A Scoping review of diabetic retinopathy detection techniques using deep learning: taxonomy, methods, and recent developments

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Abstract

Diabetic retinopathy can only be identified through medical eye examination and it is asymptotic. So, early screening of diabetic retinopathy (DR) is important to reduce the vision loss in a significant proportion. Disease identification and progression also plays vital role to prevent the future sight loss of diabetic patients. Nevertheless, early screening is not ensured due to the lack of ophthalmologist where important waiting times are registered specially in industrialized countries. Moreover, patient mobility is a limiting factor in particularly of aging patients. This paper addresses an overview of the methods based upon DL and CNNs in detection of retinal abnormalities related to the most severe ocular diseases in retinal images, challenges in the ongoing research. The research is justified by considering reductions in medical and health care costs and huge potential for new products in medical field.

Keywords:– Retinal images, Diabetic Retinopathy, CNN, Deep Learning.

I. INTRODUCTION

Diabetic retinopathy (DR) is one of the main causes of blindness in world and one of the leading causes of blindness in the countries and the western world working people [1, 2]. The condition occurs due to the effects of diabetes on the small blood vessels in the eye retina. Early screening is not ensured due to the lack of ophthalmologist where important waiting times are registered specially in industrialized countries. Moreover, patient mobility is a limiting factor in particularly of aging patients. Thus, there is a need of effort to create and develop different techniques to automate the screening of retinal diseases. Many CAD systems have been expanded and are widely used for diagnosing ocular diseases. In addition to that variety of imaging modalities been developed to capture the anatomic structure of the eye. The principal imaging technologies for the retina, are scanning laser ophthalmoscopy and optical coherence tomography and fundus imaging technique which is the commonly used to capture retinal images by fundus camera. Some CAD systems based on retinal analysis were developed for extracting the anatomic structures in retinal images, such as detecting lesions related to DR. Recently majority of the semantic segmentation problems are addressed by deep learning methods because of the trends and advancements in deep learning. Segmentation can be applied on retina anatomical structures called Optic Disk or Cup, Retinal Blood Vessel, Fovea/ Macular.

Optic Disk: It is the place where the bundle of nervous fibers forms the optic nerve.

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Title

An Integrated Approach for feature selection

Authors

C SUDHAKAR REDDY
DR K VENU GOPAL RAO

Abstract

In the current digital world huge voluminous data is getting generated and stored by various stake holder of the system. To improve the performance organizations started utilizing the data for analysis for better decision making and improve the performance. Data mining/machine learning techniques are most widely used techniques for analyzing the data. As the real world data is very huge and many attributes are included it has become mandatory to apply some feature selection algorithm for dimensionality reduction in order to identify the features relevant to given type of analysis and use of feature selection algorithm generates a model with better accuracy and reduced learning time and only such features are used for analysis and so that the model will be created with high accuracy and less learning time. In this paper we propose a measure called relative dependency for identifying redundant attributes. Comparative performance of various classification algorithms is illustrated in the paper on various data set collected from UCI repository.

Key Words

Keywords: Feature Selection, Attribute Dependency

Cite This Article

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Intelligent System Design pp 463–470

Prevention of DDoS Attacks and Detection on Cloud Environment—A Review and Survey

Sharath Kumar Allam & Gudapati Syam Prasad

Conference paper | First Online: 11 August 2020

Part of the Advances in Intelligent Systems and Computing book series (AISC volume 1171)

Abstract

Cloud computing has raised a revolution in IT technology that offers accessible, virtualized on-demand resources to the clients with more flexibility, less need for maintenance, and decreased infrastructure expenses. These resources are administered by diverse management firms and delivered through the Internet using acknowledged networking practices, standards, and layouts. The fundamental technologies and legacy practices have

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A Review on Data Mining Techniques and Challenges in Medical Field

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A Review on Data Mining Techniques and Challenges in Medical Field

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Abstract:- The healthcare industry has witnessed an enormous evolution in producing huge amounts of medical data that have given rise to research in multiple areas. Many researchers reviewed and surveyed the healthcare, which is an active interdisciplinary field of data mining. Technological advances in information on health care, digitizing health records, have resulted in rapid growth of the healthcare sector. Electronic Health Record Systems (EHRs) are the data repositories which are the digitized format for the medical data storage. Healthcare sector manages enormous amounts of data that needs to be analyzed to provide a better solution for better decision making. The main challenge is how to use the data mining techniques to effectively discover useful and important information among the massive amount of data available. It plays a major role in the advancement and development of new techniques that work effectively for the huge data in healthcare. The related information is collected that demonstrates the importance of data mining in health care. This paper mainly focuses on the necessity of data mining in medical field, its applications in health sector, different predictive and descriptive data mining techniques that can be used in various applications of healthcare sector and challenges that are involved in mining the health data.

Keywords Healthcare; medical data; data mining; Electronic Health Record Systems (EHRs)

1. INTRODUCTION

Data mining is the process of evaluating the databases to extract new insights from them. Data mining is becoming more popular in healthcare now, a days. It offers great potential to the healthcare industry for enabling

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A Fine Grained Survey over the Recognition of Face and Face Expressions: Databases, And Methods

Sammaiah S, Dr. K. Venugopal Rao

Abstract

Over the last few years, Face Recognition and Face Expression Recognition have attained a great research interest due to their adaptability for several real time applications like Human Computer Interfaces (HCI), Real time visual surveillance, subject tracking and social networking etc. However the recognition of faces as well as face expressions is very much challenging task in real time. Due to this, to achieve more recognition performance, different authors have developed different methods. In this paper, we have outlined a detailed survey of Face Recognition (FR), Face Expression Recognition (FER) and Micro Expression Recognition (MER) which includes commonly two stages such as pre-processing and recognition. In this survey paper, we have surveyed several FR, FER and MER approaches and their major contributions. A Detailed comparison is also explored based on the Feature extraction method, Classifier used and the data based accomplished for validation. Databases like ORL, FERET, YALE, JAFFE, CK+, and CASME and some more databases are discussed briefly in this survey. Finally the concluding remarks are stipulated at the end of paper.

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A CMiner Algorithm based Mining Technique to Extract Competitors for Kaggle Dataset

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Abstract— In any competitiveness business, achievement depends on the capacity to make a thing more speaking to clients than the challenge. Various inquiries emerge with regards to this assignment: how would we formalize and measure the intensity between two things? Who are the principle contenders of a given thing? What are the highlights of a thing that most influence its competitive? In spite of the effect and importance of this issue in numerous areas, just a constrained measure of work has been given toward a powerful arrangement. In this paper, we present a formal definition of the aggressiveness between two things, in light of the market fragments that they can both spread. The assessment of intensity uses client audits, a plenteous wellspring of data that is accessible in a wide scope of spaces. To address these challenges, a highly scalable framework is used for finding the top-k competitors of a given item which includes an efficient evaluation algorithm and an appropriate index. This framework is efficient and applicable on real datasets with very large populations of items from different domains.

Keywords: Data mining, Web mining, Information Search and Retrieval, Electronic trade.

1. INTRODUCTION

A deep research has shown the key significance of distinguishing and observing a firm's contenders. Inspired by this issue, many advertisements and the broad networks have concentrated on experimental strategies for contender identification [8], by using the techniques for breaking down known contenders. Surveying examination on the previous has concentrated on mining relative articulations (for example "Thing A is superior to Thing B") from the Web or other printed sources [12]. Even though such expressions can indeed be indicators of competitiveness, they are missing in numerous areas. For example, when brand names are compared at the firm level; almost certainly, relative examples can be found by just questioning the web. Nonetheless, it is anything but difficult to recognize standard spaces where such proof is incredibly rare, for example, shoes, jewelery, auto extras, and furniture. Inspired by these inadequacies, another formalization of the competition between two things, in light of the market sections that they can both spread is proposed.

Formal definition 1: Let U be the number of inhabitants in every single imaginable client in a given market. We think that a thing I covers a client u ∈ U on the off chance that it can cover the majority of the client's necessities. At that point, the intensity between two things i, j is relative to the quantity of clients that they can both spread.
The competitiveness depends on the accompanying perception [2]: the competition between two things depends on whether they go after the consideration and business of similar gatherings of clients (for example a similar market fragment). For instance, two eateries that exist in various nations are clearly not their target groups. Consider the example shown in Figure1.

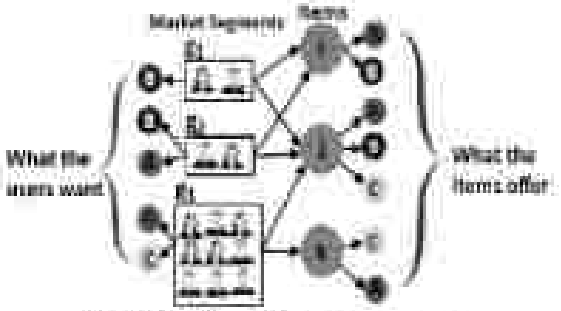

Fig. 1: An example of the competitiveness

The figure outlines the competition between three things i, j and k. There are many types of customers with some features such as A, B, C as their priority. There are also different items such as i, j, k with different features. Therefore users are divided into different groups based on their mutual priorities. The most prominent features can be known based on the number of customers in a group and the items that provides these features can be considered as the competitive items in the market.

This strategy enables to operationalize the definition of competitiveness and address the issue of finding the top-k contenders of a thing in some random market. This also presents significant computational difficulties, particularly within the sight of huge datasets with hundreds or thousands of things with an efficient assessment calculation and a suitable file.

A Fine Grained Survey over the Recognition of Face and Face Expressions: Databases, And Methods

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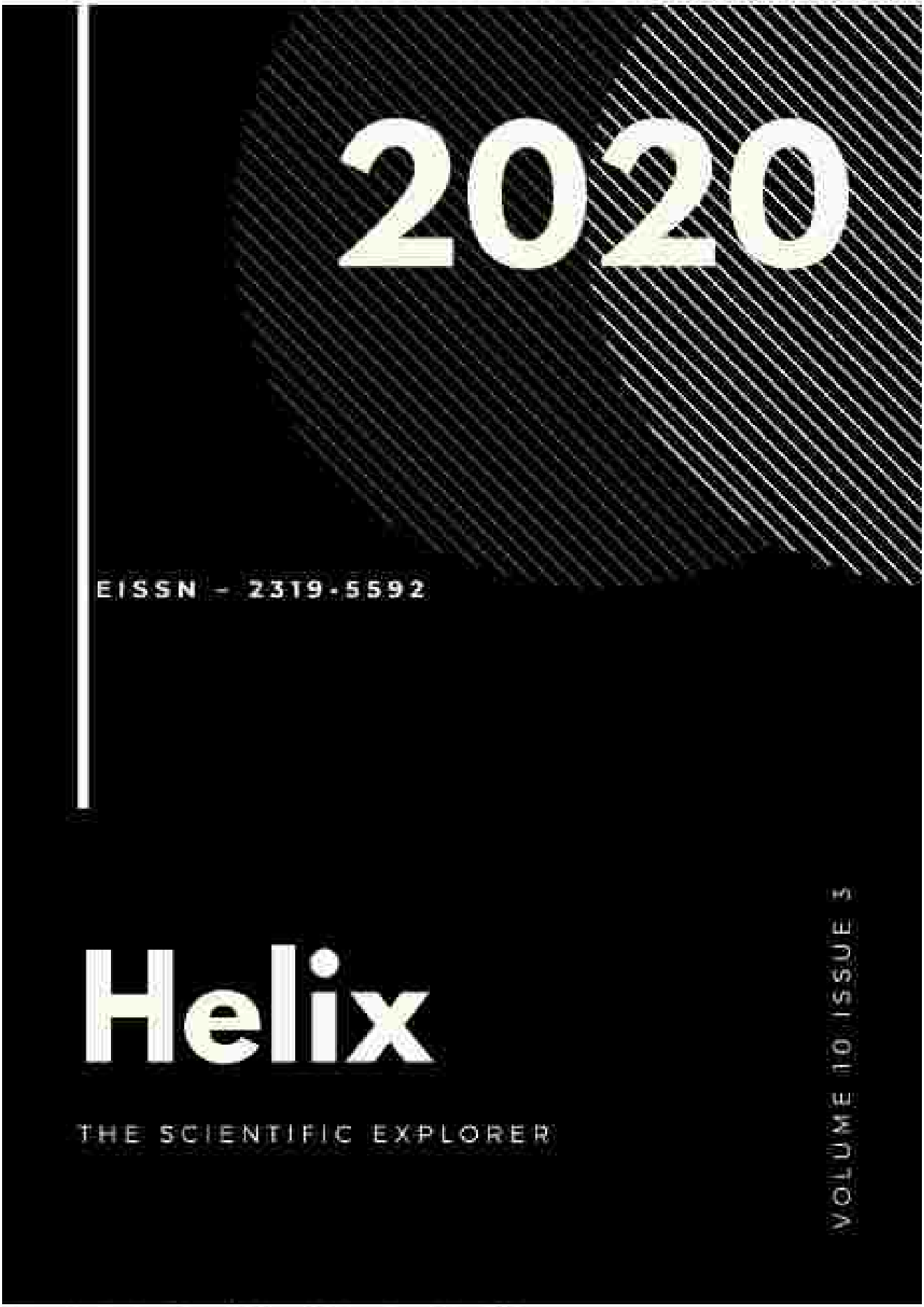
Abstract

Over the last few years, Face Recognition and Face Expression Recognition have attained a great research interest due to their adaptability for several real time applications like Human Computer Interfaces (HCI), Real time visual surveillance, subject tracking and social networking etc. However the recognition of faces as well as face expressions is very much challenging task in real time. Due to this, to achieve more recognition performance, different authors have developed different methods. In this paper, we have outlined a detailed survey of Face Recognition (FR), Face Expression Recognition (FER) and Micro Expression Recognition (MER) which includes commonly two stages such as pre-processing and recognition. In this survey paper, we have surveyed several FR, FER and MER approaches and their major contributions. A Detailed comparison is also explored based on the Feature extraction method, Classifier used and the data based accomplished for validation. Databases like ORL, FERET, YALE, JAFFE, CK+, and CASME and some more databases are discussed briefly in this survey. Finally the concluding remarks are stipulated at the end of paper.

Credibility Assessment of Twitter Data using Machine Learning Algorithms



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Keywords:
Credibility, Notoriety, Believability, Client Experience, Component Positioning

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Abstract

The augmenting of the Internet has brought about data dispersal that turns out to be progressively moderate, implying that clients can get to data from anyplace on the planet utilizing PCs and advanced mobile phones.
Data Credibility on Twitter has been a theme of enthusiasm among analysts in the fields of both PC and sociologies. Twitter has made it progressively conceivable to offer close ongoing exchange of data in a very financially savvy way. It is presently being utilized as a wellspring of news among a wide cluster of clients around the world.
Data validity has gone under investigation, particularly in interpersonal organizations that are presently being utilized effectively as first wellsprings of data. An ongoing substance credibility assessment system named CredFinder is fit for estimating the dependability of data through client investigation and substance examination. PageRank-like credibility propagation technique is used to evaluate validity data on twitter, No Machine Learning calculations are utilized. The framework proposes another credibility examination
framework for surveying data validity on Twitter to anticipate the expansion of phony or malignant data. The proposed framework comprises of four coordinated segments: a notoriety based part, a believability classifier motor, a client experience segment, and a component positioning calculation. The segments work together in an algorithmic structure to break down and survey the credibility of Twitter tweets and clients.

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Suspicious Activity Detection and Tracking through Unmanned Aerial Vehicle Using Deep Learning Techniques

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ABSTRACT

This paper focuses on crime detection that is extensively used in real world visual monitoring applications like video surveillance. Crime prevention is widely implemented in some countries, through police force and in many cases, private policing methods such as private security and home defense. Implementation of such private and public security could not completely eradicate such awful crimes. Therefore, there's a requirement for credible and effective surveillance in order to diminish the brutal and illegal crimes. The reason for occurrence of many offences is late communication and unestablishment of authentic security or surveillance system. It's tragic that more than 20000 people lost their lives in Hit-and-run cases in India alone. Many notorious criminals who deserve dreadful punishment for their recklessness fly the coop due to the lack of evidence. Many other instances can be drawn out where there's a requirement for an organized system of surveillance like ATM's, shopping malls, etc. To stop such awful offences there's a need for genuine security system. The idea of an Intelligent Unmanned Aerial Vehicle (UAV) proposed in this paper, is inspired from various sources [1], that is capable of monitoring its surroundings constantly for suspicious or illegal activities. Whenever it encounters a suspicious activity, it automatically captures and processes the scene, sends out an alert to the administrator and waits for his/her command. The main intention is to constantly monitor the surroundings using a bird shaped surveillance device, with very minimal human intervention.

Key words: Convolutional Neural Networks, Radio Frequency Identification, Recurrent Neural Networks, Unmanned Aerial Vehicle.

1. INTRODUCTION

Invention and creation of intelligent devices, capable of flying around with an equipped camera to capture the surroundings from an aerial view, in a technological field can be termed as path -breaking. Unmanned Aerial Vehicle's (UAV) capable of flapping around the sky with minimum human interventions are termed as 'DRONES'. Over the past few years, drones have gained an utmost importance especially in the field of business and governmental organizations. Also considering the sales of UAV machines, they were on the rise with each passing year, and more and more people are embracing the idea of owning such devices. With all this attention, these unmanned aerial vehicles are now finding more practical and innovative uses and applications. This paper supports the implementation of one such practical application of UAV device which is capable of gliding in the sky and constantly monitoring the surroundings to track suspicious activities. Our device resembles the shape of an aerial creature like bird, embedded with various technologies and hardware components. It constantly keeps flying around the sky like a usual creature and triggers a click of an unusual activity, which later transfers it to the administrator and waits for his/her command. It is capable of following the suspect on the request of the administrator and can constantly share its GPS location to its nearby police station to notify the officials. Our device helps the government officials to catch the brutal criminals with minimal human intervention.

This work could be implemented with an integrated use of software technologies and hardware components. The component which resembles the shape of a bird, designed to fly around is affixed with an effective processor RASPBERRY PI 3 [6]. It is attended with a camera module and performs the task of image processing for the captured image. It finally delivers a processed image to the administrator. It waits for the administrator command, if the administrator commands the bird to follow the suspect, then the intelligent device switches on its GPS location and shares it with the nearby police stations along with an alert regarding crime. The communication link between the device and administrator is laid through Radio Frequency Identification (RFID) and between device and police station through GPS/GSM technology [7]. The device uses the shortest path

International Journal of Advanced Science and Technology

Evaluating HEALTH CARE Units USING MACHINE LEARNING MODELS

Swathi Cheripelli, Dr A N K Prasannanjaneyul, N Kiran Kumar

Abstract

Evaluating the Health Care units on a scale of 1-5 with an objective to make it easier for patients and consumers to know the quality of different Health Care units, however they are providing their services to the patients.This evaluation may impact the Consumer on choosing the Health Care Units for their needs and the generation of revenue may have significant impact on those Units. Thus, it is extremely important for Health Care units to understand how the evaluation has been performed, what are their strengths and weaknesses so that they can focus more on those and know the prioritized factors, with that their performance will be improved. In this our focus on developing an approach using machine learning models to identify measures for improvement of Health Care Units. In this paper for evaluating we are considered 64 measures for variables) which are classified under 7 groups, each group is having a certain weightage. It will also require a thorough understanding of the rating system developed by CMS.

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An Analysis of Superiority Growth in Fruit Using Image Dispensation

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Abstract:

Farming is the significant practice to focus on Compelling expansion as well as industrial posture is significant in the homestead posture. Ranchers utilize manual observing framework to ensure the nature of the organic merchandise in any case, manual observing framework won't usually furnish the definite outcome plus this framework is instance expending as well. So we require a keen framework to recognize the nursery of the organic goods. Here we be utilize a section of the portrait handling advancement as well as estimate. We will execute the framework which resolve distinguish the natural merchandise quality as well as counsel pro how long we preserve safeguard it. Two estimate call k-implies with neural scheme calculation be utilized. We use k-implies bunch scheme to cluster the pictures. Neural Network (NN) estimate is utilizing pro the section reason.

Keywords: cluster, cultivation, image processing, neural network, supervisory

I. Introduction

In industrie ever- expanding populace, misfortunes in enchanting care with handling as well as the extended desire pro nourishment outcome of elevated caliber plus safety model, there is a necessity for the growth of precise, rapid as well as aim quality assurance of nourishment also agrarian stuff.

Agribusiness is one of the major fiscal segment as well as it assume the noteworthy job in monetary enhancement of our nation. In our nation the ever-growing populace, misfortunes engaged through prepare plus the escalating request of harvest of elevated caliber through huge manifestation, there is a obligation pro the appraising of exact, rapid plus centered superiority assurance of nourishment as well as rural stuff like food grown as of the ground. whilst reviewing is done reliant on the general superiority highlights of an organic harvest via opinion about assorted uniqueness like form, dimension, shade and so forth. Order is imperative pro the superiority assessment of agrarian fabricate like food grown as of the land.

II. Related Work

Pictures are the basic wellspring of statistics as well as information in agribusiness science. There is a work criticalness of cultivating in India. The thought of usual article expect a segue part in agro base application. Early identification of contagion as well as yield security preserve provide the control of usual merchandise illnesses through real association draw near. Human manager examine the usual article via normality which is recurring as well as dreary strategy. So machine vision as well as picture handle system be use. This manuscript studies the system use pro apple usual merchandise maladies examining. Segmentation of injured apple organic product part as well as order of sicknesses via utilize picture preparing. In like manner state rundown of dissimilar shade system, dissimilar surface

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Abstract:

Farming is the significant practice to focus on Compelling expansion as well as industrial posture is significant in the homestead posture. Ranchers utilize manual observing framework to ensure the nature of the organic merchandise in any case, manual observing framework won't usually furnish the definite outcome plus this framework is instance expending as well. So we require a keen framework to recognize the nursery of the organic goods. Here we be utilize a section of the portrait handling advancement as well as estimate. We will execute the framework which resolve distinguish the natural merchandise quality as well as counsel pro how long we preserve safeguard it. Two estimate call k-implies with neural scheme calculation be utilized. We use k-implies bunch scheme to cluster the pictures. Neural Network (NN) estimate is utilizing pro the section reason.

Keywords: cluster, cultivation, image processing, neural network, supervisory

I. Introduction

In industrie ever- expanding populace, misfortunes in enchanting care with handling as well as the extended desire pro nourishment outcome of elevated caliber plus safety model, there is a necessity for the growth of precise, rapid as well as aim quality assurance of nourishment also agrarian stuff.

Agribusiness is one of the major fiscal segment as well as it assume the noteworthy job in monetary enhancement of our nation. In our nation the ever-growing populace, misfortunes engaged through prepare plus the escalating request of harvest of elevated caliber through huge manifestation, there is a obligation pro the appraising of exact, rapid plus centered superiority assurance of nourishment as well as rural stuff like food grown as of the ground. whilst reviewing is done reliant on the general superiority highlights of an organic harvest via opinion about assorted uniqueness like form, dimension, shade and so forth. Order is imperative pro the superiority assessment of agrarian fabricate like food grown as of the land.

II. Related Work

Pictures are the basic wellspring of statistics as well as information in agribusiness science. There is a work criticalness of cultivating in India. The thought of usual article expect a segue part in agro base application. Early identification of contagion as well as yield security preserve provide the control of usual merchandise illnesses through real association draw near. Human manager examine the usual article via normality which is recurring as well as dreary strategy. So machine vision as well as picture handle system be use. This manuscript studies the system use pro apple usual merchandise maladies examining. Segmentation of injured apple organic product part as well as order of sicknesses via utilize picture preparing. In like manner state rundown of dissimilar shade system, dissimilar surface

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An Analysis of Superiority Growth in Fruit Using Image Dispensation

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Traffic Density Detection using Video Tracking

P Akanksha [1], UG Scholar, T Divya Kumari [2], R. Mamatha [3] Assistant Professor,
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Abstract:

Nowadays, Congestion in traffic is a serious problem. Mega cities are the ones most affected by it. Knowing the traffic density in real time helps in better signal control and effective traffic management. There can be different causes of congestion in traffic like insufficient capacity, unrestrained demand, large Red Light delays etc. Traffic lights are hard coded and dependent on traffic. Traffic density detection model is to build a system which calculates the density of the traffic through traffic video. This model assumes that there is front facing camera on traffic poles near the signals which will capture images/video. In this paper, we proposed a model, machine learning technology is of great help. OpenCV module is a highly optimized library with focus on real-time applications which can be used for the video analysis and visualization. OpenCV's helps the detection using 2D and 3D feature toolkits, Egomotion estimation, Vehicle recognition system, Human computer interaction (HCI), Motion understanding. There are three modules Object Detection, which detects the vehicle from the image/video and Vehicles Count and Density, which is used to detect a valid vehicle and count the vehicles and also the total density of traffic and Signal Timing, which calculates the signal timing for each lane in a junction.

Keywords: Deep Learning, Video tracking, vehicle detection

I. Introduction

In developing nations, many expanding cities are facing challenges that result from the overwhelming numbers of people and vehicles. Collecting real-time, reliable and precise traffic flow information is crucial for traffic management. Many large cities are suffering from severe traffic problems as their vehicle populations have become unprecedentedly large. In addition to updating road networks, local governments are developing their own intelligent transportation systems (ITSs) to address the new challenges of traffic crowding. One of the basic components of an ITS is the vehicle counting system, which is designed to collect traffic flow information. In this we focus on developing a vehicle counting system to be installed in roads and bridges and tunnels. The main purpose of this is to develop an adaptive model that

Traffic Density Detection using Video Tracking

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PSYCHO SOCIAL

A Secure Cloud-Edge-Shared Storage System for Data Sharing and Searching on Edge Servers

D. Naga Swetha, Anil Tellur

Abstract:

Ensuring and preserving the data privacy on the cloud and offering security for data sharing between IoT devices and users for pointed of data between the cloud and users on edge servers is made possible with Cloud Edge Shared Storage System (CESSS). This system effectually diminishes the computing load of IoT devices and users by allocating computation-intensive encryption and decryption algorithms to edge servers. Substantial reduction of the computing and communication overhead for generating keyword search trapdoors is beneficial with reference to maintaining the privacy of IoT devices and user's private keys and attaining further protected or resourceful data sharing and data searching.

Keywords:

Cloud Edge Shared Storage System, Edge Servers, Edge Computing, IoT Devices, Data Sharing, Data Searching.

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Article

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Authors:

Prabhakar Kandukuri

A. Ananda Rao

K. Venugopala Rao

References (13)

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Download Article

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Keywords:

Cloud-Edge Shared Storage System, Edge Servers, Edge Computing, IoT Devices, Data Sharing, Data Searching.

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Web Based Application to Manage Academic Projects and Monitor Students Progress

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IV Year UG Scholars
D. Naga Swetha, Assistant Professor, Department of Computer Science and Engineering,
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Abstract - *Academic Project management system is a major issue which is faced by many educational institutes. The main reason for this is, there is no automated system followed in any institute. College management procures all the project related reports, documents, sources and data from the students and stores these hard copies at a particular location. In order to surpass this conventional difficulty and also to make the process easier we developed a secured intranet application which is useful for all educational institutes. The system will focus mainly on automating the process of project submission. In this sense, the project topics will be submitted online along with document and approval will be provided online by the concerned faculty members along with required suggestions. This will reduce the physical efforts of students meeting the head of the department, internal guides, and coordinators and also condense the duration of completing this fragment of project work. Students can also update their project status weekly and provide information regarding the progress.*

Keywords - Web Application, Authentication, Managing academic project.

I. Introduction

Academic Project Management is a major issue which is faced by many educational institutes. The main reason for this is there is no automated system followed in any institute. College management/staff gathers all the project reports and project sources from students and store them physically in some locations probably libraries. With the help of Academic Project Automation System we can gather all the useful information needed to the management in few clicks[1]. This project consists of different modules such as student, faculty, admin etc.

The main purpose is to create software which will manage the working of these different modules. The interconnectivity among modules reduces the time to perform different operational task. Academic Project management is the software which gathers the basic information of student automatically. This software manages the information about various users including faculties, information about subjects offered in various semesters, marks obtained by Students in different semesters and then generate a final report of each and every student.

To keep track of students' progress, supervisors usually meet students in a weekly or biweekly basis. However, as supervisors commonly have to mentor three or more groups in a year, a face-to-face meeting has to be limited to as short as an hour or half, or even lesser[4]. Students will just have enough time to report their progress and setup goals for the coming week during the meeting.

Techorrect: A Tool To Evaluate Answer Scripts

Divya Kumari Tanikella, K Manusha, P Neelima
Department of Computer Science & Engineering
G Narayanamma Institute of Technology and Science for women, Hyderabad,Telangana,India

Abstract- Evaluate hundreds of papers is a very tedious and time consuming process. The Evaluator needs to have the knowledge of the subject to correct papers without which one cannot correct them. Absence of evaluator makes the process even longer. We are moving towards the digital world where every problem can be solved with a laptop in our lap. With that intention and using technologically advanced systems, this paper gives a solution, is to correct objective papers using character recognition technique from the concepts of machine learning instead of doing it manually.

Keywords – Statistical techniques of machine learning; binarization and pre-processing images

I. INTRODUCTION

Now a days, Evaluating answer scripts is tedious task. The evaluator need to have knowledge of the subject to correct papers without which no one can correct them. Using this even if the evaluator doesn't have any knowledge about the subject, papers can be corrected and marks can be allotted. Time to evaluate papers is also reduced. Hundreds of papers can be evaluated in a short span of time and correction can be done from anywhere. In this paper, evaluating objective paper using Optical Character Recognition technique(OCR) from the concept of machine learning instead of doing it manually. To make the process of tests and assessment, evaluation and feedback, easier which can be used in schools, institutions, national and international exams, colleges, any competitive exams and integrating it into daily lives to help the students and the faculty.

II. METHODOLOGY

Today, the education system is totally changed by the technology. It has become more interesting and informative by projector teaching, online tutorials, online teaching video and animation etc. There is an intense use of technology to teach the student. But evaluation process is still done in the traditional way. Objective test demands one specific answer from multiple answers. It can measure all levels of student's ability from memory to synthesis. It enables wide sampling of subject content, quick and easy to score. This type of test is used to examine the students frequently due to quite economical. Objective test can be conducted online and offline modes. In offline method we generally use Optical Mark Recognition. Optical Mark Reading(OMR) sheet. In first sight, online mode seems good in comparison to offline mode without any paper cost, automatic and fast evaluation. Manual evaluation of offline objective answer-sheet is time consuming process because at the time of evaluating answer, we must evaluate it from the ideal sheet answer-sheet if there are 60 questions then we must match 60 times with ideal sheet and mark it right or wrong. In this paper, proposed a tool which scan the objective paper and pass it onto the algorithm which will convert letters in the image to text, after conversion the correct options which are already stored in the database created and maintained by the operator, will be checked against the options written by the student. The role of operator is to upload the student and faculty details to the database. The final marks after the evaluation will be displayed in a system that is accessible by both students and faculty. The students can login and check their marks with respect to subject.

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Chapter

Exploring the Novice Approach to Orthorectification of Satellite Imagery

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B. R. K. Reddy
D. V. Lalitha Parameswari

Abstract

Orthorectification plays vital role in satellite image processing. This process imposes challenges due to the dynamism in capturing environment, capturing unit, satellite rotation, sensors parameters and overlying regions on earth. The required geometric modeling needs an accurate estimation of Ground Control Points (GCPs) and their processing. Most of the proposed models are computational intensive and use manual approach for locating GCPs. Further, GCPs coordinates are floating point numbers, the computational capability of the system imposes the constraint on the accuracy and robustness of the respective models. In this paper we have studied orthorectification process and proposed multicore processing framework for orthorectification of optical pushbroom sensor based satellite imagery. The frame work accompany metadata extraction, automatic ground control point (GCP) extraction using parallel processing, geometric modeling, orthorectification and image stitching processes. Experimental results with proposed framework confirmed the robustness of the technique and provided sub pixel accuracy on independent check points with positional accuracy around one pixel for orthoimage. Parallel SIFT features are extracted using SIMD architecture while performing image stitching.

The Satisfiability modulo Theory (SMT) in Code analysis

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Abstract:

Nowadays, Developers frequently search for code to reuse on their projects. However, the search effectiveness depends on the queries provided by the programmer. There are so many existing researches helps to retrieve accurate search results, but still it is a challenging problem to solve. In this regard, our paper presents superficial representation of SMT solver, which can be used to search for code snippets in code repositories. SMT solvers can be used in Program analysis, verification, testing and construction. In this paper, we explained the basic approaches of SMT solvers and discussed the role of SMT in semantic search.

Keywords: SMT theories, Lazy approach, program analysis, code search.

1. Introduction

Satisfiability modulo theories (SMT) solvers are play an important role in many verification tools. The main reason behind the popularity of SMT solvers is due to fast, dedicated decision procedures for constructs of first-order logic that are very much useful in hardware and software verification. Common fragments include theories such as bit vectors, arithmetic, and arrays, which are useful both for modelling basic constructs as well as for performing general reasoning. As the use of SMT solvers has spread, there has been increased demand for SMT solvers to support additional useful theories. The satisfiability modulo theories (SMT) problem is a decision problem. A decision problem is a problem that can be posed as a yes-no question of the input values. Most of the common SMT approaches support decidable theories. The extension of the SMT problem to non-linear theories SAT solvers is automatic and efficient. As a result, they are mostly used in verification Applications. Searching for code is common task of programmers which lead to high demand to have efficient application to retrieve relevant matches for the specified query. Instead of syntactic matches semantic matches return more relevant results.

1.1 Back ground theories

Theories are expressed in first-order logic which is defined over a signature $\sum$ which is a set of function and predicate symbols such as $(0, 1, \ldots, +, -, \ldots, \leq)$. The equality symbol = is assumed to be included in every signature.

The first order logic includes the Boolean operations of Boolean logic, but instead of propositional variables, more complicated expressions involving constant, function, and predicate symbols are used.

Stress Detection Based On Multimodal Data Using Machine Learning Techniques

Mrs.P.Sunitha Devi, Ms.Pissay Yasaswani Bai, Dr.A.Sharada, Dr.M.Seetha

Abstract

Stress affects everyone differently but it can lead to a variety of health issues. Early detection of stress can prevent many stress-related health problems. Physiological stress can be identified by basic parameters like heart rate, pulse rate, face recognition, respiratory signals, which provide detailed information about the person state of mind. These parameters vary from person to person on the basis of certain things such as their body condition, age, and gender.

Physiological sensor analytics is becoming an important tool to monitor health. Physiological multi-sensor studies have been conducted previously to detect stress. This paper focuses on features like respiration rate, pulse rate and facial expressions that can now be performed with Microsoft Kinect Xbox 360 sensor, Pulse sensor and Camera, to develop an efficient and robust mechanism for accurate stress identification. Using machine learning algorithms on the above features high accuracy in detecting the stress can be achieved.

Index Terms: *Physiological stress, Physiological multi-sensor, Microsoft Kinect Xbox 360 sensor, Pulse sensor.*

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A Review Paper on games Designed & Implemented on FPGA

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Abstract: In present days' computer and information technology as a lot of develop and become a part of daily human life. One of the computer applications is games and are very important in human life which gives relaxation and makes stress free. Particularly handheld based games are becoming crazier and more popular. The scientists and engineers have always thought of creating new things for entertainment. The electronics gave big opportunities to the engineers to create interesting and attractive games for all the generations of people with more upgraded version. Electronic games have big market to earn money. Electronic games can be implemented many hardware platforms one such is on Field Programmable Gate Arrays (FPGAs). This paper gives review on the different approaches to design and implement games on FPGA.

Keywords: FPGA, Game, Implementation, HDL, Model, Design.

I. INTRODUCTION

Peoples have interest in games. There are many games in the world. Electronic circuits can be used to create games. One such Electronic circuit is FPGA. The reconfigurable hardware resources like FPGA boards play great role to implement communication and transfer data between multiple FPGA and other electronic devices. There are different games like Chess, Snake, Space Shoot, Pong, Reversi, Tennis etc

First, game is modeled using HDL, synthesized after satisfying the output of model and implemented on FPGA. In the implementation different algorithms and modeling techniques are used.

The organization of this document is as follows. In Section II (Different games), games with rules are discussed. In Section III (Implementation), methods of implementation of games with advantages and drawbacks if any are given. In Section IV(Conclusion), a conclusion is given based on games implemented on FPGA.

II. DIFFERENT GAMES FROM LITERATURE

Different games that are developed and in application are present in this section II.

A. Smart Chess

Chess board consist of 32 pieces like Rook (4), Bishop (4), Knight (4), Queen (2), King (2) & pan (16). These pieces are equally divided between 2 players. Player wins the game if he kill's opposite players king. The rules for the movements of pieces on the board of the game are Rook: Moves horizontally or vertically, Bishop: Moves diagonally, Knight: Moves in the shape of L for two square and can jump on other pieces on the chessboard, Queen: Moves at paths that collect the both paths of the rook and bishop pieces at the chessboard, King: Moves such as the queen piece with only one square, Pan: Move single step either to the straight ahead or diagonally one step in the case of attack.

B. Snake game

The game consists of Snake, Border and Apples. This game is played by one person. In this game player controls a snake to eat apples generated at random locations in the play area. The snake gets longer and harder to control the more apples it consumes. Player loses the game if the head of the snake collides with its own body, or if the snake hits one of the borders.

The game rules are as follows:

1. Snake move on screen with a constant velocity.
2. The player has to use the Controller to change the direction of snake so as to make it hit the apples.
3. If player fail to prevent the head of "Snake" from hitting the Border or its own body he looses.
4. When the Snake hit any Apple, its length increases.

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Machine Learning Methods to Classify Mushrooms for Edibility-A Review

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ABSTRACT

There are thousands of species of Mushrooms in the world, they are edible and non-edible being poisonous. It is difficult for non-expertise person to identify poisonous and edible mushroom of all the species manually. So a computer aided system with software or algorithm is required to classify poisonous and nonpoisonous mushrooms. In this paper a literature review is presented on classification of poisonous and nonpoisonous mushrooms. Most of the research works to classify the type of mushroom have applied, machine learning techniques like Naive Bayes, K-Neural Network, Support vector Machine(SVM), Artificial Neural Network(ANN), Decision Tree techniques. In this literature review, a summary and comparisons of all different techniques of mushroom classification in terms of its performance parameters, merits and demerits faced during the classification of mushrooms using machine learning techniques.

KEYWORDS: *Data Mining Techniques, Mushroom Edibility Classification, Machine Learning Techniques, Image Processing Methods, UCI Machine Learning Repository.*

I. INTRODUCTION

Varying degrees of protein and fiber are available in all kinds of edible mushrooms. Mushrooms contain vitamin B element called selenium, a powerful anti-oxidant which supports immune system. The research work on mushrooms is increasing day by day because of its health benefits and different medicinal properties. These commercially available mushrooms like button, milky, oyster etc., only are edible and it has become a great source of business for small farmers. Mushroom hunting, from the term we could say that collecting mushrooms in the wild for food is a well practice in most of the places. Therefore, the common safety advice to consume mushrooms is that only truly recognized mushrooms should be eaten. At this point we may not be able to identify edible and non-edible mushrooms.

Developing a computer aided system by training the system with various machine learning algorithms depending on the accuracy helps many of them to classify mushrooms and protect them from consuming poisonous mushrooms. Unknowingly, if humans consume toxic mushrooms may lead to allergic reactions, vomiting and sometimes even death. Detecting poisonous mushrooms with naked eyes is always a trivial task for human. So classifying edible from poisonous mushrooms is a great need and demand to save lives of mushroom hunters.

This paper deals with comprehensive overview of recent research in classification of edible and non-edible mushrooms. The remaining part of the paper is organized as: Section II provides the literature review on edible mushroom

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On the Secrecy Outage of Wiretap Channel

Rechmitha Bethi, Sujatha Allipuram

Abstract: In wireless data transmission, providing security over communication channels has become a growing concern. Traditionally cryptography is used to provide security. However, physical layer studies show that it allows a huge potential in providing security. In this paper, secrecy outage probability is derived for Rician fading channels. A new secrecy metric Generalized Secrecy Outage Probability(GSOP) derivation is considered to overcome the limitation of traditional Outage probability for both passive and active users of eavesdropping.

Keywords: Active eavesdropper, fading, secrecy outage probability, wireless communication.

I. INTRODUCTION

The Information-theoretic study differentiates the main channel from the eavesdropper channel by developing comparative metrics between both channels, such as channel capacities and signal to noise ratios(SNR). It was understood that randomness is one of the main elements in the physical layer security implementations. In this paper, we shall study the effectiveness of fading in providing secure communication. Shannon's cipher system [1] was the first model considered with metrics such as entropy, mutual information, and conditional entropy. Shannon's notion of perfect secrecy depends on Eve's capacity to decode D from X, where D is the original message and X is the code word obtained after encoding message with a key, K. Thus, K played a major role in his studies. When entropy of K is greater than D, perfect secrecy is achieved. Shannon's work was extended by Wyner[2] later by Csiszar and Korner[3]. They proved the existence of the channel codes which resulted in the possibility of secure and reliable transmission when we consider discrete memoryless channels. These codes are called wiretap codes.

Perfect secrecy is defined as zero mutual information. compromising this perfect secrecy condition, strong secrecy is defined as zero information leakage, Weak secrecy is when the information leakage is zero on average but not on each channel use. These studies were extended to Gaussian wiretap channels. In [4], term secrecy capacity Cs is defined and was understood that it is the difference between the capacities of the main and wiretap channels. The limitations of Gaussian wiretap channels can be overcome by considering communication schemes exploring feedback such as secret key agreement schemes by Maurer [5]. Thangaraj et al. [12], shows how low-density parity-check(LDPC) codes can achieve the secrecy capacity of the erasure wiretap channel in an asymptotic manner. These codes are shown to be used in providing perfect secrecy communications at rates below the secrecy capacity of other channels. Transmission and power rate allocation schemes were presented for secure communication through fading channels by Gopala et al. [7], Liang et al [8], and Li et al [9], in which an ergodic secrecy capacity of fading channels was derived. Parada and Blahut [6] established the secrecy capacity of various degraded fading channels. Barros and Rodrigues [10] provided a detailed characterization of the outage secrecy capacity of slow fading channels, and in such channels, it is shown that information-theoretic security is guaranteed by fading alone, and this is true even in the case where average Signal-to-noise ratio (SNR) of a legitimate receiver—without the need for public communication over a feedback channel. Later in [13], Rician fading channels are considered and, a closed-form expression for strictly positive secrecy capacity (SPSC) is derived.

II. SYSTEM MODEL

We consider the wireless system setup depicted in Fig.1, Where a legitimate user (Alice) wants to send a message to another user (Bob). A third party (Eve) is also capable of intercepting the information. And it is also considered that Alice has channel side information of Bob but does not have CSI of Eve. Here we consider quasi-static fading channels.

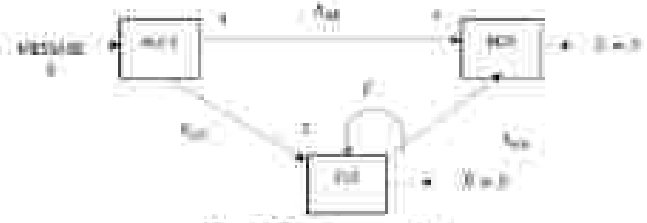

Fig.1. System model

Message D is encoded into code word X=[x(1),x(2), x(3)....x(n)] which is transmitted through a quasi-static fading channel. Y is the output of the main channel (channel between Alice and Bob) received at Bob

$$Y=Xh_{ab}+N_m \quad (1)$$

h_{ab} is the channel fading coefficient between Alice and Bob. N_m is the zero-mean circularly symmetric complex Gaussian noise of the main channel. The third party i.e. is Eve, is capable of eavesdropping the signal sent by Alice by observing the channel output of another independent fading channel. Z is the output of the wiretap channel (channel between Alice and Eve) received at Eve.

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AN AUTOMATIC MULTI-THRESHOLD IMAGE PROCESSING TECHNIQUE FOR MUSHROOM DISEASE SEGMENTATION

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Abstract
Mushrooms are great source of nutrition, with antioxidants and medicinal values, so their consumption and cultivation is increasing day by day across the world. There is a great demand in classification of mushroom types and disease segmentation. Manual mushroom disease detection methods like electroscopes, biological and chemical take more time and not a cost effective if detection is made for large scale mushrooms. This paper presents novel attempt to detect the mushroom diseases using computer aided digital image processing method. A multi threshold image processing automatic Technique is proposed to detect and segment the mushroom diseases. It includes two main parts, one removes background in the input mushroom diseased image first to overcome uncertainty in separating diseased part and removing soil part which happens to be close in its intensities values, and other part segments diseased part on the mushroom.

Index Terms— Mushroom diseases segmentation, Multi thres old, Image processing method.

I. INTRODUCTION

Mushrooms cultivation and consumption is increasing worldwide in many countries because of its medicinal, nutritional, antioxidant, and therapeutic values [1]. A mushroom is a spore-bearing and fleshy fruit body of a fungus produced above soil or on its food source. There are many types of mushrooms, among which few are edible and the others are toxic. The edible mushrooms include Button mushroom (*Agaricus bisporus*), winter mushroom (*Flammulina velutipes*), Oak mushroom (*Lentinus edodes*), Oyster mushroom (*Pleurotus species*), Milky mushroom (*Calocybe indica*), paddy straw mushroom (Volvariella volvacea) and few more. Among different mushrooms being cultivated in India, button mushroom accounted for >73% of the total mushroom production, oyster mushroom (18%), paddy straw mushroom (7%) and milky mushroom (3%) [2]

Mushrooms are subject to diseases such as fungal, bacterial and viral. The most common diseases include wet bubble, dry bubble, cobweb and bacterial blotch. Environmental conditions within rooms can increase the rate of disease development. Table 1 shows fungal disease in mushroom [3], [4]

Disease in commercial mushroom production can severely reduce the yield and productivity. The spreading of disease makes controlling disease outbreaks more challenging. Disease control depends on the hygiene in preparing mush- room bed or soil casings and growing rooms [5]. Knowledge on disease diagnosis is needed to control the disease spread within and between crops. Manual disease detection is definitely a challenging task, as it requires good knowledge of diseases and is a time consuming process. Besides this, human errors may happen which could result in loss of mushrooms which are healthy too. So, computer aided automatic mushroom disease detection using image processing segmentation and classification Techniques are a key step to get results almost nearer to accuracy and correct estimation of diseased mushrooms.

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Secure Transmission Model for Medical Data By using Contourlet Transform for Health-Care Systems

Ramya Rani Kalvakota, Uma Volety

Abstract: Security and Privacy are the major issues for transmission of medical data in a wireless medium. The proposed system used ConTourlet Transform 2 Level (CTT-2L) Steganography and encryption algorithms for transmission of medical data. The encryption algorithms used are Advanced Encryption Standard (AES) and Rivest-Shamir-Adleman (RSA) algorithms. First, the text data is encrypted by using AES and RSA Algorithms and the data which is encrypted is embedded in a cover image using CTT-2L. The cover image is any medical image which can be either colour or grayscale image. Five statistical parameters: Peak-Signal-to-Noise-Ratio (PSNR), Mean Absolute Error (MAE), Mean Square Error (MSE), Structural Similarity (SSIM), Correlation are measured for evaluating the performance of the proposed system. The PSNR is 72.2492 and 64.7453 in colour and grayscale images respectively. The MAE is 0.0019 and 0.0045 in colour and grayscale images respectively. The MSE is 0.0026 and 0.0142 in colour and grayscale images respectively. The SSIM is 0.9999 in both colour and grayscale images. The Correlation is 1.0000 in both colour and grayscale images. The proposed system hides the data with high capacity, imperceptibility and less distortion in the received stego image as compared with the conventional methods.

Keywords: CTT-2L, encryption, medical images, steganography.

I. INTRODUCTION

The remote health-care systems need transmission of medical data through a wireless medium. So, a security system is essential for protecting the diagnostic medical data transmitted through a wireless medium[1]. The proposed security system uses a combination of encryption Algorithms and steganography techniques for embedding the data in an image. In encryption, text data is converted into a format that is read only by the intended receipient and others cannot read. Encryption uses a secret key to convert the text data into human unreadable format.

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The intended receipient decrypts the data by using the same key which is used in the encryption. AES and RSA algorithms are used in data encryption. AES is a symmetric key algorithm[2]. The key, that is used in the encryption is also used in the decryption. AES uses different keys of length 128 bit, 192 bit and 256 bit for 10 rounds, 12 rounds, 14 rounds respectively. On the other side, RSA is an asymmetric key algorithm[2]. In encryption, a public key is used and in decryption, a private key is used. The length of the key varies from (2-2048) bits.

The technique of hiding message in an image is called Steganography. The encrypted data is hidden in an image and transmitted through the wireless medium without any suspicion. ConTourlet Transform uses a Double Filter Bank structure for Multiscale and Multidirectional decomposition of an image [3]. Multiscale Decomposition is performed by Laplacian Pyramid (LP). Multidirectional Decomposition is performed by Directional Filter Banks (DFB). The output of LP contains one low pass image and many high pass sub-bands. The low pass image is given to next level Laplacian Pyramid for further Decomposition. The high pass sub-bands are given to DFB for capturing the directional information.

II. RELATED WORKS

M.N. Do et al., [3] have proposed a ConTourlet Transform (CTT) in order to overcome the limitations of wavelets. CTT is a discrete domain multiresolution and multidirection Decomposition of an image that uses non-separable filter banks. Various experiments demonstrated the capability of CTT in various digital image applications.

Malini Mohan et al. [4] have proposed a technique which hides data in an image by using ConTourlet Transform. The image is decomposed using CTT and data is hidden in any of the sub-bands. Statistical parameters: PSNR, Variance, Skewness, are evaluated. The proposed system's PSNR value is very high.

Mohammed Elhoseny et al. [5] have proposed a model to transmit medical data in a wireless medium. The image is decomposed using Discrete Wavelet Transform (1 Level and 2 Level) and the data which is encrypted is hidden in any of the sub-bands. The performance was evaluated using PSNR, MSE, BER, SSIM and SC. The proposed System has high PSNR and less MSE.

Miao Qiguang et al. [6] have proposed a fusion algorithm for data hiding in an image.

Multi- stage Threshold Method for Liver Tumor Segmentation in CT scan Images and its Implementation for FPGA

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ABSTRACT

Medical Imaging is a sub-field of scientific imaging. Medical image segmentation is a challenging task due to poor contrast and noise in the medical images. Medical image segmentation is applied for liver tumor detection in CT scan images in this paper. Liver tumor is pathological disorder that affects human metabolic activity. The early identification and diagnosis of liver tumor is important for curing liver cancer. In this paper a comprehensive overview of liver tumor detection using Multi stage Threshold Method is provided. It is developed using MATLAB, Xilinx System Generator (XSG) and synthesized for Spartan-6 (xc6slx16-2csg324) FPGA. The key objective is implementing liver tumor segmentation in CT scan image for an FPGA implementation with minimum device utilization and low compilation and execution time to be suitable for real-time medical applications. This paper describes in detail about hardware framework of Multi stage Threshold Method which is modeled by XSG design models (basic as well as Mcode blocks). Finally, a comparison is made in terms of power, delay and resource utilization for the implementations based on both basic and Mcode blocks. The results show reduction in resource utilized and power with slightly increase in delay using Mcode blocks compared to basic blocks.

Key words— Medical Imaging, Segmentation, CT scan, Multi-stage Threshold, XSG, FPGA

I. INTRODUCTION

Liver is the largest glandular organ and heaviest organ in the human body is divided in to unequal size and shapes of four lobes. It is multi-tasking organ and plays important role in digestion process and metabolism. Generally, death rate is very high due to liver cancer because the disease does not show any symptoms until it is in final stages. The American Cancer Society's 2018 report [1], estimates about 42,220 new cases will be diagnosed and about 30,200 people will die of liver cancer and is 5thmost frequently diagnosed cancer and 3rd highest cause of death due to cancer. Tumor is an abnormal growth of tissues. Detection and segmentation of tumors from liver is very tedious task due to reasons like dense liver tissue, variance and complexity of tumors. Another reason for the difficulty is the similar gray values of the liver tissue and other nearby organs like kidney, stomach and abdominal wall. Also, the variations in geometric properties i.e liver size and shape makes it difficult to come up with a generalized threshold for detection and segmentation. Moreover, medical images often accompany with speckle noise due to image acquisition system. By considering all these above mentioned issues/contents for liver tumor extraction, often segmentation is carried out. Segmentation has got a significant application in the medical field. Even though there are enough segmentation algorithms readily available for detection of region of interest, it is still a challenging task, especially in medical image processing to detect tumors in CT scan images. A misdiagnosis due to human error may result because of Manual segmentation of these abnormal tissues. An

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Design and Implementation of Ternary Logic Circuits for VLSI Applications

G. Thrishala, K.Ragini

Abstract: This paper mainly concentrates on the design and implementation of ternary logic circuits. The ternary numeral system has its base as 3. Ternary logic will use three symbols, which are, 0,1 and 2. The ternary logic has significant merits over binary logic in designing digital circuits. In this paper, it is proposed to implement a half adder circuit using ternary 3 to 1 multiplexer. The main objective of the work is, to design and implement ternary logic circuits and to analyse the function of the ternary combinational circuits using mentor graphics tool in 90nm technology. This paper also compares the ternary half adder design using k-map method with the proposed ternary half adder using multiplexer in terms of power dissipation, propagation delay and transistor count.

Keywords: Ternary logic, MVL (Multi-Valued Logic).

I. INTRODUCTION

MVL (Multi-Valued Logic) is also called as Multiple-Valued, Multi-Valued logic. MVL that is, Multi-Valued Logic is termed as a technique that has more than two possible states or two truth values. A two-valued logic can be extended to a n-valued logic, that is, for example, in a three valued logic i.e., base or radix as three, it is termed as ternary logic and a quaternary logic i.e., radix as four is used for four valued logic and so on. Such a three valued logic with logic symbols as 0,1 and 2 and four valued logic has logic states of 0,1,2 and 3.

The ternary numeral system has its base or radix as 3 [1]. Radix generally defined as the number of unique digits or unique symbols that can be expressed using a single digit. In a binary system, the two logic symbols 0 and 1 are used to represent a value, and coming to the ternary system, the three logic symbols (0, 1 and 2) are used. The bipolar notation is one of the methods in the ternary logic system which is denoted with symbols -1, 0, 1. In this paper, the notation used is 0,1 and 2.

The ternary logic system gives the meaning of three-valued switching. Three valued logic system or ternary logic system has many benefits when compared with the binary logic system in designing digital circuits, reduction in chip area can be achieved, and more importantly, easy error detection and error correction codes can be employed.

For instance, more data can be transmitted over an arrangement of lines in a given length, diminishing in the complexity of interconnections is observed, decrease in chip area can be accomplished, and more significantly the error detection and error correction of codes can be accomplished.

The ternary logic system has some significant merits over the binary logic system [2,3]. To implement the different logic functions, the decrease in the number of interconnections in a circuit is observed, in this way, the chip area has been reduced, and importantly more data can be transmitted and lesser memory is required. Apart from this, at very higher speeds, the serial and some serial-parallel operations are carried out. It's been used in applications like areas of communications and digital signal processing.

II. METHODOLOGY

In this section, the ternary building blocks like ternary inverters, ternary logic gates, ternary decoder, ternary multiplexer, and half adder circuits are designed.

A. DESIGN AND IMPLEMENTATION TERNARY INVERTER:

STI (simple ternary inverter), PTI (positive ternary inverter) and NTI (Negative ternary inverter) are the three basic ternary elements.

$$STI = X_S = 2 - X$$

$$PTI, NTI = X_i = \begin{cases} 2 - 1 \rightarrow X = 1 \\ 1 \rightarrow X = 1 \end{cases}$$

Where 'i' takes the value of '2' for PTI and '0' for NTI

i. STI (SIMPLE TERNARY INVERTER):

Fig 2.1: Schematic of simple ternary inverter

The circuit diagram of a simple ternary inverter is shown in Figure 2.1. The simple ternary inverter consists of two MOS transistors and two resistors.

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Ionospheric anomaly detection and Indian ionospheric climatology from GAGAN receivers

K. M. Sridhar, M. Sridhar, Swapna Raghunath & D. Venkata Ratnam

Acta Geodaetica et Geophysica 55, 223–235 (2020)

Abstract

The ionospheric anomalies are often responsible for compromising the accuracy and performance of Global Navigation Satellite System (GNSS). GPS Aided Geo Augmented Navigation (GAGAN) is the autonomous Space Based Augmentation System of India which serves to provide timely error detection and correction for the corrupted GNSS signals in aircrafts. This paper discusses a Maximum Minimum Eigen (MME) detector to identify the ionosphere induced errors in the GNSS signals. Data has been collected from 24 different GAGAN receivers spread over the length and breadth of India from January to

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Monitoring and analysis of coma patients using wearable sensor system and WSN

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Abstract:
Coma patients undergo changes that may be either abnormal behaviour or unusual changes in the absence of doctor. It is necessary to monitor the unconscious/coma persons continuously to understand their health condition. The main objective is to accomplish two tasks. 1) Monitoring the coma patient using motion detection system and displaying the results. 2) Continuous recording and analysis of vital signals of the patient such as heartbeat and temperature and alert the doctor whenever attention is needed. Wearable Motion sensor system is used to monitor the body movements such as eye blink movement (using eye blink sensor), hand movement (using flex sensor) and body movement (using Micro-electro-mechanical systems (MEMS) sensor) to detect the conscious state of an individual. In addition, a heartbeat sensor and temperature sensor are used to detect vital signals. ARM (Advanced RISC Machine) microcontroller is used to manage the functioning of the sensor system. The project will be helpful in assisting the doctor about the health condition of the unconscious patients and alerting the doctor whenever care is required. The proposed system will assist the doctor by giving an alarm about the health condition of the patient, if there is any movement in the patient or if the set of vital signals recorded are out of the normal range. These results are displayed on the computer and on the Liquid Crystal Display (LCD). In addition, alert messages are sent to the concerned doctor.

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Keywords: Wearable sensor system, WSN (Wireless Sensor Network), Wi-Fi module, GSM module.

1. Introduction

Wearable sensor system is used to monitor the body movements and vital signals such as hand movement, eye blink movement and heartbeat rate, body temperature respectively to monitor the health condition of an individual. This system can be used to monitor and analyze coma patients, paralysis patients and individuals with complex medical conditions or disabilities. The doctor can be assisted about the health status of the patient, and can be alerted whenever care is required. Wireless Sensor Network is a group of spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the environment, here patient, and organizing the collected data at a central location. Wireless technologies such as Zigbee, Bluetooth, WLAN or GSM can be used for sensors data transmission to concerned doctor and family members. These results can displayed on the computer through Wi-Fi and on the Liquid Crystal

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Low Latitude Ionosphere Error Correction Algorithms for Global Navigation Satellite System

B. Shirani, Swapna Raghunath

Abstract:The ionospheric errors occur due to loss of data in ionospheric region. Low latitudinal regions are the most affected regions due to ionospheric errors and also causes loss of signal or data for space based augmentation system(SBAS) such as aircraft. So to reduce these ionospheric errors in low latitude regions of Global Navigation Satellite System(GNSS) Klobuchar algorithm is used which mitigates the errors occurring in low latitude regions and is used as a standard algorithm in US Global Positioning System(GPS) till now; however, this model can reduce the ionospheric error by approximately 50-60% Root Mean Square(RMS) error in low-latitudes. So in order to increase the percentage deviation of errors in low-latitude regions, Enhanced Klobuchar algorithm is proposed which enhances the correction of low-latitude ionospheric errors approximately up to 80% RMS for a single frequency GPS user. In this paper error correction algorithms are performed over International GPS Service(IGS) data was collected using Hyderabad station receiver, Telangana (latitude- 17.41738°, longitude-78.55088°) in southern part of India during year 2016.

Keywords: Ionospheric errors, IGS, IRNSS, GAGAN, GPS, GNSS, SBAS, low latitude ionospheric error corrections.

I. INTRODUCTION

Ionosphere is the region where large number of electrically charged atoms and molecules collectively form a region in earth's atmosphere. The earth's upper atmosphere from 60km to 1000km is known as ionosphere region[1]. There are many errors to be concerned in the ionosphere region which lead to data loss, delay etc. The radio signals are effected which ranges from few meters to tens of meters due to ionosphere depending on several factors like amplitude and phase scintillation. This is one of the main source of concern in satellite based augmentation system(SBAS). Most of these effects depend on The ionospheric total electron content (TEC) is the major factor by which most of these effects are occurred is the no. of electrons in a vertical column of 1 m^2 cross sectional area. The values for TEC ranges between 10^{16} e/m^2 and 10^{19} e/m^2 which depends on local time, position, season, solar, geomagnetic activities, etc.[2].

Especially these errors occur in low-latitudinal regions. The regions of ionosphere in India of low latitudeswere categorized by variations like spatial and temporal which were invented fromlow latitude electrodynamicsand equatorialwhichexhibits a phenomena during daytime as equatorial ionization anomaly (EIA)and during night-time have large scale plasma depletions known as equatorial plasma bubbles (EPB). Electron density perturbations of equatorial and in low latitude ionospheric regionsin F-region were produced by EPBs[3].

Global Positioning System(GPS), Global Navigation Satellite System(GLONASS), and Galileo are the satellite navigation systems which are been currently used. The Global Navigation Satellite System (GNSS) conducts its development in various areas such as signal generation, precise positioning, high-precision geodesy and survey in relation to individual satellite navigation systems, has drawn more attention in recent years[4]. Ionospheric effects are complex and inhomogeneous nature of the medium on GNSS signals which are difficult to mitigate. GPS Aided Geo Augmented Navigation (GAGAN) is the navigation systemserving the aircraft navigation over Indian subcontinent used in India's regional SBAS which has been fully operative since 2014. It is mostly concerned for its low-latitude ionospheric errors such as Equatorial Electro Jet (EEJ), EPB, Scintillation effects etc.[5]. In order to mitigate these errors in low-latitude ionospheric regions, error detection and correction algorithms are used.

The low-latitude ionospheric errors are corrected over a particular station's data using error correction algorithms. Here Klobuchar algorithm is used for error correction of low-latitude ionospheric errors over single frequency receivers. The Klobuchar algorithm mitigates the errors in low-latitude ionosphere and is used as a standard algorithm in US GPS till now and it is the most widely used algorithm for ionospheric correction because it is simple in structure and easy to calculate[6][7]. The drawback of the Klobuchar algorithm is that it reduces the errors only 50-60% Root Mean Square(RMS) error in low-latitudinal regions.

So in order to enhance the ionospheric error correction proportion percentage enhanced version of Klobuchar algorithm is proposed known as EnhancedKlobuchar algorithm. The Enhanced Klobuchar algorithm improves about 80% on average of the ionospheric errors, which are useful to single frequency GPS users[8]. The Enhanced Klobuchar algorithm corrects the low-latitude ionospheric errors of 30% RMS more than Klobuchar algorithm by calculating the difference between TEC of both the algorithms[9].

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Secrecy Performance of an Artificial Noise Assisted Transmission Scheme With Active Eavesdropper

Publisher: IEEE

Sujatha Allipuram ; Parthajit Mohapatra ; Saswat Chakrabarti All Authors

Abstract: In this letter, the performance of an artificial noise assisted ON-OFF scheme for a Rayleigh fading wiretap channel under active attack is analyzed. The closed-form expre... View more

Metadata

Abstract:
In this letter, the performance of an artificial noise assisted ON-OFF scheme for a Rayleigh fading wiretap channel under active attack is analyzed. The closed-form expressions for various performance metrics such as generalized secrecy outage probability (GSOP) and average fractional equivocation (AFE) has been obtained. The developed results take account of the degree of self-interference cancellation at the eavesdropper, which results due to its full-duplex operation. The derived results help to explore the role of artificial noise transmission and fading on the secrecy performance of the system under active attack. The work explores the trade-off between transmission probability and GSOP with the help of artificial noise transmission. The derived results also characterizes the performance of the artificial noise assisted scheme when the eavesdropper is passive.

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Crosstalk Noise Analysis with RLC Coupled Interconnects in VLSI Circuits

B. Obulesu, Dr. P. Sudhakara Rao

Abstract

VLSI begans in the 1970s when complex semiconductor and communication technologies were being developed. The rapid development of VLSI technology has reduced the minimum element size to a quarter of a micron and the switching period in units of peak seconds or fewer. As an outcome, degradation of high speed digital paths due to crosstalk. Crosstalk is a phenomenon in which the logic transmitted on a VLSI or network / cable circuit creates an undesired effect on an adjacent circuit or network / cable due to the capacitive coupling. The decrease of crosstalk in a VLSI connection has become much essential for digital circuits at high level. In this project estimation of crosstalk noise analysis with equally connected RLC interconnect in VLSI circuits is implemented with simulations results in CADENCE TOOLS.

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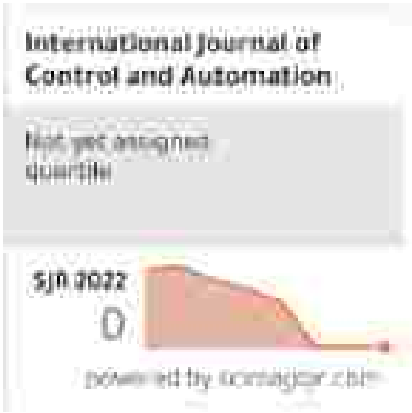

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Channel Estimation of OFDM System using Real coded Genetic Algorithm

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Abstract

The paper demonstrates that the real coded or continuous Genetic Algorithm based Channel Estimation (RCGA) is capable of approaching optimal estimates compared to traditional Least Square (LS-CE) and minimum MSE (MMSE-CE) channel estimators. The real coded GA creates optimization parameters using integers rather than binary numbers. The simulation shows that the proposed scheme exhibits least $1.25E10^{-3}$ bit error Rate (BER) & 0.0014 mean square error (MSE) and better 6.8dBps channel capacity.

Keywords—*BER, LE-CE, MMSE-CE, MSE, RCGA*

I. INTRODUCTION

The intensifying need for **S**peedier, **E**levated data rate and **T**rustworthy (SET) wireless multimedia services depends on optimal or near optimal channel estimates due to time varying multipath channel. The Orthogonal Frequency Division Multiplexing (OFDM) [1], a multiple subcarrier modulation technique with the aid of IFFT and FFT in its transceiver has been made a centre of attraction in fourth generation (4G) and fifth generation (5G) wireless standards.

Channel estimation techniques [2] are used to explore channel characteristics in the multipath fading wireless environment. The fundamental channel estimate techniques are Least Square (LS-CE) and Minimum Mean Square Channel Estimation (MMSE-CE) suffer from mean square error and complexity respectively.

Evolutionary algorithms [3] play an essential role in wireless communications for optimal channel estimates at an affordable cost and complexity. Deb [4] introduced GA to provide optimum solution with channel low bit error rate and high data rateThe need of Evolutionary aided Genetic Algorithm (GA) [5-8] in channel estimation is to apply the principle of natural genetics for the evolution of next generation wireless communication system with the better estimates. The current generation (Parent) from which future generation (offspring) is evolved through Variability and fertility (reproduction) process. Reproduction is an accountable for the selection of better channel estimates in a mating pool. Variation undergo mutation and crossover for surviving in the environment within partial resonance.

The real coded GA (RCGA) differs from binary coded GA (BCGA) with respect to decision variables (either real or binary encoded real variables) for the computation of channel estimation. It works on the principle of identifying better estimates from a set of estimates (population) and eliminating the worst estimates to minimize the fitness function.

The fundamental Real Coded Genetic Algorithm (RCGA) flow chart shown in figure 1 describes the algorithm steps that undergo to generate better channel estimates. As the number of iterations increases, one can achieve the optimum channel estimate.

Initialization: Form a set of channel estimates (population) which are derived from traditional LS-CE and MMSE-CE.

Evaluation & Selection: Select best fit channel estimates for mating.

Crossover: Crossover is a variation operator responsible for generating offspring with a probability Pc. Select a random number (r) and if $r <= Pc$, then copy parent solutions as offspring else generate random numbers for each variable.

Mutation: Mutation is also a variation operator in which each of the population member undergo mutation and generates an offspring solution with a probability Pm.

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Reconfigurable Corner Truncated Square Microstrip Patch Antennas for Wireless Communication Applications

Anantha Bharathi, Lakshminarayana Merugu & P. V. D. Somasekhar Rao

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Reconfigurable Corner Truncated Square Microstrip Patch Antennas for Wireless Communication Applications

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ABSTRACT

Reconfigurability of the radiation characteristic is one of the recent significant developments associated with the characterization of microstrip patch antennas for wireless communication systems. This paper presents, in an exhaustive and comprehensive form, the recent results for various novel reconfigurable microstrip antenna topologies involving corner truncations and ring slot loading, coupled with PIN diode switching mechanism. These designs exhibit the functions of polarization reconfiguration, polarization, and frequency reconfiguration with an attractive single layer patch and easily realizable practical structure. Emphasis is placed on design, simulation, and experimental results of each of the proposed geometries illustrating the antenna versatility in several applications.

KEYWORDS
Circular polarization; CPW-to-Slotline feed; PIN diode switch; Polarization reconfigurable; Reconfigurable antenna

1. INTRODUCTION

Communication technology has been growing rapidly and current wireless communication systems have the ability to achieve multifunctional capabilities and a single system supports several applications with different operating conditions. This has driven innovation in antenna towards multifunction capabilities. A conventional antenna can be converted to reconfigurable antenna by reconfiguring its fundamental characteristics like operating frequency, polarization, radiation pattern, or a combination of these characteristics resulting in frequency reconfigurable antenna, pattern reconfigurable antenna, polarization reconfigurable antenna, and compound reconfigurable antenna, respectively. Based on the reconfiguration mechanism [1–5], they are classified as electrically reconfigurable, optically reconfigurable, physically reconfigurable, or material reconfigurable. Recently, polarization reconfigurable microstrip antennas (MSAs) have been receiving significant attention. Polarization reconfiguration can take place between any of the combination of vertical polarization (VP), horizontal polarization (HP), slant linear polarization (LP), right hand circular polarization (RHCP), or left hand circular polarization (LHCP) [6–16].

This article presents recent developments of polarization reconfigurable corner truncated square MSA. In the original study [17], the polarization reconfiguration characteristics of the antenna having an ability to switch between VP, RHCP, and LHCP is designed, developed, and demonstrated experimentally at L-band using an FR4 Epoxy substrate. However, though the biasing aspects were addressed, they were not completely demonstrated. Special attention is given to realize the bias circuit needed for PIN diode switching operation and to investigate the applicability of design for C-band WLAN applications using an RT Duroid substrate. Furthermore, it is used as a building block in the development of three novel polarization and frequency reconfigurable antennas.

Section 2 presents a polarization reconfigurable corner truncated square MSA. The antenna design is further enhanced to design a frequency and polarization reconfigurable antenna by using ring slot loading and is discussed in section 3. Specific design relations for the superposition of ring slot geometry have been developed to configure the ring slot embedded MSA. The corner truncated square patch design concept is further extended to achieve four polarizations VP, HP, RHCP, or LHCP at two different frequencies and is presented in section 4. The axial ratio (AR) bandwidth of the corner truncated patch antenna is very narrow. Section 5 presents a compact CPW-to-Slotline transition fed perturbed ring slot antenna to improve the circular polarization (CP) performance using corner perturbation technique, retaining the polarization and frequency reconfigurability feature. Section 6 presents the comparison and discussions on the developments of novel corner truncated

An Integrated Approach for feature selection

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Abstract: In the current digital world huge voluminous data is getting generated and stored by various stake holder of the system. To improve the performance organizations started utilizing this data for analysis for better decision making and improve the performance. Data mining machine learning techniques are most widely used techniques for analyzing the data. As the real world data is very huge and may attributes are included it has become mandatory to apply some feature selection algorithm for dimensionality reduction in order to identify the features relevant for given type of analysis and use of feature selection algorithm generates a model with better accuracy and reduced learning time and only such features are used for analysis and so that the model will be created with high accuracy and less learning time. In this paper we propose a measure called relative dependency for identifying redundant attributes. Comparative performance of various classification algorithms is illustrated in the paper on various data set collected from UCI repository.

Keywords: Feature Selection; Attribute Dissimilarity

Introduction

Feature selection is defined as the process of identifying the most relative attributes from the given set of features. Wrapper method and filter method are the two most widely used feature selection techniques. In case of Wrapper method respective classifier itself chooses a measure for identifying relevant attributes where as in case of filter method approach feature selection will be performed first irrespective of the Classification algorithm then selected features will be used by classification algorithm. Both these methods perform exhaustive search for identifying features relevant for classification which may be time consuming for high dimensional data.

Proposed Method

In this paper we propose an integrated method for feature selection .An integrated approach uses the combination of wrapper method and the measure called relative dependency together to identify the features relevant for the given classification. The procedure for integrated approach is shown in the figure 1

Input: Dataset
Output: Selected List of Features
Steps

1. On the given data set apply any wrapper method to produce a set of attributes A_1
2. Use the given data set and generate relative dependency matrix.
3. Use K-means Clustering Algorithm to form the clusters using matrix constructed in step 2
4. From the set A_1 reduce the no of attributes based on clusters formed to generate Attribute set A_2
5. Set A_2 represents set of relevant features

Figure 1

Dependency between any two attributes namely A_i and A_j is calculated using attribute dissimilarity.

Attribute Dissimilarity

Dissimilarity between the two attributes is calculated as fallows

Given two attributes A_i and A_j then dependency between A_i and A_j is represented as Dep (A_i, A_j)

$$Dep(A_i, A_j) = \frac{\Pi_{A_i}(R)}{\Pi_{A_i \cup A_j}(R)}$$

$\Pi_{A_i}(R)$ indicates projection of attribute A_i over the relation R.

As the $Dep(A_i,A_j)$ is not symmetric we calculate the the Dependency as average of $Dep(A_i,A_j)$ and $Dep(A_j,A_i)$

The distance (dissimilarity) measure for the pair of attributes Ai and Aj is thus proposed as follows

$$Dep(A_i,A_j) = \frac{1}{AvgDep(A_i,A_j)+Dep(A_j,A_i)}$$

Dissimilarity between various attributes is calculated and represented as a matrix

After generating the dissimilarity matrix clusters are constructed using simple k means. Membership of the attributes is used to reduce the attributes further in order to increase the accuracy and decrease the learning time.

Example

	inter	btech	sec ex	ssecev	comm	Placed
A	IB	EB	TOK	NOK	GOOD	YES
B	IA	EB	TOK	NBEST	BAD	YES
a	IA	EB	TOK	NOK	OK	YES
A	Dist	EA	TGOOD	NBEST	OK	NO
A	Dist	EA	TGOOD	NGOOD	OK	YES
A	Dist	EA	TGOOD	NGOOD	BAD	YES
A	Dist	EB	TOK	NBEST	OK	YES
A	Dist	EB	TGOOD	NBEST	OK	YES
A	Dist	EB	TOK	NOK	GOOD	YES
A	Dist	EC	TOK	NGOOD	GOOD	NO
B	IA	EC	TOK	NGOOD	BAD	NO
A	Dist	EC	TOK	NBEST	OK	NO

Table 1 (Relation R)

$\Pi_{Placed}(R)=2$

$\Pi_{Tech}(R)=3$

$\Pi_{Tech,Placed}(R)=4$

so Dependecy (B,Tech, Placed)=3/4=0.75

Experimental Results:

To carry out the experiment we collected data sets from UCI repositories and kaggle. The data sets size is varying from few hundreds to thousands. Comparative performance of J48 and Random Forest on various data sets is shown in the table

Data file	Source	No of Instances	No of attributes	Algorithms	Accuracy	time taken to build model
uiuap-edu-data	UCI	480	17	J48	75.83	0.1
				j48(with RD)	76.25	0.02
				RandomForest	78.6	0.33
				RandomForest (With RD)	74.16	0.16
Placement+Satisfaction	kaggle	215	15	J48	82.79	0.02
				j48(with RD)	83	0
				RandomForest	85.18	0.23
				RandomForest (With RD)	83	0.04
Student performance data	kaggle	30	23	zeroR	46	0
				zero(with RD)	40	0
Network Intrusion Detection System	kaggle	25000	41	J48	99.5	2.55
				j48(with RD)	99.36	3.8

				RandomForest	99.78	12
				RandomForest (With RD)	99.78	10

Table 2

Conclusion

We performed experiments on data sets of different sizes using the integrated approach by combining wrapper methods with relative dependency between the attributes using classification algorithms J48, Random Forest. The performance of the integrated approach is providing improved results when compared with the results obtained by using cfssubsetselection feature selection, information gain ranking feature selection methods especially learning time is reduced.

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AN APPROACH FOR IOT BASED DEVELOPMENT OF SMART FARM MONITORING AND CONTROL SYSTEM

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Abstract

This test focuses to give controllable environmental factors to estimating and supporting plant development by methods for applying the Internet of Things innovation and logical trial process together which will improve ranchers' exhibition of creating vegetation. Generally, ranchers develop plants essentially dependent on their appreciate and neighborhood information from predecessors or pals without logical techniques. The plant producing yields depends in huge part on ranch circumstances can cause negative assembling yield. It is critical to gauge, comprehend, and control ranch conditions decisively with the goal that it will anticipating the presentation of cultivating. we underwrite an IoT controlled framework for plant blast with a reason to support those assignments. The machine comprises of two fundamental segments: (1) hardware along with air, mellow profundity and soil dampness sensors and actuators, for example, hand-off, engine gear DC and water siphon that are associated and constrained by method of microcontrollers. (2) Management programming programm alongside dashboard for sensors insights representation and observing, and actuators control for modifying cultivating conditions. The control may be worked physically or naturally utilizing rule based absolutely control based at the amassed plant development insights inside the contraption plant development database. Client can show and oversee air temperature, air mugginess, mellow profundity, and soil dampness through our framework UI.

1. INTRODUCTION

Farming needs technical solution to growth the productiveness, at the same time as the surroundings influence reduces with the aid of reduced application of agro- chemical substances and accelerated utilization of nature favorable control practices. An advantage of this is the lower of production cost. The speedy technological method and evolution in latest years extremely enables the fulfillment of these desires via putting off many hurdles for enactment, consisting of reservations by agriculturalist themselves. Technical Manufacturers, farmers, and researchers, all collectively, are continuing their energy to find systematic elucidation, development in productivity and decreased value. The intention is to combine latest studies and development regarding novel sensors and their utilization in Farming. Sensors in farming are based totally on necessities of the farmers according to agricultural movements that need to be addressed. Sensor networks deal with a wide variety of farming task, which include, however no longer restrained to, current developments in positive areas. The specific forms of agriculture like irrigation, inexperienced house, organic farming, park, clever farming must adapt new technology to conquer the problems which might be discovered from old methods. The proposed device encompasses wi-fi sensor community area which is fast growing in every subject such as agriculture. This machine is technically efficient and may be used through everyone. In the plant subject unique sensors are deployed at suitable locations to degree the actual situations of the plants for such that farmer can easily look at the environmental situations immediately with the assist of net app. Despite the reality that our state claims to have created regarding technological know-how and innovation, unpredictable power deliver or end breakdown for a massive duration of time collectively as each day routine. Nearly Sunlight primarily based strength is in impact progressively used global as a sustainable wellspring of vitality. India has an excellent undiscovered run off mantle openings.

2. BACKGROUND

Environmental tracking applications can be extensively classified into indoor and outside monitoring. Indoor tracking

programs commonly include homes and greenhouses monitoring. These programs contain sensing temperature, light, humidity, and air fame. Outdoor tracking applications consist of chemical risky detection, habitat tracking, visitors monitoring, earthquake detection, volcano eruption, flooding detection and climate forecasting. Sensor nodes additionally have located their applicability in agriculture. soil dampness and temperature checking are one of the maximum crucial utility of WSNs in agriculture.

- Improvement of IOT based clever protection, furthermore, checking contraptions for agriculture Iot, Sensors, Linux based totally Raspbian OS, Raspberry pi 2 gadget is designed for identification of rodents in grain stores. Failure of any component or device is not knowledgeable and has to be examined manually.
- Usage of IOT in checking and control of Agricultural Activities. Zigbee and Ethernet protocol Remote get entry to being supplied to the person in knowing the deployed sensor fame. The approach is inconvenient in smart boarder protection, Industrial automation, and low-cost domestic automation gadgets.
- A web based IoT answer for Monitoring statistics the use of MQTT Protocol. Box concept, ZigBee protocols based on IEEE 802.15.4, Hybrid community. Monitoring and manage of greenhouse parameter in precision agriculture. Not power saving and records fusion, directions are left for future studies.
- Real - time computerization and observing framework for Modernized Agriculture Sensors and Message Queing Telemtry Transport Protocol IoT solution for figuring out real- time internet-primarily based answer aimed for tracking and monitoring temperature and moisture values inside the agricultural drying process. Not energy saving and information fusion is present.
- Study on an Agricultural Environment Monitoring Server System utilizing Wireless Sensor Networks. Wireless Sensor Network (WSN) generation, Use of CCTV and GPS modules. It collects environmental and soil facts at the outdoors through WSN based totally environmental and soil sensors, collects image records via CCTVs, and collects location information the use of GPS modules. The system required a CCTV to screen a real-time video and GSM module to transfer facts and high technologies is needed.

2. RELATED WORK

To fabricate a horticulture framework, sensor hubs and door based remote sensor systems are sent in the agrarian field. Sensor hub is a microcontroller based Raspberry pi including remote module and associated sensors [1]. Information securing, environmental checking, and accuracy cultivating should be possible by use of staggered sensor organize as depicted in the paper WSN in agribusiness [2]. While considering various components for horticulture like power and sunlight water is one of the significant prerequisite, so monitoring existing water assets and overseeing it for agribusiness is significant. Protection is conceivable by utilizing cloud based investigation and checking ranch utilizing IoT [3]. Cultivating relies upon various angles like climate, yield, etc. Regardless of shifting climate condition agribusiness can give better creation by utilizing large information examination and conveyance channel [4]. Robotization is one of the creating progressions creating in all of the fields, everything considered in this paper automated control features with latest electronic development is proposed. Microcontroller which turns the coordinating motor ON and OFF on perceiving the sogginess substance of the earth will empower the GSM to phone line to check the temperature and dampness through applications [5]. To make farming further developed Zigbee organize, convention stack, WSN, and Zigbee applications are used with sensors in crop field territory [6]. There are numerous techniques received for brilliant horticulture and investigated how the robotized framework is utilized to make powerful use of water assets for farming utilizing GSM [7]. Programmed water system framework is a decent idea however the issue is finished or under watering thus the requirement for normal water system framework is proposed in the IoT based keen water system framework [8].

4. DESIGN OF SYSTEM

This desk work expects to assess the quality and oblige the trade soil sensors to make an appropriated Farm Management System. The framework comprises of two subsystems called the ace and slave. Raspberry-pi is the ace hub and remote sensor units go about as slave hub. They are packaged with a test sensor to identify the wetness in the dirt. These sensors are then coordinated with the Raspberry pi. The simple signs got from the sensors are sent to the ADC (simple to advanced converter). At that point the changed over information is sent to the raspberry pi. IOT implanted electronic application is created for checking and controlling the gadgets remotely whenever and from anyplace. The data gathered from the sensors are put away in the database or the servers. Proposed system help customer with improving norm and size of their property yield by viewing enveloping temperature, moistness, soil soddenness content, and besides perceives fire whenever occurred in the farm by any way. Each undertaking referenced is performed without human connection. By utilizing remote sensor systems and IoT framework can be efficient Farm Monitoring System is for the most part made of three sections: sensor systems, raspberry pi and IoT Interface. Fig 1 outlines the framework design that depict how the homestead checking framework for horticulture work.

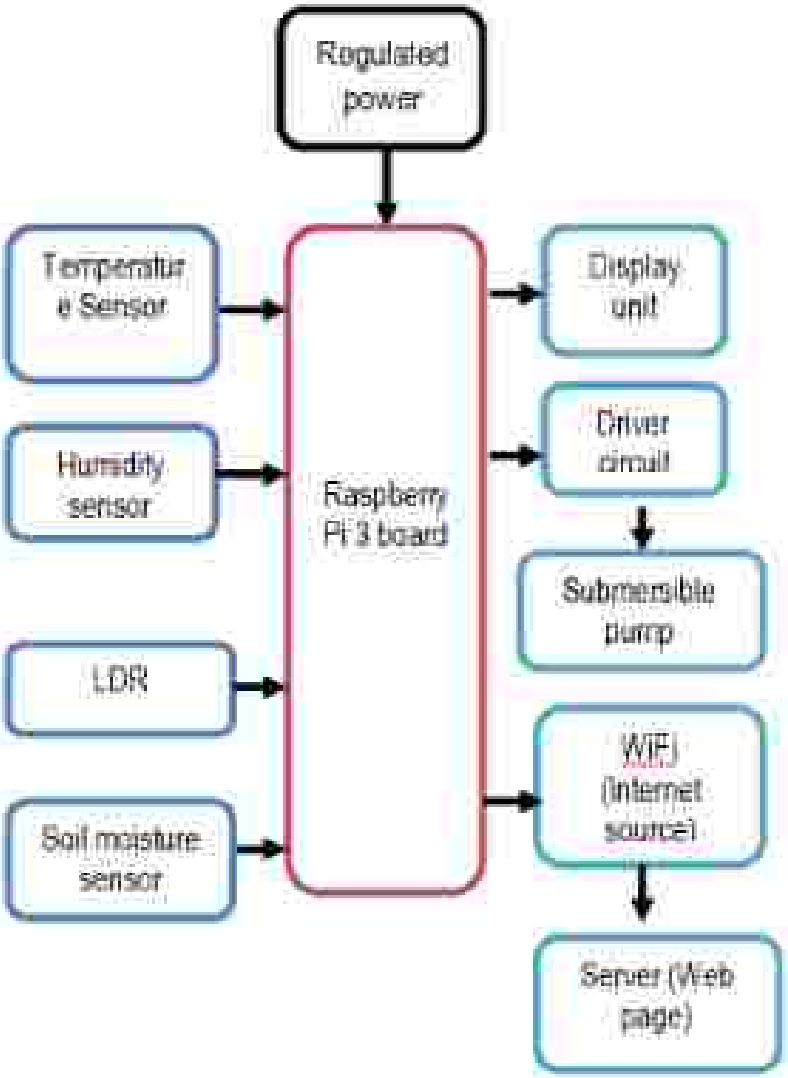


Fig. 1: Block diagram

4.1. HARDWARE USED

A. RASPBERRY PI

Fig. 1: Raspberry pi board

A Raspberry Pi 3 board contains BCM2837 controller which bolsters ARMv11 preparing unit. This is the Broadcom chip utilized in the Raspberry Pi 3, and in later models of the Raspberry Pi 2. The basic engineering of the BCM2837 is indistinguishable from the BCM2836. The main noteworthy contrast is the substitution of the ARMv7 quad center group with a quad-center ARM Cortex A53 (ARMv8) bunch.

- The ARM centers run at 1.2GHz, making the gadget about half quicker than the Raspberry Pi 2. The VideocoreIV runs at 400Mhz.
- The Raspberry Pi 3 Model B expands upon the highlights of its antecedents with another, quicker processor on board to speed up. It likewise includes WiFi and Bluetooth Low Energy capacities to upgrade the usefulness and the capacity to control all the more impressive gadgets over the USB ports [20].

B. DHT 11 SENSOR:

Fig. 3: DHT 11 Sensor

The DHT11 is a basic, extremely low priced digital temperature and humidity sensor. It makes use of a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital sign on the records pin (no analog enter pins needed). Its pretty easy to use, however requires cautious timing to grasp data. The solely actual draw back of this sensor is you can solely get new statistics from it as soon as each two seconds, so when the use of our library, sensor readings can be up to two seconds old.

C. LM393 Comparator

The LM393 arrangement are double free accuracy voltage comparators equipped for single or split gracefully activity. These gadgets are intended to allow a typical mode range-to-ground level with single flexibly activity. Info counterbalance voltage determinations as low as 2.0 mV make this gadget a magnificent choice for some applications in customer, car, and mechanical hardware.

D. Relay

The core of a hand-off is an electromagnet (a curl of wire that turns into a brief magnet when power moves through it). You can think about a hand-off as a sort of electric switch: switch it on with a minuscule flow and it turns on ("influences") another machine utilizing an a lot greater flow. For what reason is that helpful? As the name proposes, numerous sensors are extraordinarily delicate bits of electronic hardware and produce just little electric flows. In any case, frequently we need them to drive greater bits of mechanical assembly that utilization greater flows. Transfers overcome any issues, making it workable for little flows to initiate bigger ones. That implies transfers can work either as switches (turning things on and off) or as enhancers (changing over little flows into bigger ones).

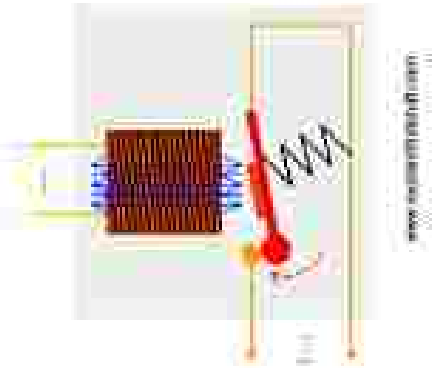


Fig. 4: Relay Principle

E. Soil Moisture Sensor

Soil dampness sensors measure the volumetric water content material in soil. Estimating soil dampness is fundamental for agrarian purposes to help ranchers control their water system structures more prominent effectively. Knowing the real soil dampness essentials on their fields, no longer exclusively are ranchers in a situation to for the most part utilize substantially less water to build up a harvest, they are furthermore able to make greater yields and the extraordinary of the yield by utilizing extended organization of soil dampness through key plant increment stages.

Fig. 5: Soil moisture sensor

5. IMPLEMENTATION

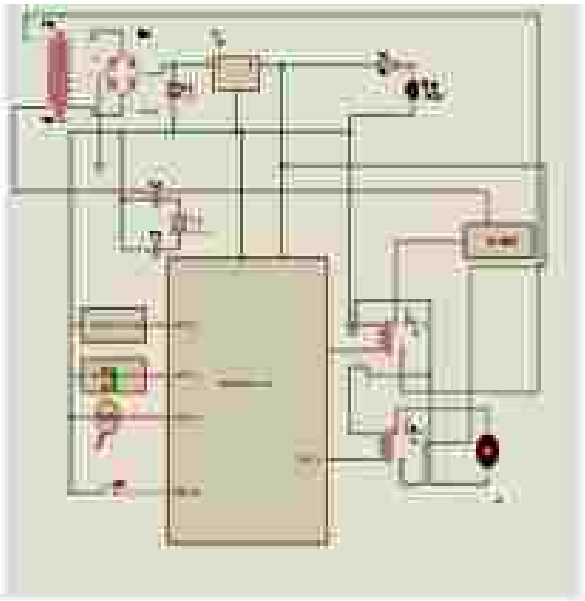


Fig. 4 Circuit diagram

5.1. Working of project

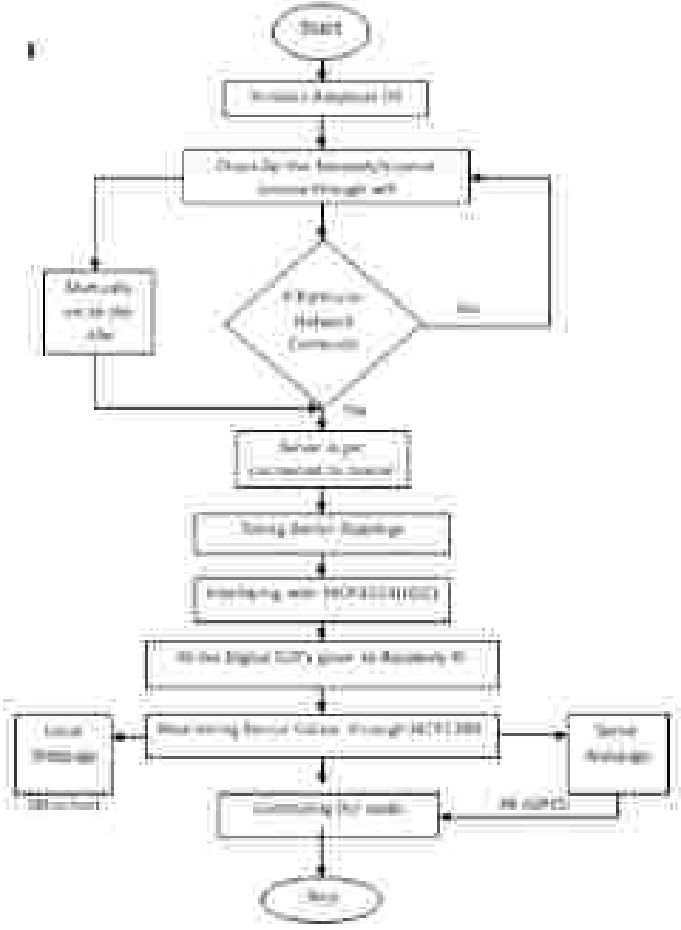
In this project, webcam is interfaced to Raspberry Pi via Wi- Fi module. Raspberry Pi is the coronary heart of the gadget. The Raspberry Pi Model B+ incorporates a number of improvements and new features. Improved power consumption, multiplied connectivity and more IO are among the upgrades to this powerful, small and lightweight ARM based computer. The Raspberry Pi cannot directly pressure the relay. It has simplest 0 volt or 3.3 V. We want 12V to pressure electromechanical relay. In that case we need a driving force circuit. The driver circuit take the low degree enter and provide the12V amplitude to force the relay which operates at 12V. We are the usage of here ULN 2003 for using the relay. Across the relay there are three connection R,Y,B so we are using right here three relay to exchange on induction motor LAN port is used for internet connectivity. Soil moisture sensor is hooked up to Raspberry Pi board through comparator circuit. Soil moisture sensor offers a resistance variation at the output. That angle is implemented to the comparator and signal conditioning circuit. The signal conditioning circuit has potentiometer to determine the moisture stage above which the output of comparator goes high. That virtual signal is given to the raspberry pi board.

If the soil moisture fee is above the moisture stage then the 3 section induction motor can be off. whereas if the moisture stage is low motor may be on via the relay. LDR is used for controlling mild routinely, at night time mild can be ON automatically in order that we can observe our farm at night time additionally the usage of cell phone.

5.2. Flowchart

Farm monitoring device for farm utility consists of wi-fi sensing gadgets that are positioned in agricultural areas to acquire facts such as moisture, temperature, humidity and fire. The gathered data are communicated to Raspberry pi through Wi-Fi the use of Master Slave conversation model. Raspberry pi, which acts as a grasp node, controls its gadgets or technique recognized as slaves. This technique consists of features like storing data, gathering facts from slaves, computing and integration of data. The raspberry pi can set up a Wi-Fi community and run the verbal exchange mannequin that is used to gather records from sensors to raspberry pi and from pi to the server. The consumer alliance that is the net software primarily based on IoT platform approves customers to keep agricultural facts in genuine time. The fundamental preferred

standpoint of the proposed framework is that the value of the setup gradually is low as raspberry-pi and different computerized sensors with internet of matters are utilized. The framework can except a good deal of a stretch conclusion the encompassing condition. The utility of the proposed device come in the areas of agricultural fields, agricultural lookup stations, cultivation areas and nursery plants. Fig. two Represents the architectural illustration of the farm monitoring system. The gadget setup suggests how the sensors can be deployed in the agricultural subject by way of taking a planter for example. The setup can be beneficial in any form of the agriculture area and can get higher yield.



6. RESULTS

Hardware used for sensing and Monitoring data:

- DM393 based Moisture sensor
- Light dependent Resistor
- DTH11 module
- MCP3204 ADC converter with 4–channel Raspberry pi 3 model B(Master)
- Relay module (SPDT) Display unit
- Power supply adapter

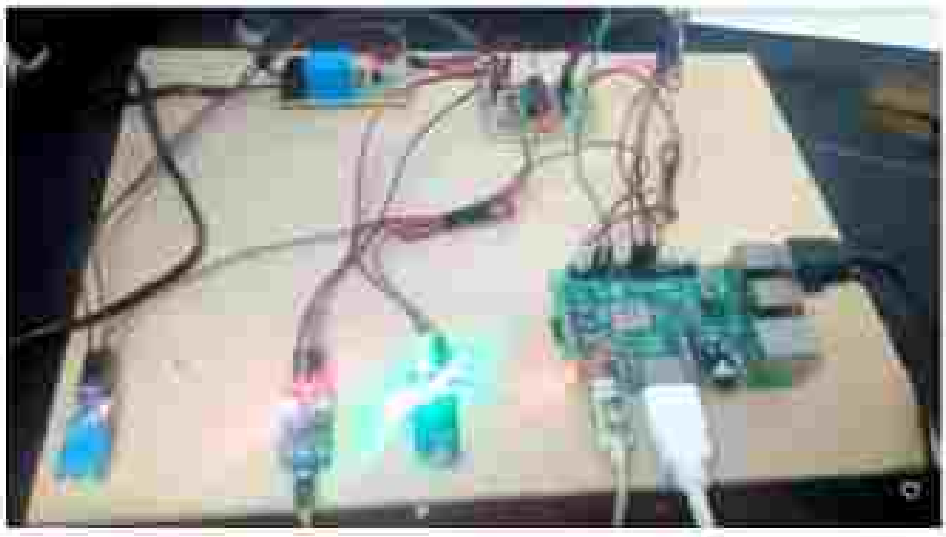


Fig. 7: Hardware Setup

6.1. Smart farm monitoring and control system:

In this we can monitor temperature in degree Celsius, Humidity in percentile, light in Lumens, Moisture in g/m, and Date and Time also.

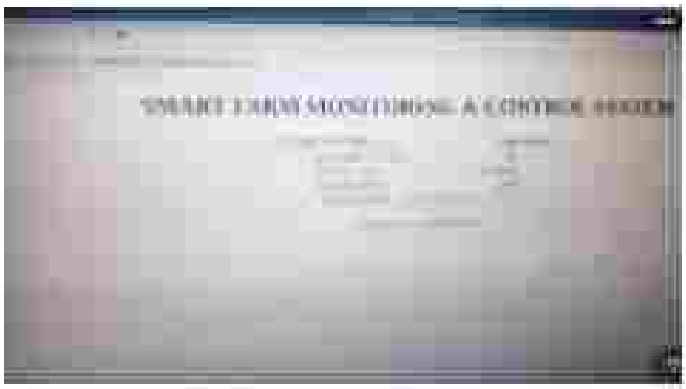


Fig. 8: Moisture level displayed as zero

Fig. 9: Switching on the motor

Fig 10: Water is pumping

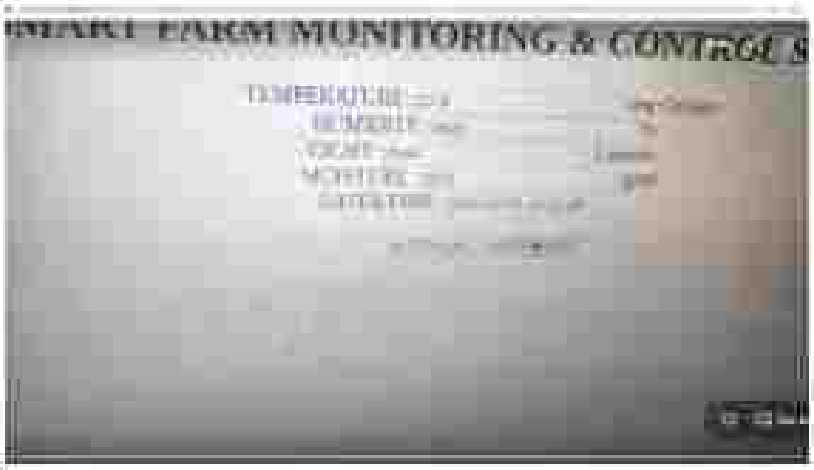


Fig 11: Moisture level increased

7. CONCLUSION

The undertaking "A strategy for IoT primarily based improvement of clever farm monitoring and manipulate system" has been correctly designed and tested. It has been developed via integrating aspects of all the hardware factors used. Presence of each module has been reasoned out and positioned cautiously for that reason contributing to the pleasant working of the unit.

This smart farm monitoring gadget is a very essential machine as it helps farmer with the aid of imparting computerized irrigation gadget with automated sensing techniques. Farmer can get the data about the agricultural area like humidity, temperature and moisture content material of the sand via the net utility developed. Practical purposes of sensors manufacture equipment to attain the purpose of the farm monitoring system. The speedy technological method and evolution in latest years extraordinarily permits the success of these dreams by using putting off many hurdles for the enactment, such as reservations by way of agriculturist themselves. In this proposed gadget have introduced the new revolutionary irrigation system. This gadget involves the stay streaming of vegetation the usage of android telephones and computerized motor on off system, this two structures make the irrigation utterly automatic. We can seize the live crop photographs on wi-fi. The whole machine is monitored and managed by means of the electricity full savings card sized microcomputer referred to as Raspberry Pi. Pi board is powered by way of Linux running system.

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A MIXED TECHNIQUE TO DETECT AUTOMATED SPAM SENDERS IN A NETWORK

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Abstract : Twitter, a popular micro-blogging service, is traditionally used to share messages and updates with a maximum of 280 characters. It is very open in nature and has a large user base which is often exploited by spammers to commit cybercrimes, like phishing, cyber bullying, harassment and spreading rumors. The proposed approach is to discriminate users depending on their activities with their corresponding *followers* where the user can bypass the features related to his/her activities, but avoiding those which are based on the *followers* is challenging. In this paper, a technique to detect automated spammers by combining metadata based features, content based features and interaction based features is proposed. Nine different features are identified for learning the dataset that includes both the legitimate users and spammers. The distinction between the feature categories is analyzed; interaction-based and content-based features are decided to be more effective for the detection of spammers, while metadata-based features are less effective.

***Index Terms* - Social Network, Automated Spammers, Social Network Security, Spambot Detection.**

I. INTRODUCTION

Twitter, a popular blogging service, is used to share messages and news with a maximum of 280 characters. It is very open in nature and Twitter has a user base up to a great extent which is certainly a benefit for the spammers to commit cybercrimes. Approaches were proposed by scientists to resolve these issues, which depend on characterization of the user and interactions between the users.

In this paper, a technique for the identification of automated spammers by combining *content-based* features, *metadata-based* features and *interaction-based* features is proposed. The approach of the proposed system lies in the depiction of users, which are based on their interactions with their *followers*. The distinction between the feature categories is analyzed; interaction-based and content-based features are decided to be more effective for the detection of spammers, while metadata-based features are less effective.

A. Need for the Study

Many researchers from industry as well as academia are continuously working to reduce the number of cyber-criminals to make the usage of Online Social Network (OSN) a pleasant and delightful experience. As a result, a plenty of spam detection methods were proposed. However, as methods are mature and innovative, spammers use more intricate mechanisms to avoid detection.

The current spam and other malicious behavior detection strategies utilize either feature-based or graph partitioning based strategies. Feature-based strategy includes features, such as number of followers, number of tweets which are easy to bypass, while few advanced features are challenging to bypass. However, features are generally based on user activities and spammers can adjust their behavior to imitate those of benign users.

Although, these methods are traditional detection approaches, spammers can try to evade them by creating adequate attack links between malevolent users and legitimate users. Hence, a technique is proposed which is a fusion of *metadata-based* features with *interaction-based* and *content-based* features. Legitimate users usually follow and react to requests from known users and avoid interactions with strangers. On the other hand, spammers follow random users, that forms very limited connections amidst followees and affect interaction-based features.

B. Objectives of the Study

A mixed technique for the detection of automated spammers in Twitter utilizes a combination of *metadata-based*, *content-based*, *interaction-based* features is proposed. In the evaluation of depicting the features of current approaches, most of the network-based features are undefined using user followees, as a result, ignoring the fact that the reputation of a user in a network is transmitted from the followers instead of the ones user is following).

The features are classified into three different categories, which are, *metadata-based*, *content-based*, and *interaction-based* features. Metadata-based features are derived from already existing extra information regarding the tweets, while content-based

features study the tweet posting behavior of a user and quality of the text used in posts and interaction-based features are derived from user interactions in a network.

II. Related Works

Spammers have been a problem from the very beginning of the internet. Through time, detection of spammers became very complex. We know that Twitter consists of many malicious tweets with URLs to perform various cyber crimes. In [1], a hybrid approach for detecting spammers in Twitter was proposed which uses a dataset containing 11000 labeled users, including 10000 benign users and 1000 spammers. It uses 19 different features, including 6 new and 2 redefined features. Our work is an extension to [1] which identifies the automated spammers and also blocks the spammer account from future signing in to the Social Network. In [2], Sangho Lee and Jong Kim, proposed Warningbird, a system which detects suspicious URLs and investigates the correlations of URL redirect chains which are extracted from various tweets.In [3], the tactics used for evasion, utilized by the spammers are classified into two types: profile-based and content-based feature evasion tactics by Chao Yang, Robert Harkreader, and Guofei Gu. In [4], Twitter spams are detected with the datasets which are collected by using various Machine Learning algorithms like KNN, k-kNN, Random Forest, c5.0, Stochastic GBM and Naive Bayes. Two features are proposed namely: Account-based features and Tweet content-based features. In [5], a review of spam detection methods is discussed. The Twitter spam detection features can be classified as follows: Account-based, Tweet-based features and the relationship between the sender and the receiver of tweets. In [6], the features used for deciding whether a tweet is a spam or not are as follows: Number of Unique Hash-tags (#), Number of Unique URLs and Number of Unique mentions (@). The different stages of spam detection in [5] are Collection of live tweets, Pre-processing, Feature extraction and Classification. In [7], Spam Detection on Twitter is done by using User-based and Content-based features. Random Forest Classifier gave the best results among SMO, Naive Bayes and K-NN neighbor. In [8], many features such as user profile features, user-activity features, content features and location-based features are proposed. After extracting the features, clusters are formed which group similar trending topics of a tweet user profile. In [9], the authors proposed an integrated approach for the classification of spammers using URL analysis, Machine Learning techniques and Natural Language Processing (NLP). In [10], Spam detection is proposed by extracting two features namely: User-based and Content-based features. User-based features are further classified into number of friends, number of followers and reputation of the user. Content-based features are further classified into number of URLs, replies/mentions, keywords/wordweight, retweets and hash-tags.

III. Proposed Approach

In the proposed system, a novel technique for the detection of automated spammers in Twitter, which utilizes a combination of various features, is developed.

The proposed features are categorized into three categories namely- metadata, content and interaction. Metadata-based features are derived from already existing extra information regarding the tweets. Content-based features study the tweet posting performance of a user and quality of the text used in posts. Interaction-based features are derived from user interactions in a network. A summary of all categories including the features in each category is shown in the below table.

Table 1: New features with their categories

Category	Feature
Metadata	1) Retweet Ratio
	2) Tweet Time Interval Standard Deviation
	3) Tweet Time Standard Deviation
Content	1) URL Ratio
	2) Unique URL Ratio
	3) Mention Ratio
	4) Hashtag Ratio
Interaction	1) Follower Ratio
	2) Reputation

A. Metadata-based features

Many researchers from industry as well as academia are continuously working to reduce the number of cyber-criminals to make the usage of Online Social Network (OSN) a pleasant and delightful experience. As a result, a plenty of spam detection methods were proposed. However, as methods are mature and innovative, spammers use more intricate mechanisms to avoid detection.

1. Retweet Ratio (RR)

$$RR(u) = \frac{RT(u)}{N(u)} \quad (1)$$

where RT(u) represent the total number of tweets retweeted by user u and N(u) is the total number of tweets tweeted by the user u.
Retweet Ratio (RR) is high for automated spammers and low for legitimate users.

2. Tweet time Interval Standard Deviation (TISD)

$$TISD(u) = \frac{\sum_{i=1}^{N(u)} (T_i - \bar{T})^2}{N(u)} \quad (2)$$

where $T_1, T_2, \ldots T_n$ is the time interval between the consecutive tweets, $\bar{T}$ is the mean of time interval and N(u) is the total number of tweets tweeted by the user u.
Tweet Time Interval Standard Deviation (TISD) is low for automated spammers and it is high for legitimate users.

3. Tweet Time Standard Deviation (TSD)

$$TSD(u) = \frac{\sum_{i=1}^{N(u)} (t_i - \bar{t})^2}{N(u)} \quad (3)$$

where t_i represents the tweet time of i^{th} tweet, $\bar{t}$ is the mean tweet time $\bar{T}$ and N(u) is the total number of tweets tweeted by the user u.
Tweet Time Standard Deviation (TSD) is low for automated spammers and it is high for legitimate users.

B. Content-based features

In the existing methods of detection of spammers, content quality is considered as the most important. Spammers usually post attractive tweets to deceive users. In the proposed method, four content-based features are identified and are defined below.

1. URL Ratio (UR)

$$UR(u) = \frac{U(u)}{N(u)} \quad (4)$$

where U(u) represents the total number of URLs used in the tweets of user u and N(u) is the total number of tweets tweeted by the user u.
URL Ratio (UR) is nearly 1 for spammers and low (nearly 0) for legitimate users.

2. Unique URL Ratio (UUR)

$$UUR(u) = \frac{UU(u)}{U(u)} \quad (5)$$

where UU(u) represents the total number of unique URLs in the tweets of user u and U(u) is the total number of URLs used in the tweets of u.
Unique URL Ratio (UUR) is low for automated spammers and it is high for legitimate users.

3. Mention Ratio (MR)

$$MR(u) = \frac{M(u)}{N(u)} \quad (6)$$

where M(u) is the overall number of mentions in the tweets and N(u) is the total number of tweets tweeted by the user u.
Mention Ratio (MR) is high for automated spammers and low for legitimate users.

4. Hashing Ratio (HTR)

$$HTR(u) = \frac{HT(u)}{N(u)} \quad (7)$$

where HT(u) is the total number of hashtags used in tweets of user u and N(u) is the number of tweets tweeted by the user u.
Hashtag Ratio (HTR) is high for automated spammers and low for legitimate users.

C. Interaction-based features

The interaction data available in Twitter can be used in spammer detection. In Twitter, there is an option to follow other users through which a user can interact with other users and create a trusted network among the users. Two features are identified under this category and are defined below.

1. Follower Ratio (FR)

$$FR(u) = \frac{|\mathcal{E}|}{|\mathcal{D}|} \quad (8)$$

where $\mathcal{D}$ is the group of followings of the user u and $\mathcal{E}$ is the group of followers of the user u.
Follower Ratio (FR) is low for automated spammers and high for legitimate users.

2. Reputation (R)

$$R(u) = \frac{|\mathcal{E}|}{|\mathcal{D}| + |\mathcal{E}|} \quad (9)$$

where $\mathcal{D}$ is the group of followings of the user u and $\mathcal{E}$ is the group of followers of the user u.
Reputation (R) is low for automated spammers and high for legitimate users.

IV. System Architecture

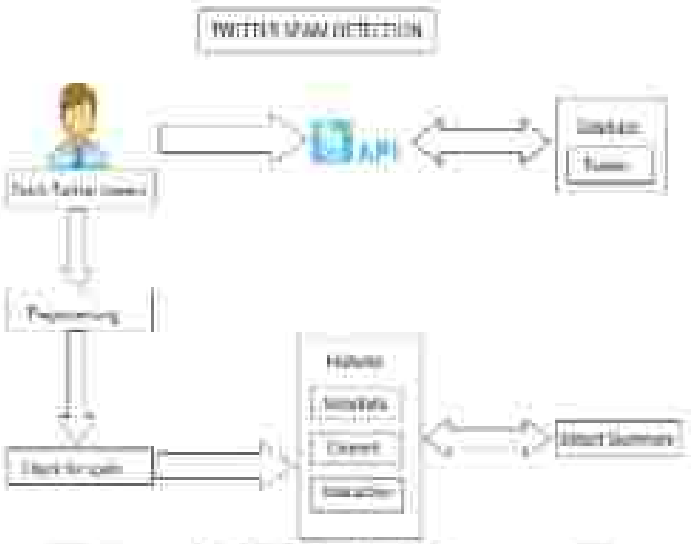

Fig 1: System Architecture

In the proposed method, the system fetches all the tweets posted by the users and then preprocesses them and searches for automated spammers. The different features through which an admin can identify an automated spammer are categorized into three categories i.e. Metadata-based features, Content-based features and Interaction-based features which are again classified into 9 different features as indicated in Table 1. The system compares each tweet posted by the users against the proposed features and detects automated spammers in any social network.

V. Applications Of Proposed System

In the proposed technique, an approach on exploiting metadata-based features along with content-based and interaction-based features to detect automated spammers was developed. The approach of the proposed system lies in the depiction of users, which depend on their interactions with their *followers*.

By using this proposed system and with the help of the proposed 9 features, the automated spammers can be easily detected which help to reduce the cyber-crimes in Online Social Networks.

VI. Enhancement

Many approaches were made to detect the automated spammers in Social Networks but the number of cyber crimes due to spammer is also increasing consistently.[1] is one of the approach to detect spammers through 10 different features. This paper is an enhancement to [1] in which automated spammers are detected through 9 different features which are classified into three categories namely Metadata, Content and Interaction. Our approach not only detects and identifies spammers but the admin also has an option to block the spammer account. When a particular user is identified as a spammer, the admin can block the user from signing in into the Social Network. When the corresponding user tries to log in into his/her account, they will not be able to sign in into their accounts. In this way, if the spammers are blocked from signing in into their accounts, there will be a decrease in the number of cyber crimes in Social Networks.

VII. Results And Discussion

Twitter, a most popular micro-blogging platform, is viewed as Online Social Network (OSN) which has a wide range of users. Twitter allows its users to follow their favorite actors, athletes, celebrities, political leaders, and news channels, and also to view to their content without interventions. By *following* activity, a user can view updates of the corresponding account. Though most of the social networking sites are used for several legitimate purposes, their open-nature and a large user base have made them targets for cyber criminals.

Hence, a method is proposed, in which 9 features are grouped into three categories which are helpful to detect automated spammers in a network. Interaction and Content based features are more effective for the detection of spammers, while metadata-based features are less effective. By using the proposed method, automated spammers can be easily detected in an Online Social Network.

The following are some of the output screenshots of the proposed method.

Fig. 2: Features

Fig. 3: Retweet Ratio

Fig. 4: Tweet time Interval Standard Deviation

Fig. 5: Blocked Users

Fig. 2 shows all the features which are observed in the homepage of Admin. Fig. 3 and Fig. 4 shows the Retweet Ratio (RR) values and Tweet time Interval Standard Deviation (TISD) values of all the users registered with the Social Network. Fig.5 represents the enhancement in which the admin can block the spammer from getting logged in to their corresponding account.

VIII. CONCLUSIONS AND FUTURE WORK

In the proposed method, 9 features are grouped into three classes which are helpful to detect automated spammers in a network. Interaction and Content-based features are more effective for the detection of spammers, while Metadata-based features are less effective. By using the proposed method, automated spammers can be easily detected in an Online Social Network.

The three classes into which the features are classified are metadata, interaction and content and the various features are shown in Table I.

In this project, the system gives a solution for detecting automated spammers on Online Social Networks. Future enhancement can be done by taking the real data from any Online Social Networks like Facebook, Twitter, Whatsapp, etc. and detect spammer accounts upto a great extent.

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Cyber Security Monitoring with Semantic Machine Learning

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Abstract: *In order to protect the availability and integrity of digital community information, there is security measures put in place. Typically, protection measures for information will prevent individuals from accessing, disclosing, modifying, or even destroying facts on both software and hardware technologies. New cyber-attacks keep coming up in all business processes, according to an evaluation done by industry experts in the place of information security. An analysis of the level of risk, after all the data had been analysed, has shown that although it is not extremely dangerous in the majority of cases, it is highly dangerous for valuable data and the severity of those attacks is prolonged. Various layers of protection have already been implemented to identify and guard against various cyber-threats, mainly using a processed data feed or alert for revealing each deterministic and stochastic behaviour. Deterministic patterns in cyber-attacks have revealed that they are neither random nor unbiased over time. Assaults that occurred in the past provide a forecasting range for future assaults. Generally speaking, the deterministic styles can be used to create slightly accurate monitoring.*

Keywords : *Cyber Security, Network Monitoring, Machine Learning, Cyber Attacks*

1. INTRODUCTION

To raise awareness of growing cyber-threats and new attacks, systems that offer real-time assessment were created. While explaining the concept of a risk system, we introduce a define of software systems that provide real-time visibility into global cyber-attacks risk system, which provide animated maps that are created from real-time data about attacks on the location. Real-time traffic data is designed to identify the different types of traffic that could be indicative of malicious intent. When it comes to finance, social development, and even our every-day lives, it has become increasingly difficult to deal with communication networks and facts systems. However, the rapid development of the internet offerings and digital communication networks, along with increasing use of records structures, make them vulnerable to one or more kinds of cyber-attacks.

A. *Cyber Security*

In this context, "cyber protection" is synonymous with "asset protection," which is made up of a variety of tools and strategies designed to defend assets (computers, networks, applications, and statistics) from assault, unauthorised access, change, or destruction. Community safety systems include PC (host) protection systems while PC (host) protection systems include community safety systems. No firewall, antivirus software, and intrusion detection device is completely essential, but these items have each, at a minimum, a firewall, antivirus software programme, and an intrusion detection gadget (IDS). Increasingly,

computing generation engineering statistics, such as security and privacy, are important issues for computer scientists.

B. Cyber Attacks

Intentional use of laptop structures, generation-dependent businesses, and networks are utilized in cyber-attacks. The rise of documents, attachments, and malicious configurations on servers causes websites and applications to be attacked every day. Malicious code is used in an attack as both the attack and the malware are being completed at the same time. Information and identification robbery could jeopardise essential statistics because of it. Precise records about the attacks and beliefs are critical in order to avoid finding the poor results and taking preventative measures. [2] Computer-based attacks, such as denial-of-service (DoS) attacks, botnets, man-in-the-middle attacks, phishing, spear phishing attacks, password attacks, malware attacks, brute force attacks, etc, can be detected by a few unique purpose websites like Denial-of-Service (DoS) Attack, Botnets, Man-In-The-Middle Attack, Phishing, Spear Phishing Attacks, Password Attack, Malware Attack, Brute Force Attack.

C. Machine Learning in Cyber Security

Cyber Machine Learning takes on an important role in next-generation cyber security. As the next cyber security products develop, increasingly they incorporate AI and ML technologies. According to educational AI software on huge states of data from the cyber security, community, or maybe physical facts, the cyber security is intended to get an organization's goal to reveal and avert average behaviour, however, without including a "signature" or sample. Cyber security experts predict that, over time, agencies will integrate machine learning into all levels of cyber security products. This latest development in deep learning and one-of-a-kind, promising technology has an undeniable impact on the overall network community. Current efforts have included numerous large advancements in numerous networking sub disciplines. In the future, a number of issues will be solved. To begin, the strength of the equipment's relationship to algorithms is a crucial undertaking for software. [3]

II. RELATED WORK

The project entitled "EMBER" presents the open dataset with labelled factors in order to enable successful training of predictive analytics and learning gadget models. Since the dataset contains specific penetration levels for the training of fashions and predictions, the dataset will serve as a fertile environment for malware.

Banin S, Dehghantanha A, Shalaginov A, and Franke K. Highlights the separate survey for malware detection that may include techniques and procedures. To arrive at higher degrees of accuracy and predictions, the methods and algorithms described in this work use highly powerful and advanced methods and algorithms. Sixteen – two students, doyen Sahoo, Chenghao Liu, and Steven C.H. Hoi, and Categorize and overview the components of research that attempt to counter various angles of Malicious URL Detection, such as design of functions and collection of policies.

N. Whitton, Crockett, A. Latham, & Proposed Predicting learning patterns in conversational creative tutoring systems by using a fuzziness rating system on a random sample of previous students' choices is possible. The publication is available online:. R. Sun, S. Chen, J. Wang, H. Chen Described a method called noise-detection that is based on AdaBoost called AdaBoost Boosting through which one can decorate AdaBoost's robustness (2016)

E. M. El-Alfy, M.M. Awais, and M. Baig. Covered a new method of studying a feed-before ANN with a single hidden layer and a single output neuron. X. Pan, and Y. Luo are renowned performers. a structural dual vector machine proposing to implement K-nearest neighbour installations with a singular vector machine (KNNSTSVM). Instead of calculating the samples based on their beauty scores, the intra-beauty KNN approach ensures that certain weights are given to the samples so that they may help to embellish the structural facts. To speed up the education system, wasteful constraints are eliminated using the inter-elegance KNN technique. [10]

R. Ottersten, D. Aouada, and A. C. Bahnsen, they introduced a fee-sensitive selection tree which includes rules that rely on one-of-kind examples. Later, people began to use it (Adler et al., 2002; Mayhew et al., 2001; Cleveland et al., 2002; Atighetchi et al., 2002; and Greenstadt et al., 2002.) When using every okay-manner clustering and manual SVM, take advantage of every overlap between skills with the skills you have selected and tested in the MBM machine and studied in the relevant literature. [12]

The flora of F. U., P. Palmieri, A. Castiglione, and A. Santis When both randomness and bluntness of traffic behaviour are present, the classifier's general overall performance is affected. As long as ICS networks remain unaffected, those issues will have no impact on them. The subject of this study is Restricted Boltzmann Machines (RBM), or more specifically, Discriminative RBM (DRBM). The findings unveiled a novel method. This use of a non-labelled approach is comparable to the method applied with MBM, as there are no previous records on the records of individuals who have visited an anomalous site. [13]

III.OBJECTIVE OF THE PRESENT WORK

The ultimate goal of this work is to discover a gadget that detects network anomalies and cyber-attacks with no more infrastructures on the network, which is capable of locating those issues in a very short period of time by utilising data-mining tools without compromising the overall network. Here, the goal of the study is to look into work.

- A new set of rules for keeping the Network Security under watch will be suggested by the researcher
- Researcher will compare a new set of rules with the existing set of rules to determine how well they perform together.
- The next steps are to be completed in order to achieve objectivity.
- Study activities and alerts in order to establish if they are connected/linked to assaults that are ongoing
- Buildings, networks, and applications should be covered.
- Discriminate between possible threats that may exploit, acquire, or take advantage of the vulnerabilities for unauthorised entry
- Examine the company's information technology to catch actual-time or nearly-real time cyber-attacks, security violations, or breaches, as well as symptoms of anomalous or symptomatic sports.
- Provide records and documents.

IV. WORK PLAN AND METHODOLOGY

a) ***Approach***

To perform this task, first UCI machine repository data will be gathered to create the training, validation, and test sets after which processing will be done. To obtain the

matrix of collected data, it will be processed to the various input formats from the different algorithms, and this will result in a dataset where each instance is a row and each feature column is a feature. In order to avoid biased results, the values in the entire matrix will be standardized so that no feature can have greatly exaggerated values relative to other features. In this case, standardization consists of determining each feature's mean and standard deviation, and then subtracting the former from the latter. Additionally, feature selection is implemented in this step, which is aimed at determining the features of relevance for this problem.

After this, a machine learning algorithm is used to build a model, which is tested and validated using the training, validation, and test sets. This model can be used in the future to find out what network conditions exist.

b) ***Methodology***

In this system architecture, several modules have been constructed to help fulfill objectives. Data Collection, Data Pre-processing, Model Creation, and, finally, Network State Identification are the modules of the system. In the Data Collection Module, the user decides whether or not the network is normal, anomalous, or unknown. The user can also choose how long they want to collect data and on which device, and they can do this by specifying the IP address of the device to be monitored. The training, validation, and testing sets in the second module, Data Pre-processing, are prepared beforehand. Since in a multi-class algorithm both anomalous and non-anomalous data are used in all sets, the user must specify if the data is to be used with a one-class or multi-class classification algorithm. In addition to providing multiple data files, the user can also give the resulting data set a name.

The Model Creation and Performance Measurement module includes a machine learning algorithm for training, saving, and testing a model that is built using the data that is acquired. The user only has to specify which data set matrix (previously created in the Data Pre-processing module) and the desired machine learning algorithm are required, except for the specific machine learning algorithm that has been selected

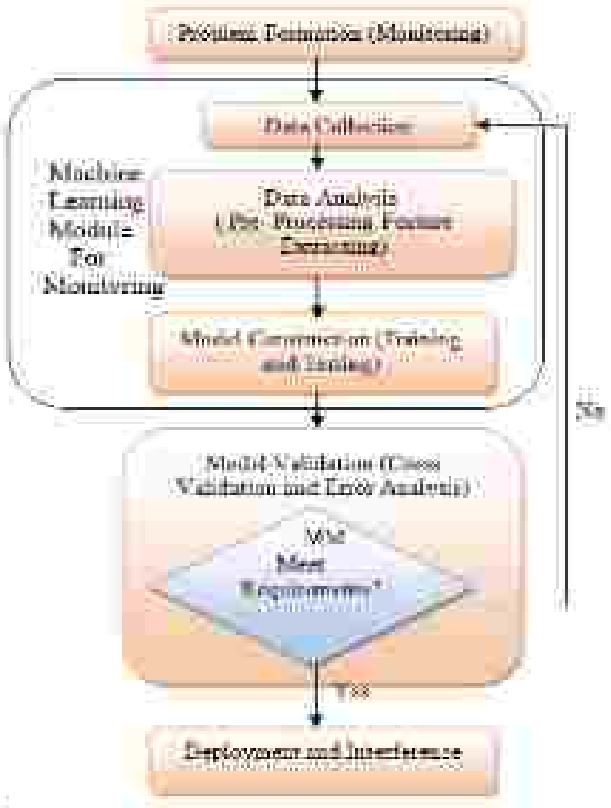

Fig. 1 – Flow Chart

V. TOOLS FOR IMPLEMENTATION

a) Anaconda

Anaconda is commonly used for computational sciences, data science, statistical analysis, and system evaluation. Anaconda 5.0.1 is released on October 1, 2017, in the ultra-modern model. A recently released model 5.0.1 contains a few minor bugs fixes, and includes features such as up-to-date R programming assistance. As with previous versions, all of those capabilities were not included in the authentic 5.0.0 launch. This supervisor includes a Python distribution, a collection of open supply packages, and an environment supervisor. This package deal supervisor also incorporates more than 1,000 R and Python packages.

b) Spyder

An open source Python project known as Spyder provides a powerful medical environment for scientists, engineers, and records analysts. it is a bit of a departure a combination of the development device's advancement optimizing, investigation, development, and monitoring expertise with the programming package's exploration, self-procedural execution, deep look, and brilliant visual results. Additionally, many famous clinical applications are integrated into Spyder, with the option to integrate in more of these via Python integration.

c) SIEM Tool

Additionally, managing the hectic volume of facts gained from pastimes on systems is a significant demanding situation in cyber security. In order to make sense of it, one must derive warning signs of attacks, understand the nature of faults, or supply proof for decision makers. the 'security facts event management' concept was first put

forward by Gartner in 2005 (SIEM). Conventional safety tracking machines meet audit and compliance needs, which is why they used it to describe such a machine. On the other hand, as record security has advanced, the needs of the SIEM have also increased.

VI. CONCLUSION AND FUTURE SCOPE

A great number of security monitoring systems are available for use in a system. In actuality, machine learning and network security advancements have benefited one another. A records evaluation process in which a decision feature is based on the network's protection level has a history of issues. Dynamic protection monitoring is an important component of system studying. It is essential to have the latest development trends in mind, in order to ensure the maximum level of system mastery. Truly useful systems are very fruitful when it comes to accumulating masses of facts, and as a result there is a pressing need for screening tools to help find possible threats in the community. Together with supervised classification and clustering, the device learning methods have also proven to be useful for network security. On the other hand, cybersecurity specialists know that community safety monitoring is critical, and they can deduce what initiatives humans, procedures, and mindsets are needed to meet those objectives. Network security monitoring is rapidly increasing in both quantity and difficulty.

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SDSR-A New Hybrid Secure Routing Protocol using Trust Recommendations in MANET

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Abstract: A mobile ad hoc network is a dynamic network which can be established where there is no possibility or if it is practically impossible to establish a standard cellular infrastructure for communication. It is a form of decentralized wireless network where nodes are independent of each other and operate on their own. Every node is free to move in and out of the network as and when needed. This also introduces many concerns about security of data being forwarded through these nodes as there is no fixed dedicated mechanism to verify the authenticity of the nodes that join and leave the network at varied times. As MANET is a multi-hop network, data should be forwarded through many intermediate nodes before it actually arrives at the intended destination. So data on transit through these intermediate nodes should be protected from any malicious nodes. Different protocols were proposed in literature that address the security concerns of routing considering varying parameters. This paper illustrates a hybrid routing protocol, SDSR Secure Dynamic Source Routing Protocol which takes the recommendations of neighbour nodes to judge about node's authenticity and uses that information to calculate the trust value of a node. Using trust values of nodes, malicious nodes are identified and these nodes are excluded from data transmission path between the source and destination. The performance of SDSR is also evaluated in terms of efficiency parameters like Packet Delivery Ratio, Packet Loss, Communication Overhead, Throughput etc., and results are presented. This protocol can also be compared with existing routing protocols proposed for MANETS in terms of various quality of service parameters.

Keywords: The performance of SDSR

I. INTRODUCTION

Network Security is an emerging area now a days, in particular the area of mobile ad hoc networks is seeing a visibly vast growing technology. Lot of research is being contributed in the area of ad hoc networks to improve efficiency in terms of various quality of service parameters like packet delivery ratio, communication overhead, packet loss etc., There has been a wide range of study with regard to routing security where data is transmitted between source to destination, there is a need for protecting the integrity and confidentiality of the data by allowing only authenticated nodes to participate in communication. But the characteristics like dynamic topology, infrastructure less operation, varying bandwidth requirements, energy constraint nodes, limited physical security and multi hop communication of MANET makes the task more challenging.

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In spite of these challenges, MANETS found their way in many emerging application areas like educational and medical fields, military and defence operations, emergency and rescue operations like earthquakes and natural calamities, disaster relief management etc., The multi hop communication of MANETs makes routing a challenging task. There were several routing protocols described in literature. These routing protocols are classified as either static or dynamic based on the time at which the decision on next node is taken during routing process. They can also be characterized based on the way their routing tables are updated and used in routing data packets. The other class of protocols which take the advantages of both these static and dynamic protocols are called as hybrid routing protocols. They either take location based information or geographical information of nodes to maintain their routing tables. This paper implements a hybrid routing protocol that takes the recommendations of neighbour nodes to evaluate the trust value of the nodes which can be used to identify the malicious nodes that are responsible for packet drops, packet loss during data transmission.

II. RELATED WORK

There were many routing protocols proposed in literature to deal with the issues in routing protocol. In a paper[1] titled " Secure Neighbor Discovery System for ad-hoc through AAER Protocol ", a new protocol called TQoS (Trust Based Quality of Service) which uses key encryption areas based routing but there is no elimination of malicious nodes during data transmission. So data cannot be protected from malicious nodes during transmission to destination. In another protocol called SEAD (Secure and Efficient Ad hoc Distance vector routing protocol) [2] , authors proposed a new methodology to prevent DoS attacks in a network, but they did not address the problems with multiple malicious nodes. In , " Trusted and Secured Routing in MANET: An Improved Approach "[3], authors proposed a trust based security model using trust quantification which assumes nodes already are authenticated and genuine. This algorithm also works for only single malicious nodes, but does not provide a solution when multiple nodes cooperate with each other and try to launch an attack. In TAODV (Opinion Based Trusted Routing Protocol) [4], opinion of the nodes is considered for routing data between the nodes. Nodes change their opinions based on the opinions received from the other nodes. This algorithm fails to address the issues caused due to internal attacks.

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An extended DSR routing is proposed in TR-DSR (A routing Protocol Based on Trust) [5], in which trust information is the basis for routing, but this algorithm has huge communication overhead and multiple malicious node detection is also not effective. An extension to AODV algorithm is suggested in AOTDV (Trust-based on-demand multipath routing in mobile ad hoc networks) [6] in which misbehaving nodes may not give proper reliable information in calculating the path trust in case of any colluding attacks. In Source based Trusted AODV Routing Protocol for Mobile Ad hoc Networks [7] , source based secure routing protocol was proposed based on AODV routing , but it adds more delays in data transmission and cannot identify the issues with multiple malicious nodes. In a paper titled "Energy Aware Trust Based Routing Scheme for Mobile Ad-hoc Networks"[8], methods to reduce transmission overhead and power consumption in MANETs were discussed which help save better life of the nodes. Energy consumption of the nodes during data transmission from a source to destination was addressed in this paper. In [9] "TBSRP: Trust Based Secure Routing Protocol for WSNs", a reliable communication approach using trust vectors to take a decision on net hop a node should make is proposed. Results are analysed in terms of metrics like delivery ratio by comparison with AODV protocol.

1. SDSR (Secure Dynamic Source Routing) Protocol

This protocol finds a secure path for data transmission between a given source and destination nodes using the trust values of the nodes, thus by identifying and eliminating the malicious nodes in the path for data transmission. When the source node has data to transmit, it forwards the request RREQ packet to all the neighbouring nodes with the goal of finding a secure path to the intended destination node. All the adjacent nodes upon receiving the request packet, verify their routing tables for route to destination, and if path exists, composes a RREP packet containing route to destination and forwards it to source node. If a route to destination node does not exist, the request packet is forwarded to their neighbouring nodes by appending their identity. This process is repeated until a route to destination is found by the source node. Upon reception of route information about the destination node, the source node can computes the final trust value of the nodes based on the primary and secondary trust values received by the neighbouring nodes. Using this trust value calculated, source node can identifies whether a node is malicious or trusted one. The trust value of the nodes acts as a measure here to compute the trustworthiness of a node based on which a decision to include a node into a route to destination is taken by the source node. If a node is identified as malicious node, that information is broadcasted to all the neighbouring nodes. Following figure fig3.1 illustrates the overall framework of the SDSR protocol.

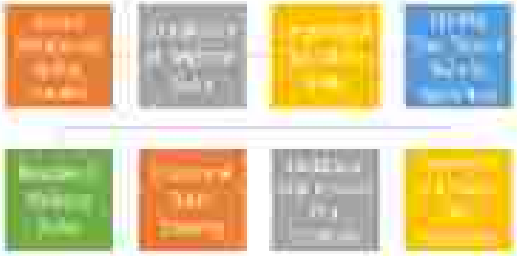

Fig 3.1. SDSR Protocol Framework

Initially Primary Trust, Temporary Trust, Functional Trust, Recommendation Trust and Final trust are all set to zero. Source node keeps a count of the number of control and data packets it has forwarded to its neighbours, successfully forwarded and dropped packets. Using this value, the source node computes the Primary Trust value of all the nodes. From the obtained Primary Trust, a node's functional Trust is also evaluated by the source node. To find the trust information of nodes which are not neighbours, the source node requests for recommendations from its neighbour nodes about their neighbour nodes. Source collects the Recommendation trust of all non-neighbour nodes in the network. Both Functional Trust and Recommendation trust together are used to evaluate the Final trust value of a node.

2. Performance Analysis of SDSR Protocol

Various performance metrics like Packet Delivery Ratio, Packet Loss, and Communication overhead, Throughput etc., are evaluated under different simulation scenarios. Number of nodes is set to 50.

4.1 Performance Analysis on PDF:

With the detection of malicious nodes and hence making a path with secure nodes to the destination, there is an increase in the PDF ratio in SDSR protocol when compared to existing protocols proposed for MANETs. Using the trust based information about the nodes on the path to destination makes it easy to identify the malicious and hence helps in finding alternates path dynamically which results in improved PDF across the network.

Fig. 4.1 Xgraph showing PDF Vs. Pause Times

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4.2 Performance analysis on Throughput:

This performance of this algorithm w.r.t. throughput is an improvement over the existing ones, which shows that at different stop times the throughput gradually increases which shows that more number of data packets can be transmitted on the identified path within a prescribed unit of time.

4.3 Performance analysis on End to End Delay:

While transmitting the packets from source to destination, as the nodes are wireless and therefore use a wireless physical channel, due to its properties like reflection and refraction, link failures, delays occur in transmission of packets from source to destination.

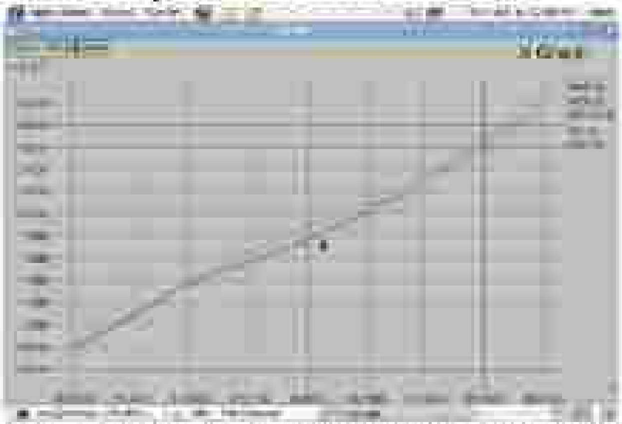

Fig. 4.2 Xgraph showing Throughput (Received Packet Size Vs. Start and Stop Times)

Fig. 4.3 Xgraph showing End to End Delay Vs. Start & Stop Times

Few packets are discarded if the packets are lost after the threshold time limit. The table in previous slide illustrates the delay in msec caused at various pause times. As the number of packets and their size increase, end to end delay also gradually increases. This is reduced in this protocol by selecting a reliable shortest path from source to destination. Even though the number of malicious nodes increase, there is not significant decrease in the performance metrics as trust evaluation is still done more co-operatively. SDSR succeeds in detection of presence of malicious nodes, so the performance of the protocol is not affected. There is a slight increase in the overhead as little more number of control packets are generated to exchange information about these malicious nodes.

4.4 Performance analysis on Packet Loss:

Due to the transmission errors and the harmful and mischievous operation of malicious nodes, few packets are lost on their way from source to destination. This results in a reduced PDF across the network which is not desirable. So in this SDSR protocol, the packet loss is drastically reduced by identifying the malicious nodes using trust metrics and verifying the nodes authenticity and hence it was seen that the secure path from source to destination is a path that excludes these nodes on the path.

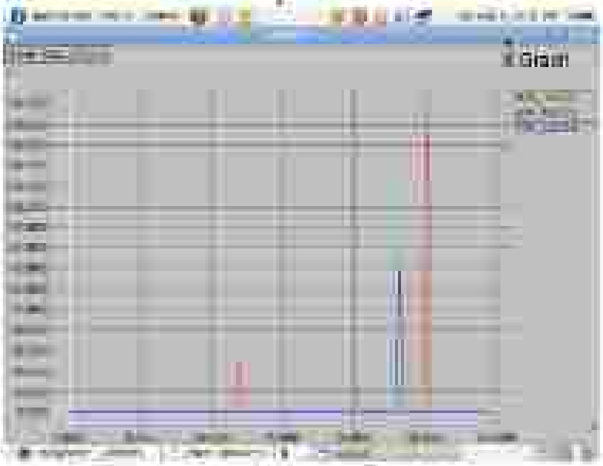

Fig. 4.4 Xgraph showing Packet Loss Vs. Start & Stop Times

4.5 Impact of varied number of malicious nodes on the performance of SDSR

Figure 4.5 illustrates the scenario of change in the number of malicious nodes in the network on various performance metrics when the number of nodes is set to 50. Even though the number of malicious nodes increase, there is not significant decrease in the performance metrics as trust evaluation is still done more co-operatively, SDSR succeeds in detection of presence of malicious nodes, so the performance of the protocol is not affected. There is a slight increase in the overhead as little more number of control packets are generated to exchange information about these malicious nodes.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	1	98.98	0.33062	163064	1656	18
2	2	97.8101	0.2317	162523	2453	56
3	4	96.987	0.4883	164227	2617	81
4	6	96.52	0.4752	162498	2939	93

Fig. 4.5 Table showing impact of varied no. of malicious nodes

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III. CONCLUSION AND KEY FINDINGS

An implementation of routing protocols proposed for MANET was done and found that various existing routing protocols doesn't address the security issues in MANETs. Various proactive and reactive protocols like AODV, DSR, and DSDV were implemented using diverse parameters. Performance Analysis of these existing protocols was done by considering metrics like Packet Delivery Fraction, Throughput, Packet loss, End to End delay, Overhead etc. to emphasize their behavior in different scenarios. Most of them exhibited better performance when there is no mischievous behavior but the number of packet drops gradually increased in the presence of malicious nodes.

A new hybrid secure protocol SDSR which can work for both proactive and reactive protocols has been proposed and implemented which reduced packet loss, end to end delay and improved packet delivery ratio, throughput even in the presence of malicious nodes. This protocol reduced the possibility of occurrence of attacks using metrics like Primary trust, functional Trust and recommendation trust to identify a secure trusted path between source and destination. Because of the use of trust information about the nodes, the authenticity of the nodes was easily verified and hence the time required for source to choose an alternate path is downsized. By varying the simulation scenarios with different types of attacks and variable packet sizes, optimal performance of the protocol can be accomplished. SDSR can be improved to find the best route to destination in much more shortest time possible that reduces the overall delay. Implementation with varied QoS parameters can be visualized.

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A NOVEL METHOD FOR TRUST EVALUATION IN A MOBILE AD HOC NETWORK

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ABSTRACT

A Mobile ad hoc Network is a kind of wireless network, and also an infrastructure less network. All the nodes are independent of each other and hence nodes can easily join and leave the network at any time. MANET's are highly dynamic in nature which makes its topology change very frequently. As the nodes both mobile and wireless, there will be no continuous power supply making the network resource constraint. The nodes are free to move randomly and manage themselves and also perform the task of routing. Because of the very unpredictable nature of this type of network, routing becomes a challenging task. Also, the very dynamic nature of a MANET attracts more possibilities for the intruders to launch attacks easily. Security in MANET has become a significant and active topic within the research community. This is because of high demand in sharing streaming video and audio in various applications of computers and communication industry. A MANET could be setup quickly to facilitate communications in a hostile environment such as battlefield or emergency situation like disaster rescue operation.

Due to the ad hoc and dynamic nature of MANET s, they are open to malicious activity from intruders. In spite of the several attacks aimed at specific nodes in MANET that have been uncovered, some attacks involving multiple nodes still receive little attention. The main reason for this is that people use the same security measures that can be used for wired networks also to MANET. Furthermore, it may also have to do with the fact that no survey or taxonomy has been done to clarify the characteristics of different multiple node attacks. There are many routing protocols proposed for MANET's but most of them exhibit poor performance in the presence of attacks. A new hybrid secure routing protocol SDSR that establishes a secure communication path across the nodes in the network which improves the packet delivery ratio, throughput and reduces the end to end delay, overhead incurred across the network and also the number of packet losses has been proposed. This protocol works for both proactive and reactive networks and hence can be considered as a hybrid protocol for MANET's. It reduces the multiple node attacks if there are malicious nodes in the network. It uses metrics like reputation, trust, packets received, delayed and dropped to create a trust environment in the network. This method also helps to identify malicious nodes based on the sequence number of the reply packet received. The proposed protocol has been implemented using NS-2. The new hybrid secure routing protocol SDSR achieved better packet delivery ratio and throughput when compared with protocols like AODV, AOMDV DSDV,DSR etc. and reduced the amount of packet losses, overhead incurred and the End-to-End delay in routing the packets from source to destination.

1. INTRODUCTION

In the recent years, Computers and Information Technology is an emerging field and is growing day by day. In spite of lot many efforts put forth towards finding secure computing environments, still there are lot of threats left unaddressed on the security, integrity and privacy of the data exchanged in communications. A mobile ad hoc network (MANET) is a communication network that can be defined as a collection of independent, dynamic, wireless and mobile nodes that can be established without the help of any pre-existing infrastructure. As every node in a MANET is a wireless node, it has a limited transmission range, and hence cannot communicate with all the other nodes in the network

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directly. This has lead MANET to be a multi hop network.

Every node in a MANET moves randomly in and out of it and hence the topology of this network changes dynamically. This feature of MANET's also result in frequent changes in the location of the mobile nodes which makes routing task more complicated. As the nodes are mobile, and hence there is no continuous power supply, the transmission power of the nodes is limited. As MANET is an infrastructure less and easily reconfigurable network, deployment is very easy and installation costs are very low, which has led to its wide range of application areas. MANETs have applications in many emergency and rescue situations like military, earth quakes, floods, war zones, medical and industrial fields, corporate offices, relief operation areas for disaster management, personal and home networks.

1.1 Routing Protocols for MANETs

As each and every node act as a router on its own, routing is a major issue to be taken care of in MANET's. There are several routing protocols proposed in literature based on the way how the routing tables are maintained in the nodes and when the path to the destination node is evaluated. There are many ways of classifying the routing protocols but most of them rely on routing strategy and network structure. Mainly these are classified as Flat, hierarchical, and Geographic position based routing protocols.

Another major classification is based on whether they are on-demand or table-driven. Flat routing protocols are further divided into several types based on whether the routing table is generated statically before itself or whether it is generated only ion demand as when the need comes so as to make a routing decision. Examples of table-driven protocols are Optimized Link state Routing (OLSR), Fish-eye state routing (FSR), Destination -Sequenced Distance Vector Routing (DSDV) etc. Examples of on-demand routing protocols are: Ad-hoc on demand Distance Vector (AODV), Dynamic source Routing Protocol (DSR), temporally ordered Routing Algorithm (TORA) etc. Several hybrid protocols are also used to find a balance between the above two types which take the domain information into account. Examples of hybrid routing protocols are Zone routing protocol and Wireless ad hoc routing protocol. As the size of the network increases, flat routing protocols do not perform well because of the lot of overhead incurred. In such cases hierarchal routing algorithms perform better. Examples of such algorithms are Hierarchical state routing, Zone routing protocol etc.

Another class of routing protocols are based on the location information and takes the geographic co-ordinates into account and maintain reference points to compute the routes. Examples of such algorithms are Geo cast (geographic addressing and routing), DREAM (Distance Routing effect algorithm for mobility) and GPSR (Greedy perimeter stateless routing).Figure 1 shows the basic classification as mentioned above.

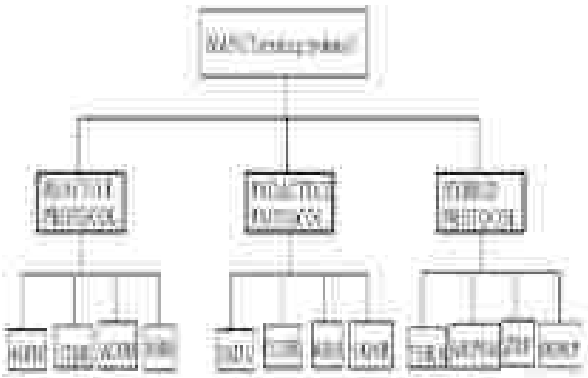

Fig.1.1: Classification of Routing protocols in MANET's

2. RELATED WORK

There are several routing protocols proposed in literature to address several issues related to security of data exchanged in communication. A secure protocol called SAODV [27] by Preeti Sachan and Pabitra Mohan Khilar, uses a route discovery mechanism that reduces time delay and reduced network load in the presence of a black hole attack. In "Evaluating the performance of secure routing protocols in Mobile Ad-hoc Networks" [28], a protocol called SEAD reduced computational overhead when there is less mobility in the nodes but this paper doesn't address collaborative attacks. A model checker called SPIN[29], which presents a MANET verification framework is applied to models of the Optimized Link State Routing (OLSR) and Secure OLSR protocol against five attack vectors. These vectors are based known attacks against each protocol but this protocol doesn't work effectively in detection of malicious nodes. So this can be treated as a reactive approach based protocol.

A secure on-demand MANET routing protocol named Robust Source Routing (RSR)[30] provides authentication and integrity goals of a MANET and improved packet delivery fraction in the presence of malicious nodes, but doesn't address all types of attacks in MANET. In a research work titled "Securing MANETs Routing Protocol under Black

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Hole Attack[8], authors proposed a solution to black hole attack in AODV routing protocol.

A scheme called "Global State Routing" (GSR)[36], has been proposed in which the nodes exchange vectors of routing information. Based on these link state vectors, nodes maintain a global knowledge of the network topology and optimize their routing decisions locally. In "Routing Protocol for Mobile Ad hoc Networks using Mobility Prediction" by W. Crescitt and K. Sezaki [35], a routing algorithm based on the location changes of the nodes due to mobility feature of MANET's was introduced. "Study of Black hole Attack Using Different Routing Protocols in MANET" [38] is a discussion on comparative investigations of routing protocols under the various types of attacks via packet delivery ratio etc.

An insight of ZRP [37] and its analysis on the basis of parameters Throughput, Load, Data Dropped and Delay using simulator OPNET 14.0 is presented. Also, a new dynamic multipath routing method [41] maintains the routes periodically and avoids breakages in routes, even if a breakage appears the route is changed priory. This method makes use of a tunable route metric which is calculated dynamically by considering the durability, consistency and quality of all individual paths and thereby gives quality routes suitable for diverse QoS requirements. A new scheme of routing and exchanging delays in the network was proposed by Mc Quillan and Rosen in "The new Routing Algorithm for the ARPANET"[42], IEEE Transactions' May 1980. J.J. Garcia-Luna-Aceves suggests "A Unified Approach to Loop free Routing using Distance Vector and link states" [43], which uses a Dual Algorithm which gives loop free paths for routing. Shortest paths are computed in this algorithm but no dynamic metrics were used. Thomas Beth[44] in 1994 proposed a method to evaluate trustworthiness in "Value of Trust in open Networks", to develop trust relationships among the nodes.

Charles E. Perkins and Pravin Bhagwath presented an innovative design in "Highly Dynamic Destination-Sequenced Distance-Vector Routing (DSDV) for Mobile Computers[45]" in SIGCOMM, ACM, 1994, and modified the basic RIP algorithm to David B. Johnson David A. Maltz, in "Dynamic Source Routing in Ad Hoc Wireless Networks"[46], book chapter in Mobile Computing 1996, emphasized on exchanging the routing updates when the host movement is frequent. Panagiotis Papadimitratos, Zygmunt J. Haas, in "Secure Link State Routing for Mobile Ad Hoc Networks[21]" during International Symposium on Applications and the Internet, Orlando, FL, January 28, 2003, proposed a method to secure a network against individual attackers, but it is not suitable to hybrid networks and for nodes with different processing capabilities.

3. Routing Attacks and Security Issues in MANET's

Due to the fact that MANET is a group of nodes that form a temporary network without centralized administration, the nodes have to communicate with each other based on unconditional trust. This characteristic leads to the consequence that MANET is more susceptible to be attacked by inside the network while comparing to other type of networks. Practically, MANET could be attacked by several ways using multiple methods. The classification can be based on the behavior of the attack (Passive vs. Active), the source of the attacks (Internal vs. External), the processing capacity of the attackers (Wired vs. Mobile) and the number of the attackers.

3.1 Multiple Node Attacks

In MANETs, the attack may be from one or more nodes also, in such case these type of attacks are called as multiple node attacks, where two or more nodes cooperate to perform any malicious activity. Such attacks are also called as cooperative-attacks.

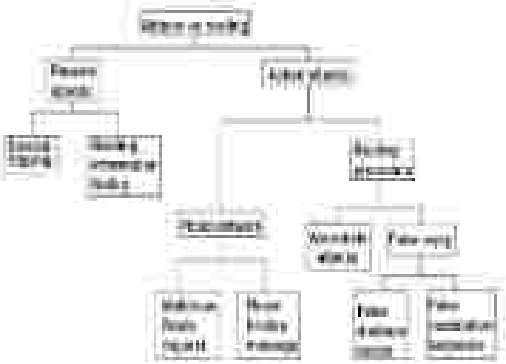

Fig 3.1: Classification of Attacks on Routing

3.1.1 Black hole attack

A black hole-attack occurs when a malicious node impersonates the destination node or forging route reply message that is sent to the source node, with no effective route to the destination. The malicious node may generate unwanted traffics and usually discards packets received in the network. When this malicious node (black hole node) has effect on one or more nodes, making them malicious as well, then this kind of attack can be referred to as multiple node attack or collaborative attack. In a black hole

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attack, the malicious node presents itself as having the shortest path to the node it is impersonating, making it easier to intercept the message. To achieve this, the malicious node waits and tries to get the replies from nearby nodes in order to discover an invalid route. This route could be forged, illegitimate or an imitation but it appears genuine to the source node.

Black hole attack can be summarized in following steps:

1. Malicious node detects the active route and notes the destination address.

2. Malicious node sends a route reply packet (RREP) including the destination address field spoofed to an unknown destination address. Hop count value is set to lowest values and the sequence number is set to the highest value.

3. Malicious node send RREP to the nearest available node which belongs to the active route. This can also be send directly to the data source node if route is available.

4. The RREP received by the nearest available node to the malicious node will relayed via the established inverse route to the data of source node.

5. The new information received in the route reply will allow the source node to update its routing table.

6. New route selected by source node for selecting data.

7. The malicious node will drop now all the data to which it belong in the route.

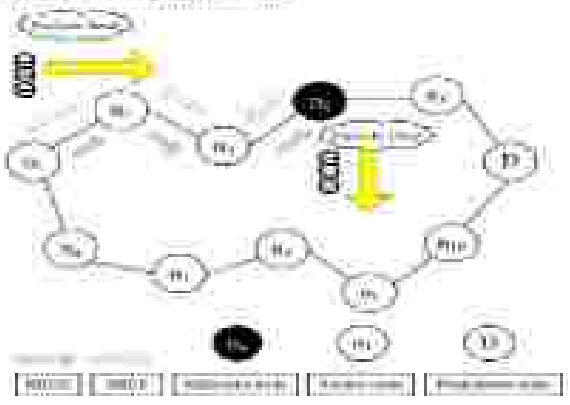

Fig 3.1.2: Presence of Black Hole in the Attack

In black hole attack the malicious node "A" first detect the active route in between the sender "S" and destination node "D". The malicious node "A" then send the RREP which contains the spoofed destination address including small hop count and large sequence number than normal to node "C". This node "C" forwards this RREP to the sender node "S". Now this route is used by the sender to send the data and in this way data will arrive at the malicious node. These data will then be dropped. In this way sender and destination node will be in no position any more to communicate in state of black hole attack.

Fig 3.1.2: Presence of a Black Hole in the network

3.1.2 Wormhole attack

A wormhole attack is an attack in which the attacker provides two choke points that are used to degrade the network or analyze traffic as referred anytime. False impressions are used in creating these choke-points with two or more nodes join together. In other words, Wormhole attack creates a tunnel that records traffic data in bits or packets at one network place and channels them to another place in the network. Wormhole attack is a severe attack in which two attackers placed themselves strategically in the network. Wormhole attack can be summarized as following steps:

1. The attackers then keep on hearing the network, record the wireless data. The figure below shows the two attackers placed themselves in a strong strategic location in the network.
2. The attacker gets themselves in strong strategic location in the network. They make the use of their location i.e. they have shortest path between the nodes.
3. They advertise their path telling the other nodes in the network to know they have the shortest path for the transmitting their data.
4. The wormhole attacker creates a tunnel in order to records the ongoing communication and traffic at one network position and channels them to another position in the network.
5. When the attacker nodes create a direct link between each other in the network, the Worm hole attacker the receives packets at one end and transmits the packets to the other end of the network.
6. When the attackers are in such position the attack is known as out of band wormhole.

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Fig. 3.1.3: Simulation of a worm hole in the network

Because of the Black Hole and Worm Hole attacks in the network, the presence of malicious nodes degrades the performance of the network so drastically in which case the efficiency of the network is far less than the desired value. Simulations were done to analyze the performance w.r.to the parameters like Packet Delivery ratio, Throughput, Packet Loss etc., in different routing protocols like AODV, DSR, DSDV etc., Following graphs shows the impact of presence of malicious nodes in the network on Packet Deliver Ratio, Throughput, Packet Loss. Results show that there is a constant decrease in the total no. of packets delivered to the destination which in turn reduces the Packet Delivery Ratio and Throughput. Also, there is an increase in the total no. of packets lost or dropped by the malicious nodes as well as an increase in End-to-End delay is testified.

The performance of the existing protocols for MANETs like AODV, DSR, DSDV etc. degrades drastically to a significant level in the presence of these attacks and the following figure 3.1.5 summarizes the performance of the protocols on various performance metrics and in which case which protocol is preferred.

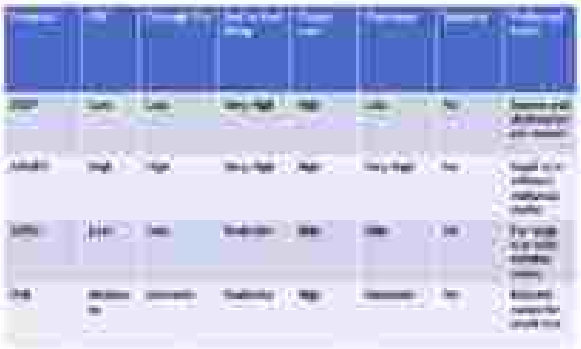

Fig. 3.1.5 Summary of Existing Protocols for MANETs

As many of the existing protocols have poor performance considering the performance parameters like Packet Delivery Ratio, Throughput, End to End Delay, Packet Loss etc., there is a need to develop a new secure protocol that addresses security threats and attacks and propose a solution to overcome the problems due to the presence of attacks.

4. Implementation of a new hybrid secure routing protocol SDSR

Source based routing is employed in the proposed protocol, where the source nodes initiates the route discovery process and updates its routing table entries based on the replies coming from the neighbor nodes. Dynamic routing updates are exchanged between the nodes using the route update mechanism in AODV, but as AODV has more overhead, to overcome that location aided routing is employed in the proposed protocol. As DSR and AODV fail in detecting the malicious nodes and secure data transmission from source to destination, this protocol uses trust metrics to detect the malicious nodes and exclude them from the path chosen for data transmission, thus guaranteeing secure data transmission.

When a node has data to send to a specific node in the network, first it initiates the route discovery phase to find a path to the destination node, if it doesn't have one. In this process, source node sends a route request to its neighbor nodes, rather than just flooding it, which reduces the overhead on the network. Upon reception of Route request, the intermediate nodes verify their routing tables, if a path to that destination exist, if exists, send a reply back to the source node. If a path doesn't exist, the request will be forwarded to the next hop and so on until it reaches the destination node.

While forwarding these, every node also evaluates the trust value of their neighbor nodes and update the same in their routing tables, as well as appending it in the reply packet. Source node upon reception of reply packet from the destination node, verifies the nodes in the path specified in the packet, evaluates them according to trust and load and finally prepares a path to the destination node, excluding the malicious nodes from the path. Hence a secure routing path is found from the source to the destination.

4.1 SDSR Protocol

When the source node forwards the RREQ packet to find a best route to the destination, all the adjacent nodes append their identities and trust information about their neighboring nodes in the RREP packet which is received by the source node. The source node can calculate the final trust value of the nodes based on the primary and

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secondary trust values received. Based on this max value computed, a node can analyze whether a specific node is malicious or not. Not only the trust value acts as a metric here to compute the trustworthiness of a node, but also the sequence number of the RREP received by the source node can be a representative of whether the node that has forwarded this packet is malicious or not. If there is a huge difference in the sequence number of the reply packet, that node can be labelled as a malicious node.

Implementation of this protocol can be summarized as follows:

1. We have to use 50 nodes to form the MANET. Each of which are all mobile nodes.
2. Then detect the location of all nodes and calculate the distance of 1 hop node and stored in table.
3. Generate the sequence number for all node's by using sequence number scheme and stored in table
4. Select source and destination.
5. The source node will send the route request RREQ to all nearest node to reach the Destination and the destination also send the route response RREP with the sequence number to all nearest node to reach the Source
6. Compare the all sequence number in RREP with sequence number table based on this detect the black hole attacker node
7. After that we find the path between the source and destination.
8. For route selection we have used SDSR routing protocol. This selects the secure path between the source and destination.

In the sequence number method the received RREPs are stored in the table. The method compares the sequence number in RREPs with that of the resource node. If there is a significant difference, the method considers that RREP is originated from a malicious node. In SDSR, the source node analyses all the stored RREPs from table and discards the RREPs having very high destination sequence number and select the Best Route

4.2 Flowchart for SDSR Protocol

Figure 4.1 shows the overall flow of the proposed new hybrid secure routing protocol starting with the route discovery from the source node and the sequence that follows the evaluation of trust information and load on the nodes by the source and finally finding the secure path towards the destination node.

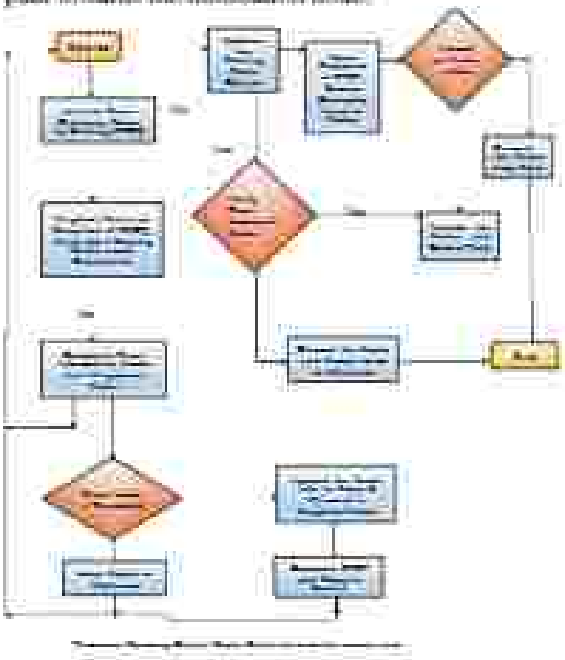

Fig. 4.1 Flowchart for SDSR Protocol

4.3 Simulation Environment

Network Simulator-2(NS-2) modeler has been used in this work for performing simulations on a network with varying parameters. The simulator is composed of two parts:

1. The TCL code
2. Visualization Tools (XGRAPH & NAM)

4.3.1 Simulation Parameters

set val(chan)	Channel/Wireless Channel # channel type
set val(prop)	Propagation/Two Ray Ground # radio-propagation model
set val(netif)	Phy/WirelessPhy # network interface type
set val(mac)	Mac/802_11 # MAC type
set val(ifq)	Queue/DropTail/PriQueue # interface queue type
set val(ll)	LL # link layer type

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```
setval(ant)        Antenna/Omni Antenna
                        # antenna model
setval(ifqlen)     50
                        # max packet in IFQ
setval(nn)         [lindex $argv 0]
                        # no. of mobile nodes
setval(rp)         SDSR
                        # routing protocol
setval(x)          300
                   #X dimension of topography
setval(y)          300
                   # Y dimension of topography
setval(stop)       30
                   # time of simulation end
```

For evaluating the efficiency of the protocol, the following performance metrics have been considered:

Packet Delivery Ratio: It is the ratio of the number of data packets received at the destination to the number of data packets generated by the source node.

*PDR= ∑Numbers of packet receive/∑Numbers of packet send*100%*

Average end-to-end delay: This is the average delay caused due to latency in route discovery, retransmission delays, transfer delays etc.

End to end delay= ∑(arrive time−send time)/∑Number of end-to-connections

Throughput: This is the ratio of total number of packets received to the number of packets during a time interval.

Throughput=∑Size received packet/∑(Stop time−start time)

Overhead: This is the total number of control packets like RTS, CTS, ACK etc., data packets generated during data transmission across the entire network.

Routing overhead=∑routing packet/∑packet received

Packet Loss: This is the total number of packets sent from the source minus the total number of packets received at the destination.

Packet Loss=Total no. of packets sent− Total no. of packets received

Detection rate: It is the ratio of the number of nodes that are possibly attacked by a malicious node to the number of how many of them are successfully detected.

Detection Rate = Total Detected malicious nodes/Total no. of malicious nodes

Detection Accuracy: It is the ratio of the number of links declared as attacked by a malicious node to the number of how many of them are actually affected.

Detection Accuracy =Total Detected malicious nodes/Total Actual malicious nodes

4.4 Performance Evaluation of SDSR Protocol

4.4.1 Performance Analysis on PDF:

With the detection of malicious nodes and hence making a path with secure nodes to the destination, there is an increase in the PDF ratio in SDSR protocol when compared to existing protocols proposed for MANET's. Using the trust based information about the nodes on the path to destination makes it easy to identify the malicious and hence helps in finding alternate path dynamically which results in improved PDF across the network.

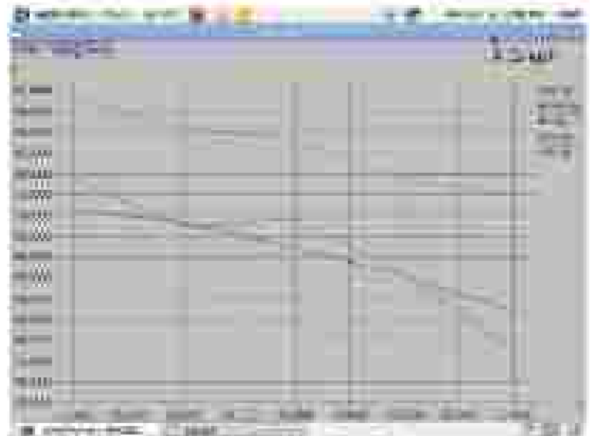

Fig. 4.5.1 Xgraph showing PDF Vs. Pause Times

4.4.2 Performance analysis on Throughput:

This performance of this algorithm w.r.t. throughput is an improvement over the existing ones, which shows that at different stop times the throughput gradually increases which shows that more number of data packets can be transmitted on the identified path within a prescribed unit of time.

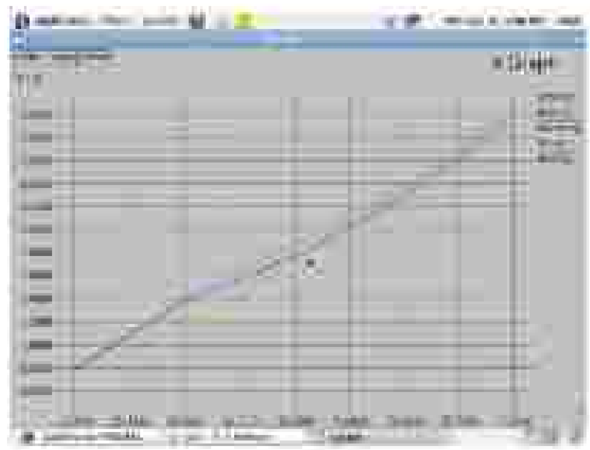

Fig. 4.5.2 Xgraph showing Throughput (Received Packet Size Vs. Start and Stop Times)

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4.4.3 Performance analysis on End to End Delay:

While transmitting the packets from source to destination, as the nodes are wireless and therefore use a wireless physical channel, due to its properties like reflection and refraction, link failures, delays occur in transmission of packets from source to destination.

Fig. 4.5.3 Xgraph showing End to End Delay Vs. Start & Stop Times

Few packets are discarded if the packets are lost after the threshold time limit. The table in previous slide illustrates the delay in msec caused at various pause times. As the number of packets and their size increase, end to end delay also gradually increases. This is reduced in this protocol by selecting a reliable shortest path from source to destination. Even though the number of malicious nodes increase, there is not significant decrease in the performance metrics as trust evaluation is still done more co-operatively. SDSR succeeds in detection of presence of malicious nodes, so the performance of the protocol is not affected. There is a slight increase in the overhead as little more number of control packets are generated to exchange information about these malicious nodes.

5 Conclusion and Future Scope

An implementation of routing protocols proposed for MANET's was done and found that various routing protocols existing for MANET's doesn't address the different types of attacks in MANET's. Various proactive and reactive protocols like AODV, DSR, and MDMDV were implemented using diverse parameters. Performance Analysis of these existing protocols was done by considering metrics like Packet Delivery Fraction, Throughput, Packet loss, End to End delay, Overhead etc. to emphasize their behavior in different scenarios. Most of them exhibited better performance when there is no mischievous behavior but when open to specific attacks like black hole and worm hole, the number of packet drops gradually increased in the presence of malicious nodes. A new hybrid secure protocol SDSR which can work for both proactive and reactive protocols has been proposed and implemented which reduced packet loss, end to end delay and improved packet delivery ratio, throughput even in the presence of malicious nodes. This protocol reduced the possibility of occurrence of attacks using metrics like service, reputation and recommendation trust metrics to create a trust network in a peer's proximity. This protocol also actualized and executed the location aided routing which reduced the number of broadcasts there by reducing the overhead and hence load on each node is maintained at a minimum level which helps to utilize the network resources effectively.

Because of the use of trust information about the nodes, the authenticity of the nodes was easily verified and hence the time required for source to choose an alternate path is downsized. There is an improvement in packet delivery ratio and throughput and reduction in end to end delay and overhead when compared to protocols like AODV, DSR, DSDV etc. Also the number of packet losses had been reduced to a significant amount. In many of these parameters, this proposed SDSR protocol outperforms the existing protocols for MANET's. This protocol works best by finding more reliable secure paths if few more additional metrics also can be added as verification of the nodes authenticity. By varying the simulation scenarios with different types of attacks and variable packet sizes, optimal performance of the protocol can be accomplished.

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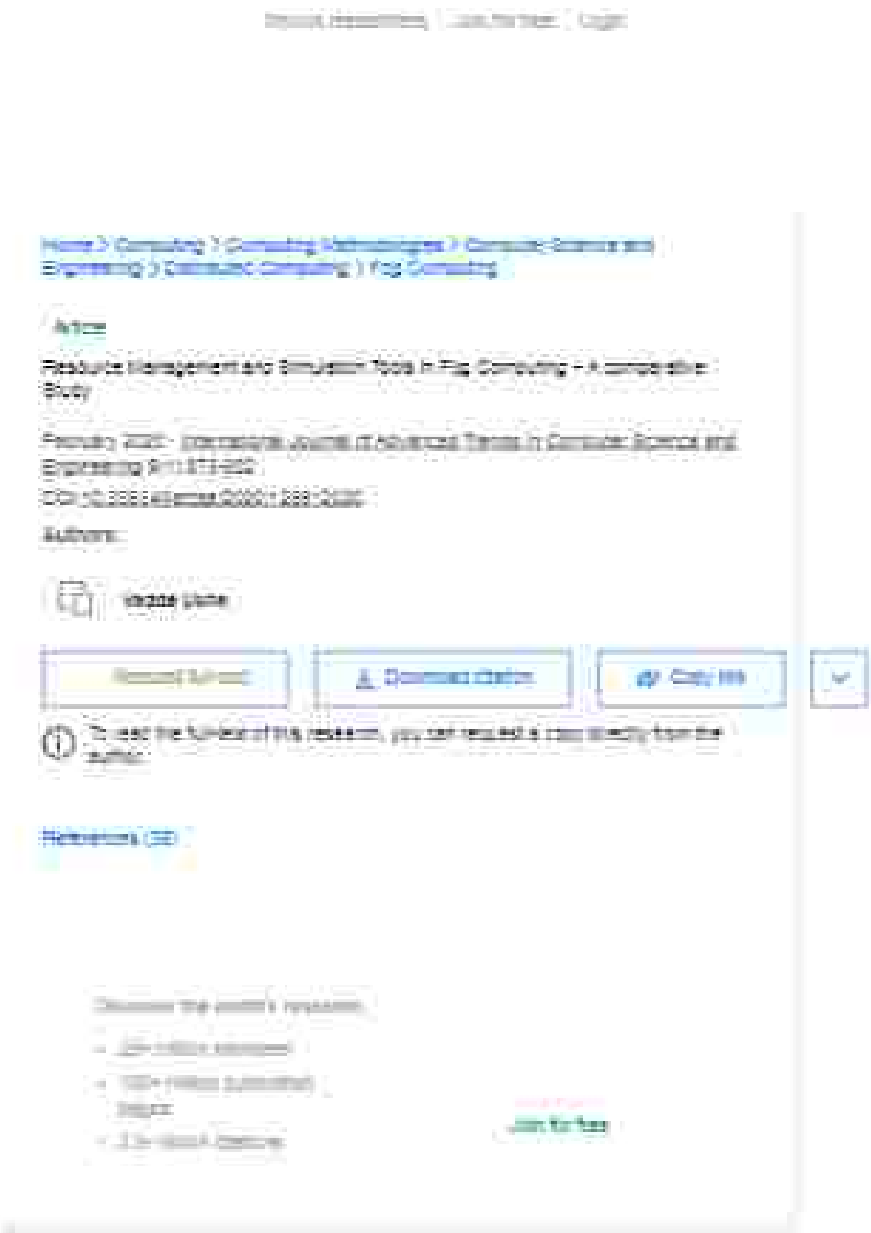


Power of random choices made efficient for fog computing

Energy Saving Using Green Computing Approach for Internet of Thing (IoT) Based Tiny Level Computational Devices

Authors: Gonuguntla, Obulesu; Munisekhar, Mahendra; Kallam, Suresh; Madda, Rajasekhararababu
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DOI: https://doi.org/10.2174/2213275912666181030110313

Abstract | References | Citations | Supplementary Data

Background: It is important to minimize energy consumption that improves battery life, system reliability and other environmental concerns and energy optimization is turning into a very important in the tiny devices in Internet of Things (IoT) research area with the increasing demand for battery operated devices. IoT need battery life improvement in tiny device, so power optimization is significant.

Methods: In this paper an Experimental Design (ED) is proposed for the performance improvement in terms of energy and run time. Among the many sutras of optimizations, by using the Green computing the products are work with limited battery. This proposed technique results in reduce power consumption.

Results: The result shows that the proposed Energy saving on tiny devices based on IoT are the energy consumed and run time by the code after applying optimization techniques, which is the minimum among all four. Besides reduction in energy and runtime, reduction in the number of executed instructions is also achieved.

Conclusion: This paper comprehensively describes the. Its average performance percentage reached 91.1 % for energy, the performance reduction in energy and runtime, reduction in the number of executed

Diabetes Prediction using Machine Learning Techniques

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Keywords:
Diabetes, Classification, Clustering, Regression, SVM, K-NN, Neural Networks

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Abstract

Diabetes Mellitus is one of the growing fatal diseases all over the world. It leads to complications that include heart disease, stroke, and nerve disease, kidney damage. So, Medical Professionals want a reliable prediction system to diagnose Diabetes. To predict the diabetes at earlier stage, different machine learning techniques are useful for examining the data from different sources and valuable knowledge is synopsized. So, mining the diabetes data in an efficient way is a crucial concern. In this project, a medical dataset has been accomplished to predict the diabetes. The R-Studio software was employed as a statistical computing tool for diagnosing diabetes. The PIMA Indian database was acquired from UCI repository will be used for analysis. The dataset was studied and analyzed to build an effective model that predicts and diagnoses the diabetes disease earlier.

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Integrated Vehicle Monitoring System

Authors: Sai Srilvani Dr.Anitha Chepuru, Greeshma Mandireddy, Hima Kosu Reddi, Priscilla Rajarao

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IoT AND TOUCH-BASED HOME AUTOMATION

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ABSTRACT - Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects through the Internet. Home monitoring and home automation are utilized in order to uphold the comfortable living conditions within a home. This IoT project focuses on building a smart wireless home automation system. A low-cost flexible and reliable home automation system with additional security using Arduino microcontroller, with IP connectivity through local Wi-Fi for accessing and controlling devices by authorized user remotely using Smart phone application. The proposed system is server independent and uses Internet of Things to control human desired appliances starting from industrial machine to consumer goods. To demonstrate the effectiveness and feasibility of this system, we present a home automation system using Arduino IDE software and ESP-32 microcontroller as a connectivity module. It helps the user to control various appliances such as light, fan, TV and can take decision based on the feedback of sensors remotely.

Keywords - Arduino IDE, ESP-32 microcontroller, Home Automation, Sensor.

I. INTRODUCTION

Home automation is the application of computer and information technology that controls home appliances easily. Home Automation system allows the users to manage and handle all the electric appliances. As the technology is developing, people tend to live a comfortable and flexible life. This IOT based home automation helps the people to connect to their appliances from anywhere and at any time. This wireless system uses a mobile application to control the home appliances and function automatically through internet from anywhere around the world globally. This project reduces the electricity, man involvement and wastage of resources. It mainly concentrates on the touch sensor which includes mobile phone for operating the appliances.

II. LITERATURE REVIEW

Existing System

There are systems similar to the proposed system in existence which have sensors for the feasible operating of the appliances. These systems work with human sensors as well as the voice recognitions. Their working with the human sensors are just limited to a particular area which cannot be operated outside the site . In this competitive world and busy schedule, human cannot spare time to perform his/her daily activities manually. As these systems require the presence of human to control the appliances it may lead to the wastage of power and electricity in the absence of people. Sometimes it is very risky when we forget to turn off the devices and it is not that simple to stop our work and rush to the site to turn off them. It also time consumable. The most common thing that we need to do is switching ON/OFF the loads without much human involvement. During our literature survey we have come across various home automation technologies where different authors have mentioned different technologies that they have used for their project implementation.

- Ali Ziya Alkar in 2005 introduced a model on secure wireless home automation which was made using the unified modelling language . They have provided security with authorization whereas unauthorized people cannot have the access to the system.
- R. Piyare in 2011 used the Bluetooth technology for smart automation using a cell phone. But sending commands from software is not feasible and Bluetooth has a short range where if a user is not in the range of the system he cannot access and control the devices using the technology.
- Rahul Ashok in 2014 compared different technologies that are most popularly used in todays world. He has stated many applications of the technologies whereas on the other hand he gave some disadvantages regarding each one of them.

 DOI : 10.35291/2454-9150.2020.0335

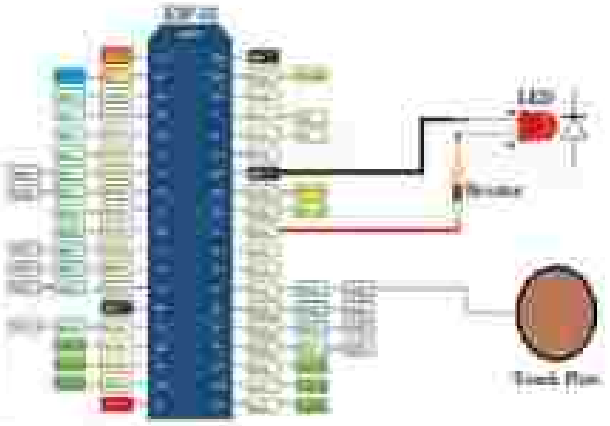
- Shiv Kumar in 2014 proposed a prototype which is android based and uses internet connectivity as well as Bluetooth technologies. It has an android application where we can select the technology by which we can access the system. But for the internet connectivity the user has to enter the IP address as well as the password and even for the Bluetooth we need to have the password. This is a bit long process as people now a days wants everything to happen at just a blink of an eye.
- Amrutha S in 2015 presented a system which is based on voice recognition. In this the system must be trained before hand with the commands. But if recognizing the voice fails, the user cannot access the system.
- K Vidyasagar in 2015 focused on the automation of home appliances using Bluetooth. In this the commands are sent through Bluetooth and the monitoring of the device status is done using IEEE 802.15.4 wireless device which is interfaced to the internet.
- Vinay sagar in 2015 presented an automation system using Intel Galileo. In this they have used the WiFi technology which connects the web server with the sensors. Alarms will be raised when the sensor parameters are beyond the threshold parameters.
- Ravi Kishore in 2016 mainly concentrated on home security and home automation. This system sends alert to the owner over voice calls through internet when it senses human movement. If the person entering the house is a guest of the owner, then the system instead of raising an alert alarm makes arrangements for the guest such as opening the door, switching on the lights and fans etc., which reduces the work and involvement of the owner.
- ProfH.B.Shinde in 2017 used android application which sends signals to the Arduino board. ESP8266 Wi-Fi module is used for communication between Arduino board and mobile application.
- Sudha Kowaliya in 2018 aimed at building a smart home automation system using Wi-Fi connection. This prototype sends alert to the owner over E-mail using the internet.

This has become a major drawback of the present-day home automation systems. The touch-based automation system has overcome the drawback of the existing system.

III. PROPOSED SYSTEM

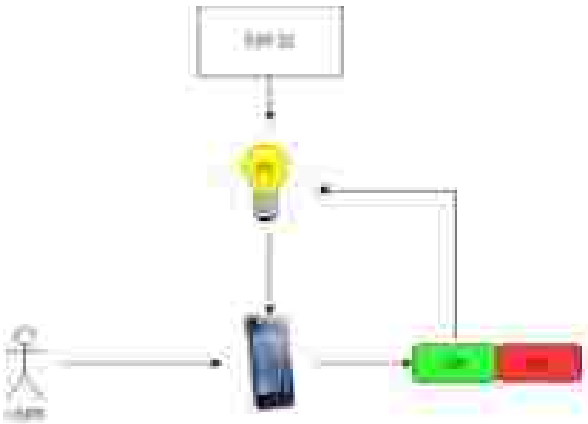
The main focus of this system is touch sensor which helps the users to control the appliances from anywhere and at any time. This is the most optimal way of controlling and handling the devices. This Automation System uses Arduino and ESP-32 microcontroller and works with Wi-Fi technology. The system is better from the reliability and flexibility point of view than the commercially available home automation systems.

The system has both hardware and software components. The hardware system includes ESP-32 microcontroller, bread board, sensor, LED and home appliances. The software system consists of an android application, Arduino IDE. The hardware components contribute to the handling and controlling of the home appliances through internet and the ESP-32 microcontroller helps to develop an interface between hardware components and software application.



The connections are made as shown in the figure.

The ESP-32 microcontroller is placed on the bread board along with the touch sensor connected to the bread board. The LED is also connected to the bread board through which we get the output. Since our project is both touch based as well as Wi-Fi enabled, the ESP-32 microcontroller and the Arduino IDE software should be compatible with each other. There is only one input[Touch sensor] and one output[LED] in the circuit. After all the connections are done, the ESP-32 is powered up with 5Volts supply or USB cables. This allows us to ON-OFF the home appliances through our mobile application with just one click from anywhere. The only requirement is that Wi-Fi should be integrated to the module. This helps the end users to access the appliances from anywhere around the world.



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The LED through which we get the output is connected to the ESP-32 microcontroller. It is also supplied with a 5V power supply. The user performs the task with the help of the android app which is developed with the help of the MIT app inventor. Each home appliance is controlled with the ON/OFF toggle buttons. The ESP-32 module has to be integrated with Arduino IDE software. Arduino IDE is a cross-platform application which is written in Java and coded in C/C++. Our aim is to control the home appliances with Touch as well as Wi-Fi. Since ESP-32 has in-built Wi-Fi port we there is no need of an external Wi-Fi module. The touch sensor is also connected to the module. When we touch the sensor plate, the commands are transmitted to the module through the connecting wires and the readings of the GPIOs are directly taken by the touch function of the module. When the readings are set, it enables the LED to glow. This is shown in the android app with the ON button toggles.

When we release the hand from the sensor it displays as the light is off.

There are many challenges faced by the existing home automation systems. These include high manufacturing costs, high development costs, high installation costs, additional service and support costs, lack of automation standards, consumer unfamiliarity with technology and complex user interface. The advancement of time, technology and processing power leads to a considerable reduction in device cost and size.

Features of the proposed system:

- Reduced Installation costs
- Internet Connectivity
- Scalable and Expandable
- Security

3.ESP-32

ESP-32 is a great module for designing IoT applications and adding touch feature to it makes it even more smart. It is a microcontroller designed by Espressif. It is so convenient that even a novice can use it. ESP-32 contains Wi-Fi, Bluetooth, inbuilt touch sensing pins, temperature and hall sensors on board which makes it fit for IoT and smart home.

ESP-32 contains 10 Touch sensing general purpose I/O(GPIO) pins. A touch sensor system is built on a substrate which carries electrodes and relevant connections under a protective flat surface. When a user touches the surface, the capacitance variation is triggered and a binary signal is generated to indicate whether the touch is valid. The 10 sensing pads are arranged in different combinations so that a larger area can be detected. The touchpad sensing process is under the control of a hardware- implemented finite-state machine(FSM) initiated by software.

IV. CONCLUSION

This IOT based home automation system has become more efficient and flexible with the touch feature. It is so simple and can be accessed easily by the novice users. Due to its performance, simplicity, low cost and reliability touch-based home automation system is making its position in global market.

Performance Analysis:

Parameters/Papers	Apurva Chopara	Ali Zaza	Rahul Ashok	Ananthi a.S	Vinay Sagar
Technology/Microcontroller used	Wi-Fi, Bluetooth ESP-32	Wi-Fi PIC16F877A	Bluetooth, Arduino Mega 2560, Arduino Ethernet Shield	SMS(Zigbee)	Intel Galileo
Cost effective	Yes	Yes	Yes	Yes	Yes
Flexible	Yes	Yes	Yes	Yes	Yes
Energy usage	54%	10mA	30mA	100 MW	25 W
User friendly	Yes	Yes	Yes	Yes	Yes

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We have compared our system with the other prototypes on which we have done the survey. We considered few parameters for the comparisons. Every project has different technologies used. Though they have various applications features, some barriers like the range of the internet connectivity shows some disadvantages of them. The touch feature of our system makes it unique from all the existing systems.

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GRENZE

Grenze International Journal of Engineering and Technology, July Issue

Direct Power Control for a Multilevel Inverter Fed Induction Motor Drive using Predictive Torque Control

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***Abstract*—A novel direct power control (DPC) scheme, with virtual flux orientation based on the grid voltages, has been implemented for an induction motor drive (IMD) fed by an active front end converter (AFEC). The inverter considered here is a multilevel inverter controlled by predictive torque control (PTC). Estimation of instantaneous active (P) and reactive power (Q) of the AFEC is carried out using virtual flux from the main supply. The optimal switching states are selected from the switching table based on the errors in P and Q and hence the active and reactive power control is directly accomplished by the device switching states of the front-end rectifier. Multilevel inverter at the motor side is controlled using a newly proposed PTC algorithm. The proposed algorithm predicts the behavior of the drive under various load conditions which accordingly sets the power requirement for the AFEC. The optimal voltage vector selection in the proposed algorithm is applied to both rectifier and inverter, which reduces the number of switchings and therefore results in distinguishable reduction in the switching losses. Four quadrant operation of this multi-level inverter fed induction motor drive with DPC at the front end and PTC at the load end is implemented in Matlab/Simulink environment and the results are presented. The performance obtained for the drive with the proposed control configuration under various steady state and transient operating conditions show that the drive possesses an excellent dynamic response apart from having impeccable power quality at the front end.**

***Index Terms*— Direct Power Control (DPC), Predictive Torque Control (PTC), Multilevel Inverter (MLI), Active front end (AFE), Induction Motor Drives (IMD), Total Harmonic Distortion (THD).**

I. INTRODUCTION

Active front end (AFE) rectifiers are being employed in a wide range of applications, such as Distributed Generating systems (DGS), Battery Energy Storage Systems (BESS) and adjustable speed drives (ASDs), to improve the power quality (PQ) at the point of common coupling (PCC). This is because the consumers as well as the utilities are very concerned about maintaining an acceptable level of PQ adhering to the international power quality standards. The quality of power has become a major concern for the consumers as well as utilities due to the proliferation of power converters employed in various applications causing non-

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Mathematical Analysis and Simulation of Permanent Magnet Synchronous Motor for Electric Vehicle Application

K. Navyasree, N Malla Reddy

Abstract: Permanent magnet synchronous motors in electric vehicles are gaining more and more attention because of its high performance and high torque to inertia and high power density. PMSM Motor should operate in four quadrant operation at different driving characteristics the torque speed characteristics of the motor is observed. Battery and super capacitor is used for energy sources to the permanent magnet synchronous motor the design of electric vehicle is onboard charging system. Battery and supercapacitor are hybrid energy sources. PMSM motor is controlled by using field oriented control technique. Voltage source inverter is used to control the speed of the PMSM motor at different frequencies. The control technique used for VSI is space vector control technique. Using MATLAB Simulink.

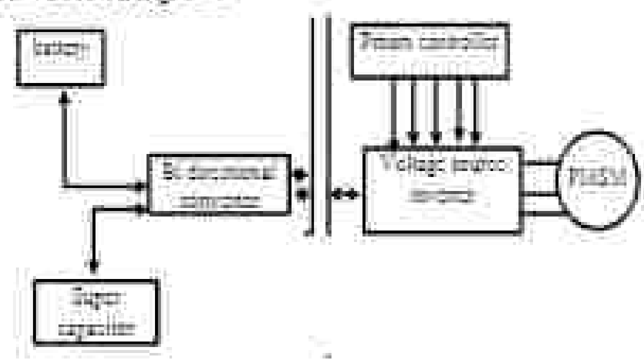
Keywords : EV, PMSM motor, PMSM mode.

I. INTRODUCTION

permanent magnet synchronous motor is same as the conventional synchronous motor only the difference is it consists of permanent magnetic the rotor so the field winding is absent in PMSM motor. PMSM is gaining of permanent magnet the losses in the motor are negligible. The controlling of PMSM is easy compared to the other motors. PMSM for electric vehicle application to drive the vehicle at different driving characteristics during motoring mode the torque and speed are positive and during regenerative braking positive speed and negative torque in this mode the load act as a source to the vehicle.

Permanent magnet synchronous motor is used in electric vehicle because of its characteristics.

A. Block Diagram



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Dr. N.Malla Reddy, M.tech from JNTU, Hyderabad and PhD from JNTU Hyderabad.

Battery and super capacitor act as anenergy supplying devices to the permanent magnet synchronous motor during acceleration the energyfrom the battery is supplied to the motor to run the vehicle when deceleration the supercapacitor and battery together will supply the energy to the motor. The voltage source inverter is used to controller the speed of the motor at different driving characteristics.

B. Field oriented controller:

In ac motor the decoupling of stator and rotor is so what difficult. By using field oriented control, we can create the decoupling between torque and flux at constant current. The permanent magnet synchronous motor is controlled by using vector controller. In this controller we use different transformation for controlling. They are:

1 clark's transformation
2 park's transformation
3 inverse park's transformation
4 inverse Clark's transformation

C. Clark's transformation

In this transformation **abc** is converted into $\alpha\beta$ three phase rotating into two phase stationary

$$\begin{bmatrix} ia \\ ib \\ ic \end{bmatrix} = \begin{bmatrix} \cos\theta & \sin\theta \\ \cos(\theta-120) & \sin(\theta-120) \\ \cos(\theta-240) & \sin(\theta-240) \end{bmatrix} \begin{bmatrix} i\alpha \\ i\beta \end{bmatrix}$$

Park's transformation. In this transformation $\alpha\beta$ is converted into d-q stationary to rotating

$$\begin{bmatrix} i\alpha \\ i\beta \end{bmatrix} = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} id \\ iq \end{bmatrix}$$

D. Inverse park transformation:

$$\begin{bmatrix} id \\ iq \end{bmatrix} = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} i\alpha \\ i\beta \end{bmatrix}$$

E. Inverse Clark's transformation:

In inverse Clark transform rotating two phase into three phase stationary.

$$\begin{bmatrix} id \\ iq \end{bmatrix} = \begin{bmatrix} \cos\theta & \cos(\theta-120) & \cos(\theta-240) \\ \sin\theta & \sin(\theta-120) & \sin(\theta-240) \end{bmatrix} \begin{bmatrix} ia \\ ib \\ ic \end{bmatrix}$$

II. CONTROL TECHNIQUE

A. Space vector pulse width modulation control technique of voltage source inverter:

- For controlling the voltage source inverter, we can implement sinusoidal pulse width modulation or space vector modulation using SPWM technique the speed and torque characteristics observed.

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A New Active Power Injection Scheme Using CHB-MLI DSTATCOM for PQ Improvement

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ABSTRACT
Power quality is the term that which appears often in electrical terminology. With good quality in power, power system performance increases. Maintaining the power system parameters close to ideal values is power quality. FACTS devices, using power electronic technology, are extremely fine devices to keep the power system well composed. A FACTS device without active energy source is confined in its operation and the addition of energy storage device can make FACTS device to exchange real and reactive power to PCC and can significantly improve the grid performance. The paper illustrates to improve quality in power system with a battery unified DSTATCOM and active power injection to PCC. DSTATCOM is a multi-level device giving out five-level output reducing the stress across the power switches of DSTATCOM. A multi-carrier level shifted carrier PWM technique is used to trigger five-level DSTATCOM. The model is designed as well as simulation results are evaluated by using Computer Simulation platform.

Key words: Active Power Control, Battery Energy, DSTATCOM, Multilevel Inverter, Instantaneous Power Controller, Power-Quality Improvement.

1. INTRODUCTION

Power Quality (PQ) is very important aspect in a power system which contributes to the progress of a country. Power quality is related to economy and with continuous power quality monitoring, net-worth can be increased. Developments in power electronic technology and usage of non-linear loads create a challenging environment. Power system parameters of a waveform like frequency, symmetry and magnitude are not always steady in nature due to faults, load disturbances [1]. Varying power system parameters can cause to inject harmonics, voltage disturbances and reactive power losses. Power quality annoyance can generate loss to the industries with end user equipment damage as well.

Use of passive filters to compensate the power system annoyance is effective for some extent but not completely. Passive filters are tuned for fixed frequency and can able to eliminate fixed harmonics. To filter lower order harmonics, the size of the interfering inductor gets larger. Based on pertained disadvantages, a novel FACTS device has been developed for PQ improvement [2-3]. The recommended FACTS devices are Static Compensator (STATCOM), Distributed Static Compensator (DSTATCOM), Dynamic-Voltage Restorer (DVR), Unified Power-Flow Controller (UPFC) and Unified Power-Quality Compensator (UPQC), etc. The above-specified FACTS devices have specific compensation principle to enhance PQ features in both transmission and distribution system.

Generally, every FACTS device is equipped with small (DC-Link) capacitor to meet the losses in converter. DC-Link supplies the required real power and stabilizes the power balance. DC-Link capacitor based FACTS devices are restraining in degree of freedom. Equipping the FACTS device with battery energy storage system (BESS) expands its operation by inducing active power to PCC (point of common coupling). During power system transients, FACTS controllers with battery energy storage systems (BESS) [4-5] can stabilize the system with real and reactive power exchange and also can increase the power transfer capability.

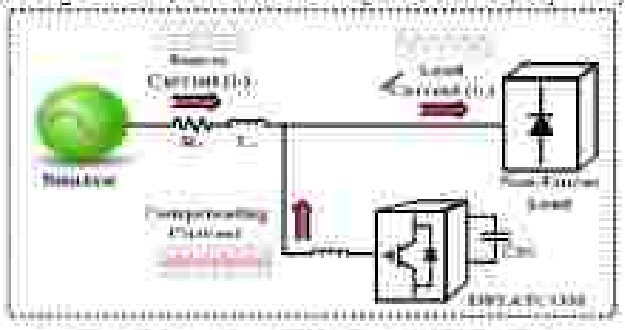

Figure 1: DSTATCOM in the distribution power system

Conventional power electronic converters with two level output makes much higher voltage stress across the power switches which increase the losses and can even damage the power switches. Inventing multi-level structures of power converters which gives out higher (more than two) voltage levels reduces the stress across the switch. Multi-level power converters also reduce the losses and increase the reliability.

The paper illustrates to improve quality in power system with a battery unified DSTATCOM and active power injection to PCC. DSTATCOM is a multi-level device [6-7] giving out five-level output reducing the stress across the power switches of DSTATCOM. IRP theory [8-10] with

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Performance Analysis of PI and Fuzzy-Logic Controlled DSTATCOM for PQ Improvement

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ABSTRACT
Power quality is one area which concerns the electrical professionals today. Advances in power electronics usage in variable frequency drives, distributed generations and uninterrupted power supply destroy the quality of power in distribution system. Harmonics especially destroy the shape of the source current and reduces the distribution equipment's capacity. This paper presents a performance comparison of both Fuzzy-logic controller and PI controller based FACTS devices for power quality enhancement in power-distribution network. Five-Level DSTATCOM is employed for PQ enhancement. LSCPWM pattern of pulses excites the DSTATCOM while reference signals are obtained from IRP based theory. PI and fuzzy controller performance (in the process of generating reference currents) in enhancing the power quality reducing the harmonic current distortion in distribution system is analysed in this paper.

Key words: DSTATCOM, Fuzzy-Logic Controller, Multilevel Inverter, Instantaneous Power Controller, PI Controller, Power-Quality Improvement.

1. INTRODUCTION
Quality in power [1-3] is an important terminology for different sections of power network. Power supplier concentrates on the standards to supply good power and the consumer focuses to use the qualified power delivered by the supplies. Any issues related to quality in power influences efficiency and interrupt the continuity of supply [4]. A short duration issue in power quality corrupts the functioning of the system [5-6]. Presence of power adaption and power electronic devices pollutes the power system by inducing harmonics [7]. The induced harmonics overheats the windings, vibrates the motor, and results in low power factor.

Efficient harmonic reduction techniques are of important in view of customer and the load devices [8]. Effectiveness of passive filters is questioned and recent trend is to use power electronic converter based DSTATCOM (distribution static compensator) to compensate harmonics.

The DSTATCOM consists of VSI, it is integrated at feeding or common-coupling point (PCC) of distribution system to generate tri-phase harmonic sequences for compensating the harmonics coming from the non-linear loads, result the source current as sinusoidal, balanced, fundamental nature [9]-[11]. The block-diagram of DSTATCOM connected in three-phase distribution system is depicted in Figure 1.

This paper confers the performance comparison of Fuzzy and PI controllers driven 5-level DSTATCOM for PQ enhancement in a three-phase distribution system. The proposed 5-level DSTATCOM topology is controlled by using LSCPWM switching pattern while reference current signals are received from IRP control theory.

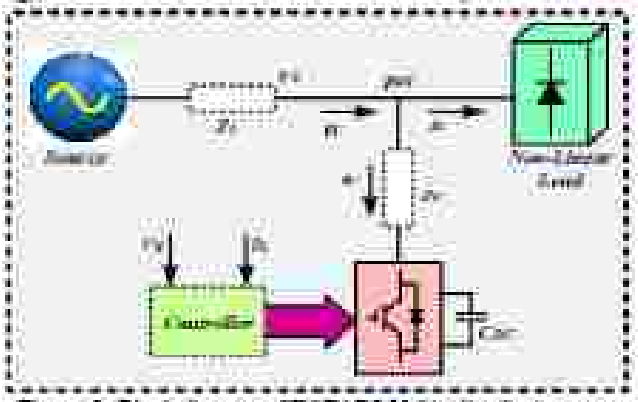

Figure 1: Block diagram of DSTATCOM in distribution system

The PI and fuzzy controller performance (in the process of generating reference currents) in enhancing the power quality reducing the harmonic distortion in source current is analysed in this paper. The simulation results of proposed 5-level DSTATCOM topology are analysed under both balanced and un-balanced non-linear loads by using Matlab/Simulink tool.

2. PROPOSED MULTILEVEL DSTATCOM

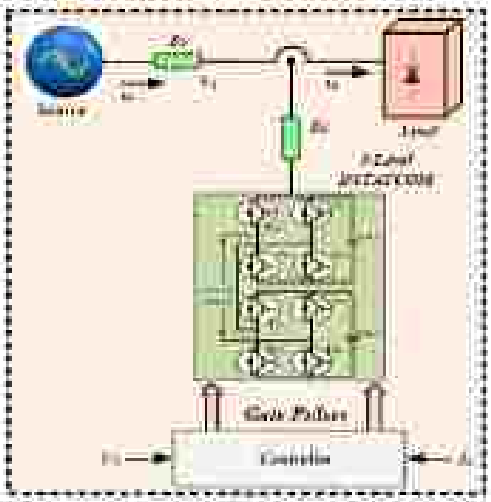

Figure 2: Multi-Level CHB structured DSTATCOM in power distribution system

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Design of a Harmonic Filter for a Grid Connected Doubly Fed Induction Generator under Unsymmetrical Fault Conditions

Chilla Soumya, Ramuva Nageswara Rao

Abstract—The analysis and controlling of harmonics in a doubly fed induction generator (DFIG) is studied under the unsymmetrical fault conditions in MATLAB/SIMULINK software. The proposed DFIG uses wind energy as the primary source for which is used for power generation. Wind energy is a non-polluting renewable energy resource that is available free of cost but when the wind is used, harmonics are introduced into the power system, as voltage imbalances occur in the grid. In order to mitigate the voltage imbalances (or) ripples in the voltage or current, LCL filters are introduced in the wind turbine because they are chiefly used for high power and low-frequency applications. Various unsymmetrical faults are simulated by referring the specifications selected and analysed with the tripping time for the desired duration of time in the circuit breaker, voltage and current waveforms are analysed only during the transient period on the basis of FFT analysis to know about THD content.

Keywords— Average value model, DFIG, LCL filter, THD, unsymmetrical faults.

I. INTRODUCTION

In recent scenario, the most predominantly used renewable non-polluting resources (or) non-conventional energy sources which available in the universe are: solar, wind, geothermal, biogas, biomass, hydro-electric power, tidal power, etc. The wind is most preferably used for power generation in DFIG (Doubly Fed Induction Generator) because it is available cheaply and can be used for low power rating switches also[1]. With the increased involvement of wind energy into the grids, DFIG wind turbines are mostly preferred, such that suitable models for DFIG are integrated. DFIG utilizes the turns ratio of the machine so that the converter need not be to be rated for machines full load power. But with the wind as the source, there are more chances of the establishment of harmonics into the system and voltage disturbances which may lead to the damage of the entire system as the power system is under a large period of time. So to reduce these specified voltage imbalances, a passive LCL filter is introduced into the system such that more amount of harmonics can be mitigated (or) reduced which increases the stability of the system. Such that total harmonic distortion (THD) content or value can be reduced to a more extent.

There are many types of filters namely L, LC, LCL. The LC filter is used for higher harmonics attenuation than L filter but when compared with LC, the LCL filter gives greater harmonics compensation so it is preferred in this aspect. DFIG can provide reactive power compensation whenever there is a fault in the power system[2]. The power electronic switches are used in rectifier and inverter circuit, such that power electronic interface controls currents in the rotor to achieve variable speed. This is also necessary for the maximum energy capturing of variable speeds, as the wind cannot be blown for a continuous duration of time.

In the power system analysis, most of the time, there will not be a normal (continuous) operation, because of faults occurring in the transmission lines, so there is a need to know and evaluate with the unsymmetrical fault conditions which may hold in the transmission lines. There are symmetrical and unsymmetrical faults in the power systems. Symmetrical faults LLL and LLLG and unsymmetrical faults are LG, LL, LLG[2]. Single line-to-ground faults are most commonly occurring faults for more than half of the total percentage of faults in the power system. Line-to-line faults are one-tenth of the total percentage of faults and line-to-line-to-ground faults are one-fourth of the total percentage of faults. These faults introduce harmonics into the whole power system[3],[4].

II. BLOCK DIAGRAM OF DFIG

A wind turbine uses DFIG which consists of a wound rotor induction generator. The connection of DFIG is in such a way that the stator windings of DFIG are directly connected to the grid and rotor windings are connected via slip rings with the help of AC DC AC converter (rectifier and inverter with a common DC link connected) to the grid.

A 9MW wind farm of each 1.5MW of six turbines is being designed in the wind turbine model in dynamic average model converter circuit[5]. The wind turbine is connected to the grid with the help of a 120KV supply system and transmitted through a transmission line of length 50km with a 25KV feeder line.

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Multicarrier PWM Strategies for Hybrid Symmetrical Multilevel Inverter with Reduced Switch Count

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Abstract: Multilevel inverters are widely used for high power and high voltage applications. The performance of multilevel inverters are superior to conventional two level inverters in terms of reduced total harmonic distortion, higher dc link voltages, lower electromagnetic interference and increased quality in the output voltage waveform. This paper presents a single phase hybrid eleven level multilevel inverter topology with reduced switch count to compensate the above mentioned disadvantages. This paper also presents various high switching frequency based multi carrier pulse width modulation strategies such as Phase Disposition PWM Strategy (PDPWM), Phase Opposition and Disposition PWM Strategy (PODPWM), Alternate Phase opposition Disposition PWM (APODPWM), Carrier Overlapping PWM (COPWM), Variable frequency carrier PWM (VFPWM), Third Harmonic Injection PWM (THIPWM) applied to the proposed eleven level multilevel inverter and is analyzed for RL load. FFT analysis is carried out and total harmonic distortion, fundamental output voltage are calculated. Simulation is carried out in MATLAB/SIMULINK.

Keywords: Multi Carrier Pulse Width Modulation, Total Harmonic Distortion, Hybrid Multilevel Inverter, High Switching Frequency PWM.

I. INTRODUCTION

In recent years, there has been a lot of increase in interest on the concept of multilevel power conversion. The theory of power conversion multilevel inverters has gained lot of advantages [1]-[3]. Recent researches have evolved in the introduction of novel inverter topologies and unique modulation techniques. However the mostly addressed multilevel inverter topologies are neutral-point clamped (NPC) inverter, the flying capacitor inverter, and the cascade inverter. Among these cascaded H Bridge configuration is more attractive because of its simplicity in design. Conventional H-Bridge inverters have applications in industrial side because of easy way of controlling and simple switching configuration. However the number of components and switching losses are quite high. "Although the above mentioned conventional MLI finds number of applications, all these topologies need more number of switches to produce higher voltages. So in the recent years the research focuses on reducing the number of components. Reducing the number of diodes used, voltage sources, switches and capacitors can improve the quality as well as reduce the switching losses, overall cost etc.," [5].

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In this paper a new symmetrical 11 level hybrid multilevel inverter topology is proposed with different PWM techniques to obtain more accurate waveform with minimal switching losses and lower harmonic distortion. This paper analyses a comparative study carried out on different high switching frequency based carrier Pulse width modulation Techniques.

II. PROPOSED HYBRID INVERTER TOPOLOGY

The proposed hybrid eleven level multilevel inverter mainly eliminates higher number of switches that are helpful in producing the output voltages when compared to the existing multilevel inverters. The fundamental structure of the proposed hybrid inverter topology is given in fig 1 (a). It consists of two isolated DC sources and six unidirectional switches (T_1, T_2, T_3, T_4, S_1 and S_2). The basic unit generates five level of output voltage ($2V_{dc}$, V_{dc}, 0, $-V_{dc}$, $-2V_{dc}$). The switching states are given in Table 1. Fig1 (b) gives the proposed 11 level symmetrical novel inverter topology with reduced switch count.

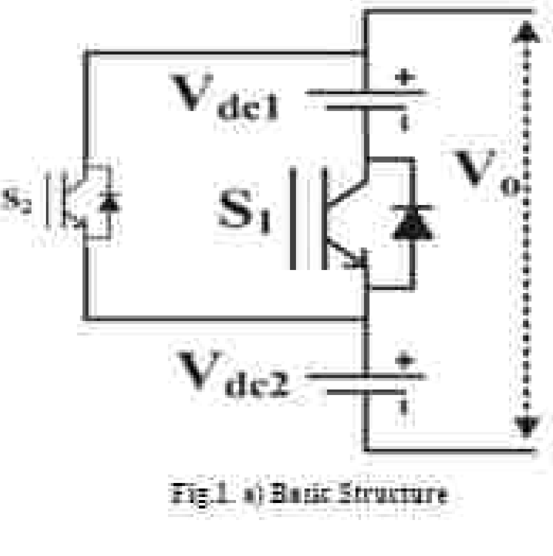

Fig.1. a) Basic Structure

An Attempt to Teach Basic Electrical Engineering Course through Virtual Mode Using Gnomio

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Micro-Grid Protection Schemes and the Role of UPFC Controller

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Abstract— The increasing demand for electrical energy has led to the emergence of renewable energy sources paving path for the concept of microgrid in recent years. The integration of microgrid with renewable energy is facing challenges with the protection issues which need to be concentrated. These challenges are a result of failure in coordinating with protection devices. They include change in the fault level and network topologies. The faults are intermittent in nature and the conventional protection schemes may fail to operate because of their pre-set conditions. In order to cope with the bi-directional energy flow due to large number of micro sources new protection schemes are required. The protection scheme must be in such a way to detect short circuit and clear faults in both the grid connected and islanded mode. In order to ensure the higher power flow with enhanced voltage profile and reduced power loss, it is proposed to integrate microgrid with FACTS controllers like Unified Power Flow Controller. Wavelet based multi-resolution analysis is used to find the detailed coefficients of the signals to calculate the fault index. The proposed scheme is tested and found effective for detection of faults with and without Unified Power Flow Controller.

Keywords— Microgrid, UPFC , renewable energy sources, solar PV, wind and solar PV system, wavelet, Protection scheme.

I. INTRODUCTION

As conventional power systems are struggling to meet the consumers increasing demand of electric power, renewable energy resources are being installed to mitigate the energy short fall. Microgrid idea is a way of integrating multiple renewable energy sources as well as conventional sources and energy storage devices and loads into electric power system [14] Among different sources of renewable energy, wind and solar are two promising alternatives to meet the future electricity needs for mankind [13]. In recent years, the distributed generation and the Micro-grid system are represented by photovoltaic generation and wind power generation [2] Microgrids have several advantages such as reduced costs, increased system efficiency, reliability and better power quality. Apart from the advantages associated with microgrid, one major challenge it faces is with its protection. Microgrid protection scheme implementation poses great technical challenges such as the protection system for microgrid which must respond to both main grid and micro grid faults. Therefore, design and selection of proper protection schemes are very much essential for control and operation of power systems. The function of power system protection is to detect and remove faults from the system as rapidly as possible while minimizing.

The techniques demonstrated in this paper are for determining the currents in different parts of the system model under faulted condition, and the short circuit analysis is performed

The Wavelet transform technique applications were improved from past few years for the improvement of fault analysis in the power system [1]

In order to improve the power flow with enhanced voltage profile and reduced power loss, it is proposed to integrate microgrids with FACTS Controllers. The SVC is a Shunt-connected static var generator that comes into Shunt controller's group and it functions as a fast generator so as to control precise parameters of the electric power systems [7,8]. The SVC consists of a Thyristor Controlled Reactor (TCR) and a Fixed Capacitors (FC) banks. Depletion of the fossil fuels in the environment is mainly driving people towards renewable energy sources at a faster pace [2]

The solution of over current related failure problems is to limit the magnitude and fault can be detected within the prescribed time. Wavelet based ANN approach has been adopted for fault detection and classification of a two terminal network [9,10] .

The proposed algorithm describes the protection scheme for micro-grid with PV and wind source compensated with Unified Power Flow controller using wavelet analysis. Operating current signals are identified and then sum of the detailed coefficients are calculated by making use of bior1.5 mother wavelet at each terminal. This is compared to a threshold value of current signal in order to provide protection against short circuit faults. The test results clearly show that the variation in the value of fault index of the healthy phase is below the threshold value of all the terminals by varying fault inception angle, distance and fault resistance.

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RESEARCH ARTICLE OPEN ACCESS

Effect of particle contamination in a 1- Phase Gas Insulated Bus duct under Lightning impulse voltage

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ABSTRACT
Gas Insulated Substations have to withstand for lightning surges without breakdown of Insulation. In this paper a single Phase Gas Insulated Bus duct with inner diameter conductor 55mm and diameter of enclosure 150 mm is considered. Three particle of different sizes assumed to be rest at a position. Lightning Impulse Voltage of 1050 kV is superimposed on Power frequency voltages of 100 kV, 132 kV ,145 and 200 kV are applied to one Phase GIS bus.
The motion of the three particles are simulated for different voltages using MATLAB. Effect of the three particles for Lightning Impulse Voltage super imposed on power frequency on particle movement are analyzed and time of collisions of the particle at first time is determined for various voltages. And also the horizontal and vertical distances at which the particles collide are determined for. Particles of copper of 10 mm in length and 0.25 mm radius, 10 mm length and 0.15 mm radius and 7 mm and 0.25 radii. The results show that the three particle collide at different points depending on the particles position , the velocity and direction of the particle changes after collisions. The max displacement of the particles without collision are compared with the max radial displacements by considering the collisions. The results show that the max displacement of particles is higher as compared with without collisions.
Keywords – Multiple particles , collision, Gas Insulated Substations, Particle Contamination, MATLAB.

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1. INTRODUCTION

Compressed Gas Insulated Substations (GIS) consists basically of a conductor supported by insulator inside an enclosure, filled with SF6 gas. Basic components of the GIS bay are circuit breakers, disconnectors, earthing switches, bus ducts, current and voltage transformers, etc. The inner live parts of GIS are supported by insulators called spacers, which are made of alumina filled epoxy material. The GIS enclosure forms an electrically integrated, grounded enclosure for the entire substation. Even though SF6 exhibits very high dielectric strength, the withstand voltage of SF6 within the GIS is drastically reduced due to the presence of particles or defects like free particles on the inner surface of the enclosure. Protrusion on the high voltage (HV) bus, protrusion on the inner surface of the enclosure and narrow gaps between the spacer and the electrode are due to imperfect casting and imperfect mechanical strength. The presence of contamination can therefore be a problem with gas-insulated substations operating at high fields [1]-[2]

Free conducting particles are most dangerous to GIS. These free conducting particles may have any shape or size. may be spherical or filamentary (wire like) or in the form of fine dust. Particles may be free to move or may be fixed on to the surfaces. wire like particles made of conducting material are more harmful and their effects are more pronounced at higher gas pressures as given by the authors [2-3], the presence of atmospheric dust containing conducting particles, especially on the cathode, reduces the breakdown voltage

The present work deals with considering three different particles on the inner surface of the bus duct at a position and using the Newt equations for the movement of these metallic particles. Lightning Impulse Voltage of 1050 kV is superimposed on Power frequency voltages of 245 kV, 300 kV ,400 and 450 kV are applied to singlePhase GIS bus.

In this paper a 1- Phase Gas Insulated Bus duct with diameter of conductor 55 mm and enclose diameter of 150 mm is considered for analysis . copper particles of 10 mm in length and 0.25 mm radius, 10 mm length and 0.15 mm radius and 7 mm and 0.25 radius are considered for simulation with MATLAB

Analysis of Induction Motor speed control fed from three phase inverter

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Abstract - The recent advancement in Semiconductor technology has led to development of Power Electronic systems. One of the significant applications of power electronic system is power converters which are very widely used in variable frequency drives and speed control of motors. Three phase voltage source inverters are proven to be very popular in variable speed AC drives for industrial applications. Due to the advent of power electronic technology, the speed control of AC drives has become very smooth and rapid. Because of latest developments in speed control of Induction motors, they are extensively used in majority of industries. The speed of the induction motor can be controlled by variable voltage or variable frequency or both. This paper presents speed control of induction motor fed from three phase inverter operated in three different modes. Simulations are carried out in MATLAB/ Simulink to demonstrate the performance of the induction motor under variable load conditions.

Keywords - Induction motor, inverter, variable load.

I. INTRODUCTION

In recent past, DC motors were used in industries for variable speed applications due to easy controllability. Today, induction motors have become very popular for industrial applications due to low cost, high efficiency, robustness and less maintenance. In the past, for constant speed applications, induction motors were used as proper speed control techniques are not available. The development of power electronics has made it achievable to control the speed of induction motor by controlling the supply voltage, supply frequency or both. With the help of Torque-Speed characteristics, the performance of the induction motor can be evaluated.

In the last century, DC motors were in use for variable speed applications as the speed can be controlled by changing the armature and field currents. At the same time, it has got the advantage of operating in four quadrants of torque- speed plane. In these days, induction motors gained importance in industrial applications due to their low cost, high efficiency and robustness. At the same time, the development of semiconductor technology has made the speed control of these ac motor very smooth and rapid. The speed of the induction motor can be controlled by varying the supply voltage, supply frequency or both. It is possible to vary the voltage as well as frequency using voltage source inverter circuit.

II. THREE PHASE INVERTER

Three phase inverters are widely used in variable speed drives. They fabricate variable voltage by applying proper control methods. The output of the inverter can be varied by varying the width of the pulse. A three phase bridge inverter consists of six switches which are operated in a proper sequence. A balanced output voltage can be developed by operating the inverter in three different modes viz. 120◦ , 150◦ and 180◦.

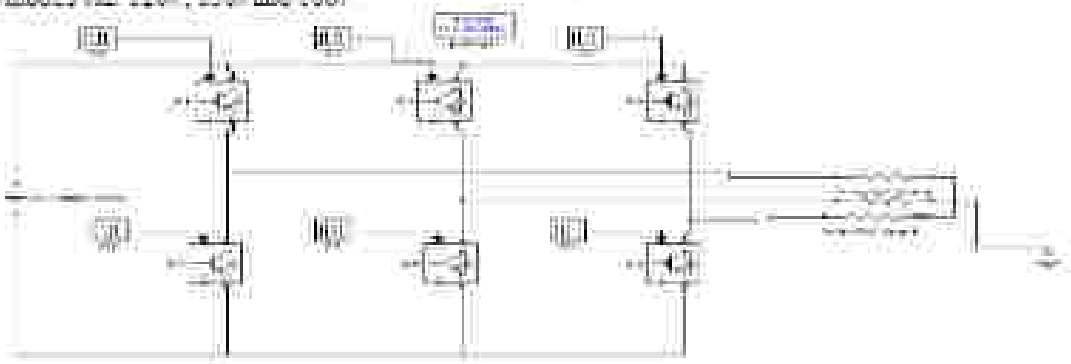

Fig. 1 Three phase inverter circuit

a) 180◦ mode of operation:

In this mode, each switch conducts for 180◦ of a cycle. The switch pairs in each leg are turned ON with an interval of 180◦. It means that S_1 conducts for 180◦ and S_4 for next 180◦ of a cycle. The switches in the upper group conduct at an interval of 120◦ and same case with lower group. If S_1 is triggered at $\omega t = 0$◦, then S_3 must be fired at 120◦ and S_5 at 240◦. The switching sequence

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Design Implementation of Single-Phase Cascaded H-Bridge Five Level Inverters using Arduino Controller

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Abstract:

Multi-level inverters are more popular because of high voltage operation capabilities, low-switching losses, high efficiency & low output of EMI. These are used to meet the demand for increased power rating and quality of power with fewer harmonics & low EMI. Cascaded MLI is used to obtain output by using SPWM. Hardware is also been done with considering MOSFET as switches by using Arduino to generate gate pulses. Simulation and experimental results have been displayed.

Keywords: CH-MLI, SPWM, Harmonics, THD

INTRODUCTION:

Due to the increase in the consumption of electrical energy the usage of renewable energy sources has increased. Since ages, fossil fuels have been used which has created global warming and greenhouse gasses emission that has drastically affected the environment and has become a serious hazard.

The renewable energy resource is a DC energy which is obtained from solar wind and tidal but at the transmission it is to be AC.

So inverter is used. For high power applications, a two-level inverter is replaced with a multi-level inverter.
Multi-level inverters reduceswitching losses, harmonics, and accesses in output level voltage. The main objective is to reduce the THD.

Comparing with other multilevel inverters. We prefer CH-MLI as it is most reliable and has fault tolerance, i.e. It can operate even at low power levels after cell failure. It does not require extra clamping diodes/voltage –balancing capacitors and has the least number of components. They can produce output voltage with low alterations, low DV/DT, operate at allow switching frequency.

2. Single Phase five Level CMLI Topology

In a 5-level cascaded-multi-level-inverter, two separate DC sources V1 and V2 are used. Two full-bridge inverters are connected in series. The output of each of the different-level full-bridge inverters are connected in series such that output voltage waveform is the sum of the individual inverter outputs. The switches S1, S2, S5,and S6 are turned ON to get voltage of (VDC) and S3, S4, S7& S8 to get (–VDC).The switches S1, S2 are turned ON to get a voltage of (VDC/2) and S3 & S4 are turned ON to get (–VDC/2)

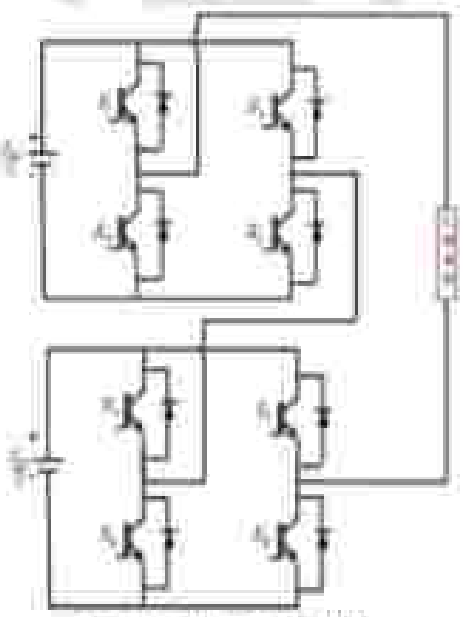

Fig: 1. 5-level CH-MLI

Journal Européen des Systèmes Automatisés

Low-Stress and Efficient Design of Integrated Boost Series Parallel Fly-Back Converters

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Keywords:
Integrated Boost Series Parallel Fly-Back Converter (IBSPFC), QSC (Quasi Switched Capacitor), voltage mode control

ABSTRACT

This paper Presents comparative analysis of IBSPFC &QSC based IBSPFC by using FPGA. By using this IBSPFC the voltage stress is reduced across the switch when compare to conventional fly-back converters. The multi winding transformer gives higher reliability i.e. if any one of the winding damages other one supplies power at the load. On the other hand, QSC based IBSPFC will achieved Zero voltage & Zero current switching, which will increase more efficiency when compare to conventional single stage integrated converters and IBSPFC. Operating modes of QSC based IBSPFC&IBSPFC have been introduced. The primary side winding of the fly-back transformer is coupled in series across with bulk capacitor to minimize switch voltage stress and the secondary winding of the 1:1 fly-back transformer. Basic voltage mode control Techniques are used to control the output voltage and current. An input voltage of 25V primary side and 50V battery at secondary side, 100v output, 100W and 100KHz DC-DC isolated QSC based IBSPFC is implemented using FPGA SPARTAN6LX9 and experimental results and comparative table have been presented.

1. INTRODUCTION

Eminent Solar Power creation has addition leads in finding and running price different to more energy sources. Solar power is a clean method with nil least preservation. Mainly PV cells can be built on the topmost of apartments or homes and trade in metropolitan cities. In solar power, there is chance of irradiation fluctuation, which makes use of battery storage system to provide the required power to load [1]. Due to separate sources, an individual power electronic converter is required which increase the complexity of the circuit shown in Figure 1 (a). To reduce the cost and complexity of the circuit a multi input dc-dc converter is preferred [2] which are shown in Figure 1(b). Presently dual input topologies are classified into two ways. One is non-isolated another one is isolated [2-14]. The basic non-isolated topologies of dc-dc converters are again classified as Buck, Boost and Buck-boost converters suffering from isolation and at the load side it requires large AC Transformers [3, 4]. Otherwise, the utility grid may affect leakage current in between solar panels and earth. The isolated converters of dual input dc-dc help to avoiding the line frequency transformer [5, 6]. The basic isolated dc-dc converters are fly back, half bridge, forward, push pull and full bridge converters [7-9]. To transfer the power from multiple sources to the output a separate isolated transformer is required for each source and the number of switches are increased followed by cost [10-13]. To eliminate this problem a two winding transformer is used [14-24]. By losing the isolation between the energy sources of single side of the isolation transformer the total number of switches in this type of topologies are reduced and Battery is connected at secondary side of the isolation transformer, the battery does not require any isolation to the output of the load [25-32].

Therefore, this type of topology is better than using multiple transformers. As the application in this paper is 100w or 200w, hence fly back converter is chosen. The basic fly back converter requires two snubber circuits one is at primary winding of transformer another one is at switch, which is connected in series with the transformer.

Generally, the fly back converter duty cycle is limited to 0.5.

To eliminate these problems IBSPFC and QSC based IBSPFC is preferred for 100w or 200w applications. In this paper single switch IBSPFC and QSC based IBSPFC is introduced. The main advantage of QSC based IBSPFC is it will reduce voltage stress on the switches, high reliability and ZVS and ZCS will achieve hence efficiency of the converter is improved [32].

The research study along with experimental results of IBSPFC with QSC is presented in this paper for closed loop control. The design considerations for inductor in boost circuit, quasi switched capacitor and output capacitor are evaluated. This presents design of QSC based IBSPFC operating at 100 kHz with DC input voltage magnitude of 25V on primary side, producing 50V and 100V at secondary side and at load with 100W of output power. The operating modes of IBSPFC are presented in Section 2 Present Necessity of IBSPFC and QSC based IBSPFC. Section 3. Section 4 presents mathematical Analysis, experimental results of the proposed circuit are shown in Section 5 for closed loop, Section 6 Working Methods of QSC Based IBSPFC. Section 7 Mathematical Calculations of QSC based IBSPFC. Section 8 Experimental Results of QSC based IBSPFC. Section 9 conclusion, and References related to the performance of the proposed circuit is discussed in this above Sections.

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A Novel Symmetrical Multilevel Inverter with Reduced Switch Count

Ujwala Gajula

Abstract: Multilevel inverters produced lot of interest in academia and industry as they are becoming feasible technology for number of applications. These are considered as the progressing power converter topologies. To generate a quality output waveform with minimum number of switches, reduced switch multilevel inverter topologies has come in focus. This paper introduces a modified symmetrical MLI with reduced component count thereby ensuring the minimum switching losses, reduced total harmonic distortion, Size and installation cost. By proper combination of switches it produces a staircase output waveform with low harmonic distortion. In this paper novel symmetrical inverter topology with reduced component count based on level shift phase opposition and disposition PWM (PODPWM) is proposed. The results are validated using MATLAB/SIMULINK.

Keywords: Reduced switch MLI, Level shift pulse width modulation, Switching losses, Total Harmonic distortion, Staircase output Waveform.

I. INTRODUCTION

The term "Multilevel Inverter" has played an important role in the recent years and is suitable for medium to high-voltage applications such as renewable energy sources, Industrial drives, fans, blowers because of their capability to synthesize output voltage waveform with better harmonic spectra, better output voltage. With proper arrangement of voltage sources and power switching semiconductor devices a multilevel output can be obtained. The three conventional MLI types are Flying capacitor Multilevel inverter, Diode Clamped Multilevel inverter and cascaded H Bridge Multilevel Inverter [1]. Although the above mentioned conventional MLI finds number of applications, all these topologies need more number of switches to produce higher voltages. So in the recent years the research focuses on reducing the number of components. Reducing the number of diodes used, voltage sources, switches and capacitors can improve the quality as well as reduce the switching losses, overall cost etc., [3]. In this paper a novel symmetrical inverter topology with reduced component count based on level shift phase opposition and disposition PWM (PODPWM) is proposed.

II. PROPOSED NOVEL INVERTER TOPOLOGY

The fundamental unit of the proposed novel inverter topology is given in fig 1 (a).

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It consists of two isolated DC sources and six unidirectional switches (T_1, T_2, T_3, T_4, S_1 and S_2). The basic unit generates five level of output voltage ($2V_{dc1}$, V_{dc1}, 0, $-V_{dc1}$, $-2V_{dc1}$). The switching states are given in Table 1. Fig.1 (b) gives the proposed 11 level symmetrical novel inverter topology with reduced switch count.

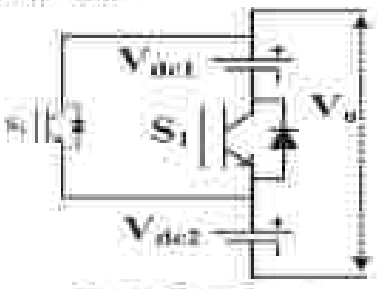

Fig.1. a) Basic Structure

Table1. Switching States for Basic Unit

S.No.	Level of Combined Signal	Switches in ON State	Output Voltage
1	2	S_1, T_1, T_2	$+2V_{dc}$
2	1	S_2, T_1, T_2	$+V_{dc}$
3	0	T_1, T_4	0
4	-1	S_1, T_3, T_4	$-V_{dc}$
5	-2	S_2, T_3, T_4	$-2V_{dc}$

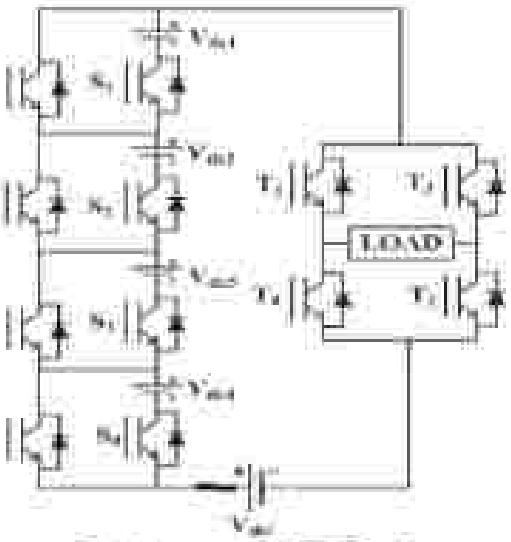

Fig.1. b) proposed MLI Topology

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Mitigation of Harmonics for Residential Loads by Shunt Active Power Filter using SRF Theory

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Abstract:-

With the rapid increase of power electronic devices usage in industrial, commercial and residential purposes have led to deterioration of supply voltage and current waveforms which in turn causes power quality problems within the supply system. This paper discusses different nonlinear loads such as personal computer, fluorescent lamp, adjustable speed drive, uninterruptable power supply. In this paper modeling and simulation of various non linear loads is considered and a Shunt active power filter (SAPF) is introduced to mitigate harmonics in the distribution system. These non-linear loads are considered individually and they are taken as loads to the electrical distribution system and Total Harmonic Distortion (THD) are evaluated. The analysis of current harmonics for these loads is performed individually. Finally THD is analyzed by using all these loads combined. The dynamic model of the SAPF is developed in the MATLAB SIMULINK environment.

Keywords-

Shunt active power filter (SAPF), Power quality, Non-Linear Loads, Total harmonic distortion (THD)

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Copy-Move Image Forgery Detection using Scale Invariant Feature Transform

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Abstract—Digital image forgery is a one of multimedia security whose objective is to show the wicked manipulations in digital images. Among different types of image forgery, copy-move forgery detection (CMFD) is the most popular one where a part of the original image is copied and pasted at another position in the same image. Various methods have been developed in the past few years. to achieve geometric transformations like rotation and scaling, a novel methodology based on Scale Invariant Features Transform (SIFT) is proposed.

The proposed algorithm mainly involves in feature matching in which features are extracted from each block by computing the dot product between the unit vectors. Random Sample Consensus (RANSAC) algorithm is used to remove the false positive matches. The experimental results of the algorithm are presented to confirm that the technique can extract more accurate results compared with existing forgery detection methods.

Keywords— SIFT, RANSAC, CMFD, KEYPOINT MATCHING

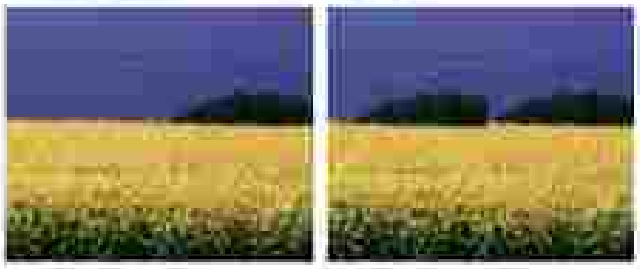
I. INTRODUCTION

Digital images are widely used everywhere in the world. Newspapers, magazines, apparel industry, medical field, science field, forensic labs etc. are relied on digital images. Exchanging soft copies of several documents may be normal practice in the present scenario. So, there is a chance of forgery while exchanging such sort of documents.

Detection of image manipulation is extremely important because an image is often used as legal evidence in forensics investigations, and in many other fields. The pixel-based image forgery detection aims to verify the authenticity of digital images with no prior knowledge of the first image.

II. COPY-MOVE IMAGE FORGERY DETECTION:

An image forgery is called as Copy-Move forgery [5] if some part of an image is copied and pasted within that same image. This is usually done to suppress some information of the image. There must be a possibility that one or more regions are copied and moved into the image. Due to the duplicated portion or portions comes from the same image, the properties of the duplicated region will be same as the original region. detection methods must be consistent with the statistical measures presented in each part of the images. the example of copy-move image forgery detection shown in the Figure 1.



a) b)

Fig 1: Copy Move Forgery a) Original image b) Tampered image

The figure 1 is a example of the cloning technique where the region of image is copied and pasted within the image in such a way that it is not recognizable with naked eye. this process is considered as an illegal act, the appropriate technique must be developed to detect the forged region accurately.

III. RELATED WORK

In the copy-move forgery detection, block-based methods that is DCT (discrete cosine transform) [8], DWT (discrete wavelet transform) [11]gives the proper results only when the copied region is directly pasted i.e. duplication is performed without any transformations. If

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Performance Enhancement of MIMO-MC-CDMA Systems by Employing Various Diversity Combining Techniques

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Abstract— Wireless communication is a system of transferring data from single point to other, without using similar wires, cables or any physical medium. In this paper, plain (MC-CDMA) scheme is implemented and the performance in expressions of (BER) is achieved. The theoretical performance of the MC-CDMA scheme is also calculated and related using the simulated presentation to verify the accuracy of the system. Then, the MIMO systems are implemented and passed through the MCCDMA system with multiple input multiple output (MISO) antenna diversity and SIMO(single input multiple output) in the Rayleigh flat fading channel. The combination of MIMO and MC-CDMA scheme is named as MIMO-MC-CDMA system. By the side of the receiver, the acknowledged signals of MIMO-MC-CDMA systems are united in the frequency domain in command to assemble the complete acknowledged signal energy spread on dissimilar subcarriers. Assuming flawless channel state information (CSI). The combining schemes used are the maximum ratio combining (MRC 1X1) with MIMO-MC-CDMA scheme, equal gain combining (EGC 1X1) with MIMO-MC-CDMA system, (MMSE 1X1) with the MIMO-MC-CDMA system, maximum likely hood combining (MLD 2x1,MLD 2x2) with MIMO-MC-CDMA system then the performance of these combining schemes will be measured with respect to the SISO-MC-CDMA systems at the receiver. The MLD (2x2) is combined with MLD (2x2)

Keywords— CDMA, OFDM, MC-CDMA, SISO, MIMO, MIMO-OFDM, STBC, EGC, MRC, MMSE, MLD, Diversity, BER.

1. INTRODUCTION

The world today is mostly dependent upon the Wireless Technologies due to their flexibility reliability, low cost and much easier way of deployment. Hence, it has become more important and only means of communications in most of the remote areas. Entire globe is dependent upon wireless communications which also includes homes, businesses etc. Satellite Communications which are a part of wireless.

Communications provide way to several military, medical and commercial applications. Several Wireless technologies evolved based on the requirement of the speed, robustness and throughput. Various versions like 4g, VOLTE, 5G also evolved. Radio waves are propagated into the air in wireless communications. The signal may undergo reflections, refractions, scattering which may result in fading of the signal quality. Hence, to measure the quality of the signal, certain parameters have to be analysed.

CDMA is a 3G technology. It is multiple access technology in which different users are allocated different codes through the same communication channel simultaneously. Advantage of this technology is that each symbol is multiplied to a code to generate the samples and the Bandwidth of the original signal is spread orthogonally between the codes. If the code length is N, then the bandwidth is spread by a factor of N.Disadvantages are near-far problem, Limited users. In CDMA, reverse link as users increases, BER (Bit Energy Rate) increases. Performances are worst as the number of users increases.

OFDM is 4G technology. It a frequency division multiplexing scheme in which digital information is encoded on multiple carrier frequency and a enormous figure of narrowly spaced orthogonal sub carrier signals carry information. Operation is a set of symbols loaded on to the sub carriers and s/p converted and IFFT is performed to generate the transmitted samples and converted to p/s (M UX) to generate serial stream. CP is applied and transmitted over the channel and remove C.P (to avoid IBI) and S/p (DeMUX & FFT) detection of symbols. P/s (MUX) to generate serial stream of data. Spatial efficiency decreases as we add C.P. Carrier frequency offset produces ICI in OFDM and thus introduces distortion and PAPR.

MC-CDMA is a mixture of CDMA and OFDM. At this

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Multi-objective emperor penguin handover optimisation for IEEE 802.21 in heterogeneous networks

Muddamalla Naresh, Dasari Venkat Reddy, Katta Ramalinga Reddy

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Abstract

IEEE concentrates on the development of effective media independent handover (IEEE 802.21 MIH) services. The major aim of IEEE 802.21 MIH is to optimise the handover process to make an uninterrupted handover service with less delay. The handover process is categorised into two types a horizontal and vertical process. Among them, vertical handover (VH) needs parameter optimisation for better performance. The optimised result depends on the parameter selection to avoid the rate of handover failure. Although the availability of various optimisation procedures for VH management, many existing works consider one/two parameters for VH optimisation. So that resultant optimal handover solution will not be better in terms of failure rate, latency, and accuracy. Thus, a method of multi-objective emperor penguin handover optimisation (MOEPHO) is developed in the proposed work, which includes almost overall network parameters for VH optimisation. So that, accurate handover with less delay and the minimum energy consumption is achieved in this work. Network simulator 2 working platform is used for the research evaluation. The resultant performances are compared with whale optimisation algorithm-based neural network, adaptive cross-layer design, fuzzy intelligent decision making and novel type 2-fuzzy logic controller to show the effectiveness of MOEPHO.

1 Introduction

To effectively manage the increasing effect of mobile traffic demand, heterogeneous network (Het Net) development is vital for capacity improvement in wireless networks [1]. It enables the existence of systems with micro, macro, femto, and Wi-Fi layers. Mobile data usage is increasing day-by-day due to huge data demand and rapid globalisation [2]. The particular mobile terminal offers good internet service

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Improved partial differential equation-based total variation approach to non-subsampled contourlet transform for medical image denoising

Sreedhar Kollem ✉ Katta Ramalinga Reddy & Duggirala Srinivasa Rao

Multimedia Tools and Applications 80, 2663–2689 (2021)

Abstract

This article proposes an improved partial differential equation (PDE)-based total variation (TV) model that enhances grey and coloured brain tumour images obtained by magnetic resonance imaging. A nonsubsampled contourlet transform was applied to images from standard databases that converted into lowpass and highpass (or bandpass) contourlet coefficients. An improved version of the power-law transform method was used on the lowpass contourlet coefficients, and an adaptive threshold method was applied to the highpass (or bandpass) contourlet coefficients. The inverse contourlet transform was performed on all the enhanced contourlet coefficients to

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Ethics declarations

Conflict of interests

The authors declare that they have no conflict of interest

Additional information

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An optimized SVM based possibilistic fuzzy c-means clustering algorithm for tumor segmentation

Sreedhar Kollem, Katta Ramalinga Reddy & Duggirala Srinivasa Rao

Multimedia Tools and Applications **80**, 409–437 (2021)

Abstract

To design an efficient partial differential equation-based total variation method for denoising and possibilistic fuzzy c-means clustering algorithm for segmentation and these methods presented the more detailed information of the MRI medical images compared to traditional methods. In this article, the pipeline of the proposed method described by two modules like pre-processing and segmentation. In pre-processing, noisy image is decomposed using nonsubsampled contourlet transform and it contains highpass contourlet coefficient (i.e., noisy coefficient) is removed by the threshold method as well. After reconstruction, the primary denoised image is enhanced by an improved partial differential equation-based total

could be perceived to have, influenced the work reported in this article.

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A TWO-WAY RELAY TRANSMISSION IN CODED MIMO-OFDM USING DELAY DIVERSITY SCHEME

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ABSTRACT:

In wireless communication, Two-way relays can enhance coverage, throughput, and reliability of wireless systems. It has attracted intense research interest in the past decades. Performance review shows that Full-Duplex relay system outperforms well than the traditional relay systems, due to its capability to double the spectral efficiency. The Self-interference (SI) releasing from the Full-Duplex (FD) node's transmission to its own reception has the detrimental effect on the performance of FD relay communication. Delay diversity (DD) MIMO-OFDM in amplify-and-forward (AF) two-way relay system is proposed, where one relay forwarding link, one direct source to destination link and residual self-interference (RSI) are taken. The required cyclic prefix (CP) length is evaluated and an appropriate Amplify and Forward (AF) relay protocol in the full-duplex relay MIMO-OFDM system is proposed. To provide spatial diversity, the direct source-to-destination link and the AF relay link can be combined. To convert the spatial diversity to channel frequency diversity that is further exploited by using the bit-interleaved coding by DD MIMO-OFDM scheme. The performance of Bit Error Rate (BER) for the proposed system is proved by simulation results.

1. INTRODUCTION:

Relay-assisted communication has been undergoing vast development in both industry and academia in recent years. The attractive benefit of relaying is the utilization of cooperative diversity to combat channel fading and boost communication reliability. By receiving, re-transmitting, and processing radio signals, low-cost, solution energy efficiency is offered by relay networks to increase coverage of wireless connections. The Amplify and Forward (AF) protocol outperforms the Delay and Forward (DF) equivalent in terms of shorter processing problems in the Self-Interference (SI) and less computational demand which results from the parallel transmission and reception at the same frequency. The strong SI looped back at the relay node from the transmitter can easily decrease the throughput of a full-duplex relay system. For SI suppression techniques, a substantial amount has been paid. The physical isolation of the relays transmits and receive antennas, the instance, or sufficiently large separation or space between transmit and receive antennas should be taken to partially remove the SI. Experiment reports show that by employing both interference and isolation cancellation techniques at least 110dB of SI can be suppressed. However, the SI can be minimized by suppression techniques, and residual self-interference still poses a problem in reality. Residual SI management is a necessary requirement in the designs of all full-duplex relay networks.

2. MOTIVATION:

The tremendous benefits a wireless technology brings along, most networks, local or otherwise, are not only adopting it but also evolving with it. The wireless technology offers, among others, lower cost, easier installation and mobility - a flexibility that no fixed network can offer. Consequently, it is expected that the reliability of data is uncertain due to error nature of wireless channels caused by fading and multipath. The goal for reliable data transmission is that received information is as close as possible to the transmitted data themselves. Hence, various techniques have been developed to deal with and help to improve the reliability of data over wireless channels. Among them, an interleaved MIMO-OFDM is considered to be an efficient and fairly simple technique that easily improves the reliability of a wireless full-duplex network. The benefits of relays are exploitation of the co-operative diversity to conflict channel fading to boost the communication performance by improving diversity of signal by relay communication with delay diversity where each relay introduces a certain time-delay to a signal before forwarding. And residual self-interference (RSI) cancellation is done by loopback interference.

3. EXISTING SYSTEM:

A detailed study of the effect of phase noise from the oscillators on cancellation is presented in when independent oscillators are used in up-

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IMPLEMENTATION OF TWO-WAY AF RELAY CRN AND ITS PERFORMANCE EVALUATION USING OUTAGE PROBABILITY

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Abstract-In study of orthogonal-frequency division-multiplexing to examine cognitive two-way relays network with imperfect spectrum sensing, we propose a joint resource allocation algorithm to increase total transmission rate of secondary users (SUs) under maximal transmit power constraints and interference temperature constraints. To answer this joint optimization problem, we implement the discrete searching approach, Lagrange dual decomposition method, and the Hungarian algorithm to obtain the subcarrier pairing matrix, best optimal power allocation and relay selection matrix. By the study of system performance and comparing the algorithm with perfect spectrum sensing the advantage of this algorithm with imperfect spectrum sensing is proved. The results also show the algorithm can protect primary user (PU) while SUs and relays opportunistically enter the spectrum occupied by PU.BER Performance analysis by using Outage Probability.

In this study, in an cognitive two-way AF relay network based on OFDM to increase total transmission rate of the secondary system under the imperfect spectrum sensing a joint RA algorithm is proposed where time-division half-duplex relays are taken to assist exchange of message between SUs.

KEYWORDS: Cognitive Radio Network, Two Way Amplify Forward relay, OFDM, Power Allocation, Relay Selection, Outage Probability.

I. INTRODUCTION

For ten years there is a rapid development in wireless communication. In telecommunication engineering the wireless communications have grown into the biggest sectors in 21st century. For the growth of business and marketing from 1990's to 21st century it is the most promising technology which has been evolved. The most attractive feature in wireless communications is mobility and portability. The user can also carry and handle the devices easily these features also have attracted the users. As every user cannot use this wireless technology however many of the residents were being able to access when Bell Laboratories have introduced cellular concept in 1950's and 1970's. In wireless communication day by day the demand for high data rates. Internet accessing and high reliability are tremendously increased along with the voice communication for the multimedia exchange. 3G technology has been introduced as the demand of high-speed data and voice transmissions. Internet accessing and high reliability was increased by investing huge amount where it supports the data rate upto 2Mbps for transmitting burst data. To meet the requirements like transmission of high-quality multimedia like HD videos or audios and like online shopping it needs to satisfy 100Mbps to 1 Gbps bit rates, a new technology in wireless environment like broad band wireless communications have to be adopted.

In recent years, 4G communications and CRN with RA as a important technique has attracted a lot of attention. 4G and 3G communications are used as they have the advantage of lower interference from orthogonal subcarriers (or channels), higher utilization of spectrum and uses orthogonal frequency-division-multiplexing (OFDM) modulation. The scenarios of multicarrier communication from OFDM technique is applied to cognitive relay networks which resulted in the growth of high data rate wireless communications and the radio spectrum is becoming overcrowded and scarce. The use of spectrum as efficiently as possible is very important under these circumstances. Cognitive radio (CR) is a technique that allows the radio spectrum to be utilized efficiently by two classes of users with two levels of priority: primary and secondary users. In CR networks, the radio spectrum is used by the secondary users by using one of the following strategies: interweave, underlay and overlay. Resource allocation (RA) techniques for wireless communications face not only sustainable developments but also significant challenges with the rapid increase in number of wireless users and various devices. The efficient use radio spectrum resources is one of the difficult challenge. Cognitive radio (CR) technology has the ability to efficiently improve the spectrum utilization. In CR networks (CRNs), there are three spectrum sharing models: interweave, underlay, overlay and hybrid. In the process of development of CRN's, to achieve better performance, power allocation technology plays an important role.

From the viewpoint of information theory to survive with fading and time-varying characteristic of the wireless channels the view of relay networks is presented. By the several standards of classification, relay networks frequently have various kinds of classification: amplify-and-forward (AF) and decode-and-forward (DF) relay networks based on the various forward protocols, one-way and two-way relay networks depending on the various duplex modes, two hop and multi-hop relay networks by depending on the number of hops, and single relay networks and multi-relay networks.

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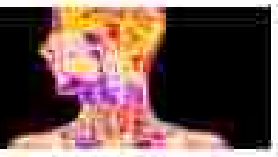

RESEARCH ARTICLE

Modified transform-based gamma correction for MRI tumor image denoising and segmentation by optimized histon-based elephant herding algorithm

Sreedhar Kollem, Katta Rama Linga Reddy, Duggirala Srinivasa Rao

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Performance analysis of MIMO OFDM for QAM by using VBLAST MMSE technique

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Abstract:
This Paper indicates the presentation exam of MIMO-OFDM (certainly one of a kind facts numerous yield with symmetrical recurrence department multiplexing) framework utilizing leveling approach minimum mean rectangular blunders. A recognitional plan, as an example, V-BLAST calculation is applied over MMSE so you can reduce the innovative obstruction, with the quit purpose that BER execution is advanced. The presentation research of a 4x4 MIMO-OFDM framework by way of the usage of V-BLAST MMSE for QAM regulation strategy is claimed in B.T BER versus SNR. The replica consequences show that the presentation of V-BLAST MMSE method is advanced to the customary technique MMSE.

Keywords: MMSE, V-BLAST, MIMO-OFDM

I. INTRODUCTION

In the recent years wireless networks and mobile communications have grown massively and achieved huge business success. When a signal is transmitted in a wireless networks due to obstacles between transmitter and receiver the signal will undergo several multipath effects. It is well known fact that the wireless multipath channel causes attenuation, phase shift and time dispersion in the received signal. This effect is called fading. Fading is caused due to interference between transmitted signals coming from multiple paths. There are several diversity techniques to handle attenuation issue, interference issue such as MIMO, OFDM, Rake receiver etc.

In the recent times MIMO OFDM system, i.e. OFDM with a MIMO transceiver system garnered a lot of interest because as the name indicates multiple outputs at receiver and multiple inputs at transmitter is much better and advantageous when compared to a single transceiver (SISO-Single input Single output) system and it increases diversity gain and the capacity of the system. The two main goals of MIMO wireless system are high data rate and high performance. The combined MIMO-OFDM system is advantageous because OFDM is able to sustain more number of antennas and it simplifies equalization in MIMO systems.

II.V-BLAST BASED SYSTEM MODEL

A V-BLAST [1] transmission system is shown in figure1. The incoming bits are given to demultiplexer and then modulated with QAM. The modulated signal is given to IFFT block and cyclic prefix is added to the output of IFFT block and the signal is transmitted through the wireless channel[3].

At the receiver end, cyclic prefix is removed and the FFT is applied on the resultant signal and passed through a V-BLAST detector. The received signal at first antenna can be represented as,

$$r_1 = [h_{1,1} h_{1,2}] \begin{bmatrix} s_1 \\ s_2 \end{bmatrix} + n_1$$

and the received signal at the second receive antenna can be represented as,

$$r_2 = [h_{2,1} h_{2,2}] \begin{bmatrix} s_1 \\ s_2 \end{bmatrix} + n_2$$

So, in general the received signal can be represented as,

$$r = Hs + n$$

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Comparative Analysis of LEEAR, AFDP and ARPASC Routing Protocols in MANETs

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Abstract:
The recent development made in mobile technologies has demanding increase of secured networks in real-time applications. Security is more significant in Mobile Adhoc Network than in wired environment. When two or more different attackers collaborate together to interrupt the network performance it results in collaborative attacks. Due to lack of resources and centralized authority, these collaborative attacks have to be handled effectively. Prior security protocols may not be appropriate or may compromise the Network performance. In this paper three proposed techniques: hybrid security protocol for detecting malicious nodes, distributed anonymity fault diagnosis protocol and Adaptive risk prediction protocol are compared. The performance metrics are evaluated in terms of Packet Delivery Ratio (PDR), End-to-End delay, Throughput, Energy Consumption using NS2.

Keywords: Anonymity, blackhole, greyhole, risk evidence, trapdoor, zero knowledge proof

I. INTRODUCTION

The technological advancement made in wireless technologies has greater impact among the wireless users. In general, MANET composes of dynamic, self- arranged and self-deployed group of nodes where each node acts as a router. This environment will not rely on any centralized architecture due to their adhoc nature. Mobility is a significant parameter in MANET environment. Most of the network protocols aim to be attack-resilient rather than discarding the attack sources. Even though, the resiliency model detects the threats, the time consumed for detecting new type of attacks is still in vain. The main source of attacks is to compromise the nodes by disrupting the network services. The effect is even worst when these attackers collude with each other and collaboratively attack the network [8] [9] [10].

Collaborative attack is one of the most vulnerable threats in routing process of mobile adhoc networks. It belongs to a class of synchronized attacks where more attackers are involved to interrupt the routing services of the network. When two or more intruder involves synchronizing the actions to interrupt the target networks, it constitutes as collaborative attack. There are different routing attacks like wormhole attacks, blackhole attacks and greyhole attacks. These attacks collaborate with each other and try to disrupt
the network services. Privacy preservation is an important concept to achieve better security system [2].The acquisition of data from different sources of network exposes different
security challenges. Even though, lot of security techniques supports the data protection process, integrity of the data is not achieved.
Anonymization [1] is one of the efficient techniques used for enhancing the security and network performance of the systems. Since MANET environment is open in nature, data may get lost or tampered by threatening the routing protocols. This

Innovative Methods of Teaching and Learning

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Abstract

Education, being a social institution serving the needs of society, is indispensable for society to survive and thrive. It should be not only comprehensive, sustainable, and superb, but must continuously evolve to meet the challenges of the fast-changing and unpredictable globalized world. This evolution must be systemic, consistent, and scalable; therefore, school teachers, college professors, administrators, researchers, and policy makers are expected to innovate the theory and practice of teaching and learning, as well as all other aspects of this complex organization to ensure quality preparation of all students to life and work. The objective of this paper is to incorporate Innovative methods and technology in teaching and learning to create a rich learning experience for students and a rewarding teaching experience for faculty.

Keywords: Innovative teaching and learning, Education Technology, Implementation, problem-based learning, Environmental approach to teaching, pedagogy

Introduction

Advance pedagogy is the way to enhance teaching and learning performance. Different innovative teaching methods are now in use across the globe. Hybrid teaching includes e – learning in addition to the face to face teaching. Use of technology and multimedia is described in details. Use of smart gadgets for different tasks like teaching, designing question papers, assessment of student, feedback and research methodology is discussed. The application of

Moodle – An Effective Learning Management System for 21st Century Learners

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The use of technology and the Internet has made education we convenient to undergo significant changes thereby bringing new methods of teaching and learning (Lopes, A.P., 2014). Students are part of the new digital age, their lives revolve around computers, smart phones, games and online messaging. Recently one of the most widely used methods of teaching that is used to promote knowledge is being focused on online teaching-learning. The use of Information and Communication Technology (ICT) in Education and particularly, the integration of Learning Management Systems (LMS) play a vital role in today's digital era. The Learning Management Systems (LMS) are technological learning environments that support online course delivery. They offer comprehensive synchronous and asynchronous services that support collaborative learning (Filippidi et al., 2010). The Present paper is briefs about e-Learning, LMS, their features and role in the present teaching – learning process.

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Computers and Internet are used as tools to enhance the teaching and learning process. It is said that the multimedia capabilities and the hypertext navigational tools of the World Wide Web not only provide access to multiple perspectives on a certain subject matter but also provide some degree of control to learners as they try to make sense of the content (Gunawardena, 1999).

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Nanostructured Al and Fe co-doped ZnO thin films for enhanced ammonia detection

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Abstract

Pure and Al, Fe doped/co-doped zinc oxide (ZnO) thin films were prepared using spray pyrolysis technique with optimized deposition parameters. Micro-structural properties of the films were carried out using X-ray diffraction (XRD), transmission electron microscopy (TEM) and Raman spectroscopy. XRD results have shown that the deposited thin films were polycrystalline in nature with Wurtzite structure. Crystallite size was determined and it was found to be decreased with single dopants and increased while co-doping in the zinc oxide matrix. Morphological studies have been studied by using Atomic Force Microscopy and Field Emission Scanning Electron Microscopy. They have clearly shown that the deposited thin films are agglomerated spherical particles with uniform distribution. Optical properties of the films were measured by UV–Vis spectrophotometer. Optical band gap was determined using Tauc plot. Gas sensing characterization of pure and doped/co-doped ZnO thin films were carried out at room temperature in static liquid distribution method towards different gases such as acetone, ethanol, xylene and ammonia. Response and recovery times were also calculated and reported.

Introduction

Over the past few decades, with the fast development of economic growth and industrialization in the world, large number of explosives, toxic, and hazardous gases have been considerably enhanced. Meanwhile, a leakage of flammable and explosive gases may result in loss of life and property damage. This encourages the researchers across the globe to put more efforts in the field of various types real-time and cost effective sensors to detect harmful gases for the cause of human and environmental safety [1], [2], [3]. Ammonium hydroxide (Ammonia) is one of the most extensively used toxic gas form in the food processing, fertilizer factories, pesticides, textiles, fire power plants, refrigeration systems, chemical, petrochemical and dye industries etc [4], [5], [6]. It can quickly catch the fire during its flammable range of [illegible]. According to the Occupational Safety and Health Administration (OSHA), the threshold exposure limit of ammonia is 25 ppm. Beyond this limit of ammonia exposure, can damage the human respiratory system, vomiting, irritating skin, eyes and long term exposure to ammonia can also leads to death [7]. It also influences the growth, immune reaction and productivity system of animals. Many of the countries across the globe have been following the standard norms that ammonia level should not exceed more than 20 ppm with lower detection limit in live stock buildings. However, the present available ammonia sensors require huge maintenance and operate with high temperature only. This stimulates us to fabricate a low cost ammonia gas sensor which is operating at room temperature.

Nanostructured semiconductor based sensors have been grabbing much attention due to their high sensitivity of toxic and exhaust gases in the fields such as domestic safety and public security, environmental monitoring, medical diagnosis, industrial production, food processing as well as their simple design, ease of construction, less power is needed for operation, low cost, and high compatibility with quick response time in microelectronic processing [8], [9], [10], [11]. The gas sensors which are satisfying these conditions are in considerable demand due to the wide range of applications. With increasing the demand for the best gas sensors of high sensitivity and selectivity, meticulous efforts are in the process to find more suitable material with required properties. Among all the semiconductor materials, ZnO based gas sensors are producing good interest as this material fulfil the requirement of an ideal sensor to a possible extent [12]. ZnO is the promising material due to its outstanding optical and electrical properties and no intrinsic deformation of structure [13,14], being extremely accessible material in nature. ZnO has also have the advantages of the huge band gap of 3.3 eV, large free exciton energy of 60 meV, excellent chemical stability, and large catalytic activity [15]. Moreover, nanostructured ZnO materials have attracted great attention by the researchers across the globe due to its huge surface area to volume ratio which is a key feature in gas sensor working principle. By doping of anion and/or cation, ZnO can be tailored to obtain expected structural, micro-structural, morphological, optical and sensing characteristics of material [16]. Addition of various metals such as Mn, Fe, Co, Mg, Al and Ga in ZnO matrix helps to control

Elliptic Curve Cryptography and Security Protocol

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Abstract: Algebraic curves over binary and finite fields used in the design of public key cryptography. The paper discusses some topics in algebraic curve cryptography namely elliptic curve cryptography with recent developments and different algorithms in Elliptic curve cryptography and also discussed discrete logarithmic problem and security protocol.

Key words: Cryptography Elliptic curves, Finite fields, binary fields, elliptic curves cryptography

Introduction: The history of cryptography is long and interesting. It had a very considerable turning point when two researchers from Stanford, Whitfield Diffie and Martin Hellman, published the paper "New Directions in Cryptography" in 1976. They preface the new idea of public key cryptography in the paper.

Public-key cryptography and symmetric-key cryptography are two main categories of cryptography. The Well-known public-key cryptography algorithms are RSA (Rivest et al. 1978), El-Gamal and Elliptic Curve Cryptography. Presently, there are only three problems of public key cryptosystems that are considered to be both secure and effective (Certicom, 2001). Table 1.1 shows these mathematical problems and the cryptosystems that rely on such problems.

	Mathematical problem	Detail	Cryptosystem
1	Integer Factorization problem (IFP)	Given an integer n find its prime factorization	RSA
2	Discrete Logarithm problem(DLP)	Given integers g and h find x such that h = g^x mod n	Diffie-Hellman(DH)
3	Elliptic curve discrete logarithm problem(ECDLP)	Given points P and Q on the curve find x such that Q=xP	Diffie-Hellman(DH)

Table 1.1 Mathematical Problem

Providing an equivalent level of security with smaller key size is an advantage of ECC compared to RSA. It is very efficient to implement ECC. ECC obtains lower power consumption, and faster computation. It also gains small memory and bandwidth because of its key size length (Dormale, Bulens and Quisquater 2004), (Huang 2007). Such attributes are mainly fascinating in security applications in which calculation power and integrated circuit space are limited. Wireless devices and smart cards present a good example for the constrained devices with limited resources.

Elliptic Curve Cryptography and Security Protocol

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An Analysis of India's Dynamism in AI growth

Dr. Rekha Paramarthy, Sr.Asst. Professor, H&AI Dept, GNITS, Hyderabad, India.

Abstract:- The initiatives taken by the public sector and the private sector attribute to the success of any new technology. AI is no exception. Artificial Intelligence (AI) is one of the fields that is spoken of in every sector and in every phase of the society. Dynamism of the government contributed significantly to the boost of AI in India. It is generally opined that the private sector is proactive in these initiatives of adoption of AI. But the public sector is no way far behind. The paper makes an attempt to explore the initiatives and measures taken by the government of India in the public sector and the contributions made thereby. An attempt is made to understand the dynamism in the Employment, public sector enterprises and in the research organizations in India.

Keywords: - Artificial Intelligence, Public sector, Employment, Research organizations.

I. INTRODUCTION

India is one of the major economies in Asia and globally looked up for the significant developments reported significantly in various sectors. India is looked up to in adopting new technological advancements. One of the trends that is redefining the way things need to be executed is Artificial Intelligence (AI). There are various initiatives taken by the government to adopt AI effectively so that it contributes to the growth of the economy. As in other initiatives the government is supporting and encouraging the efforts of the private sector even in this. Taking the support for the government, the Private sector is playing a predominant and significant role in adoption of AI in India. The government has duly extended its support through timely planning, by allocating resources and by making necessary legislative amendments to the laws prevailing. These measures have well contributed to significant positioning of India globally in the growth path. The Government of India's initiatives to combat the traditional methodologies and adept in the technological advances in all areas is notable.

Some of the major sectors that have adopted to the AI are

- Software & Hardware, IT services :
- Chip and Semiconductors
- Engineering and Industrials
- Captive firms across BFSI and Healthcare
- Setting up Research & Development and
- AI Centers of Excellence

The paper makes an attempt to analyse some of the major measures initiated in the public sector and by the Government.

II. AI INITIATIVES IN EMPLOYMENT

In the pre LPG (Liberalization Privatization and Globalization) scenario, employment exchanges played a significant role in mapping the demand factors of HR with the supply factors of HR in government recruitments with Privatization, the charm for government jobs changed. Globalization has further revolutionised the employment opportunities of job seekers. The pay package offered by the global firms attracted the local talent to technological based jobs of multinational companies. These employment exchanges have hardly played any role post LPG and have vanished, the current COVID19 has a significant impact on employment. The skilled workforce have lost their jobs in the current pandemic.

The loss of jobs has a significant impact on the skilled workforce leading to temporary unemployment for a significant number of skilled workforce. To ensure that they find re- employment the Government of India has launched ASEEM', which is an AI based platform. The Ministry of Skill development and Entrepreneurship launched Aatmanirbhar Skilled Employee Employer Mapping (ASEEM) Launched in July 2020', this AI based initiative acts as a blue collar employment management. The main objective of the AI platform is "huge impetus to our persistent efforts to bridge the demand-supply gap for skilled workforce across sectors, bringing limitless and infinite opportunities for the nation's youth."

AI Initiatives in Public sector Undertakings

DRDO has taken initiative in incorporating their research activities through CAIR (Center for Artificial Intelligence and Robotics) in 1986. CAIR developed various multipurpose robots including industrial grade capability robots and futuristic research oriented robotic platforms[1]. In the current pandemic scenario, DRDO developed AI based Attendance Application (AINA)' where it captures attendance of the employees through facial recognition. It replaces the biometric attendance with the facial features of the employee being saved in encoded form.

Another major development is in space research. ISRO is developing a female humanoid robot' named 'Vyommitra' which is expected to handle the Navigation, pre-programmed

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Technological Aspects and Digital Finance Uprising in India

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Abstract: *The Government of India is regularly supporting and embracing the technological advancements necessary to promote digital inclusion among masses. New technologies such as Artificial Intelligence, Machine Learning, Biometric Identification and Blockchain technology brought new financial technologies namely Unified Payment Interface Services, Immediate Payment System and Mobile Banking/Wallet Services into existence. As a result of the revolutionary development of FinTech, Digital Finance Companies and Digital Financial Services, various new digital products emerged and became popular among masses because of their convenient, speedy, simple, and user-friendly functions. This article focuses on FinTech, Digital Finance, Digital Payments, and their role in Digital Financial Inclusion in India.*
Keywords: *FinTech, Digital Financial Services (DFS), Digital Financial Inclusion, Digital Payments*

I. INTRODUCTION

Government's recent demonetization and plan to make India a cashless economy has provided an understanding of how digitization and its practice affects all the sectors. Government of India has made reforms in financial sector to update knowledge about digital aspect of financial literacy of every citizen by running campaigns to educate Indian citizens about digital finance. Digital India is one of the dreams of our government and as a result India is progressing moving towards the digitization in every sector.

Digital financial inclusion can improve the welfare of individuals and the businesses that have a reliable digital platform. The Ecosystem of digital financial services is vast, comprising of technology solution providers, regulators, last mile agents and users who have varied interests and diverse expertise. Co-learning and collaboration are therefore essential to develop this ecosystem and achieve the larger objective of providing access to financial services to all. Digital finance can be increased by promoting FinTech and their role in digital finance inclusion in India, using the existing framework provided by the World Bank, Reserve Bank of India, National Payment Corporation of India.

In 2016, India ranked 3rd among 55 countries across the world in having the most enabling environment for financial inclusion, along with Peru, Colombia, and Philippines. In nearly a decade of progress, multiple stakeholders have come together to enable the delivery of digital financial services to low-income households across urban and rural areas by developing a new ecosystem. Digital finance refers to the concept of implementing digital infrastructure by people and institutions for various financial services like savings, payments, insurance, investment or credit.

Critical factors for initiation and implementation of digital finance are:

A. Digital infrastructure consisting of robust network connectivity
B. Digital payments system which has a secure and swift method of making as well as receiving payments
C. Personal identification system that accurately identifies and verifies the financial transaction undertaken by person
D. System to regulate the transactions

II. LITERATURE SURVEY

The term FinTech denotes the financial technology and is defined as the delivery of financial and banking services through modern technological innovations led by computers and algorithms (Chelli, 2018). The Indian FinTech market has been growing leaps and bounds in the last five years (PWC, 2018).In 2018,India ranked second globally in the FinTech adoption rate, averaging 57.9% behind china 69.5%.The goal of financial services made available via digital platforms is to contribute to the financial inclusion objectives of developing economies (United Nations, 2016).

Digital financial inclusion results in benefits for banks by lowering transactions costs, reducing queuing lines in banks, crediting manual paperwork and documentation. This results in improved efficiency and a need for fewer branches for banks(Manyika, 2016).Digital financial inclusion can improve the welfare of individuals and business that have a reliable digital platform (CGAP, 2015). It can be concluded that there are close relationships among FinTech, Digital finance and Digital financial inclusion.

Innovative Methods of Teaching and Learning

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Innovative Methods of Teaching and Learning

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Innovative Methods of Teaching and Learning

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Abstract

Education, being a social institution serving the needs of society, is indispensable for society to survive and thrive. It should be not only comprehensive, sustainable, and superb, but must continuously evolve to meet the challenges of the fast-changing and unpredictable globalized world. This evolution must be systemic, consistent, and scalable; therefore, school teachers, college professors, administrators, researchers, and policy makers are expected to innovate the theory and practice of teaching and learning, as well as all other aspects of this complex organization to ensure quality preparation of all students to life and work. The objective of this paper is to incorporate Innovative methods and technology in teaching and learning to create a rich learning experience for students and a rewarding teaching experience for faculty.

Keywords: Innovative teaching and learning, Education Technology, Implementation, problem-based learning, Environmental approach to teaching, pedagogy

Introduction

Advance pedagogy is the way to enhance teaching and learning performance. Different innovative teaching methods are now in use across the globe. Hybrid teaching includes e – learning in addition to the face to face teaching. Use of technology and multimedia is described in details. Use of smart gadgets for different tasks like teaching, designing question papers, assessment of student, feedback and research methodology is discussed. The application of

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EFFECTIVE CONDUCT OF ONLINE CLASSES FOR ENGINEERING MATHEMATICS COURSE DURING COVID-19 LOCKDOWN

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Abstract

The Coronavirus 2019(Covid-19) pandemic has forced all the teachers to work from home. The lockdown brought the regular traditional classes to stand still all of a sudden in between a running semester (Jan-May 2020). As a result, we had to do a lot of re-thinking and re-planning of courses from offline to online. Even though "Black swan events" like the ongoing pandemic made us land down so far away from our equilibrium and comfort zone, teaching and learning have become far more paramount during this crisis. In this paper, we discuss the differences between the online mode and offline mode of teaching, the ways to overcome the challenges of online teaching methods and we touch upon the three essential aspects of learning in online mode i.e. Delivery, Engagement and Assessment for effective commencement of online classes employing ICT tools for freshmen engineering graduates. The feedback received from students has shown that e-learning lead to more effective learning, its super flexibility and its comfort for learning.

Key words: Learning Management System (LMS), Google classroom, ICT tools, online resources.

INTRODUCTION

When the Coronavirus 2019 (Covid-19) lockdown in India came into effect, strains of "Bharat Padhe Online" (India studies online) have been intensifying, with a push for a shift to e-learning (virtual learning) to address the disruption in the educational institutions due to the epidemic. The digital disparity is becoming visible as more educational institutions begin to adopt virtual tools. The University Grants Commission of India through its advisory instructed all the institutes to continue classes in online mode as per feasibility and engage ICT tools available for use in academic discourse. The faculty members of the university and colleges are also requested by its advisory to make use of the various online tools in order to reach out to the students.

A typical online course directs (content's presentation) needs modern educational technology (video/audio/mixed) to connect the content with students. Converting offline course may require additional effort to make contents. With this, teachers are now in the driver's seat and delivering online lectures. The advantages and opportunity of the online course is now felt by the masses.

Multiple communication modes like creating email groups, informing via WhatsApp/Telegram app, using web-based live online classes through WebEx, Zoom, use of YouTube with recorded academic and class lectures and/or ready lectures through NPTEL, and

Moodle –An Effective Learning Management System for 21 st Century Learners

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Moodle – An Effective Learning Management System for 21st Century Learners

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Abstract

Technology is been used in almost all aspects, including education. Anytime, anywhere learning is the new jargon in today's digital world. So there is a need to change teaching techniques to the technological changes. The recent trend of higher educational institute throughout the world is to use E-learning as it delivers more training to students at its fast, convenient and consistent advantage.

The use of technology and the Internet has made education we convenient to undergo significant changes thereby bringing new methods of teaching and learning (Lopes, A.P., 2014). Students are part of the new digital age, their lives revolve around computers, smart phones, games and online messaging. Recently one of the most widely used methods of teaching that is used to promote knowledge is being focused on online teaching-learning. The use of Information and Communication Technology (ICT) in Education and particularly, the integration of Learning Management Systems (LMS) play a vital role in today's digital era. The Learning Management Systems (LMS) are technological learning environments that support online course delivery. They offer comprehensive synchronous and asynchronous services that support collaborative learning (Filippidi et al., 2010). The Present paper is briefs about e-Learning, LMS, their features and role in the present teaching – learning process.

Keywords: LMS, E-Learning, ICT

Introduction

Computers and Internet are used as tools to enhance the teaching and learning process. It is said that the multimedia capabilities and the hypertext navigational tools of the World Wide Web not only provide access to multiple perspectives on a certain subject matter but also provide some degree of control to learners as they try to make sense of the content (Gunawardena, 1999).

Traditional teaching methods, with teachers in front of a blackboard giving long hours of lectures do not "work" with today's students and certainly will not work with the students of tomorrow. By using ICT (Information and

Teaching Analytical Writing Through Editorials Of Newspapers

Dr. B. Sushma

Abstract: Newspapers are authentic resources of language learning. The various components of language skills such as listening, speaking, reading, writing, grammar and vocabulary are readily available in the newspaper articles. This paper tries to analyze how materials from newspapers can be exploited to teach the micro and macro skills of writing analytical essays especially by using the editorials of standard and prominent newspapers like 'The Hindu' and 'Times of India'. Editorials contain information regarding the current issues and the personal opinions of the authors help us a lot to understand how one can voice one's opinions related to the issues. Writing essays is an art by itself. Analyzing the situations of any event, trying to record their views using appropriate language - words, phrases, thoughts, and opinions is something which the language learners must be capable of. For this to happen, the students are made to look at the sentence structures, vocabulary - general and academic, the organization of paragraphs, the linkers, the discourse markers to check the development of ideas, transition of thoughts, supportive statements, contradictory statements, one's own ideas related to the topic of discussion etc. A comprehensive view about the ideas presented in the article for meaning making is also necessary. This helps the learners to freely understand the nuances involved in writing and then apply them to their own writing. The knowledge and awareness they have about the current affairs or any issue of concern can be analyzed and presented effectively through the writing skills they have learnt from this writing workshop. The researcher conducted an experimental study to 20 learners for 3 hours. The results and outcomes are presented through data analysis and interpretation. The effectiveness and course of this method will be discussed elaborately in this paper. These instructions give you guidelines for preparing papers for IJSTR JOURNALS. Use this document as a template if you are using Microsoft Word 6.0 or later. Otherwise, use this document as an instruction set. The electronic file of your paper will be formatted further at IJSTR. Define all symbols used in the abstract. Do not cite references in the abstract. Do not delete the blank line immediately above the abstract; it sets the footnote at the bottom of this column. Don't use all caps for research paper title.

Index Terms: Current Affairs, Discourse Markers, Editorials, Effectiveness, Newspapers, Words, Phrases.

1 INTRODUTION

IN the contemporary times, students of graduation or post-graduation, appear for competitive exams like GRE, TOEFL, GMAT, CAT etc. The technical graduates may fare well in Quantitative Aptitude, logical reasoning sections. They find it difficult with the Verbal or English Language section, where vocabulary, comprehension abilities, analytical skills through writing are tested. Writing analytical essays helps the students to understand an issue from various perspectives and present it effectively. Examiners have the scope to check the lateral thinking, logical reasoning and writing abilities of learners through the essays. This paper tries to give some insights into teaching analytical writing to language learners. A classroom experiment was conducted to find out the existing competency levels in the learners and to find out whether there is improvement in the competencies after the intervention by the facilitator. Academic Writing includes writing letters, formal reports, abstracts, precis, e-mails, essays, statements of purpose, research papers etc. The different types of essays such as descriptive, argumentative, analytical or persuasive essays often test the learners' abilities to construct good arguments, research questions and write convincing essays. Analytical writing requires one to show the relationships between pieces of information. It is used to compare, contrast, assess or evaluate. It has a structure based on the ordering or sequencing of main ideas in relation to each other and uses evidences and real-life examples from various sources. Newspapers are authentic resources of language learning. LSRW skills (Listening, Speaking, Reading and Writing) can abundantly be taught or improved through the newspaper clippings. All kinds of articles related to political, social, economic, art, language, literature, sports can liberally be used as per the interests and needs of the learners to promote greater learning in language learners. Materials from newspapers can be exploited to teach the micro and macro skills of writing analytical essays especially by using the editorials of standard and prominent newspapers like 'The Hindu' and 'Times of India'. Editorials contain information regarding the current issues. The opinions of the authors help us immensely to analyze the issues from various angles. By analyzing the structure of the Newspaper articles, students will be able to understand the nuances of writing analytical essays. While reading the article, the students need to firstly focus on the content, overall idea of the article, and then give attention to the following details. The researcher gives them the inputs as to how to look at the organization and presentation of the content in the editorials.

Stage 1: First Reading

i. Observe the headline or title, subtitle or caption and the words used in it.
ii. Skim the essay for the number of paragraphs present in the article.
iii. Observe the introduction and conclusion.
iv. Start reading slowly, clearly by registering the meaning in the mind.
v. While reading, label the paragraph with one or two words/phrases (central ideas of the paragraph)
vi. While reading, underline the important lines which give the essential information.
vii. Summarize the entire article in 5 to 7 lines as per your understanding. (in your own words)

Stage 2: Second Reading

i. Analyze the structures of sentences whether it has SVO (subject, verb, Object) order, subject, verb, complement order, it starts with a phrase, clause, 'to infinitive', gerund or it is a simple or compound or complex or compound complex sentence.

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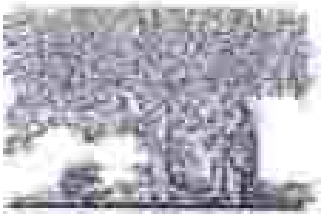

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Title: A COMPARISON OF EOQ WITH JIT

Volume 09, Issue 02, Pages: 48-53.

Paper Authors

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BLENDED LEARNING AND FLIPPED CLASSROOM IN ENGINEERING MATHEMATICS EDUCATION: THEIR EFFECTIVENESS.

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Dr.NVSL Narasimham
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Received: Jan. 2020 Accepted: Feb. 2020 Published: Feb. 2020

Abstract: The main objective of this study is to establish a Flipped class room and blended learning environment model to support students' mathematical thinking in the learning of Engineering Mathematics. Students no more want typical traditional classrooms where information transmission takes place in the class room. They want a platform which allows them to learn when they want to learn. They want to actively participate in the class, taking learning into their own hands. Flipping the class room makes learners engaged in effective learning in and outside the classrooms. The result comparison showed that the overall percentages of marks were increased after implementing Flipped classroom and Blended learning environment.

Keywords: Blended Learning, Flipped Classroom, Conventional Learning, Mathematical Thinking, Online Resources.

Introduction: With the help of technology, it's easy to capture the information transmission and we can let students work on lower cognitive levels such as what is definition of something, explain how something works, explain the process of other system. All these level of concepts can be worked on by looking at information transmission. The higher order concepts or higher cognitive levels can be dealt with in class which is where the students have the difficulty. Flipped classroom is one way to ensure that class time is spent in assimilation rather than information transmission.

Blended learning is a phenomenon where online resources, materials, audios, videos, web articles, link; blogs are used for discussions or activities in the classroom which is usually called flipped classroom. It is called 'flipped' because the traditional classroom conducts lectures and gives homework to learners, in a flipped classroom; learners do the homework in the classroom, by referring to the content online at home. The conventional roles are reversed. A lot of learning happens in pairs or groups through discussions, quizzes, debates, task sheets, assignments, projects in a flipped classroom. This method is most suitable for undergraduate and post graduate students even to secondary grade students in schools. It promotes self learning which raises the thinking skills in learners. Learners do not appreciate the 'sage on stage', teacher lecturing there for an hour on the stage. The attention span would not last for more than fifteen minutes in a traditional classroom. It thus becomes challenging for teachers to engage the learners. Instead of this, the teacher can plan out many exercises, activities, discussions based on the lessons to be taught. Prior to this, teachers need to provide the learners with some online content, articles to read, videos to watch on the given topic so that they can participate in the discussions in the class. Students' achievement is more effective in this kind of learning.

Blended learning or flipped classrooms as a concept was first conceived by Bonk and Graham in the book 'Handbook of Blended Learning' in 2006. According to Graham, Blending learning "combines face-to-face instruction with computer mediated instruction." Norm Friesen, a researcher says blended

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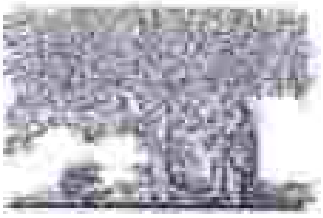

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Dissimulation and Pretence in 'Balthazar's Marvellous Afternoon'

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Abstract:

Gabriel Garcia Marquez's 'Balthazar's Marvellous Afternoon' lends much space for critical analysis as it contains complex themes, varied techniques and characterization leaving the readers in a moral dilemma. The plot revolves around Balthazar, the central character, the commoners who support Balthazar's art and Jose Montiel who denies buying the cage which Balthazar designed. With various episodes from Balthazar's place to Jose Montiel's house, the liquor shop and back to Balthazar's home, the story is resplendent in action. This paper tries to analyze the binaries operating at various levels in the story. The papet also tries to study how the various characters show pretence and dissimulation for the situations they are caught up in and how they try to escape from the existing realities around them.

Key words: Dissimulation, binaries, themes, characters, realities, pretence.

'Balthazar's Marvellous Afternoon' a short story by the Nobel Laureate and Columbian writer, Gabriel Garcia Marquez is a heart rending yet a complex saga of human emotions and experiences. With the two central characters of Balthazar and his wife, the minor characters of Jose Montiel, Pepe Montiel, Octavio, the setting of Balthazar's house and Jose's house, the story becomes fascinating and lively yet poignant. The thematic angles of binaries, polarization, hypocrisy, sincerity, conflict, humility, greed, generosity, pride portrayed exquisitely make the story strong and puts it in a proper place. Third person narration by the omniscient narrator, the dialogic discourse between the characters and the lucid narrative style add to the magnificence of the story.

Balthazar is portrayed as a dedicated artist who works relentlessly and untiringly for two weeks to complete the wooden cage. He is not bothered about his external appearance. He comes across as a very skilful carpenter who has confidence in his work and is unmindful of the output, 'He did not know that for some people the cage he had just made was the most beautiful one in the world. For him, accustomed to making cages since childhood, it had been hardly any more difficult than the others.' (Balthazar's Marvellous Afternoon 1) He makes a cage for Pepe Montiel, the son of Jose Montiel. But Jose Montiel fails to obtain the cage for his son, and out of generosity, Balthazar gives the cage to Pepe Montiel free of cost. His followers consider it to be the best work of his life. Everyone remains eager to see for what price Balthazar would sell the cage.

In the beginning of the story, Balthazar's character is elevated quite liberally. Balthazar was fairly a famous carpenter that once he finished making the cage, everyone started admiring it as, 'the most beautiful cage in the world'. The narrator's words, 'so many people came to see it that a crowd formed in front of the house and Balthazar had to take it down and close the shop' suggests that the name, fame and craftsmanship of Balthazar is spread far and wide. Balthazar's wife also says, 'It's the biggest cage I've ever seen in my life'

The creativity of Balthazar is further described. The cage was majestic in its appearance with 'its enormous dome of wire', 'three stories inside', 'passageways and compartments'. 'It seemed like a small-scale model of a gigantic ice factory'. Balthazar receives appreciation from Doctor Octavio Giraldo, an old Physician, 'This is a flight of imagination' and 'It would be enough to hang it in the trees so it could sing by itself.' 'It's very pretty.', 'Extremely pretty.' Jose Montiel's wife too likes Balthazar's work and exclaims, 'What a marvellous thing.', 'I've never seen anything like it in my life.'

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Disjuncture Between The Power And Truths In Indira Ganesan's "The Journey"

B.R Lakshmi, Dr.G.Hampamma, Dr.V.B. Chitra

Abstract: Knowledge and Power are [illegible] defined in a different terms by [illegible] theorists, [illegible] to the Power and Truth. One can dialectically [illegible] both the terms in view of [illegible] self, [illegible] word, self-confinement of the contexts [illegible] them. [illegible] associated with American and Indian cultures. The paper presents how these two fail to [illegible] Renu from her [illegible] anxiety and confusion [illegible] continuous suffer and pain cannot be [illegible] by them. As a result, her life throughout the novel, moves through depression, psychological trauma and [illegible] her being away from the life-giving choices offered by her Indian family or solitary life in America. Instead of opting any one of the ways, [illegible] she chooses the [illegible] death [illegible] in ending of "the Journey".

Keywords: Anxiety, Confusion, Conflict, Power, Suffer and Truth.

INTRODUCTION:

The Challenges of knowledge and the approaches of confrontation do not have the same substantial results in terms of a perfect constant and sustainable world for socially excluded self. A socially excluded self tries to set the protocols of its own inclusivity and centeredness in a system of resistant knowledge by suspending the rules, conditions and notions of truth and valid meaning set by power. Whether it is in the societal systems, family, community, state or individual life, the decision of these stories and characters are foreclosed. The situations and the incidents in the life demand an adolescent suicide based on the uncertainty of the world and a personal loss. One of such reasons made Indira Ganesan to choose protagonist, Renu Krishnan, of her novel, "The Journey" commit suicide as her internal journey from India to America and internal Journey from Truth to Power amalgamates her life a continuous psychological illness and physical strain.

STORY IN BRIEF:

Indira Ganesan's novel, "The Journey" moves around two major characters i.e., Renu Krishnan and her sister Meenakshi Krishnan whose lives are designed by two different cultures. They were born in the tropical Asian island of 'Pi' created by the novelist but they have grown up in align culture USA. All other characters like Adda Krishnamurthy and Hippie Freddie Flat and others have also dual culture backdrop with a confusion and revelation. Renu's struggle is to come with the sudden loss of her twin cousin, with whom she had assumed a rare closeness. She is made to acknowledge her own repressed sexuality and incestuous love she had for her twin cousin Rajesh. In a nation of immigrants, the story of entrance and modification is a perpetual fictional favourite. But Ganesan's handling of the story makes Renu's cousin Rajesh meeting with an accident and is dead by drowning. Conceived on the same day and born on the same day, Renu and Rajesh are considered as twins. According to village lore, if one of the twins dies, the other will follow soon. So Renu believes that since her twin Rajesh is dead by water, she will die by fire.

Elaboration: Power of myth strongly influences Renu's early life. During the childhood days, Renu and Rajesh unknowingly and accidentally killed a monkey which is believed an emissary of God., Hanuman and hit definitely there will be a punishment in life for this brutal action. Such early impressions on mind at her earlier life sense that she irritates the gods for her misbehaviour continues with Renu over the years:

> "Whenever she slipped into the American Way of life. When she stopped wearing the red tikka on her forehead, when she stopped going to temple, she could not free herself of the idea that the gods were still hunting her, that they were waiting to seek retribution" (14)

The very first line of the novel begins with the ambiguous ending of a major character in the novel by giving the information about the worst thing happened in their life. Rajesh died of by drowning into the water. It was happened when the train he was travelling slipped from the tracks due to heavy rains and fallen into river below. This death affects Renu beyond the reasons. She continues heavily introvert, worried, and alarmed. She gets nightmares and imagines all bad signs in dreams. She becomes melancholic and never spends time with anyone always thinking about her frightened future. She feels guilty and suffers from psychological illness. All the plans designed by Rukmini to bring Renu into the main stream of life by looking at suitable matrimonial matches are faded away. However, Renu made it very clear that she will die soon

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Hydrodynamic Studies of Pressurized Fluidized Bed Gasifier of Conical Distributors

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Abstract

This paper aims at measurement of hydrodynamic parameters of cold model of Pressurized Fluidized Bed Gasifier (PFBG) and develops hydrodynamic similarity with the existing hot model PFBG of an IGCC Power plant. In the present experimental work, pilot scale hot model data of PFBG of 168 TPD had been verified by constructing hydrodynamically similar cold model of 2/3rd scale semi-circular. Also pressure measurements at four different heights have been taken for recording pressure fluctuations. It is found that amplitude of pressure fluctuations is related to bubble size and reflect Bed hydrodynamics. Experiments have been conducted using different distributor configurations with apex angles of 60° and 120° which were designed, fabricated and tested in a cold model and the optimised distributor configuration arrived. Experiments were conducted for different materials such as REFRACTORY (of mean particle sizes-0.8) and BOTTOM ASH (of mean particle size- 0.6mm) at different static bed heights (D, 1.5D, 2D) with distributors of apex angles: 60°, and 120°. Trends in distributor pressure drop (ΔP_d) and Bed pressure drop (ΔP_{bed}) values in relation to superficial velocity (U_o) have been recorded and formatted into a graph of ΔP_{bed} V/s U_o. Minimum fluidization velocities (U_{mf}) for afore mentioned materials at respective static bed heights with each of two distributors, are then determined from related plots.

It is found that Minimum fluidization velocities (U_{mf}) are decreasing with increase in static bed heights (D, 1.5D, 2D) when the air flow was increasing from zero to maximum. The U_{mf} values are found to be increasing with increase in distributor apex angle (ϕ) from 60° to 120°.

Keywords

Hydrodynamics, Fluidization, Integrated Gasification Combined Cycle (IGCC), Pressurized Fluidized Bed Gasifier (PFBG), Refractory, Bottom Ash, Distributors of Apex Angles.

1. Introduction

Fluidized beds represented an environmentally acceptable way of exploiting Indian Coal reserves, prompting an increase in research and development related to fluidized-bed coal gasification and combustion. Although the underlying interest in fluidized beds is primarily related to their environmental performance, the hydrodynamics of a fluidized bed significantly influences both its environmental and thermal performance. Hence, understanding the hydrodynamics of fluidized beds is essential to fully capitalize on the benefits of fluidized bed combustion gasification.

Pressurized fluidized bed gasifier (PFBG) represents a new technology that offers higher cycle efficiencies than traditional atmospheric-fluidized-bed and pulverized-coal combustor. This study focuses on the hydrodynamics of PFBG that provides the added potential for operating in a combined-cycle configuration. IGCC is an emerging technology with potential for great impact on electric power generation. With the introduction of PFBG plant the overall efficiency of the power plant increases to 40-45% compared to 30-35% of conventional power plants. Therefore the importance has been given to the study of fluidization phenomenon. In Pressurized Fluidized Bed Gasifier (PFBG) during gasification of low grade coal, the elutriation of unburnt carbon with fly ash is observed to be about 10-16% bringing down the carbon conversion efficiency. The reason for the same is attributed to bubble coalescence and breaking of large bubbles at the surface (splash zone) throwing out fines along with unburnt carbon at higher than the terminal velocity of particles as reported by Davidson. J.F,etal 1977while using conventional flat plate or conical type of distributors. The elutriation is further expected to increase with increase in gasifier operating pressure. One of the objective of this work is to investigate the influence of distributor types on the performance of fluidized bed reactors using group B particles as per Geldart D. 1972. Classification, with most particles of size 40 μm < d_p< 500 μm and density 1.4 < ρ_s < 4 gm. / cm^3 covering bubbling regime.

To properly design a fluidized bed gasifier there is a particular need to develop laboratory scale beds operating at standard conditions that will properly simulate the hydrodynamics of a commercial unit operating at elevated pressure and temperature. It is more efficient to conduct controlled experiments in smaller cold model beds and compare confidently the test results to larger scale beds at actual operating conditions. Experiments can then be carried out in beds where detailed measurements of bed behavior can be made and modifications are simpler and less expensive. Also material problems due to harsh environments with in the bed will be avoided.

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Transient Thermal Analysis of the Turbine Blade

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Abstract- Turbine blade is the individual component which makes up the turbine section of a gas turbine or steam turbine. The blades are extracting power from the high temperature, high pressure gas makes by the combustor. The turbine blades are often the limiting component of gas turbines. In general, all solid and non-solid models will deform when certain amount of thermal or structural loads applied within the environmental condition. With specific end goal to discover the progressions of the item or segment analysis software is utilized. In this paper the model is designed concerning all the accessible constraints utilizing line Catia in which all the individual parts are created in part module and assemble each other in assemble module. Later the product record is changed over to "stp" file format (standard exchange of product file) and imported to Ansys workbench to find deformation and analytic value with respect to the model or product distinctions. Ansys software finds the precise or estimated solutions.

Keywords: design, analysis, meshing, turbine blades.

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