (CCA) and in the ending phase, each segmented characters are conceptualized using cross correlation template matching- a scheme specifically appropriate for fixed format. Major application of ALPR is Tolling collection, Border Control, Parking, Stolen cars, Enforcement, Access Control, Traffic control. The database consists of 500 car images taken under dissimilar lighting condition is used. The efficiency of the system is 97%. Our future focus is Indian Vehicle License Plate Validation (Whether License plate of a vehicle is as per Road transport and highway standard)

Keywords—Automatic License plate recognition, Character recognition, Number plate Recognition, Template matching, morphological operation, canny edge detection.

I. Introduction

IN India the license plate number is issued by the district-level Regional Transport Office (RTO) of respective states. The plate must be placed in front and rear of the vehicle. On the basis of the recommendations made by the Technical Standing Committee on Central Motor Vehicles Rules, the Central Government had amended rule 50 of the Central Motor Vehicles Rules, 1989, mandating introduction of new High Security Registration Plates, both in respect of new and in-use motor vehicles throughout the country. A sample format for high security registration plate [16] is shown in Fig. 1. The Features of High Security Registration Plates are Chromium hologram, a retro-reflective film, bearing a verification inscription 'India' at 45 degree inclination. Laser numbering, which is unique in nature containing alpha-numeric identification of both Testing Agencies and the manufacturers. The Registration numbers to be embossed on the plates. In case of rear registration plate, same to be fitted with a non-reusable snap lock to make it tamper proof.

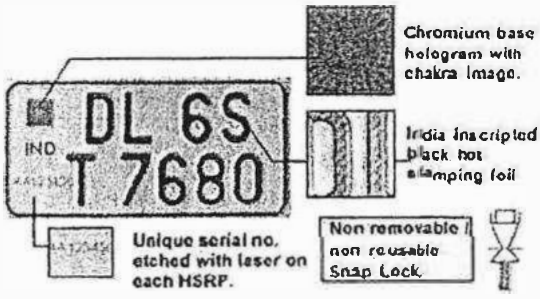

Fig. 1 High Security Registration Plates Image

A Chromium based third registration plate in the form of sticker is to be attached to the wind shield, wherein the number of engine and chassis are indicated along with the name of registering authority. If tampered with, it self-destructs. In front and rear registration plates, letter IND in blue color is hot stamped. Letters 'IND' written in blue color is located on extreme left center of the plates [12].

The fonts are mandatorily to be written only using modern Hindu-Arabic numerals with Latin letters. The license plate consists of 3 parts; i) First two letters indicate the state to which the vehicle is registered. ii) Next two digit numbers are the sequential number of a district. iii) The third part is a 4 digit number unique to each vehicle plate. A letter(s) is prefixed when the 4 digit number runs out and then two letters and so on. The image shown below is the format for license plate. The plates will be highly secure with "lock, hologram and unique numbers. Fig. 2 is a sample number plate figure in which

- TN –Tamil Nadu
- 28 – Namakkal District code in Tamil Nadu
- AQ 0191 –unique serial code for that particular vehicle.

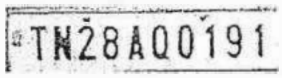

Fig. 2 Sample License plate

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Real Time Speed Bump Detection Using Gaussian Filtering and Connected Component Approach

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Abstract

An Intelligent Transportation System (ITS) is a new system developed for the betterment of user in traffic and transport management domain area for smart and safe driving. ITS subsystems are Emergency vehicle notification systems, Automatic road enforcement, Collision avoidance systems, Automatic parking, Map database management, etc. Advance Driver Assists System (ADAS) belongs to ITS which provides alert or warning or information to the user during driving. The proposed method uses Gaussian filtering and Median filtering to remove noise in the image. Subsequently image subtraction is achieved by subtracting Median filtered image from Gaussian filtered image. The resultant image is converted to binary image and the regions are analyzed using connected component approach. The prior work on speed bump detection is achieved using sensors which are failed to detect speed bumps that are constructed with small height and the detection rate is affected due to erroneous identification. And the smartphone and accelerometer methodologies are not perfectly suitable for real time scenario due to GPS error, network overload, real-time delay, accuracy and battery running out. The proposed system goes very well for the roads which are constructed with proper painting irrespective of their dimension.

Keywords

Intelligent Transportation System, Speed Bumps, Driver Assistance System, Gaussian and Median Filtering, Connected Component Analysis

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An Improved Direct Torque Control Using Intelligent Technique for Switched Reluctance Motor Drive

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Abstract

In the direct torque control of switched reluctance motor, flux and torque are controlled directly by the selection of switching vector. However, the selected vector is not always the best one. In this paper fuzzy logic approach is used to select the switching vector hence the torque and flux ripple is reduced and also no flux drooping caused by sector changes. This new technique implemented in real time with low cost DSP controller can give fast torque response.

Click here to enter text.

Keywords: Direct torque control, Flux control, Fuzzy control, Switched Reluctance Motor.

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1. INTRODUCTION

Switched reluctance motor, the doubly salient, singly excited motor has simple and robust construction. Although, the induction motor is still the workhorse of the industries, the promising feature of the high torque to mass ratio, high torque to inertia ratio, low maintenance, high specific output and excellent overall performance of SRM make it an efficient competitor for ac drives. The simplified converter topology and switching algorithm due to the unipolar operation avoiding shoot through faults makes SRM advantageous in applications of aerospace, which require high reliability. Also it finds wide application in automotive industries, direct drive machine tools etc [1].

However, significant torque ripple, vibration and acoustic noise are the main drawbacks of SRM to achieve high performance. As the control of SR motor is being the recent trend of research, schemes were developed involving linear and non-linear models to control torque ripple [1]-[18]. But due to inaccuracy in linear models and complexity involved in non-linear model, the Direct Torque Control (DTC) was proposed which provided simple solution to control the motor torque and speed and minimized torque ripple.

There are two types of instantaneous electromagnetic torque controlled drives used for high performance applications

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Raspberry Pi (Model B) Based Interactive Home Automation System

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Abstract: The process of automation is becoming more popular because of its numerous applications. Home automation is something that deals with the control of domestic appliances. The main aim of this paper is to develop an advanced method of home automation with the application of Raspberry Pi through voice. Python is used as the main programming language which is default, provided by Raspberry Pi. The voice is recognized by using DTW algorithm.

Keywords: *Raspberry Pi, Voice, Home Automation, Python, DTW Algorithm.*

I. INTRODUCTION

Home automation is the automation of home, by controlling the appliances in the home by using controllers. It may include centralized control of appliances, security locks of gates and doors and other systems. The system integrates electrical devices in a house with each other. Through the integration of information technologies with the home environment, systems and appliances can communicate in an integrated manner which results in convenience, energy efficiency, and safety benefits. Automation is, characterized into two types. They are, Scheduled events and Non-scheduled events. In scheduled events the programming may include time-related commands, such as having your lights turn on or off at specific times each day. In non-scheduled events, such as turning on the lights in the home according to the user command.

II. VOICE RECOGNITION SYSTEM

The first step used in the voice recognition is the user to speak a word or phrase into a microphone. The microphone detects the voice signal which is in the form of analog. Then the analog signal is digitized by using an "analog-to-digital (A/D) converter", and then stored in memory.

To determine the "meaning" of this voice input, the processor attempts to match the input with a digitized voice sample, or template that has a known meaning. This technique is a close analogy to the traditional command inputs from a keyboard. The program contains the input template, and attempts to match this template with the actual input using a simple conditional statement

Each person's voice is different; the program cannot possibly contain a template for each potential user, so the program must first be "trained" with a new user's voice input before that user's voice can be recognized by the program. During a training session, the program displays a printed word or phrase. The user speaks that word or phrase several times into a microphone. The program computes a statistical average of the multiple samples of the same word and stores the averaged sample as a template in a program data structure.

This approach to voice recognition, the program has a "vocabulary" that is limited to the words or phrases used in the training session, and its user base is also limited to those users who have trained the program. This type of system is known as "speaker dependent". It can have vocabularies on the order of a few hundred words and short phrases, and recognition accuracy can be about 98 percent.

A more general form of voice recognition is available through feature analysis and this technique usually leads to "speaker-independent" voice recognition. Instead of trying to find an exact or near-exact match between the actual voice input and a previously stored voice template, this method first processes the voice input using "Fourier transforms" or "linear predictive coding (LPC)", then attempts to find characteristic similarities between the expected inputs and the actual digitized voice input. Figure 2 shows the working of voice recognizer.

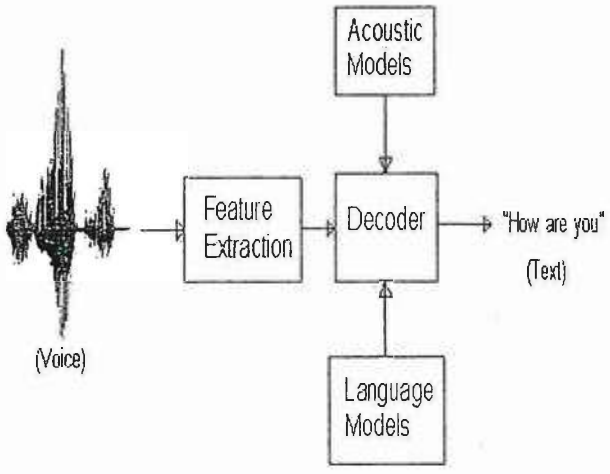

Figure 2: Voice Recognition

III. DTW ALGORITHM

Dynamic time warping (DTW) is a time series alignment algorithm developed originally for speech recognition. It aims at aligning two sequences of feature

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Energy Management for Robotic Vehicle Using Tracked Solar Panels

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Abstract: The aim is to construct a optimization charging for lead- acid batteries in the robotic vehicle by means of tracked solar panels. The proposed system is testing on the vanter robotic platform - the autonomous unmanned exploration vehicle is specialized in recognition. On the one hand, it presents the construction of a solar tracking mechanism aimed at increasing the rover's power regardless of its mobility and another proposes an alternative design of power system performance based on a pack of two batteries. There are, one for charging a battery independently from the tracked solar panel and the other battery provides all the energy consumed by the robotic vehicle. By implementing this method, the efficient power management becomes possible. The switching time between the batteries can also be reduced by using matlab coding. The main attraction is to design the concept of the charging and discharging cycles of the batteries. The sensors attached to the battery system will monitor the battery's external parameters and thus the life time of battery can be increased based on the sensors readings. The results are verifying using matlab/simulink environment.

Keywords: *Photovoltaic (Pv), Robotic Vehicle, Solar Tracker*

I. INTRODUCTION

Solar power is the most commonly using renewable energy in electronics field. The concept of battery charging using solar panel has been used for some years. Many rovers are using solar panel for their battery charging. An example for the rover using the solar power for charging is sojourner which have reduced size photovoltaic (pv) panel [1] and the photovoltaic panel doesn't get the enough solar light the batteries cannot be charged [2]. The concept of rechargeable batteries was first used in the mars exploration rovers [3]. Later nasa designed rover for exploration and remote operation also [4]. The example for the remote science exploration and intelligent operation is the k9 rover [5]. Micro 5, a series of robotic exploration vehicle also uses solar panels for lunar exploration [6].

Some noteworthy projects have come whose main advantage is the efficient and optimal selection of solar energy and different sources of energy depends on the area of working [7]-[9]. Hyperion is an example for this type of rover which uses the concept of solar synchronous techniques for the better use of the energy generated by the solar panels [10].

Zoe is also a rover which uses two batteries. The main aim of this rover is to move long distance under tough conditions [11]. The concept of battery switching is used in vanter a rover which have a pair of batteries [14]. The main problems faced in the existing systems were higher photovoltaic size, no battery protection from external environmental conditions and charging and discharging of the battery at a time reduces the life time of the battery.

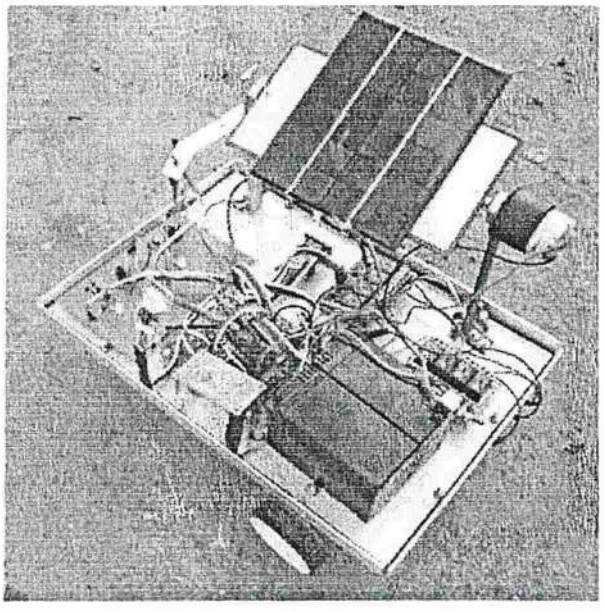

Figure 1: Solar Powered Robotic Vehicle

This paper focuses to improve the operation of aforementioned robotic exploration rovers with intelligent purposes and also with the power system operations. Fig.1 represents the proposed system. The tool used in this proposed system is LCD display for indicating the external parameters like temperature, humidity for monitoring the battery external parameters. LCD also gives the light sensors readings. Controller includes the control switches for the vehicle movement control. The system reduces the size of the pv panels by charging one battery at a time and other will be connected to the load. This paper is presented as follows. The next section is the basic platform, which describes the hardware and software design. After that describes the solar tracking mechanism and the battery section. These sections control the battery charging, discharging and the switching between them based on the tracked solar panels readings. The final section includes the results and developments based on the work.

II. BASIC PLATFORM

The rover consists of four wheels that can rotate independently. Since it can control independently the ackerman configuration and different types of movement are also possible. Each wheel consists of two motors. When the motors rotate in the clockwise direction with constant speed, then the vehicle will move in the forward direction. One motor will used to control the direction of

Intelligent Car Braking System with Collision Avoidance and ABS

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ABSTRACT
This paper provides an efficient way to design an automatic car braking system using Fuzzy Logic. The system could avoid accidents caused by the delays in driver reaction times at critical situations. The proposed Fuzzy Logic Controller is able to brake a car when the car approaches for an obstacle in the very near range. Collision avoidance is achieved by steering the car if the obstacle is in the tolerable range and hence there is no necessity to apply the brakes. Another FLC (which is cascaded with the first FLC for collision avoidance) implements the Anti-lock Braking capability during heavy braking condition. Thus the system is made intelligent since it could take decisions automatically depending upon the inputs from ultrasonic sensors. A simulative study is done using MATLAB and LabVIEW software. The results obtained by the simulation model are compared with the existing system and the proposed model conveys a satisfactory result which has high consumer acceptance. ATMega controller is used for implementation of the proposed system.

General Terms
Ultrasonic Sensor, Fuzzy Logic, Mamdani fuzzy logic controller.

Keywords
Collision Avoidance, Anti-lock Braking System (ABS), Slip Ratio, Simulation Interface Toolkit (SIT).

1. INTRODUCTION
The number of automobile users is increasing day by day. At the same time, traffic congestion has become a worldwide problem. This problem is mainly due to human driving which involves reaction time delays and judgment errors that may affect traffic flow and cause accidents. Engineers in the automotive industry put a lot of effort in devising systems which ensure safety in road vehicles. Even with all the advancements in vehicle safety technology, the number of people killed in auto accidents continues to rise. Close to 1.2 million people die each year on the world's roads and that number is expected to rise by 65 percent by the year 2020, says a report by World Health Organization (WHO) and the World Bank.

Braking system is the most important system in a car. Generally, a car brake system is operated manually as the driver pushes the brake pedal. If the brake fails, the result can be disastrous. Countless rear-ending automobile accidents could have been prevented or at least reduced in damage cost if the rear-ending driver had applied a sufficient amount of brake pressure at the right time. Unfortunately, the time required by the driver to understand potential accident situations, compounded with driver's delayed reaction times in applying the brakes, usually causes a lag between the identification of a potential accident situation and the execution of the corrective actions that will prevent the accident. Hence, in such emergency situations an efficient control mechanism has to be employed to avoid accidents.

Therefore, by automating the task of assessing the situation and deciding the correct amount of brake pressure, we could prevent numerous accidents. By that means, the car brake itself should have a good software system to assist a driver along the road. This would significantly decrease the amount of property and monetary loss due to accident damage, and it could save lives.

There are two issues related to the design of intelligent braking system. Collision Avoidance (CA) is a difficult and challenging operation for driving autonomous vehicles. The challenge in designing a Collision Avoidance system is in balancing the effectiveness of avoiding collisions versus the risk of false alarms. False alarms are extremely critical, because they may lead to serious consequences. This maneuver is used in a critical situation by braking and/or steering the car as long as the accident is still avoidable. Anti-lock braking is another issue in designing an efficient braking system in automobiles. Conventionally, in automobiles equipped with ABS, it is a part of the engine control unit and prevents the locking up of wheels. Hence, applying fuzzy logic to intelligent control seems to be an appropriate way to achieve this human behavior, because driver's experience can be transformed easily into rules and any kind of non-linearities can be easily tackled.

The organization of this paper is as follows. Section 2 gives an overview of collision avoidance and ABS. Section 3 discusses the existing scenario of car braking system. Section 4 explains the proposed technique which describes the implementation of the system in MATLAB and LabVIEW. Section 5 shows the results of simulation and comparison of results with the existing techniques. Section 6 concludes the work done on intelligent car braking system.

2. OVERVIEW
Automatic braking is a technology for automobiles that sense an imminent collision with another vehicle, person or obstacle; and applies the brake to slow-down the vehicle without any driver input. Sensors to detect other vehicles or obstacles can include radar, video, infrared, ultrasonic or other technologies.

2.1 Collision Avoidance
Automatic braking by the system after sensing an obstacle can be executed in two modes: In collision avoidance, the collision is avoided by the automatic braking, but the driver

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LINEAR BINARY PATTERN BASED BIOMETRIC RECOGNITION USING HAND GEOMETRY AND IRIS IMAGES

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Abstract- Biometric recognition is an emerging technology that can be used to resolve the person identity related security issues. This work considers the problem of strengthening security level and also avoids the denial of service. The proposed system gets the input image as Hand Geometry and Iris image. Median filter is used to perform the pre processing. Discrete curvelet transform is used to perform the image enhancement. Thresholding technique is used to segregate foreground object. Then Linear Binary Pattern (LBP) is used to extract the unique feature. The extracted feature is stored to database. The real time comparison is made with feature stored database. Finally result is either accepted or rejected with quick response. The input images are collected from standard database as CASIA Iris Image Database Version 4.0, CASIA Hand geometry Image Database and comparison is made with existing system. The application areas are security and surveillance systems, gaming, human-computer interaction systems etc.

Keywords: Linear Binary Pattern, Discrete Curvelet Transform, Median filter, Thresholding technique

Introduction

Identification and verification are two general biometrics uses which require reference data that a person's measured traits are compared to reference templates or raw data. During such processes, biometric data sample is compared with respective biometric data of a person in a database or against a person's reference template to confirm his/her identity. When a biometric system identifies a person correctly, then identification result is a true positive and if it rejects a person for not matching the enrolled template, it is a true negative result [1]. Biometric authentication technologies like face, finger, hand, iris, and speaker recognition are commercially available and in use [2]. A biometric system is a pattern recognition system operating by acquiring an individual's biometric data, extracting a feature set from learned data, and comparing this against a database template. Depending on context, a biometric system operates in verification or identification modes [3]. This proposed model is more advanced than unimodal where it combines the hand geometry and iris image.

Overview

The proposed system gets the input image as hand geometry and Iris image which is a bio-model one where hand geometry and iris are combined together. Median filter is used to perform the pre-processing. Discrete curvelet transform is used to perform the image enhancement. Thresholding technique is used to segregate foreground object. Then Linear Binary Pattern (LBP) is used to extract the unique feature. The extracted feature is stored to database. The real time comparison is made with feature stored database. Finally result is either accepted or rejected with quick response.

Related Work

Unimodal biometrics have problems like noisy data, non-universality, intra class variation inter class similarities and spoofing which make the system less accurate and secure. To offset them and increase security, multimodal biometrics are used. Multimodal biometrics use multiple information sources for personal authentication. They are popular now as it is at the front of unimodal biometrics [4].

Biometric systems are unimodal when used in real world applications [5]. They rely on a single source of information for evidence for authenticating a person. Disadvantages of Unimodal Biometrics are:

- Noisy data: - biometric sensors susceptibility to noise results in inaccurate matching, as noisy data leads to false rejection.
- Intra class variation: - biometric data acquired in verification will not be identical to data used to generate template during individual enrolment. This is intra-class variation and they increase a biometric system's False Rejection Rate (FRR)
- Interclass similarities: - refers to feature spaces overlap corresponding to multiple individuals. They increase a biometric system's False Acceptance Rate (FAR).
- Non universality: -Some people cannot provide required standalone biometric, due to illness/disabilities [5].
- Spoofing: - Unimodal biometrics is susceptible to spoofing where the data is imitated/forged.

Hand geometry-based authentication is effective in biometrics. All working populations have hands, and excepting processing for disabled people,can beengineered.

Physical Activity Classification and Monitoring using Artificial Neural Network

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ABSTRACT
This paper provides an efficient way to design a physical activity classification and monitoring system using a wireless sensor network which consisting of cost sensitive tri-axial accelerometers. Physical activity increases the fitness level and exercise capacity of the human body and helps to reduce risk factors such as obesity, diabetes and extends the life expectancy. The main objective of this project is to develop a real-time and accurate physical activity monitoring system based on physical signal detection technique. To detect and classify multiple activities, the proposed system uses multi-sensor network which is able to overcome the limitations of a single accelerometer. It consists of an electronic device which is worn on the hip and finger of the person under test. The system can be used to monitor physiological parameters, such as temperature and physical activity of a human subject using temperature and accelerometer sensors. Artificial Neural Network is used to classifying the different physical activities such as jogging, cycling, normal and fast walking. Neural Network Toolbox in MATLAB is used to classify such kind of activities.

General Terms
Physiological parameters, Temperature, multi sensor network

Keywords
Accelerometer, Physical Activity, Artificial Neural Network.

1. INTRODUCTION
Real-time monitoring of human physical activity (PA) is important for assessing the intensity of activity and exposure to environmental pollutions. Today, the progress in science and technology offers miniaturization, speed, intelligence, sophistication, and new materials at lower cost, resulting in the development of various high-performance smart sensing system [1]. Many new research is focused at improving quality of human life in terms of health by designing and fabricating sensors which are either in direct contact with the human body (invasive) or indirectly (non-invasive).

One of the reasons for more development in this area is the global population and rise in ageing population, one statistic provided by the U.S. According to the data provided by U.S. Census Bureau, the U.S. population has shown steady growth since the year 1980 (0.8% - 1.2% annually) and is expected to reach 341 million by the year 2020. The life expectancy at birth has also shown a tendency to increase every year in the U.S because of advances in healthcare, medical research, sanitation, and nutrition. A U.S. child born in 2008 is expected to live four years longer than one who was born in 1981. It is expected that the U.S. population over age 65 will be more than 20% over the total U.S. population in year 2050 due to increasing life expectancy and decreasing birth rates. On the other hand, there is a declining trend in the number of hospitals in the United States due to the structural change in the medical industry. As a result, the cost of medical services has increased for patients and hospitals seek to reduce hospital admissions and the length of stay.

The number of hospitals in the U.S. dropped from 7,000 to 5,700 between the year 1975 and 2005. Nearly 20% of those in the US live in rural areas, but only 9% of physicians work in rural areas. This results in a requirement for medical care, which is expensive for long-term monitoring and long waiting lists for consultations with health professionals. The cost of hospitalization is ever increasing, so is the cost of rehabilitation after a major illness or surgery. Hospitals are looking at sending people back as soon as possible at home.

This technique offers non-invasive and low-cost measurement with low subject burden [3], [4], and studies [5] have shown effectiveness in using accelerometers for identifying PA intensities. However, using accelerometers alone has shown to be insufficient for distinguishing different types of activities. Furthermore, it does not quantify the human subject's exposure to environmental pollutions. To enable comprehensive and accurate assessment of PA intensity, type, energy expenditure and environmental exposure, multiple sensors are needed. Recent advancement in wireless technology has enabled increasing applications of wireless sensors for monitoring physical activities and human health [6]–[8]. Compared to wired systems, wireless sensors eliminate interference with activities caused by wire tangling, thus are more convenient to wear [9]-[11]. Accordingly, Wireless Body Sensor or area networks have quickly grown into a promising technology for human health monitoring.

2. OVERVIEW
2.1 Physical Activity Monitoring
Physical activity can be defined as "any body movement produced by skeletal muscles result in energy expenditure above resting level". Physical activity is important for people of every age and physical condition and should be an integrated module of human behavior in daily life.

In everyday life, mobile monitoring systems are needed to distinguish between basic activities types such as walking, jogging, running and cycling. The physical activity monitoring is based on the accelerometer (motion) sensor and temperature sensor. The motion sensors can be used to differentiate user activity states (e.g., sitting, walking, jogging and cycling), or estimate the intensity of activity. Depending on the target application, the activity sensor can be attached to the user's hip, an ankle, or the wrist.

More motion sensors can be deployed to achieve a more robust state differentiation and a better estimation of the user's activity. The temperature sensor measures the real time body temperature

Mathematical Modeling of Common Carotid Artery Using Polynomial Interpolation by Automated Lumen Segmentation and Estimation of Numerical Attributes

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Abstract—Computational models of arteries in the cardiovascular system provide insight into normal and diseased conditions in blood vessels and have applications in areas such as surgical planning and medical device design. Aortic elasticity and stiffness has been proven to be a strong independent predictor of cardio vascular diseases (CVDs). Many features have been used to quantify arterial elasticity and stiffness. This paper describes a novel and automated technique for segmentation and boundary detection of the lumen of common carotid artery (CCA) using longitudinal B-mode ultrasound images. Numerical attributes are measured from the detected boundary of lumen. The main objective of this work is to develop mathematical model of CCA to describe its behavior during a cardiac cycle and determine good arterial features based on the attributes to characterize the elasticity and stiffness of CCA. Attributes are measured for each frame and analyzed for minimum two cardiac cycles to see the changes from systole to diastole. Polynomials that describe the diameter of CCA as a function of cardiac cycle time are derived from the attributes using different interpolation methods. Findings of this analysis would be very useful for the diagnosis of abnormalities in the CCA.

Index Terms—Carotid artery, ultrasound, segmentation, measurement, mathematical modeling.

I. Introduction

Cardiovascular disease is the first leading cause of death and adult disability in the industrial world [1]. World Health Organization revealed in a recent study that by 2015 almost 20 million people will die from cardiovascular diseases, mainly from stroke and heart diseases. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke. By 2030, almost 23.6 million people will die from CVDs, mostly from heart disease and stroke.

Arteries are blood vessels that carry blood between the heart, different tissues and organs of the body. They have ability to expand or contract to allow more blood or control the flow. Hollow centre through which blood flows is called lumen. CCA supplies blood to skull, brain, eyeballs, ears and external nose. When the blood supply to parts of the brain is suddenly interrupted, stroke occurs [2], [3].The diameter of CCA decreases due to increase in the thickness of arterial wall due to plaque deposit. This causes a reduction of the lumen with possible vascular problems and alters the arterial properties elasticity and stiffness. The intima-media thickness (IMT) of the CCA is widely used as an early indicator of cardiovascular diseases. It is usually measured by using ultrasound imaging [4], [5].

As the carotid artery supplies oxygenated blood to the brain, it may be very useful to quantify its stiffness information in the early diagnosis and characterization of vascular diseases such as carotid artery atherosclerosis [6]. The intimal thickening of stenotic artery is known as a beginning step of atherosclerosis. Atherosclerosis is a common dangerous disease and a major cause of death in many countries. There are a large number of investigations which have led to the understanding of the flow disorders due to stenosis [7], [8]. Advanced medical treatment of atherosclerosis is one of the challenges for contemporary medicine. A study of vascular diseases and, in particular, of atherosclerosis impact on haemodynamics may be based on mathematical models and numerical simulation [9].

Blood flow induces body forces and stresses in the arterial walls due to complex fluid–structure interactions. These forces and stresses play an important role in the onset and progression of many acquired and congenital cardiovascular diseases such as atherosclerosis and aneurysms. Atherosclerosis involves the accumulation of plaque in the intima of the arterial wall, which reduces arterial lumen and increases local arterial stiffiness [10], [11]. Moreover, the mechanical quantities stress and strain are known to trigger the onset of several diseases such as atherosclerosis. These facts are some of the reasons why the mechanical properties of arterial wall tissues have received increasing attention in the literature over the past few years [12], [13].

Arterial properties estimated from the ultrasound images can be used to assess arterial stiffiness and atherosclerosis in the study of CVDs [14], [15]. As ultrasound imaging allows noninvasive assessment of the degrees of stenosis and plaque

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Automated Boundary Detection and Measurement of Common Carotid Artery Attributes Using Transversal B –Mode Ultrasound Images

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Cardio vascular diseases, Common carotid artery, Measurement, segmentation, ultrasound.

ABSTRACT

Cardio vascular diseases (CVD) can be predicted by measuring the elasticity and stiffness of any artery and it has been proven to be a strong independent predictor. Various indices have been introduced to quantify arterial stiffness. This paper describes a novel and automated technique for segmentation and boundary detection of common carotid artery (CCA) using transversal B-mode ultrasound images. Numerical attributes are measured from the detected boundary. The main objective of this work is to determine good arterial features based on the attributes to characterize the elasticity and stiffness of CCA. Attributes are measured for each frame and analyzed for minimum two cardiac cycles to see the changes from systole to diastole. Findings of this analysis would be very useful for the diagnosis of abnormalities in the CCA.

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INTRODUCTION

Cardiovascular disease is the first leading cause of death and adult disability in the industrial world (Kyriacou *et al.*, 2010). World Health Organization revealed in a recent study that by 2015 almost 20 million people will die from cardiovascular diseases, mainly from stroke and heart diseases. CCA supplies blood to skull, brain, eyeballs, ears and external nose. When the blood supply to parts of the brain is suddenly interrupted, stroke occurs (Wang *et al.*, 2009). The diameter of CCA decreases due to increase in the thickness of arterial wall due to plaque deposit. This causes a reduction of the lumen with possible vascular problems and alters the arterial properties elasticity and stiffness (Molinari *et al.*, 2012). The intima-media thickness (IMT) of the CCA is widely used as an early indicator of cardiovascular diseases. It is usually measured by using ultrasound imaging (Loizou *et al.*, 2011; Molinari *et al.*, 2010). As the carotid artery supplies oxygenated blood to the brain, it may be very useful to quantify its stiffness information in the early diagnosis and characterization of vascular diseases such as carotid artery atherosclerosis (Luo *et al.*, 2012). Moreover, arterial stiffness is strongly related to atherosclerosis.

Arterial properties estimated from the ultrasound images can be used to assess arterial stiffness and atherosclerosis in the study of CVDs (Larsson *et al.*, 2011; Swillens *et al.*, 2012). As ultrasound imaging allows noninvasive assessment of the degrees of stenosis and plaque morphology, it is widely used in the diagnosis of atherosclerosis of the carotid artery (Golemati *et al.*, 2009). The resolution of diagnostic ultrasound image is significantly limited by speckle noise. The application of edge detection and segmentation algorithms is also limited by speckle noise (Molinari *et al.*, 2011; Tsiaparas *et al.*, 2011).

Segmentation of atherosclerotic carotid plaque in ultrasound imaging is investigated in several studies (Loizou *et al.*, 2007). If the boundary of carotid artery is segmented precisely, then various bio mechanical and anatomical properties of the artery wall can be computed and that may be useful to clinicians to follow the evolution of the atherosclerotic diseases. In the previous work boundary of CCA was extracted using watershed and wavelet transforms. The diameter was measured from the extracted boundary and used for the analysis of plaque deposit in the vessel (Jayanthi *et al.*, 2009).

For the segmentation of the carotid arteries, several algorithms have been proposed in ultrasound imaging. But, an algorithm that performs the segmentation based on minimal user interaction is important in the research context (Destrempes *et al.*, 2011). As an early indicator of cardiovascular diseases, we are also interested in the segmentation and characterization of CCA. Hence an effort is

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(Anna university - Annexure - II)

Indian License Plate Detection and Recognition Using Morphological Operation and Template Matching

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***Abstract*—**Automatic License plate recognition (ALPR) is a technology which recognizes the registration plate or number plate or License plate of a vehicle. In this paper, an Indian vehicle number plate is mined and the characters are predicted in efficient manner. ALPR involves four major technique i) Pre-processing ii) License Plate Location Identification iii) Individual Character Segmentation iv) Character Recognition. The opening phase, named pre-processing helps to remove noises and enhances the quality of the image using the conception of Morphological Operation and Image subtraction. The second phase, the most puzzling stage ascertain the location of license plate using the protocol Canny Edge detection, dilation and erosion. In the third phase, each characters characterized by Connected Component Approach (CCA) and in the ending phase, each segmented characters are conceptualized using cross correlation template matching- a scheme specifically appropriate for fixed format. Major application of ALPR is Tolling collection, Border Control, Parking, Stolen cars, Enforcement, Access Control, Traffic control. The database consists of 500 car images taken under dissimilar lighting condition is used. The efficiency of the system is 97%. Our future focus is Indian Vehicle License Plate Validation (Whether License plate of a vehicle is as per Road transport and highway standard)

***Keywords*—**Automatic License plate recognition, Character recognition, Number plate Recognition, Template matching, morphological operation, canny edge detection.

I. Introduction

IN India the license plate number is issued by the district-level Regional Transport Office (RTO) of respective states. The plate must be placed in front and rear of the vehicle. On the basis of the recommendations made by the Technical Standing Committee on Central Motor Vehicles Rules, the Central Government had amended rule 50 of the Central Motor Vehicles Rules, 1989, mandating introduction of new High Security Registration Plates, both in respect of new and in-use motor vehicles throughout the country. A sample format for high security registration plate [16] is shown in Fig. 1. The Features of High Security Registration Plates are Chromium hologram, a retro-reflective film, bearing a verification inscription 'India' at 45 degree inclination. Laser numbering, which is unique in nature containing alpha-numeric identification of both Testing Agencies and the manufacturers. The Registration numbers to be embossed on the plates. In case of rear registration plate, same to be fitted with a non-reusable snap lock to make it tamper proof.

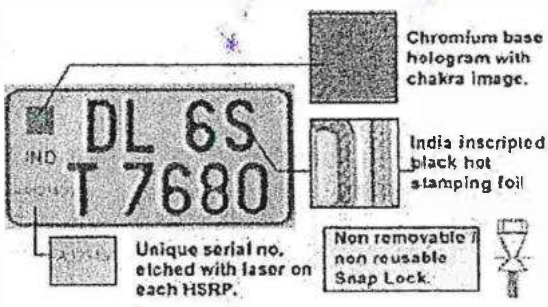

Fig. 1 High Security Registration Plates Image

A Chromium based third registration plate in the form of sticker is to be attached to the wind shield, wherein the number of engine and chassis are indicated along with the name of registering authority. If tampered with, it self-destructs. In front and rear registration plates, letter IND in blue color is hot stamped. Letters 'IND' written in blue color is located on extreme left center of the plates [12].

The fonts are mandatorily to be written only using modern Hindu-Arabic numerals with Latin letters. The license plate consists of 3 parts; i) First two letters indicate the state to which the vehicle is registered. ii) Next two digit numbers are the sequential number of a district. iii) The third part is a 4 digit number unique to each vehicle plate. A letter(s) is prefixed when the 4 digit number runs out and then two letters and so on. The image shown below is the format for license plate. The plates will be highly secure with "lock, hologram and unique numbers. Fig. 2 is a sample number plate figure in which

- TN – Tamil Nadu
- 28 – Namakkal District code in Tamil Nadu
- AQ 0191 –unique serial code for that particular vehicle.

Fig. 2 Sample Lice nse plate

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CFD ANALYSIS OF FLAT PLATE SOLAR COLLECTER FOR HEAT TRANSFER ENHANCEMENT USING VARIOUS INSETS

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Abstract *- The performance of solar water heater can be improved to perform a certain heat transfer duty by heat transfer enhancement techniques. In general, these techniques can be divided into two groups: active and passive techniques. The active techniques require external forces, e.g. electric field, acoustic or surface vibration, etc. The passive techniques require fluid additives or special surface geometries. Curved tapes have been used as one of the passive heat transfer enhancement techniques and are the most widely used techniques in several heat transfer applications. The main categories of heat transfer augmentation involves insetting curved tapes, helically coiled tapes, spirally coiled rods, other coiled tubes and also using fins are studied and analyzed to determine the optimum technique for a solar water heater by improving the convective heat transfer between the circular pipe and water medium. Simulations were carried out using commercial CFD software ANSYS FLUENT 14.0.*

Keywords: Solar water heater, Solar energy, Twisted tapes, Helical tubes, CFD, Fluent, Heat augmentation.

I. INTRODUCTION

Solar water heating (SWH) or solar hot water (SHW) systems comprise several innovations and many mature renewable energy technologies that have been well established for many years. SWH has been widely used in Australia, Austria, China, Cyprus, Greece, India, Israel, Japan, Jordan, Nepal, Spain and Turkey. In a "close-coupled" SWH system the storage tank is horizontally mounted immediately above the solar collectors on the roof. No pumping is required as the hot water naturally rises into the tank through thermosyphon flow. In a "pump-circulated" system the storage tank is ground or floor mounted and is below the level of the collectors; a circulating pump moves water or heat transfer fluid between the tank and the collectors. SWH systems are designed to deliver hot water for most of the year. However, in winter there sometimes may not be sufficient solar heat gain to deliver sufficient hot water. In this case a gas or electric booster is used to heat the water.

A. Freeze protection

Freeze protection measures prevent damage to the system due to the expansion of freezing transfer fluid. Drain back systems drain the transfer fluid from the system when the pump stops. Many indirect systems use antifreeze (e.g. Propylene glycol) in the heat transfer fluid. In some direct systems, the collectors can be manually drained when freezing is expected. This approach is common in climates where freezing temperatures do not occur often, but is somewhat unreliable since the operator can forget to drain the system. Other direct systems use freeze-tolerant collectors made with flexible polymers such as silicone rubber. A third type of freeze protection is freeze-tolerance, where low pressure polymer water channels made of silicone rubber simply expands on freezing. One such collector now has European Solar Key mark accreditation, following extra durability testing.

B. Overheat protection

When no hot water has been used for a day or two, the fluid in the collectors and storage can reach very high temperatures in all systems except for those of the drain back variety. When the storage tank in a drain back system reaches its desired temperature, the pumps are shut off, putting an end to the heating process and thus preventing the storage tank from overheating. One method of providing over heat protection is to dump the heat into a hot tub. Some active systems deliberately cool the water in the storage tank by circulating hot water through the collector at times

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HEAT TRANSFER ANALYSIS IN INTERNALLY GROOVED TUBES

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ABSTRACT

Forced convection heat transfer is the most frequently em ployed mode of the heat transfer in heat exchangers or in various chemical process plants. The use of the turbulence promoters or roughness elements, such as welded ribs, grooves or wires on the surface, is a common technique to enhance the rate of heat transfer. In this investigation the transient heat transfer analysis on different grooved tubes (circular, rectangular, trapezoidal) was performed. Forced convection heat transfer is applied on the inner surface of tubes by passing hot air through the grooved tube.

The out side surfaces of the tubes are insulated to with glass wool to minimize the heat losses. The temperature distribution on the wall of tubes are evaluated by using finite element method (FEM) commercial package (ANSYS 11 version) and the results are compared by plotting the graph between time vs. temperature distribution for each grooved tube.

Keywords— *Grooved tubes, Heat transfer, Heat exchanger, FEM, ANSYS*

INTRODUCTION

A commonly used technique for improving the performance of heat exchange devices is to set up periodic disturbance promoters along the streamline directions. Such an arrangement of the channels enhances the heat transfer due to flow mixing and periodic interruptions of thermal boundary layers.

Using artificial grooved tubes is widely used in modern heat exchangers, because they are very effective in heat transfer augmentation. Finite element method is a most famous and reliable method which is widely used in solving heat transfer problems.

In this analysis the commercial finite element general purpose solver package ANSYS 11 is used to evaluate an approximate solution of temperature distribution over the different grooved tubes.

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DESIGN & ANALYSIS OF CONNECTING ROD BY COMPOSITE MATERIAL

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Abstract— Connecting rod is one of the important components of the whole engine assembly as it acts as a mediator between piston assembly and crankshaft. Its converting the reciprocating motion of the piston to rotary motion of the crank. Also it faces a lot of tensile and compressive loads during its life time. Generally connecting rods are manufactured using carbon steel and in recent days aluminium alloys are finding its application in connecting rod. In this work connecting rod is replaced by aluminium based composite material reinforced with Boron carbide. And it also describes the modelling and analysis of connecting rod. Pro-e solid modeling software is used to generate the 3-D solid model of Connecting rod. Ansys software is used to analyze the connecting rod. The main aim of the project is to analysis the stress, strain, deformation of connecting rod by varying material with same geometry.

Keywords— connecting rod, ANSYS, composite, boron carbide, analysis

I. INTRODUCTION

A Connecting rod is the link between the reciprocating piston and rotating crank shaft. Small end of the connecting rod is connected to the piston by means of gudgeon pin. The big end of the connecting rod is connected to the crankshaft.

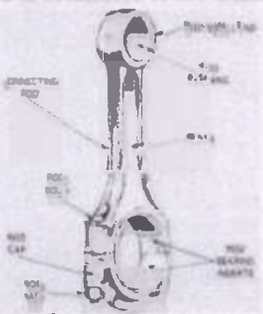

Fig. 1.General diagram

A typical connecting rod is shown in fig 1. A combination of axial and bending stresses act on the rod in operation. The axial stresses are product due to cylinder gas pressure and the inertia force arising on account of reciprocating motion.

Whereas bending stresses are caused due to the centrifugal effects. To provide the maximum rigidity with minimum weight, the cross section of the connecting rod is made as and I – section end of the rod is a solid eye or a split eye this end holding the piston pin.

The big end works on the crank pin and is always split. In some connecting rods, a hole is drilled between two ends for carrying lubricating oil from the big end to the small end for lubrication of piston and the piston pin.

II. LITERATURE REVIEW

Kuldeep B "Analysis and optimization of connecting rod using Alfasic composites". This research is motivated by the responsible to transmit the push and pull from the piston pin to crank pin, thus converting the reciprocating motion of the piston to rotary motion of the crank. Generally connecting rods are manufactured using carbon steel and in recent days aluminium alloys are finding its application in connecting rod.

In this work connecting rod is replaced by aluminium based composite material reinforced with silicon carbide and fly ash. And it also describes the modelling and analysis of connecting rod. FEA analysis was carried out by considering two materials. The parameters like von misses stress, von misses strain and displacement were obtained from ANSYS software. Compared to the former material the new material found to have less weight and better stiffiness. It resulted in reduction of 43.48% of weight, with 75% reduction in displacement.

Prof. N.P.Doshi "Analysis of Connecting Rod Using Analytical and Finite Element Method". The connecting rod is a major link inside of a combustion engine. It connects the piston to the crankshaft and is responsible for transferring power from the piston to the crankshaft and sending it to the transmission. The most common types of materials used for connecting rods are steel and aluminum.

Connecting rods are widely used in variety of engines such as, in-line engines, V-engine, opposed cylinder engines, radial engines and oppose-piston engines. For the project work we have selected connecting rod used in light commercial vehicle oftata motors had recently been launched in the market.

We found out the stresses developed in connecting rod under static loading with different loading conditions of compression and tension at crank end and pin end of connecting rod. Design of connecting rod which is designed by machine design approach is compared with actual production drawing of connecting rod. We found that there is possibility of further reduction in mass of connecting rod .

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An Analysis of Energy Efficiency of Leach Protocol in Wireless Sensor Network

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ABSTRACT : *A wireless sensor network (WSN) is formed by grouping a number of sensor nodes together to play its role like sensing, monitoring, gathering and forwarding the data. The application of a sensor includes vast areas like Home security, machine failure diagnosis and biological detection, military, agriculture, etc. Researchers are doing a lot of researchers in various areas of sensor networks like routing, energy efficiency, and data aggregation etc., Routing plays an important role in WSN. A number of routing protocols are emerging day to day. The energy efficiency is the main constraints. LEACH (Low-Energy Adaptive Clustering Hierarchy) is one of the routing protocols proposed to routing. This paper presents a review of the Variants of LEACH protocols proposed to wireless sensor networks. Finally, we provide a comparative study on these various protocols.*

KEYWORDS - *Energy efficiency, LEACH, Routing Protocols, Wireless Sensor Networks*

1. INTRODUCTION

Wireless sensor network (WSN) becomes an essential element in our daily life. A sensor network includes low-cost, low-power wireless sensor nodes, with functions like sensing, monitoring and computation capabilities [1].

The communication distance between sensor nodes is very short. Sensor nodes are battery-powered and are expected to operate for a long time. The architecture of WSN is shown in Fig 1. The lifetime of a battery is limited. Each sensor loses its energy during the process of sensing, communicating and data forwarding. Even though in idle state a little bit of energy is utilized. It is very difficult and costly to recharge and replace the battery.

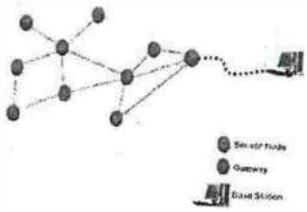

Figure 1 Architecture of WSN

The unique characteristics and constraints on the sensor network leads to new challenges. Researchers focus on various activities to explore and overcome the constraints on WSNs and solve design and application issues. Hierarchical routing technique [2] is used to maintain the energy consumption of sensor nodes. Main objective is to reduce the level of transmission of the sink. LEACH [3] is one of the hierarchical routing protocols for sensor networks. The idea proposed to LEACH leads to many hierarchical routing protocols [4]. LEACH uses a cluster

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Energy aware Intrusion Detection System for MANETs

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***Abstract*—An ad hoc network is the assortment of cooperative wireless nodes without existence of any central point or infrastructure. The network topologies dynamically change in an unpredictable manner. Because of these features it is now popular among critical mission applications like military use or emergency recovery. There also have 2 issues like Security and energy respectively. Since there is no central authority to manage the nodes in mantes, malicious attackers can easily capture and compromise nodes to achieve attacks. In this case, it is crucial to develop efficient intrusion-detection mechanisms to protect MANET from attacks. Also each node act both as transmitter and receiver, hence energy consumption is a major challenge in MANETS. Main focus of this paper is, with minimum energy detecting intrusion node by using the existing Enhanced Adaptive Acknowledgement (EAACK) scheme and the overhead is further reduced by using Zone based routing.**

Keywords*— *Zone Routing Protocol, Enhanced Adaptive Acknowledgement (EAACK), Intrusion Detection system (IDS), Mobile Ad hoc Network (MANET)

I. INTRODUCTION

Because of the independent nature, wireless networks have more attained more importance in the recent years. An ad hoc network is a set of wireless mobile nodes that forms a transitory network without any access point. Each node in the MANETs communicates through radio waves. Node within range can directly communicate, while the nodes outside the range establish communication through the intermediate nodes. Each node act as both transmitter and receiver. This idea of Mobile ad-hoc network is also called infrastructure less networking, since the mobile nodes in the network dynamically establish routing among themselves to form their own network on the fly. Fig 1. Shows a sample Manet environment.

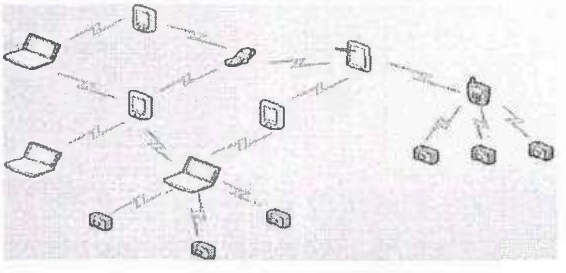

Fig. 1. Mobile Adhoc Network

Though MANETs have many advantages, recent research analysing the challenges in adopting Manets.

A. CHALLENGES IN MANETS

1) Limited radio range: Wireless link have lower coverage area than infrastructure networks. further fading, noise, and interference conditions, etc., occurs when the coverage area increases.

2) Dynamic topology: Dynamic topology membership may disturb the trust relationship among nodes. The trust may also be disturbed if some nodes are detected as compromised.

3) Routing Overhead: In wireless adhoc networks, nodes often change their location within network. So, some stale routes are generated in the routing table which leads to unnecessary routing overhead.

4) Battery constraints: Devices used in these networks have restrictions on the power source in order to maintain portability, size and weight of the device.

5) Security threats: The wireless mobile ad hoc nature of MANETs brings new security challenges to the network design. As the wireless medium is vulnerable to eavesdropping and ad hoc network functionality is established through node cooperation, mobile ad hoc networks are intrinsically exposed to numerous security attacks.

In general, the wireless MANET is particularly vulnerable due to its fundamental characteristics of open medium, dynamic topology, and absence of access point, routing overhead and energy constraint.

II. ANALYSIS OF EXISTING IDS IN MANET

As discussed above, due to the limitations of most MANET routing protocols, nodes in MANETs assume that other nodes always cooperate with each other to relay data. This assumption leaves the attackers with the opportunities to achieve significant impact on the network with just one or two compromised nodes. To address this problem, IDS should be added to enhance the security level of MANETs.

If MANET can detect the attackers as soon as they enter the network, we will be able to completely eliminate the

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Direction based Heuristic for Pathfinding in Video Games

By Geethu Elizebeth Mathew & Mrs. G. Malathy
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Abstract- Pathfinding has been one of major research areas in video games for many years. It is a key problem that most of the video games are confronted with. Search algorithms such as the A* algorithm and the Dijkstra's algorithm representing such regular grid, visibility graphs also have significant impact on the performance. This paper reviews the current widely used solutions for pathfinding and proposes a new method which is expected to generate a higher quality path using less time and memory than other existing solutions. The deployment of the methodologies and techniques is described in detail. The significance of the proposed method in future video games is addressed and the conclusion is given at the end.

Keywords: pathfinding, A, A* optimization, computer game.*

GJCST-F Classification: I.2.1 K.8.0

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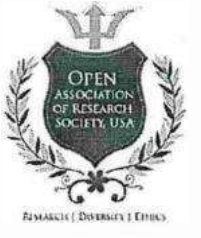

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Improving The Accuracy of Intrusion Detection Systems In Mobile Adhoc Network Using Fuzzy Logic Method

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Abstract

Mobile ad hoc networking (MANET) has become an agitating and significant technology in recent years because of the speedy proliferation of wireless devices. MANETs are extremely tender to aggresses attributable the open medium, dynamically interchanging network topology, combined algorithms, deficiency of centralized monitoring and management point, and lack of a absolved line of defensive structure. Due to the progression in wireless technologies, a lot of Modern epitomes have opened up for communicating. Amongst this technologies, mobile ad hoc networks act as a spectacular role for offering communication in a lot arenas because of its freelance nature of predefined infrastructure. But in terms of security system, these networks are tenderer than the ceremonious networks because firewall and gateway stationed protection mechanists can't be enforced on it. We have applied deposited width clustering algorithmic program for effective signal detection of the anomalies in the MANET traffic and likewise engendered a different cases of attacks in the network. Intrusion Detection System (IDS) may accumulate and examine audit data point for the whole network. This paper accentuated upon proposed fuzzy based intrusion detection systems in MANET and awarded their effectivity to distinguish the intrusions. This paper also analyzes the disadvantages of fuzzy based intrusion detection systems and discoursed the future guidance in the area of intrusion detection for mobile ad hoc networks.

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Trust based Multipath Authentication Protocol for MANET

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Abstract:

Security is a major issue in ad hoc networks. Due to high mobility of nodes, the network partition occurs that leads to network unavailability. The nodes are compromised by the attackers that make lack of data integrity as well as authentication. To overcome this issues several research work concentrated on trust model and authentication schemes to achieve the security challenges. In this research work, the Trust based Multipath Authentication Protocol (TMAP) to attain data integrity and authentication. It consists of three phases. First, the authenticated multipath routing is established from source to destination node to achieve load balancing and path reliability. Second, the trust model is designed based on trust count value of node and path. Third, the signature generation and verification process is developed to provide secure data information throughout the entire path. Based on the simulation results, the proposed protocol achieves better results than previous schemes.

Keywords- **Ad hoc network, Trust model, authenticated multipath routing, trust count value of node and path, signature generation and verification scheme, data integrity etc.**

1. INTRODUCTION

Mobile Ad-Hoc Networks (MANETs) play an increasingly important role in many environments and applications, especially, in critical settings that lack fixed network infrastructure, such as: emergency rescue, humanitarian aid, as well as military and law enforcement. MANETs feature self-organizing and independent infrastructures, which make them an ideal choice for uses such as communication and information sharing. Because of the openness and decentralization features of MANETs, it is usually not desirable to constrain the membership of the nodes in the network. Nodes in MANETs are vulnerable to malicious entities that aim to tamper and analyze data and traffic analysis by communication eavesdropping or attacking routing protocols, so high security anonymous routing protocols are required in MANETs to provide secure communications by hiding node identities and preventing traffic analysis attacks from outside observers. Anonymity in MANETs includes identity and location anonymity of data sources (i.e., senders) and destinations (i.e., recipients), as well as route anonymity. Zhu et al. [1] propose an anonymous secure routing for ad hoc networks, which owns the anonymous properties in the field of identity, location, and route information. This protocol achieves anonymity of all participators. However, the basic assumption of its routing is that the source node and the destination node have to share secrets. In the ad hoc network, each node may be the source node or destination node in different sessions. To meet this assumption, each node has to share secrets with all the other nodes before the practical network is deployed. It is obvious that the storage of so many secrets is extravagant, which makes the network hard to manage. With the movement of the nodes, if some nodes leave the network, the corresponding secret stored in other nodes is useless. Furthermore, if some new nodes want to join this network, all the other nodes have to negotiate new secrets with them. That is nearly impossible for some deployed nodes. It means that this routing protocol is difficult to be scalable.

2. RELATED WORK

Vivek Pathak et.al [2] proposed the secure location aware services over with geographical secure path routing protocol. Geographic locations of anonymous nodes are authenticated in order to provide location authentication and location privacy simultaneously. This protocol also authenticates the routing paths taken by individual messages. This paper presents the design of the GSPR secure geographic routing protocol. The overhead of location authentication was investigated under various scenarios through network simulation

Yu Chee et.al [3] defined Location awareness means that each mobile host uses a positioning device to determine its current physical location. If the mobile hosts' locations are known, it can accurately describe their geometric relationship. Without such information, a manet can be represented by depicting the hosts' connectivity abstractly in, for example, a graph.

Karim et.al [4] presented the privacy preserving protocol which supports anonymous reactive routing in suspicious location-based MANETs. It relies on group signatures to authenticate nodes, ensure integrity of routing messages while preventing node tracking. It works with any group signature scheme and any location-based forwarding mechanism. The routing overhead was evaluated that it can outperform anonymous link state based approaches under certain traffic patterns.

Sathish et.al [5] addressed the adversaries on tracing network routes and inferring the mobility pattern of nodes during the routing of packets. Anonymous routing protocols are hidden that hide node identities and/or routes from outside observers

Energy Efficient Routing Protocol for Energy Consumption in MANET using EEDSR

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Abstract— In this paper considers energy constrained routing protocols and Energy Consumption techniques for improving MANET routing protocols and energy efficiency. Given a new routing protocol that EEDSR (Energy Efficient Dynamic Source Routing) technique to the MANET routing protocols with node caching enhancement. Also, show new application of energy efficiency metrics to MANET routing protocols for energy efficiency evaluation of the protocols with limited power supply. Main protocol of existing system is EPAR and it many network metrics (EPAR, DSR) used for different purpose. But still this system not yet enough improvement in performance. Because of these drawbacks may propose system aims to implement the Energy Efficient Dynamic Source Routing (EEDSR) protocol. Main contribution of this system is an EEDSR this protocol, satisfying less energy consumption from the viewpoints of nodes and networks. Its protocol must be able to handle high mobility of the nodes that often cause changes in the network topology. In this scheme reduces the total energy consumption and decreases the mean delay, especially for high load networks, while achieving a good packet delivery ratio.

Key words: Routing Protocol, Mobile Adhoc Networking, EPAR, EEDSR, DSR Energy Consumption

I. INTRODUCTION

In mobile ad hoc network (MANET) each node creates a network link in a self-organizing manner, forwarding data packets for other nodes in the network. Mobile ad hoc networks (MANETs) are instantly deployable without any wired base station or fixed infrastructure. Due to these features, MANETs suffers from limitations like lower capacity, limited security, higher loss rates, more delays and jitter as compared to fixed networks. A critical issue for MANETs is that the activity of node is energy-constrained. In MANET, operations of nodes rely on batteries or other exhaustible power supplies for their energy. Hence depletion of batteries will have greater effect on overall network. As a consequence, energy saving is an important system design criterion. Mobile Ad hoc wireless networks are energy constrained since nodes operate with limited battery energy. If some nodes die early due to lack of energy, they cannot communicate with each other. Therefore, inordinate consumption of nodes energy should be prevented. In fact, node energy consumption should be balanced in order to increase the energy awareness of networks and find out the scheme has been proposed that utilizes energy status of each mobile node and alternate paths. This scheme can be incorporated into any ad hoc on-demand routing protocol to improve reliable packet delivery in the face of node movements and route breaks.

MANET have many applications, they are applied in Military Scenarios, Rescue Operations, Data Networks, Free Internet Connection Sharing, Sensor Network etc. all mobile nodes are battery operated. They are suffering from limited energy level problems and the battery lifetime extension is very important aim. Some nodes get down due to power exhaustion and thus often reduce the lifetime of Manet. Nowadays researchers are trying to develop efficient energy routing protocols. Although there are other types of protocols like DSR ,DSDV, AODV etc. these protocols makes routing based on the smallest distance routing algorithm and never consider the factor power. But in energy efficient routing protocol the main considering factor is power.

II. RELATED WORK

Most of the previous work on routing in wireless ad-hoc networks deals with the problem of finding and maintaining correct routes to the destination during mobility and changing topology. In, the authors presented a simple implementable algorithm which guarantees strong connectivity and assumes limited node range. Shortest path algorithm is used in this strongly connected backbone network. However, the route may not be the minimum energy solution due to the possible omission of the optimal links at the time of the backbone connection network calculation. In, the authors developed a dynamic routing algorithm for establishing and maintaining connection-oriented sessions which uses the idea of proactive to cope with the unpredictable topology changes.

A. Proactive Energy Aware Routing:

With table-driven routing protocols, each node attempts to maintain consistent up to date routing information to every other node in the network. This is done in response to changes in the network by having each node update its routing table and propagate the updates to its neighboring nodes. Thus, it is proactive in the sense that when a packet needs to be forwarded the route is already known and can be immediately used. As is the case for wired networks, the routing table is constructed using either link-state or distance vector algorithms containing a list of all the destinations, the next hop, and the number of hops to each destination.

B. Reactive Energy Aware Routing:

With on-demand driven routing, routes are discovered only when a source node desires them. Route discovery and route maintenance are two main procedures: The route discovery process involves sending route-request packets from a source to its neighbor nodes, which then forward the request to their neighbors, and so on. Once the route-request reaches the destination node, it responds by unicasting a route-reply packet back to the source node via the neighbor from which reaches an intermediate node that has a sufficiently up-to-

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Joint cost and secured node disjoint energy efficient multipath routing in mobile ad hoc network

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Published online: 17 May 2016

Abstract The severe resource constraints and deployment environments of mobile ad hoc networks (MANETs) pose challenges for the security and energy consumption during data transmission for these networks. Multipath routing and energy consumption are the important factors to be considered in mobile ad hoc network as it provides a powerful tool for studying security aspects during data transmission. Advances in MANET technology have provided the availability of energy efficient reliable and multi path routing for intrusion tolerance with capability of identifying reliable routes, determining the best redundancy level to increase the operational lifetime of the network. Identifying a secured and energy efficient multipath routing for MANET represents the basic challenge during data transmission. In order to overcome such limitation, a hybrid method called as joint cost and secured node disjoint energy-efficient multipath routing (NDE-MR) is designed for MANET to reduce the energy consumption and execution time during the multipath routing and to improve security during data transfer. Node initialization initializes the mobile nodes with energy efficient model by obtaining the neighbor node data. Next, cost-based multipath route discovery model identifies the path with the least transmission cost through which data forwarding is made. Finally, security is achieved through node disjoint path model by splitting the data packets into different segments. Simulation results show that the NDE-MR model is able to reduce energy consumption and execution time during multipath routing and to increases the security of the network.

Keywords Mobile ad hoc network · Intrusion · Node disjoint · Multipath · Route discovery

1 Introduction

In mobile ad hoc network security and energy efficient model has become a critical issue because of the impracticability of energy management. Reliable minimum energy cost routing (RMECR) and reliable minimum energy routing (RMER) [1] was designed for improving energy-efficiency, reliability, and prolonging network lifetime. But, security remained unaddressed in this method. Another method was presented to maximize the network lifetime by means of managing redundancy [2] and using voting-based intrusion detection algorithm. Though, multi path routing was not considered in this method. Cross-layer optimized energy aware multipath routing protocol [3] was designed by utilizing network resources such as node energy and link bandwidth. But, the nodes' behaviour under different mobility scenarios was not considered. According to quality of service [4], certain metrics like link expiration time, probabilistic link reliable time, link packet error rate and link received signal strength were considered with aiming at reducing the energy consumption and improving the packet delivery ratio. Though, this model takes more energy.

Energy based multipath reliable routing protocol [5] was introduced to improve packet reliability rate and to reduce the end-to-end delay, communication overhead. However, the authentication and security in the optimized multicast

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An Analysis of Energy Efficiency of Leach Protocol in Wireless Sensor Network

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ABSTRACT : *A wireless sensor network (WSN) is formed by grouping a number of sensor nodes together to play its role like sensing, monitoring, gathering and forwarding the data. The application of a sensor includes vast areas like Home security, machine failure diagnosis and biological detection, military, agriculture, etc. Researchers are doing a lot of researchers in various areas of sensor networks like routing, energy efficiency, and data aggregation etc., Routing plays an important role in WSN. A number of routing protocols are emerging day to day. The energy efficiency is the main constraints. LEACH (Low-Energy Adaptive Clustering Hierarchy) is one of the routing protocols proposed to routing. This paper presents a review of the Variants of LEACH protocols proposed to wireless sensor networks. Finally, we provide a comparative study on these various protocols.*

KEYWORDS - *Energy efficiency, LEACH, Routing Protocols, Wireless Sensor Networks*

1. INTRODUCTION

Wireless sensor network (WSN) becomes an essential element in our daily life. A sensor network includes low-cost, low-power wireless sensor nodes, with functions like sensing, monitoring and computation capabilities [1].

The communication distance between sensor nodes is very short. Sensor nodes are battery-powered and are expected to operate for a long time. The architecture of WSN is shown in Fig 1. The lifetime of a battery is limited. Each sensor loses its energy during the process of sensing, communicating and data forwarding. Even though in idle state a little bit of energy is utilized. It is very difficult and costly to recharge and replace the battery.

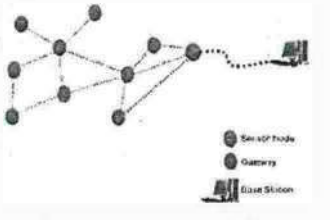

Figure 1 Architecture of WSN

The unique characteristics and constraints on the sensor network leads to new challenges. Researchers focus on various activities to explore and overcome the constraints on WSNs and solve design and application issues. Hierarchical routing technique [2] is used to maintain the energy consumption of sensor nodes. Main objective is to reduce the level of transmission of the sink. LEACH [3] is one of the hierarchical routing protocols for sensor networks. The idea proposed to LEACH leads to many hierarchical routing protocols [4]. LEACH uses a cluster

Enhancing the Energy Efficiency of Leach Protocol in Wireless Sensor Network

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Abstract— A Wireless Sensor Network is the collection of large number of sensor nodes, which are economically feasible and measure the ambient condition in the environment surrounding them. The difference between ordinary wireless networks and WSNs is that sensors are sensitive to energy utilization. Energy saving is the essential issue in designing the wireless sensor networks. In this paper the protocol called Kmedoids-LEACH protocol (K-LEACH) for clustered WSN is aimed to prolonging the lifetime of sensor networks by balancing the energy consumption of the nodes. The protocol uses the Kmedoids clustering algorithm for uniform clustering. Euclidean distance and Maximum Residual Energy (MRE) is used to select the Cluster Head (CH).This protocol is used to enhance the lifetime of the network. To address the problem of how to control the failure of Cluster Head (CH) in network, the proposed work carries Vice Cluster Head (VCH) selection algorithm to allow the node that will become a VCH of the cluster in case of CH dies. By doing this, cluster nodes data will always reach base station in an efficient way and no need to elect a new CH at each time if the CH dies. This will extend the overall network life time.

Keywords: LEACH, WSN, Routing protocols, K-LEACH, chief-VCH

I. INTRODUCTION

A sensor network is defined as being composed of a large number of nodes with sensing, processing and communication facilities which are deployed either inside the phenomenon or very close to it. Each of these nodes collects data and route the information back to a sink [5]. In Current years, Wireless sensor networks becomes the furthermost exciting networking technologies to offer the sensed collected data to the base station with restricted power ability . Sensor nodes are battery driven devices with restricted energy resources. Once installed, the minor sensor nodes are usually unapproachable to the operator, and thus auxiliary of the energy source is not practicable. Stretching network lifespan for these nodes is a vital issue [7].

Sensor networks may consist of many different types of sensors such as seismic, low sampling rate magnetic, thermal, visual, infrared, acoustic and radar. Applications of the WSNs include to monitor a wide variety of ambient conditions like temperature, humidity, vehicular movement, lightning condition, pressure, soil makeup, noise levels, In Military for target field imaging, Earth Monitoring, Disaster management. Fire alarm sensors, Sensors planted underground for precision agriculture, intrusion detection and criminal hunting [5].In general, routing in WSNs can be divided into *flat-based* routing (*data-centric* routing), *hierarchical-based* routing, and *location-based* routing depending on the network structure. In hierarchical-based routing, nodes will play different roles in the network. The main aim of hierarchical routing is to efficiently maintain the energy consumption of sensor nodes by involving them in multi-hop communication within a particular cluster. Here data aggregation and fusion is performed in order to decrease the number of transmitted messages to the sink. Here all nodes get a chance to become cluster head for the cluster period [2]. LEACH is one of the widely used dynamic clustering hierarchical routing protocol for sensors networks [2]. In the following section, we will describe LEACH protocol and it's shortcomings. To avoid the shortcomings of LEACH here new K-LEACH protocol is to reduce average energy consumption of network and enhance the network lifetime which ensures high availability of sensor nodes and so high reliability of data transmission to sink node which ultimately makes the entire network reliable. But failure of Cluster Head(CH) leads to not transmit of data to base station. So the proposed protocol Vice Cluster Head (VCH) selection algorithm is used to collect data from cluster nodes and transmit data to base station at the time of CH fails. It will enhance the lifetime of whole network.

II. RELATED WORK

Here a brief overview of LEACH protocol and it's advantages and shortcomings are described.

A. Low-Energy Adaptive Clustering Hierarchy (LEACH)

Low Energy Adaptive Cluster Hierarchy protocol is a type of hierarchical clustering algorithm for sensor networks. The idea is to form clusters of the sensor nodes based on the received signal strength and use local cluster heads (CHs)as routers to the sink. This decision is made by the node by choosing a random number between 0 and 1. The node becomes a CH for the current round if the number is less than the following threshold:

$$T(n) = \begin{cases} \frac{p}{1 - p * \mod \frac{1}{p}} & \text{if } n \in G \\ 0 & otherwise \end{cases} \quad (1)$$

where p is the desired percentage of CHs, r is= the current round, and G is the set of nodes that have not been selected as cluster heads in the last 1/p rounds [1]. The nodes' die randomly and dynamic clustering increases lifetime of the system. Fig.1, redrawn from [3] shows the clustering in LEACH protocol.

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Protocol For Location Privacy Using K- Anonymity With Hla In Wireless Sensor Networks

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Abstract—**K-anonymity has been used to protect location privacy for place monitoring services in wireless sensor networks (WSNs), where sensor nodes work together to report k-anonymized aggregate locations to a server. Each k-anonymized aggregate location is a cloaked area that contains at least k persons. However, we identify an attack model to show that overlapping aggregate locations still pose privacy risks because an adversary can infer some overlapping areas with less than k persons that violates the k-anonymity privacy requirement. In this paper, propose a reciprocal protocol for location privacy (REAL) in WSNs. In REAL, sensor nodes are required to autonomously organize their sensing areas into a set of non overlapping and highly accurate k-anonymized aggregate locations. To confront the three key challenges in REAL, namely, self-organization, reciprocity property and high accuracy, we design a state transition process, a locking mechanism and a time delay mechanism, respectively. We compare the performance of REAL with current protocols through simulated experiments. The results show that REAL protects location privacy, provides more accurate query answers, and reduces communication and computational costs.**

Keywords—**Location privacy, k-anonymity, wireless sensor networks, location monitoring systems, aggregate locations**

INTRODUCTION

Sensor nodes are stationary after deployment, but routing paths may change over time due to node failure. In each reporting period, every sensor node is aware of its location and sensing area and responsible for determining the number of persons in its sensing area. All sensor nodes autonomously organize their sensing areas into a set of non-overlapping k-anonym zed aggregate locations and report them to the server. The server collects k-anonymized aggregate locations from sensor nodes, estimates distribution of monitored persons using the spatial histogram method, and provides location-based services through answering aggregate queries from users, for instance. The spatial histo gram divides the whole monitored area into disjointed equal-sized grid cells and maintains an estimator of the number of objects with in each grid cell. Further only the system administrator can change the anonymity level k of the system by disseminating message with a new value of k to all the sensor nodes. Users are the persons monitored by the system. They can also issue aggregate queries to the system via the sensor nodes.

The server answers the queries based on the estimated object distribution. Communication models by maintaining a routing table, a sensor node know how to communicate with others even ifthe network topology is changing due to node failure. Once a sensor node receives a message of any type, it immediately confirms the receipt by sending an acknowledgement message. Thus, if a message gets lost, the source sensor node will send it again until it receives the acknowledgement message. Sensor nodes use two communication paradigms: (1) Broadcast. All sensor nodes residing in the transmission range of a source node receive the broadcast message in the field. (2) Point-to-point (P2P). There is only one destination node for the message being sent from a source node the P2P communication can be implemented using multi-hop routing techniques. In addition, our system(a) establishes a secure network channel for communicationbetween sensor nodes to avoid internal network attacks like eavesdropping and malicious nodes and asecure protocol to ensure data confidentiality, data authentication ,data integrity and data freshness, and (b)employs anonymous communication techniques for communication between sensor nodes and the server; hence, given a k-anonymized aggregate location R, the server only knows that R's sender is one of the sensor nodes within R. through establishing secure network channels, the sensor nodes constitute a trusted zone inwhich they just behave as defined in our proposed REAL protocol. Second, through the anonymous communication techniques for communication between sensor nodes and a server, the server only knows that the sender of a k-anonymized aggregate location R is one of the sensor nodes within R, but cannot infer the exact identifier of the sender ofR.

Third, the system only allows sensor nodes to report k-anonymized aggregate locations to the server and these aggregate locations are publicly available. Lastly, an adversaryis a user of the monitored system or a certain operator of the server who can arbitrarily analyze aggregate locations through the system terminal and the background knowledge in order to infer the location of a monitored person,

A Peer-To-Peer System For Location Privacy Protection On Road Networks

The k-anonymity technique is widely used to provide location privacy protection for accessing location-based services (LBS), i.e., the exact location of a query initiator is cloaked into a spatial region that contains at least k indistinguishable users. However, a centralized location

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On Edge Regular Bipolar Fuzzy Graphs

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Abstract. In this paper, we introduce the concepts of edge regular and totally edge regular bipolar fuzzy graphs. We determined necessary and sufficient condition under which edge regular bipolar fuzzy graph and totally edge regular bipolar fuzzy graph are equivalent. Some properties of edge regular bipolar fuzzy graphs are studied.

Keywords: Edge regular fuzzy graph, totally edge regular fuzzy graph, bipolar fuzzy set, bipolar fuzzy graph, regular bipolar fuzzy graph

AMS Mathematics Subject Classification (2010): 03E72, 05C72

1. Introduction

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975. In 1994, Zhang initiated the concept of bipolar fuzzy sets as a generalization of fuzzy sets. Bipolar fuzzy sets are extension of fuzzy sets whose range of membership degree is [–1, 1] . In bipolar fuzzy set, membership degree 0 of an element means that the element is irrelevant to the corresponding property, the membership degree within (0, 1] of an element indicates that the element somewhat satisfies the property, and the membership degree within [–1, 0) of an element indicates the element somewhat satisfies the implicit counter property [1]. For example, sweetness of foods is a bipolar fuzzy set. If sweetness of foods has been given as positive membership values then bitterness of foods is for negative membership values. Other tastes like salty, sour, pungent (e.g. chili), etc are irrelevant to the corresponding property. So these foods are taken as zero membership values [9]. Akram and Dudek introduced the concept of regular and totlly regular bipolar fuzzy graphs in 2011 [1]. In this paper, we discuss some theorems of edge regular bipolar fuzzy graphs through various examples. We provide a necessary and sufficient condition under which they are equivalent.

First we go through some basic definitions which can be found in [1–9].

2. Basic concepts

Let V be a non-empty finite set and $E \subseteq V \times V$. A fuzzy graph $G:(\sigma,\mu)$ is a pair of

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Edge Regular Property of Alpha Product, Beta Product and Gamma Product of Two Fuzzy Graphs

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Abstract: *In this paper, we determined that the alpha product, beta product and gamma product of two edge regular fuzzy graphs need not be edge regular and that if these operations of two fuzzy graphs are edge regular, then G_1 (or) G_2 need not be edge regular. A necessary and sufficient condition for alpha product and gamma product of two fuzzy graphs to be edge regular fuzzy graph is determined.*

Key Words: *Alpha product, Beta product, Gamma product, Regular fuzzy graph, Edge regular fuzzy graph.*
AMS Mathematics Subject Classification (2010): 03E72, 05C72, 05C76

I. Introduction

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975 [11]. Mordeson. J. N and Peng. C. S introduced the concept of operations on fuzzy graphs [2]. The degree of a vertex in fuzzy graphs which are obtained from two given fuzzy graphs using the operations of alpha product, beta product and gamma product was discussed by Nagoor Gani. A and Fathima Kani. B [3]. Radha. K and Kumaravel. N introduced the concept of degree of an edge and total degree of an edge in fuzzy graphs [8]. We study about edge regular fuzzy graphs which are obtained from two given fuzzy graphs using the operations of alpha, beta and gamma product. In general, alpha, beta and gamma product of two edge regular fuzzy graphs G_1 and G_2 need not be edge regular. In this paper, we find necessary and sufficient condition for alpha product, beta product and gamma product of two fuzzy graphs to be edge regular fuzzy graph. First we go through some basic concepts which can be found in [1] – [14].

A fuzzy subset of a set V is a mapping σ from V to [0, 1]. A fuzzy graph G is a pair of functions $G:(\sigma,\mu)$ where σ is a fuzzy subset of a non-empty set V and μ is a symmetric fuzzy relation on σ, (i.e.) $\mu(xy) \le \sigma(x) \wedge \sigma(y)$ for all $x, y \in V$. The underlying crisp graph of $G:(\sigma,\mu)$ is denoted by $G^*:(V,E)$ where $E \subseteq V \times V$. Throughout this paper, $G_1:(\sigma_1,\mu_1)$ and $G_2:(\sigma_2,\mu_2)$ denote two fuzzy graphs with underlying crisp graphs $G_1^*:(V_1,E_1)$ and $G_2^*:(V_2,E_2)$ with $|V_i| = p_i, i = 1,2$. Also $d_{G_i^*}(u_i)$ denotes the degree of u_i in G_i^* and $d_{\overline{G}_i^*}(u_i)$ denotes the degree of u_i in $\overline{G}_i^*$, where $\overline{G}_i^*$ is the complement of G_i^*.

Let $G:(\sigma,\mu)$ be a fuzzy graph on $G^*:(V,E)$. The degree of a vertex u is $d_G(u) = \sum_{u \ne v} \mu(uv)$. The minimum degree of G is $\delta(G) = \wedge\{d_G(v), \forall\ v \in V\}$ and the maximum degree of G is $\Delta(G) = \vee\{d_G(v), \forall\ v \in V\}$. The total degree of a vertex $u \in V$ is defined by $td_G(u) = \sum_{u \ne v} \mu(uv) + \sigma(u)$. If each vertex in G has same degree k, then G is said to be a regular fuzzy graph or k – regular fuzzy graph. If each vertex in G has same total degree k, then G is said to be a totally regular fuzzy graph or k – totally regular fuzzy graph.

The order and size of a fuzzy graph G are defined by $O(G) = \sum_{u \in V} \sigma(u)$ and $S(G) = \sum_{uv \in E} \mu(uv)$.

Let $G^*:(V,E)$ be a graph and let $e = uv$ be an edge in G^*. Then the degree of an edge $e = uv \in E$ is defined by $d_{G^*}(uv) = d_{G^*}(u) + d_{G^*}(v) - 2$. If each and every pair of distinct vertices is joined by an edge, then $G^*:(V,E)$ is said to be complete graph.

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EDGE REGULAR PROPERTY OF COMPLEMENT AND μ-COMPLEMENT OF A FUZZY GRAPH AND EDGE ADJACENCY SEQUENCE IN FUZZY GRAPH

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Abstract: In this paper, some theorems of edge regular fuzzy graphs are discussed with their complements and μ-complements. A necessary and sufficient condition under which they are equivalent is provided. Finally, adjacency sequence of edges in a fuzzy graph is defined. Using the sequences, characterization for a fuzzy graph with at most four vertices to be edge regular is obtained.

AMS Subject Classification: 03E72, 05C72
Key Words: strong fuzzy graph, complete fuzzy graph, edge regular fuzzy graph, totally edge regular fuzzy graph, complement of a fuzzy graph and μ-complement of a fuzzy graph

1. Introduction

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975 [8]. Though it is very young, it has been growing fast and has numerous applications in various fields. During the same time Yeh and Bang have also introduced various connectedness concepts in fuzzy graphs [10]. Mordeson (1994) introduced the

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On Edge Regular Antipodal Fuzzy Graphs

Research Article

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Abstract: In this paper, some properties of edge regular antipodal fuzzy graphs are studied. Antipodal fuzzy graph of an edge regular fuzzy graph need not be edge regular. Conditions under which it is edge regular are provided.

MSC: 03E72, 05C72.

Keywords: Strong fuzzy graph, complete fuzzy graph, edge regular fuzzy graph, totally edge regular fuzzy graph, antipodal fuzzy graph.

1. Introduction

Fuzzy graph theory was introduced by Azriel Rosenfeld in 1975 [11]. Though it is very young, it has been growing fast and has numerous applications in various fields. During the same time Yeh and bang have also introduced various connectedness concepts in fuzzy graphs [12]. In crisp graph theory the concept of antipodal graph of a given graph G was introduced by Smith. A.Nagoor Gani and J.Malarvizhi (2010) introduced the concept of antipodal fuzzy graph [2]. K.Radha and N.Kumaravel (2014) introduced the concept of edge regular fuzzy graphs [9]. In this paper, we study about edge regular property of antipodal fuzzy graphs.

First we go through some basic definitions in the next section, which are represented in [1, 2, 4, 5, 8, 9].

2. Basic Concepts

Let V be a non-empty finite set and $E \subseteq V \times V$. A fuzzy graph $G : (\sigma, \mu)$ is a pair of functions $\sigma : V \to [0, 1]$ and $\mu : E \to [0, 1]$ such that $\mu(x, y) \leq \sigma(x) \wedge \sigma(y)$ for all $x, y \in V$. The order and size of a fuzzy graph $G : (\sigma, \mu)$ are defined by $O(G) = \sum_{x \in V} \sigma(x)$ and $S(G) = \sum_{xy \in E} \mu(xy)$. A fuzzy Graph $G : (\sigma, \mu)$ is strong, if $\mu(xy) = \sigma(x) \wedge \sigma(y)$ for all $xy \in E$. A fuzzy Graph $G : (\sigma, \mu)$ is complete, if $\mu(xy) = \sigma(x) \wedge \sigma(y)$ for all $x, y \in V$. The underlying crisp graph is denoted by $G^* : (V, E)$. The degree of a vertex x is $d_G(x) = \sum_{x \neq y} \mu(xy)$. If each vertex in G has same degree k, then G is said to be a regular fuzzy graph or $k-$regular fuzzy graph. The degree of an edge $e = uv \in E$ in G^* is defined by $d_{G^*}(uv) = d_{G^*}(u) + d_{G^*}(v) - 2$. If each edge in G^* has same degree, then G^* is said to be edge regular. The degree of an edge $xy \in E$ is $d_G(xy) = \sum_{x \neq z} \mu(xz) + \sum_{z \neq y} \mu(zy) - 2\mu(xy)$. If each edge in G has same degree k, then G is said to be an edge regular fuzzy graph or $k-$edge regular fuzzy graph.

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STABILITY ANALYSIS OF CARRIER OILS MEDIATED IRON OXIDE NANOPARTICLES AND ITS PHOTODEGRADATION STUDIES

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ABSTRACT

Iron oxide nanoparticles (IONPs) were synthesized with olive oil and linseed oil as stabilizers by co-precipitation method. The dried nanoparticles were stored in a room at room temperature over a period of six months. The stability assessment was done by measuring poly dispersity index (PDI), zeta potential measurement, pH values and thermo gravimetric analysis (TGA). Further the photodegradation of Acridine Orange (AO) dye was taken for the better stability offered by olive oil stabilized IONPs using UV-visible spectrophotometer. Effect of pH and intensity of light on photocatalytic degradation of AO dye with olive oil stabilized IONPs were also analysed.

Key words: Iron oxide nanoparticles, Carrier oils, Stability, Photodegradation.

INTRODUCTION

Stability of IONPs

Magnetic iron oxide nanoparticles represent a fascinating material for various researchers due to their biomedical applications in the treatment of solid tumours[1] or contrast agents[2]. In order to be efficient in biological applications, colloidal suspensions of magnetic nanoparticles must have long time stability and the magnetic core must respond to an external magnetic field that directs the particle to a desired location. The nanoparticles stability is influenced by the size, structure and composition of the particle with a narrow

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Corrosion Inhibition Studies Of Mild Steel With Carrier Oil Stabilized Of Iron Oxide Nanoparticles Incorporated Into A Paint

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Abstract: Corrosion inhibitors are chemical substances that are added to the corrosive environment to reduce or eliminate corrosion. The good inhibitor has many advantages such as high inhibition efficiency, low price, low toxicity and easy production. Nanomaterials exhibit such advantages with addition of improvement of the environmental impact. The stabilization is the significant factor for these iron oxide nanoparticles to exhibit high corrosion inhibition efficiency. Hence it was decided to have a better corrosion protection for these metals, iron oxide nanoparticles (IONPs) functionalized with carrier oils such as Olive oil and lineed oil as natural stabilizing agents composited with paint after six months of storage at room temperature and coated on mild steels. The morphology of these six months stored IONPs was investigated by scanning electronic microscopy (SEM). The weight loss method was chosen for determining the corrosion inhibition efficiency and corrosion rate.
Key words : Corrosion inhibition, Carrier oils, Iron oxide nanoparticles.

Introduction

Corrosion is an undesirable phenomenon that has to be prevented with the kind of new inventions or technology developed. There are several ways of preventing corrosion and the rates at which it can propagate with a view of improving the lifetime of metallic and alloy materials. The use of inhibitors for the control of corrosion of metals and alloys which are in contact with aggressive environment is one among the acceptable practices used to reduce and/or prevent corrosion. A corrosion inhibitor is a substance which, when added in small concentration to an environment, effectively reduces the corrosion rate of a metal exposed to that environment (1-2).

Removing or separating the corrosion environment from the metal can prevent corrosion. This is the principle of coatings applied for corrosion protection. Paint and galvanizing are examples of coatings that have been used for many years. Nanostructures materials (1–100 nm) are known for their outstanding mechanical and physical properties due to their extremely fine grain size and high grain boundary volume fraction. Significant progress has been made in various aspects of synthesis of nanoscale structures and coatings having greater wear and Corrosion resistance. Steel is widely used as the constructional material in most of the major industries particularly in food, petroleum, power production, chemical and electrochemical industries, especially due to its excellent mechanical properties and low cost.

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Microwave assisted Synthesis and Characterization of Cu^{2+} doped ZnO Nano particles

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Abstract : We have investigated the influences of Cu^{2+} doping on zinc oxide nano particles. Pure and Cu^{2+} doped Zinc oxide has been recognized as one of the most important transparent high preferential directed particles in view of its numerous applications in many fields. Microwave assisted synthesis has certain advantages in the preparation of nano materials such as reducing the time, requires fewer material and also offers better control over the reaction process. Crystallite size and phase identification was carried out by x-ray diffraction. The crystalline size and lattice strain was calculated using Williamson-Hall method. The lattice parameter was found by Nelson-Riley fit. Morphology of the crystallites was studied using SEM and TEM analysis. The optical properties were characterized by UV-Vis absorption spectroscopy.

Key Words: Cu^{2+}doping on zinc oxide, SEM,TEM,UV-Vis,Crystallite size.

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Structural and optical properties of $Zn_xCd_{1-x}O$ nanoparticles

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Abstract: $Zn_xCd_{1-x}O$ is a promising optical material to enhance the luminescence property for possible applications in luminescent devices. They have unique optical, thermal and structural properties. Zinc and Cadmiun nanoparticles and Cd substituted ZnO nano particles with different concentration were prepared by microwave assisted method. The effect of Cd substituted ZnO concentrations on the crystal structure, morphology and optical properties of the nanoparticles was also investigated. Temperature is deemed as a key parameter for the formation of different morphologies of $Zn_xCd_{1-x}O$ nanostructures. In this paper, we reported the synthesis of $Zn_xCd_{1-x}O$ nanoparticles successfully with the diameter of 20nm. By using scanning electron microscope (SEM) the surface morphology of synthesized material was investigated. The structure and phases of $Zn_xCd_{1-x}O$ were analyzed by powder X-ray diffraction (XRD) method and the optical properties were measured by using UV visible spectrophotometer and photoluminescence spectroscopy. The results suggest the applicability of these nano materials as transparent conductors in various solid state devices.

Keywords: $Zn_xCd_{1-x}O$; microwave method, XRD, SEM,PL and Photoconductivity.

1. Introduction

The fabrication of complex nanosystems arises due to the progress of nanotechnology for the recent years. Enhanced impetus is being given to the development of multi-functional and size-dependent materials. Recent trends and developments in nanotechnology and nanoscience have brought potential building blocks for a nanoscale electronic, optoelectronics, luminescent devices, medicines and solar cells [1-4]. The material dimension decreases to nano-order as the surface/volume ratio increases. Hence the high surface/volume ratio of nanomaterials has significant implications with respect to energy storage density.

Over the last few years nanomaterials, especially metal oxides have received a considerable attention in various fields due to their distinguished performance and potential applications. Among these oxides, ZnO exhibits the most diverse and abundant configurations of nanostructures [5-7]. ZnO considered and reported to be one of the best metal oxides that can be used at a nanoscale level. ZnO has a hexagonal or wurtzite structure and it is an n-type II–VI semiconductor with a wide direct band-gap of about 3.37 eV and a large exciton binding energy of 60 meV [8]. They have large applications in catalysis, electronics, optoelectronics, transducers, solar cells, electrical & acoustical devices, luminescent, chemical sensor, gas sensor devices and biomedical devices [9,10]. Enormal applications have made the ZnO as treasure material for material scientists and the usage of ZnO in different application is also increasing. Hence, its production ever increases and trial on suitable method for preparing ZnO possessing less operating cost, working at ambient temperature, less time with narrow size range and better properties is a challenge task for researchers [11]. One of the well-known II – VI semiconductor with a direct band gap of 2.39 eV (563.6 nm) is Cadmium oxide (CdO) and it has found its use in various applications such as in solar cells, photodiodes [12], phototransistors[13] and

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Influence of Zn doping on structural, optical and photocatalytic activity of WO_3 nanoparticles by a novel microwave irradiation technique

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Abstract In the present work we have successfully synthesized pure and zinc (Zn) doped WO_3 nanoparticles by microwave irradiation method for the first time. Powder X-ray diffraction results reveal that the WO_3 doped with Zn concentration from 0 to 10 wt% crystallizes in monoclinic structure and the results are in good agreement with the standard JCPDS data (card no: 83-0950). Field emission scanning electron microscopy studies illustrate that both the pristine and Zn doped WO_3 form in spherical shaped morphology with an average diameter of 48–36 nm, which is in good agreement with the average crystallite sizes calculated by Scherrer's formula. A considerable red shift in the absorbing band edge and decrease the band gap energy from 2.93 to 2.71 eV for Zn doped samples was observed by using UV–Vis spectra analysis. The defects in crystal and oxygen deficiencies were analyzed by photoluminescence spectra analysis. The photocatalytic activities of the pure and Zn doped WO_3 samples were evaluated by the degradation of methylene blue rhodamine B in an aqueous solution under visible light irradiation. The photocatalytic activity and reusability of Zn (10 wt%) doped WO_3 was much higher than that of the pure WO_3. The improvement mechanism by Zn doping was also discussed.

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1 Introduction

In recent years, photocatalysis technology has received universal attention due to its applications in organic synthesis and the abatement of pollutants in water and air. There has been considerable interest in the synthesis of transition metal oxide semiconductors with diverse morphological structure and the investigation of their properties due to their potential application in electronic, optical, super conductor devices, etc. [1]. Among the various types of semiconductor photocatalysts (ZnO, TiO_2, SnO_2, In_2O_3) tungsten oxide (WO_3) is highly interesting and have been intensively studied for a long time due to their promising physical and chemical properties [2]. WO_3, an n-type semiconductor with an excellent electrochromic, photochromic and gasochromic properties has been extensively used in variety of applications, including gas and temperature sensing, catalysis, electrochromic windows and displays, flat panel displays, solar energy devices and so on [3]. Many processes have been developed for the synthesis of WO_3 nanostructures, e.g., hydrothermal route [4], surfactant mediated method [5] sol–gel [6], chemical co precipitation [7], acidification method [8], and electrodeposition method [9]. Compared with the above processes, the microwave method has sparked much interest due to their operation simplicity, effective, low-cost route to synthesis, less time consuming (about 10 min), and for large-scale production [10].

There are several additives and dopants which can improve the photocatalytic performance of WO_3. Chemical doping of WO_3 with metallic (Cu [11], Sn [12], Pd [13]

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Effect of tungsten (W^{6+}) metal ion dopant on structural, optical and photocatalytic activity of SnO_2 nanoparticles by a novel microwave method

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Abstract In this report, we have successfully synthesized pristine and tungsten (W) doped SnO_2 nanoparticles by using novel and one-step microwave irradiation method for the first time. Powder X-ray diffraction results suggest that both pure and W doped SnO_2 nanoparticles are crystalline with tetragonal rutile type structure (space group of P42/*mnm*) formed directly during the microwave irradiation process. The morphology of the nanoparticles are in spherical shaped and the average particle sizes were around 23–32 nm was observed for pure and W doped SnO_2 nanoparticles as investigated by transmission electron microscopy analysis. UV–Vis transmission spectra analysis revealed that optical transmission is decreases with the increase of W concentrations (0–10 wt%) and the red shift was observed. The calculated band gap energy of pure SnO_2 was found to be 3.61 eV and further it was decreases to 3.47 eV for W (10 wt%) doped SnO_2. The photocatalytic properties of the pure and W doped SnO_2 samples were evaluated by the degradation of methylene blue rhodamine B in an aqueous solution under visible light irradiation. The photocatalytic activity and reusability of W (10 wt%) doped SnO_2 was much higher than that of the pristine SnO_2. The improvement mechanism by W doping was also discussed. The samples were further characterized by photoluminescence and Fourier transforms infra- red spectra analysis.

1 Introduction

The degradation of organic pollutants in water and air by photocatalysis, using semiconductors, has attracted extensive attention during the last few years. Semiconductor photocatalysts have been widely investigated in the field of photochemistry and environmental protection, such as the photocatalytic degradation of environmental pollutants using near-UV or solar light. Among various kinds of metal oxide semiconductors, SnO_2 semiconductors have been keenly studied due to their excellent chemical stability and optical and electrical properties [1]. SnO_2 has the rutile type tetragonal structure belonging to the P42/*mnm* space group. The lattice parameters are $a = b = 4.7382$ Å and $c = 3.1871$ Å, and the band-gap energy is in the ultraviolet range between 3.5 and 3.8 eV as estimated from experimental results and theoretical calculations [2]. Its high optical transparency, electrical conductivity, and chemical stability, these properties make SnO_2 a suitable candidate for device such as for gas sensor application, Li- ion batteries, photovoltaic, super capacitor, light emitting diode, display devices and solar cell [3, 4]. Up to now, a variety of methods have been used to synthesis of SnO_2 in powder or thin film form: chemical precipitation [5], microwave technique [6], combustion route [7], sol–gel [8], solvothermal [9], hydrothermal [10], sonochemical [11] and mechanochemical [12]. Among the above mentioned techniques, microwave irradiation is particularly attractive due to its operation simplicity, low cost, high purity, homogeneous distribution

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Status of Woman in Margaret Atwood"s the Edible Woman and Surfacing

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Abstract

The status of woman has always been a subject of change in society. For centuries, it has been a strenuous struggle for a woman to ensure her freedom in all aspects. Subordination and suppression of woman is common everywhere irrespective of the country and race. Further, woman has been marginalized and the woman writers are left invisible. Throughout the world, the woman writers, though forceful and rich in writing, are hardly recognized as writers. Margaret Atwood, in her novels, depicts the inner urge of women who strive to break all the barriers created by men and establish an identity of their own. This paper deals with the selected works of Margaret Atwood and her use of imagery and symbol to depict the status of women in a hostile society.

Keywords: New woman, society, imagery, symbol, self-identity.

Introduction

Literature is a mirror of life and society. It reflects the different facets of life including the mind of the people. Particularly, the oppressed and the neglected section of the society cries loudly in literature which deserves in depth analysis. The representation of modern woman, her pursuit and struggle for identity is a promising venture in literature. Today, though woman has the determination to face the world with individual pursuit, she is not able to attain her freedom