NATIONAL CONFERENCE
ON
MODERN ENGINEERING & TECHNOLOGY
(NCMET-2018)

17-18 DECEMBER, 2018

Organized by:

KRUPAJAL

Department of Computer Science & Engineering
Department of Electrical Engineering
Department of Electronics & Telecommunication Engineering

Krupajal Engineering College

Bhubaneswar, Odisha, India

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Krupajal Engineering College

Bhubaneswar, Odisha, India-751002

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It is a matter of great delight to know that the Department of Computer Science & Engineering is organizing a National Conference on "**MODERN ENGINEERING & TECHNOLOGY**" from 17-18 December, 2018. To mark this event, the department is going to publish a proceeding comprising all the technical papers presented in the conference. This is a multidisciplinary conference with the objective of bringing together scientists, professors and research scholars from India and abroad in the broad areas of communication, technology and engineering.

I wish the conference a grand success and hope it contributes immensely in the area of computing and engineering.

Dr. Bhabani Charan Rath

CHAIRMAN
Krupajal Engineering College

MESSAGE FROM CONVENOR

On behalf of Krupajal Engineering College, I welcome you all. The National Conference on "MODERN ENGINEERING & TECHNOLOGY " NCMET-2018 has various scope for different fields like Computer Programming, Networking, Security, Cloud Computing, Machine Learning, Artificial Intelligence, etc. I hope that this conference helped many students, faculty members and researchers for a wide spread are of research. I am very glad to announce that, our Institution had also encouraged and guided the students for their company start-up and at present many of them have started and running their own company with the support of the Incubation department.

I wish all the Successes for the conference.

Dr. Dillip Kumar Biswal

Principal
Krupajal Engineering College

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Keynote Speaker

Dr.Sujata Dash
P G Dept. Of Computer Application
North Odisha University.

Fog Computing Techniques in Smart Grid

The present handwriting concentrates on the operation of Fog computing to a Smart Grid Network that comprises of a Distribution Generation System known as a Microgrid. It addresses features and advantages of a smart grid. Two computational styles for on- demand processing grounded on participated information coffers is bandied. Fog Computing acts as an fresh subcaste of computational and/ or communication bumps that discharge the Cloud backend from multi-tasking while dealing with large quantities of data. Both Fog computing and pall computing hierarchical armature is compared with respect to effective application of coffers. To palliate the advantages of Fog computing, a Fog calculating frame grounded on Intel Edison is proposed. The proposed armature has been tackle enforced for a microgrid system. The results attained show the efficacity of Fog Computing for smart grid network in terms of low power consumption, reduced storehouse demand and overlay analysis capabilities.Electric Power Utilities are guided by the SMART GRID(SG) to track and control the operation of power by the consumers. Its a real timebi-directional data communication performed by smart measures. cargo balancing in SG network is possible due to distributed energy operation point. The service ability and the final consumers through online monitoring and controlling the power operation achieve the operation and operation of their electric power systems. SG balances the energy consumption by transferring the signals to the consumers whenever the energy consumption reaches peak values. It orders the consumers to cut off some of the unused appliances from the force to overcome the peak demand. In the control center, all the protection bias and the complete power system is well covered for security purpose.

The RF Issues and Their Solutions in the Absence of a Working Internet

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Abstract

Today, the entire world uses the internet. If we were to analyse without internet, we would have to return to offline mode in every area, whether it be the banking industry, a commercial business, or a domestic one. It is crucial to think about living without the internet. It is quite unfortunate for people to use technologies in a comfortable lifestyle without the internet. This work addresses RF wave stability resolution and its spectrum retention in the absence of the internet. With cameras, we can communicate photos, data, audio, and video while also going in a different direction from our conventional, antiquated methods.

Keyword: Penetration, RF, Copper and Water, Barrier

Introduction

Digital information can be received, transformed, fetching and retrieve data back and forth via radio waves in the range of 3kHz-300kHz. It may be in the form of tethering, Wi-Fi, Bluetooth, hotspot or USB. RF is a measurement of oscillations rate of electromagnetic radiation spectrum or waves .beyond RF is IR infrared zone, ultraviolet and other waves Xrays ,gamma rays. Examples on these waves devices like microwave oven, doors garage , TV remote (IR), which are shorter electromagnetic .RF used in communication technology like TV , mobile phones and radios, etc. The penetration to these radio waves are non-conducting materials from building materials like wall, concrete, wood , bricks etc . and travel through air. The radio waves cant pass through metals and water, Copper is s such example which makes barrier shielding RF. Usually by the principle of diffraction. These radio waves travel there is no medium.almost same speed as that of speed of light 300000000 m/s and waves produced from moving charged particles example electric current in a wire.The copper and water as the medium for RF barrier which attenuates loss of radio signals. The 7 layers of IOT and cloud computing also taken into considered.

Using a GPS system, a boat localization and border alert system for fishermen's safety

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Abstract

Numerous fishermen are caught, detained, or even killed on a daily basis. The primary reason for this cross-border cruelty is that the nations' sea borders are difficult to identify. In a few cases theoblivious and unfortunate anglers unwittingly cross the boundary because of absence ofspecialized hardware and information. A system that will notify fishermen when the threshold of the maritime border has been reached has been proposed as a means of reducing this problem. The spinning boat vessel that has strayed into the sea is monitored and tracked by the proposed border alert system using the Global Positioning System (GPS). An alert will be issued with the assistance of an Apache Portable Runtime (APR) Voice playback circuit and a buzzer if the boat reaches the warning zone. Indeed, even after the ensuingcautions, when the anglers cross the admonition zone the Alert keeps on blaringalso, the engine of the motorized boat will be consequently switched off and anready message is shipped off the coast gatekeeper and control room with the assistance of theWorldwide Framework for Portable Correspondence (GSM) module. As a result, the proposed system contributes to both preventing fishermen from crossing the marine border and saving their lives.

Keyword- Global Positioning System (GPS), Global System for Mobile Communication (GSM), Apache Portable Runtime (APR)

Introduction

Even today, fishermen still use their historical rights to fish within the International Maritime Boundary Line (IMBL). The primary reason for this cross-border cruelty is that the nations' sea borders are difficult to identify. However, they are shot by naval forces for crossing the border without their knowledge by accident. This results in a decline not only in human income but also in economic income. As a result, the proposed border alert system utilizes the Global Positioning System (GPS) to monitor and track the vessel's movement. The created equipment unit is put on the boat. Contingent upon IMBL the region is separated into safe zone, cautioning zone, zone close to limited zone and at last the limited zone.

An Experiment on the Application of the AUC-ROC Curve to Software Fault Prediction Classification Models

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Abstract-

Using fundamental project resources, software bug prediction identifies software modules that are likely to have bugs before actual testing begins. It's best to start predicting bugs early in development rather than during testing due to the high cost of fixing bugs that are found. Prediction models can be built using a variety of methods and strategies, including machine learning. We have concentrated on nine unique kinds of datasets and seven sorts of machine learning procedures have been distinguished. Concerning execution measures, both graphical and mathematical measures are utilized to assess the execution of models. When creating a prediction model, there are a few difficulties. In this review, we have reduced to nine unique kinds of datasets and seven sorts of AI methods have been distinguished.

Keyword: KNN, ROC, AI, FPR

Introduction

Sensibly messed with or imperfection free, followed through on time, meet the necessities or assumptions, inside determined financial plan, and is viable are focuses which are alluded as programming quality boundaries. Software quality can be improved by identifying flaws in the system. Software errors can occur for a variety of reasons. It is the result of human error, designer or programmer error, incorrect data entry, documentation, communication failure, and incorrect line code.

Social Impact on Military Children's Parenting Issues: Scientific Studies

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Abstract- Military children are significantly impacted by frequent relocations. It fosters these children's social, educational, and emotional growth. Dhaka sometimes has officers and children living there. The children find the regular posting of military personnel and the absence of lodging options in the area interesting. Staying with a "Single Parent" is required in the home town, villages, and occasionally the capital city of Dhaka. In recent times, only escalating was used to address it. Offices like expanding out leaving in different posts, expanding the convenience offices, and it are presently required to lay out new instructive foundations. It is done so that the children of the Army can remain with their parents. However, not all army personnel could benefit from these amenities. Social support can't always come from taking care of parents, but organizational support can help with child care and other needs. The organization or nation can act as caregivers when the individual ignores. In order to prepare the next generation, the research should ascertain the cognitive outcome of the current system.

Keywords: Military Children, Junior Commissioned Officer, Children, JCO, Social, Social Impact

Introduction

Due to the nature of the military profession, it is unable to address all social needs; Again, its "nature" alone cannot be ignored. Being taken part in difficulty, the tactical staff neglect their own life. However, his personal and professional lives must be balanced. However, the majority of children of Junior Commissioned Officers (JCOs) and Other Ranks (ORs) reside in rural areas. In both instances, it can be challenging to raise a child in a military household. Young children have a limited capacity to comprehend their military parents' prolonged absence because they are most reliant on their parents' emotional and physical availability for establishing and maintaining a sense of safety and security (Chartrand, Frank, White, &Shope, 2008).

Utilizing Particle Swarm Optimization, a connected median filter that is optimized

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Abstract

In image processing, impulse noise was removed with a median filter. It keeps the edges for the next level of operations like object recognition and segmentation. The pre-processing of chili x-ray images is the topic of this paper. The analyst has as of now pre-processed the stew x-beam pictures by taking on the Normal channel, Middle channel, Wiener channel, Gamma power adjustment, CLAHE, 4-associated Middle channel and weighted 4-associated middle channel. The pixel noise that results from the aforementioned pre-processing techniques renders them unsuitable for higher-level operations. To eliminate such clamor from the picture, this paper contributes an exact and efficient calculation. In the selected window, the proposed noise removal algorithm uses a "4-connected median value" to replace the noisy pixels and a "weighted 4-connected median value" to replace the remaining pixels. Particle swarm optimization is used to replace the middle pixel value in a 4-connected median filter. Particle swarm optimization makes use of the Peak Signal to Noise Ratio as the fitness function. The presentation measures were taken for all the commotion expulsion calculation. The proposed algorithm performs better than other methods among the various outcomes that were obtained.

Keyword: Impulse noise, particle swarm optimization, Optimized connected Median filter, Particle, Swarm Optimization

Introduction

Salt and pepper clamor is a sort of motivation commotion. It by and large tracked down on a wide range of pictures. It appears randomly on the images and resembles a black-and-white pixel. In the noisy image, white pixels appear in the dark and black pixels appear in the bright areas. In the past, linear filters were thought to be the best for removing noise from images. Because of the way it worked, it became famous. Direct channel safeguards the edges of the picture and eliminates the clamor with no deficiency of essential items of the picture. The median filter is the most significant of the various linear filters. However, it appears to be difficult to remove salt and pepper noise without causing image distortion with the median filter [2].

Secure Data Duplication Improves the Performance of Cloud Data Storage

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Abstract
Cloud computing has become very important because it makes cloud storage space easy to access. One of the most common methods for compressing data is data deduplication. The goal of this strategy is to cut down on information duplication. Deduplication of information is used in cloud storage to both maintain capacity and reduce storage space. This paper tries to formalize the idea of secure and productive cloud storage by addressing issues that have arisen. The openness and accessibility of the information component can thus be achieved. As input, text files are used. In the principal module, the record is first handled for finding the fundamental elements from the text documents. The records are arranged according to space in advance. The Tiger hash generation algorithm generates a key for the 3DES encoding algorithm. The outcomes demonstrate that the proposed strategies have a positive effect on contrast and the conventional system.

Keyword: Hash Tree, Cloud Storage, Cryptographic Data, Data Management

Introduction

This Picture Distributed computing innovation not just has added to different applications and affected the activity of unique organizations yet additionally permitted the Web to exist in various corners with various gadgets. However, due to the fact that the effectiveness of control methods has a significant impact on cloud network performance and quality, data access, node management, and control have become significant issues that need to be emphasized with the emergence of numerous devices and data.

Cloud Choice Emotionally supportive networks: Problems and Challenges in Security

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Abstract- Data-oriented analyses and improved business performance are supported by decision support systems, a subset of information systems. Due to the value it can bring to businesses, cloud-based decision support systems become increasingly popular. Be that as it may, since choice help information are extremely touchy, information security stays one of the top worries. In this paper, we look at the cryptographic and security mechanisms that aim to keep decision support systems safe in a cloud environment and talk about current challenges in related research.

Keywords: Decision Support System, Cloud Computing, Data Privacy, Cloud Security

Introduction

Through a pay-per-use model on the Internet, cloud computing provides a variety of services. Cloud computing's flexibility is very appealing to many businesses, particularly mid-sized and small ones, because it has lower start-up costs and allows businesses to financially deal with changes in system usage. Particularly intriguing is the use of the cloud for data outsourcing [34]. However, decision-support data, such as personal, health-related, and business data, are particularly sensible. Information distribution centres (DWs) is a perused just insightful data set is the groundwork of choice emotionally supportive network [42]. Generally, choice help information are put away in focal archives, i.e., information distribution centres (DWs), which merge authentic information from various sources and permit on-line examination handling (OLAP). Security concerns arise when decision-support data is outsourced to the cloud. Traditional security measures are no longer adequate to safeguard such data in the face of increasingly sophisticated cloud-based internal and external attacks [36].

The significance of AI in today's trends, as well as its numerous Applications And Technologies

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Abstract-

The ability for machines to think conceptually and analytically is provided by the field of artificial intelligence. Huge commitment to the different regions has been made by the Man-made consciousness procedures from the most recent twenty years. Man-made consciousness will keep on assuming an undeniably significant part in the different fields. This paper depends on the idea of man-made reasoning, areas of man-made consciousness, utilizations of man-made brainpower and Advances utilized in Computerized reasoning.

Keywords: ArtificialIntelligence,Applications,Advantages&DisadvantagesandLimitations.

Introduction-

Because of the numerous ways in which artificial intelligence has improved human life, the field of computer science is gaining popularity. Man-made reasoning over the most recent twenty years has significantly further developed execution of the assembling and administration frameworks. Expert system is a technology that has emerged as a result of research in the field of artificial intelligence. It is expanding at a rapid rate. Application areas of Man-made brainpower is colossally affecting different fields of life as master framework is broadly utilized these days to take care of the perplexing issues in different regions as science, designing, business, medication, weather conditions anticipating. The quality and effectiveness of those applications that make use of Artificial Intelligence technology have improved.

A Bio-Inspired Algorithm-Based Data Mining Framework for an Intrusion Detection System (IDS)

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Abstract-
Any organization's information, which is managed by a sophisticated information system (IS), is constantly at risk from vulnerabilities caused by intrusion. This paper focuses on the novel way of dealing with the various intrusions and proposes a model for the Intrusion Detection Systems (IDS). There is always a need to have a better and proper security mechanism in place so that the effect of the intruders may be minimized and the information may not be compromised. In the model, the efficiency and accuracy of the optimization are improved through the use of biologically inspired algorithms. To deal with potential threats to information systems, the proposed model has three crucial phases: clustering, mining, and classification.

Keywords : Information System(IS), intrusion, Intrusion Detection Systems (IDS), biological inspired algorithms,Clustering,Mining andClassification.

Introduction-

Money was once regarded as an organization's most valuable asset. However, over time, a paradigm shift occurred, and organizations began to view information as the most valuable asset rather than the financial aspect. To achieve a higher level of data and information integrity, the vital information in any information system requires a secure mechanism. In order to minimize the risk of compromising information integrity, a robust information security strategy is required. The quality of the information a company stores and processes is critical to its competitive advantage. Any split the difference in the idea of the data might prompt the serious impediment as data is viewed as a significant element for the arrangement choice. Different information mining and delicate figuring strategies have been proposed by the specialists overall for identifying interruptions that might think twice about uprightness of the data system[1]. However, the researchers are always motivated to continue their research in this direction because there is always a tradeoff between the results' consistency and accuracy.

Deep Q-Networks for Binary Actions Used in Reinforcement Learning

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Abstract:

Modern Reinforcement Learning (RL) systems have been developed for a variety of difficult and real-world tasks as a result of the development of RL. The literature has a variety of strategies because of the vastness of this field. One such noteworthy method is the employment of several Deep Q-Network (DQN)-based entities in RL systems. These entities communicate and learn from one another. In such a scheme, the learning must be evenly spread across all entities, and the protocol for inter-entity communication must be well thought out. The complexity of these multi-entity systems has multiplied as more complicated DQNs have emerged, which has raised their total complexity and caused problems with training, resource requirements, training duration, and fine-tuning that affect performance. We offer a lightweight ensemble-based strategy for resolving the essential RL problems, taking inspiration from the parallel processing seen in nature and its efficacy. It makes use of many shared-state, shared-reward binary action DQNs. When compared to traditional DQN-based techniques, the suggested methodology has the advantages of overall simplicity, quicker convergence, and superior performance. By forming its ensemble, the method may be used to any type of DQN.

Keywords: Deep Q-networks, ensemble learning, reinforcement learning, Open AI

Introduction:

Using ensembles in deep RL is rare as has been done in [25], where Q-learning agents have been used in an ensemble for a time series prediction task. In the same work, different agents are trained over different epochs leading to varied exposure and hence they have varied decision-making abilities. This tendency may not be suitable in the long run. In addition, if the time series is too long, the number of agents in the ensemble grows exponentially. In order to address these issues, the proposed approach is used in Deep Q- Network ensembles (DQN ensembles) and applied to core RL decision-making tasks. In experiments on some notable OpenAI Gym tasks, Atari 2600 games, etc., the proposed approach shows advantages like robustness, faster convergence and better performance as compared to state-of-the-art techniques, including various conventional Deep Q-Network techniques. The proposed approach achieves state-of- the-art results on the tasks.

A survey of data mining methods and applications from 2000 to 2011

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Abstract:

This research examines data mining techniques and their evolution from 2000 to 2011 through a review of the literature and the classification of articles in order to identify how data mining techniques (DMT) and their applications have evolved over the previous ten years. This paper surveys and categorises DMT according to the following three areas: knowledge types, analysis types, and architecture types, along with their applications in various research and practical domains. The articles were found using keyword indices and article abstracts and were drawn from 159 academic journals.The direction of any potential future advancements in DMT applications and methodology is discussed: (1) Expertise orientation is one area where DMT is finding more and more applications, and DMT application development is a problem-oriented field. (2) It is proposed that, as an alternative to the approaches already available, DMT may be used in several social scientific methodologies, including psychology, cognitive science, and human behaviour.

Keywords: DMT, data mining, scientific methodologies, cognitive science

Introduction:

Data mining techniques (DMT) have formed a branch of applied artificial intelligence (AI), since the 1960s. During the intervening decades, important innovations in computer systems have led to the introduction of new technologies (Ha, Bae, & Park, 2000), for web-based education. Data mining allows a search, for valuable information, in large volumes of data (Weiss &Indurkhya, 1998). The explosive growth in databases has created a need to develop technologies that use information and knowledge intelligently. Therefore, DMT has become an increasingly important research area (Fayyad, Djorgovski, & Weir, 1996).

Of the data mining techniques developed recently, several major kinds of data mining methods, including generalization, characterization, classification, clustering, association, evolution, pattern matching, data visualization and meta-rule guided mining, are herein reviewed. The techniques for mining knowledge from different kinds of databases, including relational, transactional, object oriented, spatial and active databases, as well as global information systems, are also examined.

An Examination of Clustering Data Mining Methods

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Abstract:

The partitioning of data into groups of related items is known as clustering. In the process of clustering, some details are ignored in favour of data simplification. It is possible to think of clustering as a data modelling tool that offers succinct summaries of the data. As a result, clustering is connected to a variety of academic fields and is crucial to several applications. Clustering is frequently applied to huge datasets and data with several properties. The study of such data is known as data mining. This survey focuses on data mining approaches to clustering algorithms.

Keywords: clustering algorithms, simplification, data mining, survey

Introduction:

Clustering refers to the division of data into groups of similar objects. Each group, or cluster, consists of objects that are similar to one another and dissimilar to objects in other groups. When representing a quantity of data with a relatively small number of clusters, we achieve some simplification, at the price of some loss of detail (as in lossy data compression, for example). Clustering is a form of data modeling, which puts it in a historical perspective rooted in mathematics and statistics. From a machine learning perspective, clusters correspond to hidden patterns, the search for clusters is unsupervised learning, and the resulting system represents a data concept. Therefore, clustering is unsupervised learning of a hidden data concept.

Empirical Research on Data Mining Applications in Healthcare

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Abstract:

The healthcare industry is typically thought of as "information rich" yet "knowledge poor." Within the healthcare systems, there is a lot of data. Effective analytic tools, however, are lacking, making it difficult to find hidden links and patterns in data. Data mining and knowledge discovery have many uses in the corporate and scientific worlds. The implementation of data mining techniques in the healthcare system can yield useful insights. In this study, we briefly look at the possible use of rule-based, decision-tree, and artificial neural network data mining approaches to a large volume of healthcare data. We focus in particular on a case study that employed categorization algorithms on a set of medical records pertaining to diabetic patients.

Key words: Healthcare, health data, medical diagnosis, data mining, artificial neural network

Introduction:

Knowledge discovery in databases is well-defined process consisting of several distinct steps. Data mining is the core step, which results in the discovery of hidden but useful knowledge from massive databases. A formal definition of Knowledge discovery in databases is given as follows: "Data mining is the non trivial extraction of implicit previously unknown and potentially useful information about data"[1]. Data mining technology provides a user- oriented approach to novel and hidden patterns in the data. The discovered knowledge can be used by the healthcare administrators to improve the quality of service.

Cascaded Multilevel Inverter with a Lower Component Count

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Abstract:
This work describes a fundamental module for symmetrical multilevel inverters. The suggested multilevel inverter is made up of cascaded basic units connected by an H-bridge. To generate switching signals for switches, a multicarrier-based level-shift pulse width modulation system is devised. When compared to other conventional and modern multilevel inverters, the suggested cascaded multilevel inverter has less components. The suggested inverter's performance and operation are validated using simulation results from MATLAB/Simulink software and experimental implementation of a single phase 11-level inverter.

Keywords—Multilevel inverter; reduced component count; multi-carrier based pulse width modulation; total harmonic distortion

Introduction

In recent past years, multilevel converters (MLIs) have played essential role in high power and medium voltage applications, such dynamic voltage restorer, flexible ac transmission systems (FACTS), electric vehicle and renewable source based power systems. The various advantages of multilevel inverter such as, high quality waveform, less dv/dt stress on switches, better electromagnetic interference and better total harmonic distortion (THD) profile [1]–[8]. However, multilevel inverters have some drawbacks, it required number of components. This makes complexity in circuit, size of circuit, cost and reduces the efficiency of the inverter.

In general there are three conventional topologies are; flying capacitor (FC), cascaded H-bridge (CHB) and neutral point clamped (NPC) [1]–[10]. Many researchers have moved towards CHB MLI due to disadvantages. Moreover, reduced component counts are main goal in design of cascaded MLI topologies [9-10]. A CHB MLI is classified as symmetric source structure and asymmetric source structure. In symmetric source structure, the value of dc sources voltage is identical, whereas in asymmetric source structure value of dc sources are different.

Asymmetric source structure inverter offers reduced number of switches with higher voltage level [9]-[10] but intricacy in modulation process [11]. Some of recent MLI topologies are recommended in literature [12]-[14], each one of these topologies has some merits and demerits in term of number of devices and voltage stress on switches. In this paper, a modified cascaded inverter with reduced componentcount is explained and compared with conventional CHB MLI and contemporary topologies [12]-[14].

STUDY OF ADHOC NETWORKS FOR STUDY OF VEHICLES

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Abstract:

Vehicular Ad hoc Networks (VANETs) are the hopeful way for drivers and travelers to get insurance. They are used for vehicle-to-vehicle (onboard units) or vehicle-to-infrastructure (roadside units) communications. Wireless communication, security and privacy are very important parameters to avoid threats in a network. It plays an important role in an intelligent transportation system that provides a self-aware mechanism that has a great impact on improving traffic services and reducing traffic accidents. But like other networks, VANET has security issues, especially authentication, privacy, and resource attacks. This paper presents an overview of security issues, solutions, challenges, and attack types for various VANET applications.

Keywords: VehicularAdhocNetwork, VANET,Attacks, Securitythreats.

INTRODUCTION

These days, the incidents related to road are common.The death rate has contacted 1.2 million individuals oreveryyearonstreetmishaps[13].Asidefromroadmovement,thedrivershouldbedynamiconroad.Wecanmakesomeassistancetodriverbygivingclimateconditions or any risk on street. In this way, new kind ofsystemisbeingintroducedcalledVANET(VehicularAd-hocNetwork).VANETisasegmentofMANETs(MobileAd-hoc Networks) in which vehicle turned into a node.This is a huge system with more noteworthy number ofnodes accessible on system and spread in different roads.The vehicles on system can connect to impart each otherlikeV2V(Vehicle-to-Vehicle)correspondence.Bethatasit may, each system needs administrations to keep up asystem. Safety accomplished by trading of informationthroughVANETthatdecreasesthequantityofmischances on road. Every vehicle can give an alert callthatcouldbeproducedwhenmishaphappen,onthattimethe vehicle will work like a caution for another vehicle.Every vehicle is well-informed with such messages thatcould conserve life and will make essential strides. So,data must be solid and genuine. In this circumstance, thesecurity prerequisites are critical. In the meantime, thesecurity of every driver or vehicle is exceptionally vitalfromunapprovedindividual.

An Inverter Topology with Cascaded Multilevel and a Single Bidirectional Conducting Switch

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Abstract:

The neutral point clamped or diode clamped inverter, the flying capacitor inverter, and the cascaded H-bridge inverter are the three most popular topologies for multilevel inverters. With the transition to renewable energy, the cascaded H-bridge inverter is one of the three that is gaining the most popularity. Because of its modular design, the cascaded H-bridge is easily adaptable to systems with multiple dc sources, such as photovoltaic systems. The fundamental drawback of cascaded H-bridge inverters is their high switch count requirements, especially for designs with numerous output voltage levels. Another significant drawback is that a large number of switches must be activated for a cascaded H-bridge to operate, accumulating voltage drops across the conducting switches before they reach the output terminals and leading to losses and decreased efficiency, particularly for a high power installation. This work proposes a continuous neutral line multilevel inverter topology with a single conducting bidirectional switch operating at all times. The proposed topology is built and tested using the Matlab Simulink platform at level 41. The outcome demonstrates that the suggested inverter has a very low output THD level and a minimum internal losses for high output voltage levels and large power loads.

Keywords— Cascaded multilevel inverter; Conducting switch; High power inverter; Uninterruptible neutral line; Renewable energy; Low THD component

Introduction

As the world trying to move away from fossil fuel based energy systems toward completely renewable energy based systems, the role of inverter becomes more and more important in the renewable energy system design. A directly grid-connected photovoltaic system or wind energy system exposed the main vulnerability of such system – unpredictable and irregular energy source – as shown recently in the energy crisis that engulfed South Australia state [1]-[2]. The solution is by using battery banks as the intermediate phase between the renewable energy sources and the grid [2], so this means the inverter will be the main component in the energy system. Another advantage of an inverter-based grid system is that the inverter can condition its output really fast to the changes in the load system, compared to the conventional generator based system. The fast response make the inverter very flexible to the load demands, further enhance the importance of the battery based grid systems [3].

The multilevel inverter has several advantages compared to conventional inverters and two-level inverters such as low distortion in input and output, smaller common-mode voltage and low frequency switching [4]-[5].

A SURVEILLANCE SYSTEM BASED ON VIDEO SUMMERIZATION BASED KEY FRAME

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Abstract.

Surveillance systems are very popular nowadays. Efficient access to surveillance system records is an important research goal. In this paper, a simple method for improving video image summarization using key frame information is proposed. The goal is to improve the efficiency of accessing documentary video. The proposed method summarizes the video in terms of reducing the number of frames based on the histogram equalizer

Keywords: Digital image processing, surveillance system, video summarization, key frame extraction, video summarization, motion-focusing.

INTRODUCTION

Video summarization aims to create useful summary of video so user can get maximum and relevant information from video contains. Video summarization, as an important video content service, produces a condensed and succinctre presentation of video content, which facilitates the browsing, retrieval, and storage of the original videos. There is no universal method for video summarization. However, there are mainly to two approaches for video summarization one is static or key-frame based or story board and other one is dynamic or video skimming based.[1].Video summarization mainly touches three domains[1]: Consumer video application(consumer electronic devices like Personal video Recorders (PVR), DVD, CD) etc.

REACTIVE POWER COMPENSATION TECHNIQUE FOR THREE PHASE INDUCTION MOTOR

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Abstract.

Recently, the quality of power supply has become an increasing focus around the world as the overall quality of life continues to increase, prompting researchers to work on new application developments in this area. Reactive power is one of the most critical parameters for power quality analysis and improvement. Therefore, the development of a reactive power compensation mechanism for the 3-phase system AC has been considered as a research problem. The work presented in this paper includes a systematic literature review and critique for the same research problem. The work is based on shunt compensation of reactive power caused by various loads in the distribution system.

Keywords:PQquality,Reactive power, Reactivepowercompensatoretc.

INTRODUCTION

Supply of electricity plays an important role in the technological advanced world. Thequality and reliability of power supplies relates closely to the economical growth of a country.However, power quality disturbances such as reactive power, harmonics, voltage imbalance etc.,create a lot of problem in achieving a reliable and quality power supply.These power qualityproblemsareverycommonintheelectricaldistributionsystems.

The custom power term was proposed to designate a new generation of power qualityimprovement devices in distribution systems. It is dedicated to maintain and improve the qualityandreliabilityofdistribution levelpower.

Inverter Topology for Distributed DC Sources with Single-Phase Cascade

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Abstract: To decrease the amount of active components and enhance power quality, a novel single-phase cascaded multilevel inverter topology utilizing an H-bridge inverter is proposed. To enhance the number of voltage levels and power handling capacity, the topology uses two or more cascaded H-bridges. The voltage-level generator (VLG), which is coupled to the input of the conventional H-bridge, is the fundamental component of the suggested inverter. The primary benefit of this configuration is a considerable reduction in the quantity of switches and voltage sources needed to provide the requisite number of voltage levels. The output power's quality, price, and size are thereby greatly enhanced. In order to more thoroughly demonstrate the advantages of this topology, both the symmetric and asymmetric configurations are investigated. The performance of the suggested topology is validated using MATLAB/Simulink models for symmetric 9-level and asymmetric 31-level cascaded multilevel inverter setups. Satisfactory results are provided.

Keywords—multilevel inverter; inverter power loss; reduced switch count; cascaded topology.

Introduction

The past two decades has seen a growing demand for high power, high-voltage utility scale inverters mostly fueled by the integration of large wind farms. Multilevel inverters (MLIs) have emerged as the industry choice for these megawatt range inverters [1]–[4]. The increasing demand for these MLIs has led to an avalanche of various configurations. Most of these fall into one of three categories - neutral-point-clamped (NPC) [5], [6], flying-capacitor (FC) [7], [8] and cascaded H-bridge (CHB) topologies [9]–[13] or some hybrid of these [14].

Cascaded MLIs can be categorized into two types– symmetric and asymmetric. This classification is based on the DC voltage sources. In the symmetric case, the input DC sources are assumed equal in magnitude whilst in the asymmetric case, the DC sources assume different values. In addition to being well-conditioned for high power applications, the structure of most MLIs make them inherently suitable for use in distributed power systems. They produce lower harmonic content and reduce filter requirements, lower electromagnetic interference (EMI), and lower stresses on the load [15], [16] compared to the conventional two-levelinverters.

Different Modulation Methods for Symmetrical Multilevel Inverters

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Abstract: The adaptable machine for running highly rated machines is the multilevel inverter. Despite the fact that it can perform admirably for medium and low rating machines, a standard two level inverter is by much superior due to its benefits such as decreased electromagnetic interference (EMI), suppressed harmonic distortion, and greater DC link voltages. Their primary flaw is complexity, as they need a lot of batteries and switches. This paper presents a symmetrical inverter structure that can generate nine levels of output voltage with fewer switches.This technology greatly decreases complexity because it uses fewer circuit elements than other methods. The MATLAB/SIMULINK platform is used to execute the performance of the current technology, and the results are shown, demonstrating how the current topology operates as a multilevel inverter.

Keywords— Multilevel inverter (MLI), Multi-level DC-link inverter (MLDCLI),Pulse Width Modulation (PWM), THD.

Introduction

In recent years, multilevel inverter has occupied a large part of the industry, due to use in high power and high voltage application [7]. The word 'multi-level inverter' was first introduced in year 1970s and 1980s. The fundamental unit of a multilevel inverter is called three level, it is similar to a square waveform [3]. Multilevel inverter has certain advantages over two level inverters such as, low switching frequency hence reduction in switching losses, lower harmonic, low common mode voltage. An MLI generates a stepped waveform which looks like a sinusoidal, alternately it generates an increasing and decreasing staircase waveforms by increasing the voltage levels. Staircase waveform so generated will tend towards pure sinusoidal which in turn leads to require more gate driver circuits. Different PWM techniques are used to control output voltage waveform within multilevel inverter [1].

Power electronic inverter are used in adjustable speed ac drive, induction heating, stand by aircraft power supplies, ups (uninterruptable power supplies) for computer, HVDC transmission lines etc [2]. MLI are preferred for medium and high power system like static reactive power compensation. MLI reduced total harmonic distortion content in output side. Cause of technical and economical barrier like that cost of drive and protection, stable dc supply voltage and packing, the number of inverter to be limited.

A NOVEL TECHNIQUE BASED ON XBEE TO ESTIMATE PARAMETER OF DC MOTOR

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Abstract.

Nowadays, automation has become a basic need of industry. Motors are the nerves of many industries. Therefore, industrial automation is necessary for precise and accurate operation. In this paper, we propose a wireless monitoring system for a DC motor based on Xbee communication protocol for secure and economical data communication in industrial areas where wired communication is more expensive or impossible due to physical conditions. A module of transducers and sensors monitors motor (DC motor) parameters and transmits data via the Xbee protocol. An Arduino-based system is used to collect and shop data and accordingly generates a signal to monitor the motor parameters wirelessly via a computer interface developed with Xbee.

Keywords:dcmotor,wireless monitoringsystem,xbeeprotocol,arduino,xctu.

1. INTRODUCTION

Motors are very popular in industry because they are prime movershenceitbecomesnecessary to protect them against faults. In our case, we used dc motor for the monitoringsystem by xbee basedsystem becauseitis cost-effective andsimple solutionforwirelessmonitoring system. We can also use xbee based system for other motors like induction motor.(2)To start with; xbee is a wireless communication device like Bluetooth and Wireless Local AreaNetwork(WLAN).(3)Basicdifferencebetweenxbeeandothersisthatallxbeedevicesrelay each other's traffic, bypassing the wired network entirely. (4) The Institute of Electrical and Electronics Engineers (IEEE) developed 802.15.4 standards and helped the production of xbeeprotocol and devices that support this protocol. (5)The basic structure of xbee based parametermonitoring system consists of one microcontroller board and two xbee device, microcontrollerboard and one xbee device are near dc motor and acts as transmitter for the other xbee devicewhich is near the computer known as receiver where the parameters are displayed on computerusingXCTUsoftware.

Permanent magnet Brushless DC Motor Performance Improvement Using Multilevel Inverter

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Abstract: This research compares the performance of voltage source inverter (VSI) and multilevel inverter (MLI) supplied brushless DC motors (BLDC). For these two inverter topologies, stator currents and back EMFs of BLDC motors with total harmonic distortion (THD) are compared. Multilevel inverters have been used in the past for high power and medium voltage control applications. Different types of multilayer inverters are utilized to achieve higher voltage levels. Cascaded H-bridge multi level inverters are the most popular among them because of their benefits over the others. Here, experimental findings of BLDC motor performance driven by a cascaded H-bridge multilevel inverter and a voltage source inverter are compared.

Index terms- Brushless DC motor; voltage source inverter (VSI); Multi level inverter; Cascaded H –bridge multilevel inverter (CHB); Total harmonic distortion (THD); Torque ripple;

Introduction

Multi phase Permanent magnet brushless DC motors are wide spread in high power systems due to its advantages like high efficiency, high reliability, and less maintenance [1].In [2], T.M.Jahns and W.L.Soong given that torque pulsations are results from any deviation of source from ideal conditions of motor or from converter side. Using Fourier series coefficients a new current control algorithm is posited by Tae-Sung Kim[3].

This posited algorithm can reduce ripple content in torque due to the phase current commutation of BLDC motor. A method of optimizing the reference phase current waveforms [4] which include the case of three-phase unbalanced conditions is proposed by Sung Jun Park, Han Woong Park, Man Hyung Lee, F.Harashima. Hanselman [5], Carlson et al. [6], Pillay and Krishnan [7], and Ying and Ertugrul [8] implemented the Equation for electromagnetic torque and stated that under trapezoidal back EMF, for the production of constant electromagnetic torque, rectangular excitation currents are required. The power converters must be able to provide smoother voltage level. This can be achieved by using multilevel inverters.

A NOVEL TECHNIQUE FOR TEMPERATURE MONITORING USING K-TYPETHERMOCOUPLEANDMAX-31855

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Abstract.

We had to measure the temperature in a place where ordinary temperature sensors like LM35 or TMP36 would not fit. Not only that, but the temperature was many degrees below zero, between -70 and -80 degrees to be exact. Conventional sensors do not work below -50°C, so the solution we came up with was to use a k-type thermocouple. In order for the Arduino to read the values of the k-type thermocouple, we had to use a thermocouple-to-digital converter. For this, we need to use a MAX31855 thermocouple amplifier IC that can convert the data of the thermocouple into real data. After we get the data, we need to display it on the 16x2 LCD by making an appropriate connection with the Arduino.

Keywords:Temperature,Thermocouple,Arduino.

INTRODUCTION

Thermocoupleshavebecometheindustry-standardmethodforcost-effectivemeasurementofa wide range of temperatures with reasonable accuracy. They are used in a variety of applicationsup to approximately +2500°C in boilers, water heaters, ovens, and aircraft engines to name justafew.ThemostpopularthermocoupleisthetypeK,consistingofChromelandAlumel(trademarkednickelalloyscontainingchromium,andaluminum,manganese,andsilicon,respectively), with ameasurement range of200°C to +1250°C. Thermocouple responseisshowninfigure1.

MVDC and LVDC Grids, a Partial-Power Regulated Hybrid Modular DC-DC Converter

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Abstract

The integration of multiple voltage levels in power distribution systems has gained significant attention in recent years. The interconnection of Medium Voltage Direct Current (MVDC) and Low Voltage Direct Current (LVDC) grids presents numerous advantages, such as improved energy efficiency, enhanced power quality, and increased system flexibility. This abstract presents a novel approach to interconnect MVDC and LVDC grids using a Partial-Power Regulated Hybrid Modular DC-DC Converter.The proposed converter design consists of modular units that are interconnected to form a hybrid converter system. The modular units are responsible for regulating power flow between the MVDC and LVDC grids by dynamically adjusting their power transfer capacity. This partial-power regulation capability enables efficient power transfer and voltage conversion between the two grids, accommodating variations in load demand and optimizing overall system performance.

Keywords: Low Voltage Direct Current, Medium Voltage Direct Current, DC-DC Converter, bidirectional power flow,

Introduction

The hybrid converter system employs a combination of two different topologies: a bidirectional buck-boost converter and a bidirectional dual-active bridge converter. The bidirectional buck-boost converter provides high voltage step-up/step-down capabilities, while the bidirectional dual-active bridge converter enables bidirectional power flow with reduced losses and improved controllability. The hybrid configuration leverages the advantages of both topologies to achieve efficient and reliable power transfer. Control strategies are developed to regulate the power flow and voltage levels between the MVDC and LVDC grids. Advanced control algorithms, such as proportional-integral (PI) control and model predictive control (MPC), are implemented to ensure accurate power sharing and voltage regulation. The control system takes into account grid constraints, such as voltage limits and current limits, and dynamically adjusts the operating parameters of the converter modules to maintain system stability and optimize energy transfer.

A FIS-MO-GA-based optimisedMicrogrid Energy Management System

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ABSTRACT—A lot of recent research on smart grids (SGs) has focused on how effectively renewable energy sources can be integrated into the actual electrical grid. Through the implementation of local grid-connected Microgrids (MGs), which are often located close to the RESs and provided by Energy Storage Systems (ESSs), it is possible to progressively transform existing electric distribution networks into SGs. Each MG is responsible for overseeing linked RES, ensuring both the local power demand and the stability and safety of the electrical system. In order to achieve this goal, the Energy Management System (EMS) must offer intelligent decision-making in real-time fixing of MGIn this work, an MG EMS based on a Fuzzy Inference System (FIS) is proposed. This FIS is optimised using a customised MO-GA implementation. The EMS, in instance, is based on a three-input FIS and was created to maximise energy auto-consumption by effectively utilising the ESS while minimising variations in energy exchanged with the grid (i.e., grid stress). Results indicate that by enhancing peak shaving in relation to the greatest power request from the main grid, it is possible to significantly enhance auto-consumption performance while at the same time reducing grid stress.

Keywords: Fuzzy Inference System, Microgrids, Smart Grids

INTRODUCTION

Most western nations have recently begun to promote and adopt a number of strategies aimed at an intelligent and sustainable production and utilisation of energy, particularly in the transportation, industrial, and domestic fields, as a result of the growing populations and energy consumption with the ensuing increase in fossil fuel emissions. The effective integration of renewable energy sources (RES) in the actual electrical grid, which must be supported in order to progress towards the smart grids (SGs) paradigm, is one of the most pertinent issues in this regard.

CALCULATION OF LOSSES IN A TWO-WAY WIRELESS POWER TRANSFER SYSTEM FOR ELECTRIC VEHICLES

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Abstract :

Systems for inductive power transfer are becoming more and more common in contemporary applications like electric automobiles. The transfer efficiency of this technology must be appealing in order to Definitely very high. The majority of publications in the literature identify the wireless charger's efficiency as being related to the inverter, linked coils, and compensation networks. As a result, they frequently skip over studying the losses that happen in other components of the system, including the secondary rectifier. This study assesses the losses in a fully wireless charger that is constructed and engineered to offer V2G features.

Keywords:charge, losses, electric vehicle, inductively-coupled, power system, ICPT, bidirectional.

Introduction

A theoretical model that relies on the non-idealities of the experimental results is contrasted with the experimental evaluation based on waveform analysis. The assessment shows that measurement inaccuracy has a significant impact on the power losses generated from the two methodologies.In a two-way wireless power transfer system for electric vehicles, losses can occur in both the transmitter and receiver coils, as well as in the power electronics used to regulate and control the power transfer. To calculate the total losses in the system, one would need to measure the input and output power at both the transmitter and receiver, and compare the two.Additionally, losses can also occur due to the effects of the environment, such as interference from other wireless devices or objects in the vicinity of the power transfer coils. To account for these factors, one would need to perform additional tests and measurements to determine the total losses in the system.

Comparison of Isolated Forward Converter Active Clamping Circuits

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Abstract

A buck-derived isolated DC-DC converter is the single-ended forward converter. Microprocessors, battery chargers, EHV, and other low voltage and high current applications are best suited for forward converters. In comparison to traditional single-ended reset methods, the active clamp transformer reset technique has various benefits, such as less voltage stress on the primary switch, the ability to switch at zero voltage, and duty cycle functioning above 50%. The advantages of the active clamp over the more widely utilized RCD clamp, third winding, and resonant reset approaches have been compared in a number of publications. In order to get the best circuit performance, this paper demonstrates how to successfully apply various active clamp circuits, such as positive clamp, negative clamp, or a mix of both positive and negative clamp. The comparison of various active clamping circuits for forward converters is summarized in this study.

Keywords: Active Clamping, DC Biasing; DC-DC Converter; Delay time; Forward Converter; Magnetizing Current.

Introduction

The fundamental Active Clamp circuit for a forward converter. Transformer core resetting is mostly responsible for the forward converter's operation. Since it overcomes the 50% duty cycle constraints with the least amount of stress on the switching components, Active Clamp reset is superior to alternative resetting techniques.The primary switch and auxiliary switch are given a delay to accomplish Zero Voltage Switching (ZVS).

Hybrid Control of Shipboard DC Power System for Peak-Shaving using DC-DC Converter Control

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Abstract: Shipboard DC power systems are becoming increasingly popular due to their potential for enhanced efficiency and reliability in maritime applications. Peak-shaving techniques are commonly employed in these systems to manage power demand fluctuations and improve overall system stability. This abstract presents a novel approach to DC-DC converter control for peak-shaving in shipboard DC power systems using hybrid control techniques.The proposed hybrid control scheme combines the advantages of both model-based control and adaptive control strategies to achieve optimal peak-shaving performance. The control system utilizes a model-based controller that employs a dynamic model of the shipboard DC power system to predict load demand and control the power flow within the system. Additionally, an adaptive control algorithm is integrated to continuously adjust the control parameters based on real-time system measurements and variations in load characteristics.

Keywords: Shipboard DC power systems, adaptive control algorithm, DC-DC converters.

Introduction

The hybrid control scheme is applied to DC-DC converters, which are key components in shipboard DC power systems for voltage conversion and power distribution. The converters are equipped with advanced sensing and communication capabilities to enable real-time monitoring of load conditions and system performance. The hybrid control algorithm utilizes this information to dynamically adjust the operating parameters of the converters, such as duty cycle and switching frequency, to match the power demand and perform peak-shaving effectively. To evaluate the effectiveness of the proposed control scheme, extensive simulations and experimental validations are conducted. The simulations involve modeling the shipboard DC power system, including the DC-DC converters and various loads with dynamic power profiles. Different load scenarios and transient conditions are considered to assess the performance of the hybrid control approach in terms of peak reduction, voltage regulation, and stability.

Design and Analysis of a Dual Input DC-DC Converter for Hybrid Electric Vehicles

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Abstract :
The efficient integration of multiple power sources, such as the internal combustion engine and battery, is a critical aspect of HEV design. This abstract presents the design and analysis of a Dual Input DC-DC Converter specifically tailored for HEVs to manage the power flow between the different power sources.
The proposed Dual Input DC-DC Converter serves as an interface between the high-voltage battery and the internal combustion engine generator. It enables bidirectional power flow, allowing energy transfer from the battery to the engine during periods of high power demand or regenerative braking, as well as charging the battery during engine operation. The converter operates at high switching frequencies to ensure efficient power conversion and voltage regulation.
Keywords— Hybrid electric Vehicle, DC-DC converter

Introduction

The design process involves selecting appropriate power electronic components, such as switches, diodes, and capacitors, to handle the high-power levels and switching speeds encountered in HEV applications. Various topologies, such as the boost, buck, and bidirectional buck-boost configurations, are analyzed and compared based on their performance metrics, including efficiency, voltage regulation, and transient response. To optimize the performance of the Dual Input DC-DC Converter, control strategies are implemented. Advanced control techniques, such as pulse width modulation (PWM) and maximum power point tracking (MPPT), are employed to regulate the power flow and ensure optimal energy transfer efficiency. The control algorithms are designed to adapt to varying operating conditions, such as changes in load demand and battery state of charge, to maximize the overall system efficiency.

Development of a Three Phase Z-Source Inverter for Solar Photovoltaic Use

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Abstract :The three-phase z-source inverter (ZSI) design structure for solar photovoltaic (PV) application is presented in this research. A unique type of inverter is the impedance source inverterthat can enhance voltage through an inverter. Traditional inverters have a number of drawbacks. The z-source inverter overcomes the flaws of traditional inverters. Between the input DC source and the six switches of the inverter, the impedance network is injected. This intermediate stage has the benefit of increasing the DC input voltage, which makes it an extremely alluring solution for unconventional energy interfaces like photovoltaic systems.Due to their minimal maintenance requirements, clean energy supply, and lack of pollutants, photovoltaic technology is more widely used. This technology provides a reliable source for producing DC power. photovoltaic cell built of silicon or another semiconductor material. It is possible for the PV cell's characteristics to be crucial in the production of electricity. The conventional power production industry is responsible for a number of environmental issues in the modern period. The renewable energy sources solve these drawbacks. These solar photovoltaic methods are employed in a number of systems, including satellite power systems, battery charging systems, etc.Voltage source inverters (VSI) and current source inverters (CSI) are two types of power inverters.

Keywords: Voltage Source Inverter, Current Source Inverter, Photo Voltaic.

Introduction

A CSI has a dc current source at its input terminal while a VSI has a dc voltage source there. The standard VSI and CSI are shown in Figures 2 and 3. Traditional inverter topologies prohibit turning on two switches of an equivalent leg at once since doing so could cause the dc source to short circuit, which would render the inverter useless. By turning on both the superior and inferior switches on a single leg, the ZSI takes use of the shoot through states to increase the dc voltage.Solar energy utilization would require a power electronics inverter with both buck and boost capabilities.Instead of operating in buck-boost mode, conventional inverters either function in boost mode or buck mode. Two switches on the same leg cannot conduct simultaneously. Therefore, a dead band is supplied between the power switches of the same leg's complementary legs being turned on and off.

Effects of Series Battery Internal Resistance under Direct Current Load

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Abstract : The amount of electrical energy applied to the load and time consumption determine the battery energy capacity in an application system. The battery's ability to supply electrical energy is what determines how reliable the system is.The battery's energy capacity will guarantee that the unit device or piece of equipment will function as intended. For instance, the UPS system offers a clean, conditioned, and continuous power supply for delicate loads like the computers in data centres, hospitals, and aeroplanes as well as for communication and medical support systems. It is crucial to accurately predict the battery's remaining capacity at all times. In general, the UPS system will power the primary applications and offer a regulated sinusoidal output voltage with switching operation.Power from the battery modules is used by some UPS inverters to operate. High frequency ripple will be produced by the switching activity that the gadget performs. A fixed load can be compared to numerous other batteries uses. As a result, the load does not alter until the battery's energy capacity is decreased. The battery's internal resistance will be impacted by both static and dynamic loads. Some writings discuss the significance of the battery modules' system performance and the pace of battery internal resistance degradation.Other categories are utilized to look at the relationship between battery temperature and deep cycle as part of accelerated cycling and storage studies.

Keywords: Uninterrupted Power Supply, State of Charge, Time delay effect

Introduction

The purpose of these experiments is to ascertain how the battery impedance changes as a result of battery ageing under various circumstances. commonly, the resistance or impedance of batteries is measured at a single temperature (commonly 20OC, 25OC, or 30OC) and then at various SoC.The battery's internal processes are numerous. If we continue to discharge on the static load while ignoring all internal processes. Ohm's law states that the voltage of the battery cells will decrease.There are actually three voltage decreases in the actual situation. In the first instance, the ohmic loss is characterized by the battery current pulse drawn without any transient or time delay effects.Second, the voltage loss into a steady voltage is caused by the transient effect of the double layer capacity, which runs after a little time delay. Third, the voltage losses that result from electrolyte and active material weakness diffusion up until the voltage drop cycle.

Efficient Management of a Connected Microgrid

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ABSTRACT—The growth of distributed generation, the decline in storage cost, and the advancement of communication and sensor technologies provide new distribution choices for electricity that are also conducive to the seamless integration of distributed generating. Marketplaces for ancillary services and energy are continually changing.The potential of microgrids is examined in this study, and we go into depth about how to implement a smart energy management system for a microgrid pilot project in the Walloon region of Belgium.

Keywords: Microgrids, Storage, Smart Energy

INTRODUCTION

In addition to providing new options for the conventional distribution of electric energy, which involves a centralised production dispatched to consumers through transmission and distribution networks, the development of distributed generation, the declining costs of storage means, and the advancement of communication and sensing technologies also open new options for integrating distributed generation smoothly in constantly changing energy and ancillary services markets.The idea of a microgrid is one of these possibilities. A microgrid is a collection of interconnected loads and dispersed energy resources (such as generation or storage) that operates as a single, controllable entity in relation to the main grid and is contained within well-defined electrical limits. It can either connect to the grid or disconnect from it. When connected, it can provide the grid with services, such as balancing the entire power system. An appropriate energy management system (EMS) enables the microgrid's functioning and communication with the main grid to be optimised.The microgrid idea is one of these solutions. A microgrid is a collection of interconnected loads and dispersed energy resources (such as generation or storage) that operate as a single, controllable unit in relation to the main grid. It is capable of connecting to or disconnecting from the grid. When connected, it can provide services to the grid, such balancing the entire power grid.

Micro Grid Energy Management System with Renewable Energy Sources: A Review

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ABSTRACT—In order to successfully harvest energy from the various Renewable Energy Sources (RES), the generation side of the power industry has made significant strides. In order to achieve a pollution-free environment, to slow the rapid depletion of natural resources, and to lower the cost of transmission for energising remote areas, daily continuous efforts are made to use more energy from these RES rather than relying on conventional energy sources. Since all of these hybrid energy sources (HES) in combination with load make up a micro grid, the management of their energy in real time is crucial for accurately meeting all load side demands (while minimising substantial losses).of all of these hybrid energy sources (HES) together with the load comprise a micro grid.This review paper provides an overview of the Energy Management System (EMS) in micro grids, their connection modes, the various strategies and control techniques created, and the various optimisation techniques used to reduce the cost of the micro grid as a whole and to reduce the variations between generation and demand at every moment. Additionally, a fuel cell model that can instantly produce an output current of 0.8638A and a voltage of 12.09V has been demonstrated. Once more, modelling indicates that the wind turbine will have a maximum output capacity of 11.49 MW.

Keywords: hybrid energy sources, Energy Management System, Renewable Energy Sources

INTRODUCTION

Since the introduction of Distributed Generators (DGs), the electricity sector has expanded dramatically for the following reasons: 1) Consumption occurs when production begins. 2) The cost of gearbox is minimal. 3) supplying electricity to remote areas. Several DGs or dispersed grids were combined to form the phrase "Micro Grid."There are numerous definitions for micro grids, including that it includes backup storage facilities, load, and small sources with low voltage levels and power ratings up to 1 MW. It also includes a hybrid energy system. A standardised definition, however, has not yet been investigated since although the idea of a micro grid is not very old, it has undergone great growth and research in recent years, and new buzzwords like "Nano-grids" are emerging.Micro turbines, fuel cells, photovoltaic arrays, and wind turbines were all previously used in micro grids. Storage became increasingly required as a means of supplying the load continuously and offsetting the intermittent energy sources. When compared to batteries, flywheels, ultra capacitors, super magnetic energy storage, and super capacitors, these storage facilities represent a technological advance.

Grid-connected Wind Turbine Back-to-Back Converter Control to Reduce Voltage Drop Due to Faults

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Abstract :

Wind turbines may produce electricity more effectively when they are operating at a variable speed thanks to power electronic converters. Permanent magnetic synchronous generators (PMSG), which operate at variable speeds, have drawn increased attention due to its low cost and low maintenance needs.Additionally, a wind turbine with PMSG's converter decouples the turbine from the electrical grid, favoring them in terms of grid codes. This study examines the effectiveness of back-to-back (B2B) converter control of a wind turbine system with PMSG on a malfunctioning grid.As the greatest amount of active power from the wind turbine system is injected into the grid and the DC link voltage in the converter is managed, the switching strategy of the grid side converter is created to improve voltage drop caused by the fault in the grid. The converter control's methodology is described in depth, and simulation is used to evaluate how well it performs on a sample grid with flaws.Renewable energy sources have advantages for the environment, but they are also receiving greater attention due to the development of new technology for managing and operating them as well as the rising demand for a reliable supply.

Keywords: Back-to-back (B2B) converter, direct-in-line windturbine, wind turbine control, permanent magnetic synchronous generator (PMSG), voltage drop

Introduction :

One of the most difficult problems is controlling a power system when it is malfunctioning, in addition to ensuring optimal performance of the system under ideal conditions.One of the most important considerations when using distributed generation (DG) is power quality. Voltage and reactive power must also be limited and managed within predetermined ranges, in addition to frequency and active power.Reactive power injection at the point of common coupling (PCC), in addition to active power injection and local load supply, is one of the most significant benefits of DGs. Voltage profile and power quality can be enhanced in the grid's various operational modes, particularly during breakdowns, by managing a DG's reactive power. One of the most popular sources used in distributed generating systems for this reason is wind turbine power.

Microgrids and its management through IoT

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Abstract :

The rapid growth of renewable energy sources and the increasing demand for sustainable energy solutions have led to the emergence of microgrids as an effective approach to energy management. Microgrids are localized power systems that integrate distributed energy resources, such as solar panels, wind turbines, and energy storage, with the goal of achieving energy independence, enhancing grid resilience, and promoting efficient energy utilization. To optimize the operation and control of microgrids, advanced technologies such as the Internet of Things (IoT) are being leveraged. This abstract presents an IoT-based energy management platform specifically designed for microgrids. The proposed platform combines the power of IoT devices, data analytics, and intelligent algorithms to enable real-time monitoring, control, and optimization of energy generation, consumption, and storage within the microgrid ecosystem. It offers a scalable and flexible solution that can accommodate various types of distributed energy resources, enabling seamless integration and coordination among them.The IoT energy management platform consists of three key components: sensors and actuators, data communication infrastructure, and a cloud-based analytics engine. The sensors and actuators are deployed throughout the microgrid infrastructure to collect data on energy generation, consumption, storage levels, and other relevant parameters. This data is then transmitted through a robust communication infrastructure, which can include wired and wireless networks, to the cloud-based analytics engine. The analytics engine employs machine learning algorithms and optimization techniques to analyze the data, predict energy patterns, and make intelligent decisions for energy management and control.

Keyword: Microgrids, proactive load management, IoT

Introduction :

By leveraging real-time data and analytics, the IoT energy management platform offers several benefits for microgrids. It enables accurate monitoring and forecasting of energy demand and supply, allowing for proactive load management and efficient utilization of available resources. The platform also supports demand response programs by facilitating two-way communication between the microgrid and the grid operator or energy consumers, enabling demand-side management and load balancing. Additionally, the platform offers fault detection and rapid response capabilities, ensuring the reliable and resilient operation of the microgrid.

Utilization of Hybrid Power System of Electric Vehicles using DC/DC Converter

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Abstract :

Electric vehicles (EVs) are gaining widespread adoption as a sustainable transportation solution. Hybrid power systems, combining different energy sources such as batteries and fuel cells, offer improved range, efficiency, and performance for EVs. The DC/DC converter plays a crucial role in managing power flow and voltage conversion within the hybrid power system. This abstract presents the application of DC/DC converters in hybrid power systems of electric vehicles.The hybrid power system of an EV typically consists of multiple power sources, such as a high-voltage battery pack, a fuel cell stack, and possibly a supercapacitor or ultracapacitor bank. The DC/DC converter acts as an interface between these power sources, ensuring efficient power transfer and voltage matching. It converts the voltage level from the high-voltage battery to the lower voltage required by the vehicle's electrical system or charges the battery from other power sources, depending on the operational conditions.
Keyword:Electric vehicles, ultracapacitor bank, high-voltage battery pack, PWM, MPPT.

Introduction

The design and control of the DC/DC converter in the hybrid power system involve several considerations. The converter should be capable of handling high-power levels and operate efficiently under dynamic load conditions. Various converter topologies, such as buck, boost, and bidirectional converters, can be employed based on the specific requirements of the hybrid power system. The selection of power electronic components, such as switches, diodes, and capacitors, is crucial to achieve reliable and efficient power conversion. Control strategies are developed to regulate the power flow and voltage conversion in the hybrid power system. Advanced control techniques, including pulse width modulation (PWM) and maximum power point tracking (MPPT), are utilized to optimize energy transfer efficiency and maintain system stability. The control algorithms continuously monitor the power sources, load demand, and system conditions to adaptively adjust the operating parameters of the DC/DC converter for optimal performance. The performance and effectiveness of the DC/DC converter in the hybrid power system are assessed through simulations and experimental validation. Simulations involve modeling the hybrid power system, including the DC/DC converter and various power sources, load profiles, and driving conditions.

Smart Grid management controlling demand

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Abstract— The demand side operation(DSM) comprises ways and programs which aim at equating energy consumption situations over the day. As opposed to the force side operation involving the addition of new generation units and total installed capacity, the idea then's not only to increase the energy to be supplied, but also to control the shape of consumption by applying energy operation ways. The main challenge in the perpetration of a DSM program is the hunt for knowledge of the diurnal of loads in the electrical system, which is generally not available from the systems grounded on conventional electromechanical measures. In such a script, the emergence of new technologies like Smart Grid technology, creates an terrain for confluence between the architectures of generation, transmission, distribution, information technology and digital communication structure which enables the exchange of information and control conduct among the colorful parts of the power grid. The paper throws light on the exploration trends within the area of demand side operation in a smart grid terrain and proposes a scheduling scheme using inheritable algorithm for cargo operation. Simulation results confirm that the proposed algorithm efficiently reduces the PAR and electricity consumption cost.

Key words: Demand side operation, smart grid, control strategy

INTRODUCTION

The demand side operation(DSM) consists of all similar conditioning that manages time of energy operation so as to defer investment in new electrical installations. The most important thing of DSM is to reduce the peak. The constantly used ways in DSM are shown inFig. 1(1)-(6) a) Peak trimming It refers to cargo slice or demand reduction during heavy cargo ages. The duration for which peak occurs is reduced by styles like shutting down the consumer accoutrements , distributed generation. b) Valley filling It promotes the consumption of energy during off- peak hours when the cost of product is lower compared to peak hours. colorful impulses, like abatements, motivate consumers to change their habits related to the consumption of energy. c) Strategic conservation It decreases the seasonal consumption of energy, primarily by the reduction of energy destruction, to increase the effectiveness of energy consumption. colorful impulses, substantially for the technological change, are included in the program. d) Strategic cargo growth It controls an increase in the seasonal consumption of energy.

Indian Initiatives to automate the Grid

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Abstarct- With an ever- growing energy demand coupled with the continual reduction of reactionary energy reserves and environmental goods of conventional power sources, India needs to address the unsustainability of the present power structure. To alleviate these issues and grease the integration the information and communication technologies and distributed energy sources, India needs to catch its power delivery structure. Smart Grid, i.e., the modernization of the electric grid is an evolving mix of colorful technologies intended at bringing a drastic change in the electrical power grid. The ingredients of smart grid and its need in the Indian environment has been bandied. This work collectively covers the colorful enabler schemes launched by the Indian Government for expediting the smart grid deployment. Further, a comprehensive and streamlined review of Indian smart grid's enterprise and gests is presented. farther implicit walls and results for smart grid deployment are bandied. This work accentuates the robotization of being electric grid for generating the sustainable and clean energy.

Keywords—Distributed energy resources, Energy storage, Indian smart grid, Smart grid projects

Introduction:

With an ever- growing energy demand coupled with the continual reduction of reactionary energy reserves and environmental goods of conventional power sources, India needs to address the unsustainability of the present power structure. To alleviate these issues and grease the integration the information and communication technologies and distributed energy sources, India needs to catch its power delivery structure. Smart Grid, i.e., the modernization of the electric grid is an evolving mix of colorful technologies intended at bringing a drastic change in the electrical power grid. The ingredients of smart grid and its need in the Indian environment has been bandied. This work collectively covers the colorful enabler schemes launched by the Indian Government for expediting the smart grid deployment. Further, a comprehensive and streamlined review of Indian smart grid's enterprise and gests is presented. farther implicit walls and results for smart grid deployment are bandied. This work accentuates the robotization of being electric grid for generating the sustainable and clean energy.

so, the conventional sources of energy are demeaning the terrain from the dangerous emigrations, which has needed the finding of indispensable green and clean sources for electricity generation.

An Overview of Image Processing for Plant Disorder Monitoring

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Abstract: India is the country with the most agricultural output, accounting for 7.68 percent of all agricultural output worldwide. In India, the horticultural area contributes around seventeen percent of our Indian GDP (Gross domestic product). India's economy and farmer profits will grow if plants grow more efficiently and produce more. Farmers need domain experts to manually monitor plants for this purpose. However, manual monitoring will not always yield satisfactory results.Also, domain experts aren't always available and expensive because farmers have to pay fees and travel costs. Consequently, it requires fostering a productive savvy cultivatingmethod that will help for improved yield and development with fewerhuman endeavors. In this paper, we present a summary of image processing-based approaches developed by various researchers for the detection of plant diseases. It includes studies on the detection of diseases in plants like tomatoes, grapes, pepper, pomegranate, apple, and so on.

Keywords- Plant disease; Symptom; Classification; Feature extraction; Image processing

Introduction:

Apple Diseases The apple fruit is one of the most popular fruits worldwide. It has many health benefits and comes in a variety of colors and flavors. This plant suffers from common diseases such as 1) Apple Scab: It causes the most devastating apple infection. It occurs throughout the apple-growing areas. During the bloom in cool and wet weather, apple scab is more severe but it is not reasonably significant in dry or warm climates. Signs of apple scabs are visible on leaves, petals, flowers, husks, fruit, young shoots, and bud scales of apple trees. Mostly infections on the fruit and leaves are common and obvious.2) Apple Rot: It is a fungus caused due to Botryosphaeria obtuse. It attacks the fruits, leaves, and bark of apple plants. The first symptom of apple rot appears on the outer surfaces of leaves one to three weeks after the petiole fall as a small, purple blotch after which the centerturns brown tan, and yellowish brown as shown in Fig. 2. Second stage of apple rot occurs after few weeks. In this stage secondary enlargement of leaf spots occurs. The leaf that is highly infected drops from the tree.3) Marssonina Leaf Blotch: This disease is identified by the formation of dark green circular blotches over the leaf.

Detection of Interstitial Lung Disease Using a Convolutional Neural Network that is Based on Texture

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ABSTRACT

In CT scan images, a wide variety of diseased lung texture patterns can be seen. Because these images contain a variety of patterns mixed together, radiologists have a difficult time distinguishing between them and diagnosing the disease. Using convolutional neural networks (CNN) as a solution to this problem is one option. Pattern classification and image recognition systems typically make use of CNN. They were able to reduce the number of errors in the database, and the CNN-based image classification was surprisingly quick. The term "interstitial lung disease" encompasses a variety of lung conditions. Interstitial lung sicknessesinfluence the interstitial for example the piece of the lung's anatomicstructure. For the purpose of identifying interstitial lung diseases (ILDs), the characterization of lung tissue is an essential component of a computer-aided diagnosis (CAD) system. Hence utilizing CNN, interstitial lung illness recognition gives precise outcomes.

Keywords- Texture classification, Convolutional neural networks, or interstitial diseases of the lungs.

INTRODUCTION

Interstitial lung disease (ILD) is a group of lung illnesses that affect the interstitial, or the area between the lungs' air sacs. Typically, the interstitial X-rays of the chest show that she is too thin to be seen. CT scans are the most often used imaging modality for ILD diagnosis. Reticulation, ground glass opacity (GGO), consolidation, and micronodule are common ILD patterns seen in CT images [1]. The automated identification of ILD using Computed Tomography (CT) images will aid in the diagnosis and treatment of lung illness.

Segmentation of Soft Tissue Sarcomas Using Improved Otsu Thresholding Algorithms

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ABSTRACT

Sarcomas of the soft tissue in the human body are malignant tumors that are difficult to treat. Experts have difficulty predicting the effects that the tumor will have on the body. The size and area of thecancer mass are expected to recognize by a precisedivision strategy. Delicate tissue sarcoma picturedivision assumes a significant part in deciding moreaccurate conclusions from attractive reverberation pictures(X-ray). In this review, streamlined Otsu limit-based preprocessing and post-handling techniques are proposedfor STS division on 9 X-ray pictures that comprise dangerous growths. The Otsu method is optimized using four well-known optimization algorithms: Particle Swarm Optimization, Differential Evaluation, Whale Optimization, and Grasshopper Optimization.On MRI images, the proposed segmentation technique delivers high robust performance.

Keywords- Soft Tissue Sarcomas, Otsu Threshold, and Optimisation.

INTRODUCTION

Soft tissue sarcomas (STS) in the malignant lesion group may occur in various regions of the human body such as muscle, fat, nerves, and vessels. Also, it can occur in various types as fibrosarcoma, leiomyosarcomas, liposarcomas, synovial sarcomas, angiosarcomas, malignant peripheral nerve sheath tumors, gastrointestinal stromal sarcoma [1]. Especially, STS has been usually seen in the extremities. STS tumor ranges from 1.8 to 5 per 100,000 per year in accordance with international standards. In 2016, the United States had 12,310 new and 4,990 death cases of STS which were identified [2]. When the statistics in recent years are analyzed, it can be observed that about half of STS patients die due to poor prognosis with fewer therapeutic options [3]. It is assumed that the same histological subclasses of STS have several clinical responses.

Recent Developments and Future Issues for Wireless Sensors for Medical Applications

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Abstract—

It is hoped that using wireless body area networks of implantable and wearable medical devices for continuous health monitoring will revolutionize healthcare. This vision is on the verge of becoming a reality thanks to rapid advancements in wireless communications, low-power electronics, and biomedical sensors. Be that as it may, key difficulties actually still need to be tended to. The current state of the art in the field of wireless sensors for medical applications is reviewed in this paper. It focuses on highlighting the most recent developments in implantable and wearable technologies. In addition, this paper discusses the difficulties that are encountered in the various Open Systems Interconnection (OSI) layers and provides examples of potential directions for future research regarding the application of wireless sensors in healthcare settings.

Keywords-wearable, implantable, sensors, and healthcare.

Introduction:

Wireless Body Area Networks (WBANs) are a new generation of Wireless Sensor Networks (WSNs) dedicated to healthcare monitoring applications. The aim of these applications is to ensure continuous monitoring of the patient's vital parameters while giving them the freedom of moving. In doing so, WBANs result in an enhanced quality of healthcare [1]. Advanced healthcare delivery relies on both body surface and internal sensors [2]. Basically, sensors for chemical, physical and visual applications will become part of future monitoring platforms to check, for example, insulin or hemoglobin. The benefit provided by WBAN is obvious to the patients' comfort, especially for long-term monitoring as well as complex monitoring during surgery and medical examinations [3]. Nonetheless, meeting the potential of wireless sensor networks (WSNs) in healthcare necessitates addressing a number of technical challenges.

Deep learning ensembles for detecting melanoma in dermoscopy images

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ABSTRACT

The most lethal type of skin cancer is melanoma. While treatable with early discovery, just exceptionally prepared experts are able to precisely perceive the infection. As skill is in restricted supply, mechanized frameworks fit for distinguishing illness could save lives, decrease superfluous biopsies, and lessen costs. We propose a system that accomplishes this by combining recent advances in machine learning with ensembles of methods that are capable of segmenting skin lesions and analyzing the detected area and the tissue surrounding it for melanoma detection. The largest dermoscopic image benchmark dataset, which includes 900 training and 379 testing images, is used to evaluate the system. An improvement in the area under the receiver operating characteristic curve of 7.5% (0.843 versus 0.783), an increase in average precision of 4% (0.649 versus 0.624), and a specificity measured at the clinically relevant 95% sensitivity operating point that is 2.9 times higher than the previous state of the art are all examples of new state-of-the-art performance levels.

Keywords: Dermoscopy, Machine Learning KNN, Naive Bayes.

INTRODUCTION

Skin cancer is the most common cancer in the United States, with over 5 million cases diagnosed each year [1]. Melanoma, the deadliest form of skin cancer, is involved in approximately 100,000 new instances every year in the United States and more than 9,000 deaths [2]. The cost to the U.S. healthcare system exceeds $8 billion [3]. Internationally, skin cancer also poses a major public health threat. In Australia, more than 13,000 new instances of melanoma occur yearly, leading to over 1,200 deaths [4]. In Europe, melanoma causes more than 20,000 deaths a year [5]. In order to combat the rising mortality of melanoma, early detection is critical. Currently, highly trained expert clinicians with dermoscopic devices are needed for accurate and early detection of melanoma, but the number of experts has not kept up with demand [6].

Partial Face Recognition and Face Synthesis from Videos

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Abstract:

Although surveillance footage typically only shows half of a person's face, it is still possible to identify them using the wealth of information they carry. When partial face photos are given, the performance of recognition models suffers because the conventional approach of partial face recognition uses a database that only contains full-frontal faces. In this study, we synthesized two- and three-dimensional facial photographs and expanded the library of full-frontal face images. We created a technique for enhanced database partial face recognition. We categorized the available video images into groups based on their similarity and picked a sample image from each group in order to synthesize the two-dimensional (2D) facial images.Using the scale-invariant feature transform (SIFT) pipeline, we combined each representative image with a full-frontal face image before adding the merged photos to the original database. By measuring the number of keypoints provided by the SIFT, we carefully assessed the similarity between a series of video images from cameras and an image from the enhanced database in order to create a partial face recognition method.

Key words: Scale-invariant feature transform, partial face recognition, face synthesis.

Introduction:

Among several methods to identify a person, facerecognition stands out due to its multiple benefits. Unlikeidentity recognition through a smartphone application,fingerprint, key-card, or human-computer interface, facerecognition avoids physical contact and could be beneficialduring a pandemic [1]. Face recognition uses input imagesfrom video cameras, which are ubiquitous, and can be usedfor monitoring and surveillance purposes. Videos offer differentviews of a person, providing diversity for face recognitionand potentially improving the face recognition rate.Face recognition from videos is widely used for identity verification.

The difficulties in face recognition arise from the environmentin which the videos are recorded. The imagescaptured by the video cameras may originate either fromcontrolled or uncontrolled environments. In controlled environments[2], captured images have high resolution andcontain full frontal faces of a person under suitable lightingconditions.

Study of printed electronic circuits using various printing methods in the endurance test in comparison

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Abstract:

The objective of this research is to determine whether printed electronics circuitry from inexpensive printers can be made to perform as well as circuitry from higher-quality printers by using specific ink combinations or post-treatments. For this, 5 million switching cycles of endurance testing were performed on six sample circuitries from various printers (professional and semi-professional) using various ink combinations (PEDOT: PSS, Silver, and Carbon). Each sample underwent a total of 30 experimental evaluations for this purpose, with a test number of N = 5 each evaluation. The findings demonstrate that suitable ink and post-treatment combinations could yield satisfactory results.This creates new opportunities for future advancements in the "low-cost" realm of printers, inks, and post-treatments.

Key words:printers; conductive ink; switch; electronic circuits; printed electronics

Introduction:

Low-cost inkjet-printed technology is a promising approach for the future. In recent years wecould see a significant progress in printing technology as well as pre/post treatment methodologies,different inks formulations [1–4] and substrates. Despite the progress in this field, problems existsin regard to lifetime [5, 6], e.g. cycle bending reliability of printed silver electronics: "…traces of a125 μm-thick on a polyethylene terephthalate substrate were found to have the lowest characteristiclifetime of about 1000 bending cycles, whereas the traces with the same geometry with a thickness of50 μm endured hundreds of thousands of bending cycles" [5]. As mentioned in previous articlesbeside the geometry, the ink itself is a challenge: "When flexed, PEDOT: PSS remained conductivefor a lower radius of curvature (10 mm) than silver. Among the printed patterns, the sinewave patternwas observed to be superior for flexible electronics applications" [6]. Furthermore the fact thatenvironmental stability of conductive inks should also be considered [7,8] (e.g. caused by thehygroscopic behavior or pH-value [9]). Next problem which has a high impact is the printingtechnology itself. Without hesitation we could state that we could see lot of progress in this area, butthe cost associated with the high cost printing technology is always high and the low cost solutionsare not available in this area.

High-resolution lock-in photometer for USB

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Abstract:

A simple and affordable dual-beam photometer/electrometer is designed using the DDC112 current-input analogue-to-digital converter, a PIC microcontroller, and related hardware. The PIC controls the analogue-to-digital converter's operation and provides a rolling average filter-based lock-in function that enables intensity measuring down to parts per million. In order to drive one or more power LEDs as light sources, normally, it also concurrently controls a source of regulated current. When combined with Cavity Enhanced Absorption Spectrometry, it can be used to quantify ultra-low absorbance and has been employed in a variety of fluorescence and absorbance experiments. A PIC32 processor that can manage eight channels for a PixelSensor multispectral detector has been developed for the extended version. The source code and all circuit specifications are given publicly.

Key words: Spectrophotometer, fluorometer, absorbance, DDC112, and microcontroller.

Introduction:

The author had been tasked with improving the signal conditioning around a fluorescence sensor for ammonia measurement [1]. The existing system used an unsterilized continuously illuminated LED and a photodiode, a combination certain to give poor results [2]. Initial improvements centered on sine wave LED modulation at audio frequencies with synchronous detection to remove the effects of DC offset and uncorrelated noise, but low frequency noise and drift remained a problem; this was because LEDs exhibit large temperature coefficients, both of forward voltage and of luminous efficiency, typically 1% / °C [3]. The solution adopted was a dualfluorescence cell and a high gain differential amplifier prior to synchronous rectification. Results were good but not robust, still having too much drift and general instability.

Related experiments on absorbance measurements clarified the need, not just for sensitivity, but for very wide dynamic range. Fluorescence and scattering are dark-field measurements, that is, the whole signal is due to the analyte, so no fluorescence = no signal. Absorbance measurements are _bright-field', which is to say that the analyte causes a reduction (which may be a very small reduction) in the detected signal;

A portable, two-element MIMO-UWB antenna array for communication devices

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Abstract:

This study presents the design of a small multiple input multiple output (MIMO) antenna for operating in the ultra-wideband (UWB) frequency range, i.e., from 3.1 GHz to 10.6 GHz, with dimensions of 44 mm 27 mm 0.8 mm. The design consists of two coplanar waveguide (CPW)-fed, symmetrically parallel radiators that are printed on the same side of a substrate. A T-shaped groove is etched out of the ground plane to improve isolation and broaden impedance. The two antenna elements are designed using simulations, and their performance is examined in terms of their envelope correlation coefficient (ECC) for pattern diversity, mutual coupling, current distribution, and radiation pattern.Results from simulations and measurements demonstrate that the proposed antenna's impedance bandwidth spans the whole UWB frequency range with an isolation of better than 15 dB between the two elements. The proposed antenna is a strong option for portable MIMO/diversity UWB applications, according to test results.

Keywords:UWB; MIMO antennas; wireless communication; envelope correlation coefficient

Introduction:

Ultra-wide band (UWB) technology using frequencies from 3.1 GHz to 10.6 GHz [1] offers high speed data rate, extremely low spectral power density, high precision ranging, low cost, and low complexity. Multiple input and multiple output (MIMO) antennas used in UWB systems improve system's performance by providing increased data rates and increased range through beam-forming [2]. Antenna diversity is a well-known technique to enhance the performance of MIMO systems by mitigating the multipath fading and co-channel interference. Thus, MIMO/diversity antennas covering UWB frequency range and having good radiation patterns and diversity performance have become the focus of wireless communications.

Several UWB MIMO antennas have been designed in the past. The focus of these studies has been on reducing the size of the antenna while enhancing the isolation. To improve the isolation between the elements, in [3], the shape of the ground plane has been optimized and radiators have been notched. These have greatly suppressed the mutual coupling through the common ground plane. Also, the orthogonal configuration for the radiating elements has reduced the mutual coupling even further.

Discrete Gabor Transformed Nonlinear Channel Equalizer

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Abstract:

With regard to the channel characteristics at the receiver's front end, the adaptive equalizer uses adaptive digital filters, whose filter coefficients are adjusted. As a result, the receiver's signal-to-noise ratio increases. The noise that was introduced into the channel is cancelled out. Mean Square Error (MSE) convergence performance improves noticeably as a result of the Discrete Gabor Transform (DGT)'s assistance in de-correlating input data. The time domain LMS equalizer's convergence is shown to be slow. It has been investigated to use DFT, DGT, and DWT (2, 5, 6, and 7) to increase convergence rate and MSE floor level transform domain. In terms of convergence rate and MSE level, it is discovered that all orthogonal transforms behave similarly. This study uses the Gabor transform, a frequency and time domain transform, to assess channel performance. This work reports on the discrete Gabor transform-based nonlinear channel equalizer. Although the Gabor Transform is nonlinear and non-orthogonal, it is anticipated that it will be better suited for nonlinear channels. Even though Gabor transform-based adaptive equalizers require more training time, it has been discovered that they perform better in terms of noise recovery and MSE level, particularly when the channel's additive noise is significant.

Key words:MSE: Mean Square Error, Adaptive Channel Equalizer, DFT, DGT, EVR: eigenvalue ratio.

Introduction:

Adaptive filter is a programmable filter, whose frequency response is adapted in such a way that in the output we extract the desired signal without degradation and reduce the distortion to the best possible extent. The adaptive filter updates its filter coefficients from the knowledge of past inputs, and the present error generated from the reference and estimated output. The update procedure is based on any one of the adaptive algorithms. In case of the N-tap FIR adaptive filter, the desired signals d(k) is estimated using a linear combination of delayed samples of the input signal x(k) and found to be $y(k) = X(k)^T W(k)$. Where, W(k) is the column vector of filter weights at the k-th instant and X(k) is a column vector of last N input signal samples, which are represented by $W(k) = [w_0(k), w_1(k) \ldots\ldots, w_{N-1}(k)]^T$ and $X(k) = [x(k)\ x(k-1) \ldots\ldots x(k-N+1)]^T$ The task of the adaptive algorithm is to interactively define the value of W(k) at any time k, so as to make the mean square error between the desired and the estimated signals to the optimum value.In the steepest - decent technique, the weight vector is modified in the direction of decreasing gradient of the mean-square error surface of the process.

Adaptable Neural Network Architecture for Recognising Handwritten Signatures

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Abstract—Modeling of adaptable neural networks for the preprocessing of handwritten signatures is demonstrated in this study. A descriptor vector is then put together after interpolating an input signature to change the inclination angle. This data is preprocessed using a flexible neural network architecture that has been suggested, where particular neurons are becoming increasingly important for classification and recognition. The effectiveness of the suggested strategy is discussed by comparing experimental research results with those from traditional approaches in benchmark testing.

Key words: Chebyshev polynomials, neural networks, and preparation of handwritten signatures.

INTRODUCTION

Pattern analysis and classification methods are useful techniques of Computational Intelligence (CI) with various applications. One of them is classification of handwritten texts so important for identity control systems present i.e. financial institutions, branch institutions and other structures with remote documents verification systems. Efficient methods of knowledge aggregation and retrieval must be applied in distributed systems, where input data is processed on remote unit to verify if the input signature match the pattern. Various methods of CI help i.e. in case of missing or incomplete data [1], [2] and authorship semantical identification [3]. Natural Language Processing (NLP) techniques can be applied in prescription processing [4] and robot instructions composition from natural behavior [5]. Neural Networks (NN) are structures that can be efficiently applied in these types of systems because of ability to generalize knowledge for creative systems [6] and variety of developed architectures with new abilities for multi agent systems [7], more efficient memory [8] and other applications [9].

Fabrication of a Class-D Audio Amplifier for Mobile Applications with an Analogue Volume Control

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Abstract-This paper proposes a class-D audio amplifier with analogue volume control (AVC) for portable applications. There are two sections in the proposed class-D. An integrator, an analogue MUX, and a programmable gain amplifier (PGA) make up the first section, an analogue volume control. The three analogue inputs used by the AVC are audio, voice, and FM. The driver is the second portion and it is made up of a gate driver, a comparator, a level shifter, and a ramp generator. The driver is made to have little distortion and a lot of efficiency. The class-D audio amplifier with AVC is designed with 0.18 um 1P6M CMOS technology and achieves a total root-mean-square (RMS) output power of 0.5W and total harmonic distortion plus noise (THD+N) at the 8- load less than 0.06%.

Keywords: analogue volume control, pulse, class-D amplifiers, modulation of width, ramp generation

INTRODUCTION- SMALL size, low-cost and high-efficiency class-D audio amplifiers are in widespread demand for mobile applications. Conventional linear amplifiers feature low distortion performance but have several disadvantages versus market needs [1-2]. The main drawback using linear amplifiers is low efficiency. Low efficiency translates into more power dissipation inside the chip which uses a heat sink to dissipate the heat and also lowers the battery life. This increases the cost and the area of the audio solution. A class-D amplifier is attractive because of the high power efficiency and low distortion by using PWM compared to a linear amplifier, which realizes a longer battery life and eliminates the heat sink requirement. This allows the design of compact and low-cost multi-channel high-power systems [3]. An analog-input closed-loop topology for audio class-D amplifiers has the potential of achieving very high audio performance because it can be designed with feedback from the power stage. Class-D amplifier using a pulse-density modulation (PDM) switching scheme [6] has reported good performance with 0.004% THD+N, 1W output power and 103dB DR. However, PDM switching has one drawback in comparison with PWM. The wide-band spread spectrum and tones of the PDM switching interfere with AM/FM radio signals, while the PWM switching scheme is able to control the carrier frequency to avoid such interference. Autors are from Sidi Mouhamed Ben Abbellah University, DharMahraz Science Faculty, B.P.1796.Fez, Morocco (e-mail: {karim.elkhadiri, hassan.qidaa}@usmba.ac.ma). In a class-D amplifier, the audio signal is converted in to a high-frequency PWM signal whose pulse width varies with the amplitude of the audio signal. The varying-width pulses switch the output transistors of the class-D output stage at a fixed frequency. A low-pass filter (LPF) then converts the output pulses in to an amplified audio-signal that drives the speaker.

Leakage Power Reduction in VLSI Circuits Using the Particle Swarm Optimisation Algorithm

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Abstract—In nanoscale technology, leakage power is the main cause of power loss. Static power outweighs dynamic power, according to the International Technology Roadmap for Semiconductors (ITRS), with the progress in technology. Input Vector Control (IVC) is one of the widely utilised methods for reducing leakage. IVC's stacking effect results in less leakage when the Minimum Leakage Vector (MLV) is applied at the test circuit's inputs. In order to determine the smallest leakage vector, this study introduces the Particle Swarm Optimisation (PSO) algorithm to the field of VLSI.In order to search MLV, the Genetic Algorithm (GA) is also used, and its number of iterations is contrasted with that of PSO. The suggested method is tested by simulation of a few test circuits. The PSO and GA algorithms are used. Based on the simulation, compared to genetically based implementation, results show that the PSO-based approach is preferable for determining MLV since it uses less data, compared to GA, runtime. To the best of the author's knowledge, PSO algorithm is utilized in IVC approach for the first time to optimize power, and it works fairly well while looking for MLV.

Key words: Minimum leakage vector, Leakage power, PSO algorithm, Genetic algorithm, Verilog HDL implementation.

INTRODUCTION- ADVANCEMENTS in scaling with reduced threshold and supply voltages lead to increased leakages in MOS transistors. Many studies presented that leakage power consumption is up to 40% of total power consumption in nanometer technology [1]. Hence, reducing leakage power is of top concern in present day scenario. Number of techniques have been proposed previously to minimize leakage power by varying threshold voltage and adding sleep transistors [2][3][4][5]. Although above techniques are popular, they need extra process steps during fabrication. One of the popular approaches called Input Vector Control (IVC)is presented in this paper which is independent of process technology parameters [6]. Leakage current depends on input vector [7][8] due to stacking effect of transistors in the circuit. CMOS gate's sub threshold and gate oxide leakage currents vary with the input applied [9]. So, it is necessary to find input vectors which can optimize leakage. Forcing the circuit to low leakage state to reduce leakage power is the basic concept in IVC [10]. Minimum leakage vector is the low leakage state determined among different test inputs applied to circuit [11]. Furthermore, IVC does not require any circuit modifications and depends on transistor stacking effect. Fig1. shows design flow of IVC approach in sleep mode. Leakage power calculations for all input combinations of a test circuit are to be measured to form a Look Up Table. From Look Up Table. Many researchers have found that optimization algorithms are best in solving many complex problems in various fields of science and engineering. Researchers have used different algorithms like genetic algorithm, integer linear programming for power reduction in the area of VLSI. Genetic algorithm is used by many authors to determine the minimum leakage vector as best solution [12][13]. In the previous work of authors [11] genetic algorithm is used but implemented in Verilog HDL and comparison is performed with [14].

Local and Global Impacts of Free Electron Laser Development in Europe

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Abstract—
Free electron lasers (FELs) are mostly developed as independent infrastructures or as extensions of synchrotron infrastructures in Europe. They are mostly built in locations like DESY, Trieste, INFN, and other facilities that have extensive expertise with third-generation synchrotron light sources. The development of FEL machines across Europe accelerated due to improvements in extremely energy efficient superconducting linear accelerators for electron beams, such as the TESLA type. A laser beam with high intensity and good parameters is emitted in the IR, VIS, UV, EUV, and X-ray spectral regions by a new generation of FELs. Young active researchers from Poland are also included in the machine construction teams. A significant amount of M.Sc. and Ph.D. students from Warsaw University of Technology participated in the construction of FLASH I, FLASH II, and EXFEL machine. Unique encounters, these significant experiments conducted at work lead to the growth of these young teams and their continued commitment with new initiatives like laser, laser-accelerated, inertial, plasma, plasma-energy, etc. are examples of new endeavours. We can see this with satisfaction. We are not, however, a part of the infrastructure owner clubs because Poland lacks significant research infrastructures. Only indirectly, as members of cooperation teams from the industrialised nations, are our young researchers able to participate in the programmes. As a further effect, Polish laser and accelerator researchers only have limited access to particular types of European infrastructure development initiatives currently being carried out under the H2020.
Keywords: EUV radiation, RTG radiation, free electron lasers, photonics, laser development, and research infrastructures

INTRODUCTION-

HE idea to use a relativistic electron beam passing previously through a bent magnet and later through a wiggler for generation of coherent EM radiation in the spectral range from IR to UV was presented in literature more than half a century ago [1]. Microwave tube called Ubitron – an early precursor of a FEL was constructed in 60-ties. First fundamental theoretical work on FEL was carried out in 60-ties and 70-ties. The first precursors of a FEL were tested in labs in 1971 for wavelength 10μm [2], and next in 1977 [3]. The SASE theory – self-amplified spontaneous emission of FEL radiation was elaborated in mid-80-ties [4-5]. First solutions of a FEL machine based on ring accumulation, typical for classical synchrotron architecture, thus with a beam of relatively low intensity and almost no coherence. A linear bypass in the circle was used to insert a wiggler (Halbach magnetic matrix), and later undulator. Optical field was amplified in a resonant cavity analogous to the one used in classical optical lasers. Further increase in electron beam energy and shortening of the wavelength of optical beam met a confinement associated with the lack of relevant optical mirrors for X rays (short wavelengths of few tens of nm), even using the technique of grazing angle incidence and reflection and circular resonant cavities. An alternative is to use no resonant cavity in laser architecture, i.e. a single pass solution for the optical beam pulse.

Performance of IP address auto-configuration methods in networks that tolerate delay and disruption

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Abstract-Current research on the methods utilized in Delay Tolerant Networks (DTN) for Mobile Ad-hoc Networks (MANET) address assignment is lacking. In the challenging setting of delay- and disruption-tolerant networks, the purpose of this research is to review the SDAD, WDAD, and Buddy techniques of IP address assignment that are known from MANET. Our research enables us to determine the effectiveness of the selected solution and, as a result, to select the most appropriate one for the given circumstances. As part of the effort, we developed a tool that enables comparison of these approaches with regard to their capacity to resolve address conflicts and network load. Our simulator was written entirely from scratch in Java so adding new functions and making changes in the future will be as simple as feasible.

Keywords-Address assignment, automatic configuration, MANET, DTN.

INTRODUCTION- DELAY and Disruptive Tolerant Network (DTN) [1] is composed of highly mobile, wireless nodes which cooperatively form a network. The DTN network origins from Mobile Ad-Hoc Networks (MANET) and has similar characteristics. A network node usually communicates directly with other nodes within its range, and is independent from any infrastructure. For a long range communication the node uses a multi-hop communication through other nodes in the network. The extension of DTN network is, in contrast to the MANET network where the path set up is necessary, the use of carry messages between isolated nodes and sub-networks. It is done by the use a store-carry-forward paradigm [2, 3]. A high mobility of network nodes is the reason for changes in the network topology and its frequent disruptions. The classic multi-hop ad-hoc routing protocols like DSR [4], AODV [5], OLSR [6] etc. are in-effective in this difficult conditions. Therefore, DTN communication is done by specialized routing protocols like Spray-and-Wait [7], Spray-and-Focus [8], Prophet [9], Maxprop [10], BubleRap [11] and Rapid [12]. Most of DTN routing protocols are IP-based. Most of research effort bypasses the issue of node configuration and network address assign. Usually, it is assumed that nodes in network are configured in advance, before the network is established. Due to the mobility of nodes, it should be able to enter and leave the network. Therefore all nodes should have procedures for dynamic address configuration. The uniqueness of assigned IP address should be maintained despite the separation between sub-networks, and should not be changed during the network node activity. The standard dynamic address configuration protocols known from a wired network like DHCP [13] and SAA [14] are ineffective in ad-hoc environment, because of a centralized server as a basic approach. Since MANET is distributed in nature and there is no centralized point of administration, this approach cannot be taken. Hence, some protocols for MANET networks have been proposed. All this work has been done with the assumption of at least one path between any pair of nodes in the network. Some solutions like DAD [15] and based on binary split (Buddy System) [16] are very popular. In DTN network a path formulation is often impossible, and the nodes work separately. There are no DTN specific auto-configuration protocols.

Delay-tolerant networks' social-based routing technique-Social Routing

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Abstract-Delay and Disruptive Tolerant Networks (DTNs) are a relatively new networking concept that have the potential to offer reliable communication in a variety of implementations across the space, to military use on the battlefield or elsewhere. Message forwarding method, however, is a crucial issue in such dynamic networks, which can be thought of as a collection of intermittently connected nodes.The two primary routing families flooding and knowledge-based algorithms receive the majority of attention in current routing solutions. The social-based routing algorithm created for DTN, SocialRouting, is presented in this work. The unique method of message routing that is based on message ferrying between dispersed elements of the network is the utilization of the social features of wireless mobile nodes. The proposed idea has undergone rigorous simulation tool testing. The simulations were created based on measures specifically created for DTN scenarios and contrasted with common solutions.

Keywords: MANET, DTN, routing protocols.

INTRODUCTION-NOWADAYS Delay and Disruptive Tolerant Networks (DTN) [1] are dynamically explored. The ad-hoc DTN is a collaboration of nodes which are connected via wireless links in a spontaneous manner. The DTN is characterized by a changeable structure of the network. It also has another property, of highest importance: due to permanent network partitions, the path between message source and destination usually does not exists. The communication in the DTN network is done by ferrying messages between separate subnetworks, using mobility of nodes. This style of functioning is known as a store-and-forward paradigm. The nodes which are storing and moving messages are called message ferries or mules. Those mechanisms, which are relatively simple and well known to the old-fashioned human environment, such as post or courier services, cannot be easily implemented in an environment of small and mobile wireless networks. Although the technology progress is very fast, the communication and nodes storing capability are still an important problem to solve. Therefore, the proper routing algorithm is fundamental in the DTN network creation as it saves restricted node resources. Due to acceptable disruptions in the structure of the network, the DTN may be used in many possible applications. It can be applied in: emergency and rescue scenarios, where traditional communication infrastructure is unserviceable e.g. in earthquake, or in hardly-accessible terrains, such as railway and metro tunnels. The small size of the node makes it possible to be carried by e.g. rescuers. The major contribution of this paper is the algorithm for routing messages in Delay and Disruptive Tolerant Networks using the social properties of wireless nodes.

A Multidimensional Signal Constellation with Energy Efficient QAM Modulation

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Abstract-The idea of multidimensional modulation, which packs constellations of points in higher dimensions, uses a geometry-inspired approach to look for dense spherical packings in using a given dimension to reduce the average energy of the underlying constellations. The study that follows examines the effects of using a spherical bound for constellations rather than the more conventional hypercubical bound. The N-dimensional simplex merging algorithm produces balanced constellation systems. In terms of bits transferred per complex (two-dimensional) symbol, the examined constellations provide a BER gain of 0.7 to 1 dB in comparison to a typical QAM modulation.

Keywords: communication system, multidimensional constellations, lattice, QAM modulation.

INTRODUCTION The use of multidimensional constellations was introduced by Gersho and Lawrence in [10]. Their work showed the method of generating four-dimensional signals based on the An lattice. They assumed a cubical topology of the underlying constellations (4D or 8D). However, constellations that are bounded by an N-dimensional sphere result in a much lower average energy due to a more cohesive packing [18]. A 1.2 dB gain with respect to the 16-QAM was achieved at BER = 10−6 for a four-dimensional constellation in an experiment, and a gain of 2.4 dB was calculated mathematically for an eight-dimensional constellation [10]. In [4], Bourtos et. al. considered certain lattice packings that led to good constellations for both Rayleigh and Gaussian channels, which were used for a mathematical description of terrestrial and satellite links. They presented a thorough method of construction of multidimensional lattices from totally complex cyclotomic algebraic number fields, using a Q-homomorphism (rational number invariant homomorphism), in order to find a uniform class of constellations with a good performance for terrestrial and satellite links. Despite analysing a plethora of lattices, their work does not cover An lattices. Porath and Aulin described in [16] the method of constructing constellations from the behaviour of equally charged particles in free space. However, constellations constructed in such a manner suffer from the 'zero symbol' that is located in the beginning of the coordinate system. Unfortunately, removing the 'zero symbol' may cause a non-optimal distribution of points of a constellation, increase in its average energy and degradation of the overall performance as a final result. The method proposed by them results in a constellation that achieves approximately a 0.2 dB gain with respect to the 16-QAM at BER = 10−4 . An attempt to generalise multidimensional modulations in the time or frequency domains was undertaken by Sari in [20]. It was done using Walsh-Hadamard sequences, therefore, the solution was limited only to the dimensions of integer powers of 2. The main emphasis of multidimensionality in his work was put on a multi-user communication instead of enhancing the performance of a communication system. Various aspects of multidimensional communication methods have been studied so far, either from the perspective of multidimensional signal sets [11], [19], [21] together with TCM [17], or with STBC codes [2], as well as from the point of view of information theory, in order to generate optimum codes for band-limited channels [3]. The impact of forming constellations based on multidimensional lattices was exploited in [4], [10], [16] as well. Multidimensional constellation schemes were also applied with success in optical communications [6], [8], [9], [13], [14].

NOMA in 5G and millimetre wave Communications

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Abstract: This study investigates the interaction between millimeterwave (mmWave) communications and non-orthogonal multiple access (NOMA) in 5G mobile networks. With random beamforming, the base station won't have to be aware of the channel status information for every user, which will improve mmWave-NOMA performance. The effectiveness of the suggested mmWave-NOMA transmission strategy is evaluated using stochastic geometry, which takes into consideration the highly directed character of mmWave transmissions and potential obstacles. Two random beamforming techniques are suggested in the paper, and their sum rates and outage probability are examined. The efficiency of the suggested schemes is demonstrated by the simulation results, which validate the accuracy of the analytical findings.

Keywords: NOMA, mm wave, channel state information

Introduction:

Non-orthogonal multiple access (NOMA) has recently received considerable attention as a promising multiple access (MA) technique to be used in fifth generation (5G) mobile networks [1], [2]. Compared to conventional orthogonal multiple access (OMA), such as time division multiple access andor frequency division multiple access, NOMA encourages spectrum sharing among multiple users, rather than serving a single user in one orthogonal bandwidth block [3], [4]. Sophisticated power allocation policies and detection methods, such as cognitive radio inspired power allocation, superposition coding and successive interference cancellation (SIC), are used to combat the co-channel interference which is not presented in OMA cases [5], [6]. It is worth pointing out that the use of NOMA can still effectively support massive connectivity and efficiently meet users' diverse QoS requirements, even if the users have similar channel conditions [7]. As an promising enabling technology for 5G networks, NOMA has been shown to be compatible to many other 5G techniques, such as massive multiple-input multiple-output (MIMO), cognitive radio networks, as well as other types of MA techniques, such as orthogonal frequency division multiple access (OFDMA) [8]–[10]. The purpose of this paper is to investigate the coexistence between NOMA and another important 5G technique, millimeter-wave (mmWave) communications [11]–[15]. Even though more bandwidth resources are available at very high frequencies, the use of NOMA is still important for the following reasons: • The highly directional feature of mmWave transmission implies that users' channels can be highly correlated, which potentially degrades the system performance. But such correlation is ideal for the application of NOMA. • The combination supports massive connectivity in dense networks, e.g., where there are hundreds of users to be connected in a small area. • The rapid growth of mobile Internet services, particularly emerging virtual reality (VR) and augmented .

Power Allocation in NOMA with Channel Estimation Error

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Abstract: The energy efficiency of a downlink NOMA single-cell network with faulty CSI is examined in this research. The maximum power of the system, the minimum user data rate, and the maximum number of multiplexed users sharing the same sub channel are among the limits placed on the formulation of the non-convex optimisation problem. To maximise system energy efficiency, an iterative technique for user scheduling and power allocation is suggested. In order to strike a balance between system performance and computing complexity, a suboptimal user scheduling technique is presented. The proposed user scheduling algorithm comes very near to performing at its best, according to simulation data.

Keywords: Downlink, NOMA, channel state information.

Introduction:

NOMA has been proposed as a solution to address the explosive growth of user data requirement and the shortage of spectrum in wireless communications. This technology uses power domain to enable multiple users to access the same channel, and successive interference cancellation (SIC) is applied at the receivers to allow multiple users to be multiplexed on the same subchannel with different power levels. The multiplexed user with higher channel gain can correctly decode and remove the interference from users with lower channel gains on the same subchannel, guaranteeing a higher sum rate compared to the orthogonal frequency division multiple access (OFDMA) system. NOMA is considered a key technology for the fifth-generation mobile communication networks. Various studies have been conducted to improve the throughput performance of the NOMA system over the OFDMA system, such as the cooperative NOMA transmission scheme, the use of multiple-input and multiple-output (MIMO) technique, and energy-efficient resource allocation. The energy-efficient resource allocation for NOMA systems has been investigated in several studies, where a near-optimal power allocation scheme was proposed for NOMA systems by using statistical CSI at the transmitter. Most research works on NOMA systems have focused on the case that the base station (BS) knows the perfect knowledge of the CSI. However, in practice, the perfect CSI is challenging to obtain. In this paper, the authors consider energy-efficient resource allocation for a downlink single-cell NOMA network with imperfect CSI. They propose a low-complexity suboptimal user scheduling scheme to achieve the maximum system energy efficiency by formulating user scheduling and power allocation as an energy efficiency optimization problem. They present a power allocation scheme to further maximize the energy efficiency of the system.

Integration of NOMA with Cooperative relaying

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Abstract: A technology that holds promise for fifth generation (5G) wireless communications is non-orthogonal multiple access (NOMA). The integration of NOMA with cooperative relaying has lately gained growing interest because users with good channel conditions can function as relays to improve the system performance by using successive interference cancellation (SIC). An analytical approach for assessing the performance of a cooperative relaying system based on NOMA is proposed in this research. The exact expression of the average achievable rate is derived after studying NOMA's performance over Rician fading channels. In addition, we also suggest a Gauss-Chebyshev integration-based approximation method to determine the feasible rate. The numerical results support the strong agreement between our derived analytical conclusions and the Monte Carlo simulations.

Keywords:successive interference cancellation, Fading channel, NOMA.

Introduction:

I T is highly expected that future 5G networks should achieve a 10-fold increase in connection density, i.e., 10 6 connections per square kilometers [1]. Non-orthogonal multiple access (NOMA) has been proposed as a promising candidate to realize such an aggressive 5G goal [2]–[5]. NOMA is foundamentally different from conventional orthogonal multiple access (OMA) schemes such as FDMA, TDMA, OFDMA, etc., since it allows multiple users to simultaneously transmit signals using the same time/frequency radio resources but different power levels [3]–[5]. The key advantage of NOMA is to explore the extra power domain to further increase the number of supportable users. Specifically, users are identified by their channel conditions, those with good channel conditions are called strong users and others are called weak users. For the sake of fairness, less power are allocated to strong users at the transmitter side. In this way, the transmitter sends the superposition of signals with different power levels and the receiver applies successive interference cancellation (SIC) to strong users to realize multi-user detection [5], [6]. Such non-orthogonal resource allocation enables NOMA to accomodate more users and makes it promising to address the 5G requirement of massive connectivity, with the cost of controllable increase of complexity in receiver design due to SIC [5]. In NOMA systems, the use of SIC implies that strong users have prior information about the messages of other users, so essentially they are able to serve as cooperative relays. Moreover, cooperative relaying is able to significantly enhance the system performance of cellular networks [7]. Thus, combining cooperative relaying and NOMA is promising to improve the throughput of future 5G wireless

Lens Antenna Array in Millimetre-Wave NOMA Communications

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Abstract: In millimeter-wave (mmWave) huge MIMO systems, beamspace multiple input multiple output (MIMO) can reduce the number of radio-frequency (RF) chains necessary without obviously sacrificing performance. However, the number of RF chains using the same time-frequency resources in beamspace MIMO restricts the number of supported users. In order to get over this restriction, a brand-new beamspace MIMO-NOMA mmWave transmission system is suggested in this study. The number of supported users in beamspace MIMO systems can exceed the number of RF chains by utilising non-orthogonal multiple access (NOMA). The suggested beamspace MIMO-NOMA outperforms the current beamspace MIMO, according to an examination of the possible sum rate. To lessen inter-beam interference, a precoding system based on the zero-forcing (ZF) principle and a dynamic power allocation algorithm are used.

Keywords:MIMO, NOMA. Mm wave, Radio Frequency.

Introduction:

The rise of the Mobile Internet and the Internet of Things has brought about an explosive growth in mobile data traffic, with predictions that it will increase up to 100 times from 2020 to 2030. To meet this demand, the 5th generation (5G) of wireless communication systems are expected to provide larger bandwidths and more antennas in the same physical space, enabling massive multiple input multiple output (MIMO) and beamforming gain. However, the high complexity and energy consumption required by a large number of radio-frequency (RF) chains in MIMO systems, particularly in millimeterwave (mmWave) communications, make them unaffordable in practice. To solve this problem, the concept of beamspace MIMO has been proposed, which reduces the number of required RF chains by using a lens antenna array to transform the conventional spatial channel to the beamspace channel and select the dominant beams according to the sparse beamspace channel. This allows for a significant reduction in power required per beam and inter-beam interferences. However, the fundamental limit of beamspace MIMO is that each RF chain can only support one user at the same time-frequency resources, limiting the number of supported users.

Multi Relay in Cooperative NOMA with AF/DF Relaying

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Abstract: This study examines non-orthogonal multiple access (NOMA) relaying networks, in which a base station uses a number of relays to connect with two mobile users. For NOMA networks with decode-and-forward (DF) and amplify-and-forward (AF) relaying protocols, which have differing quality of service requirements at the users, respectively, we suggest a two-stage relay selection technique. The diversity order is next established using the asymptotic expressions of the NOMA two-stage DF and AF schemes at high signal-to-noise ratios. Next, the outage probability of the two-stage DF and AF schemes are found in closed form formulas. NOMA two-stage DF (AF) relaying is superior to current relay selection algorithms created for cooperative NOMA and orthogonal multiple access networks, according to developed analytical results and executed computer simulations.

Keywords: Cooperative non-orthogonal multiple access amplify-and-forward, decode-and-forward, outage probability.

Introduction:

BECAUSE of its superior spectral efficiency, nonorthogonal multiple access (NOMA) has lately attracted much attention, and NOMAhas been recognized as a promising multiple access candidate scheme for the next generation mobile communication networks [1] and [2]. Furthermore, downlink NOMA has recently been adopted by 3GPP long term evolution (LTE) [3], namely, multiple user superposition transmission (MUST). The basic concept of NOMA is to exploit the power domain and channel quality difference among users to achieve multiple access, where users can be served at the same time/frequency/code [2]. Meanwhile, successive interference cancellation (SIC) is implemented at the users to decode the signals for those users whose channel conditions are poor, then remove these decoded messages, and lastly detect their own information [4]. The outage probability and average sum rate for downlink NOMA with partial channel information have been studied in [5] and [6], where users are randomly placed in a cell. These analytical results draw a conclusion that NOMA outperforms traditional orthogonal multiple access (OMA). Another conclusion is that in contrast to OMA, the strong user in NOMA can significantly strengthen its performance, but the performance gain for the weak user is relatively small. A natural idea is that combining relay transmission with NOMA can enhance the weak user's performance. Cooperative NOMA was firstly proposed in [7], where the user having strong channel conditions can act as a relay to help the user suffering from weak channel conditions because SIC is implemented at the strong user.