

3.3.1 Number of research papers published per teacher in the Journals notified on UGC CARE list during the last five years

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Link to the recognition in UGC enlistment of the	
				Link to website of the Journal	Is it listed in UGC Care list
Effect of Polymeric Resins on Geotechnical Properties of Black Cotton Soil	Jayaganesh Kuppusamy	Civil	International Journal of Recent Technology and Engineering /SCOPUS	http://www.ijrte.org	Yes
Impact Behaviour of Ferrocement Slabs with High Strength Mortar	C Makendran	Civil	Test Engineering & Management	http://www.testmagzine.biz	Yes
Prediction of Potholes for PMGSY Roads in India	C Makendran	Civil	Test Engineering & Management	http://www.testmagzine.biz	Yes
Multilevel sentiment analysis using domain thesaurus	K Priya	CSE	Journal of Ambient Intelligence and Humanized Computing /SCI	http://www.springer.com/journal/12652	Yes
Protection on Wireless Sensor Network from Clone Attack using the SDN.Enabled Hybrid Clone Node Detection Mechanisms	P.P.Devi	CSE	Computer Communications/SCI	http://www.journals.elsevier.com/computer-communications	Yes
Analysis of Udeemy courses based on Machine Learning Algorithm	J Mary Jenifer	CSE	International Journal of Control and Automation/SCOPUS	http://www.sersc.org/journals/IJCA/	Yes
Survey on Automatically Mining Query Facets	J Mary Jenifer	CSE	International Journal of Control and Automation/SCOPUS	http://www.sersc.org/journals/IJCA/	Yes
Object Assimilation using Machine Learning Algorithms from Radar Data	Noorul Julaiha	CSE	Journal of the Gujarat Research Society/UGC	http://www.gujaratresearchsociety.in	Yes
Efficient routing in UASN during the thermohaline environment conditionto improve the propagation delay and throughput	N.R.Shanker	ECE	Soft Computing/SCI	http://www.springer.com/journal/500	Yes
Geometric distortion and mixed pixel elimination via TDYWT image enhancement for precise spatial measurement to avoid land survey error modeling	N.R.Shanker	ECE	Soft Computing/SCI	http://www.springer.com/journal/500	Yes
Improving Packet Delivery Performance in Water Column Variations through LOCAN in Underwater Acoustic Sensor Network	N.R.Shanker	ECE	Journal of Sensors	http://www.hindawi.com/journals/sensors/	Yes
A Condition Monitoring system based on dyadic wavelet transform using thermal image	N.R.Shanker	ECE	International Journal of Innovative Technology and Exploring Engineering/SCOPUS	http://www.ijitee.org	Yes
Analysis and Design of a Giromill Type Vertical Axis Wind Turbine for a Low Wind Profile Urban Area	A Mohanasundaram	EEE	Journal of Electrical Engineering/SCI	http://www.jee.ro	Yes

Spam Detection in Sms using Machine learning through Text mining	Alagesan & Rubin Julis	IT	International Journal Of Science And Technology/SCOPUS	http://www.ijst.org	Yes
Accident prevention by Eye.Gaze tracking Using imaging Constrains	Lavanya & Amanullah	IT	International Journal Of Science And Technology/SCOPUS	http://www.ijst.org	Yes
Effect of laser remelting on the microstructure and mechanical propeerties of meta inert gas welded low carbon mild steel	Dr.S.Sathish	Mech	Indian Journal of Engineering and Material Sciences/SCI	http://www.niscair.res.in	Yes
Selective laser Ablation of CFRP Composite to enhance adhesion bonding	S Ramkumar	Mech	Materials and Manufacturing Processes/SCI	http://www.tandfonline.com/toc/umam20/current	Yes
Mixed ligand ternary complexes of Co(II), Ni (II), Cu (II) and Zn (II) and their structural characterization, electrochemical, theoretical and biological studies	A Ashma	Chemistry	Journal of Molecular Structure/SCI	http://www.journals.elsevier.com/journal-of-molecular-structure	Yes




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Effect of Polymeric Resins on Geotechnical Properties of Black Cotton Soil

Jayaganesh Kuppusamy, Muthumani Krishnamurthy

Abstract: Stabilization of black cotton soil is a challenging task for geotechnical engineers since such soil is highly vulnerable to expansive characteristics when the moisture content is increased. Due to its expansive nature, it is also called as swelling or expansive soils. Among the clay minerals, Montmorillonite is mainly responsible for such expansive characteristics. Bore log profile has a cluster of soil specimens including black cotton soil also which is unavoidable. Soil engineers have a serious concern about such expansive soil since it is treacherous for foundation of buildings. To overcome such deficiencies it becomes essential to stabilize the soil conditions. The commonly employed methods to decrease the expansive behaviour are: Chemical stabilization, Mechanical stabilization and installation of moisture barriers. In this paper, chemical stabilization method is adopted. Soil stabilizers, namely, sodium silicate, epoxy resin and polyvinyl alcohol are chosen and are mixed with black cotton soil in varying proportions of 5%, 10% and 15% to study the changes in geotechnical properties. From the results it is evident that polymer treated soils reduce plasticity characteristics and shows better results in geotechnical properties.

Index Terms: Black cotton soil, Soil stabilization technique, Soil stabilizers, Polymeric Resins, Geotechnical properties.

I. INTRODUCTION

Expansive soils are problematic soils since it has volume change behaviour (swelling & shrinkage) characteristics. Intensive research activities are carried out by many geotechnical investigators to decrease such plasticity nature of soil. The plasticity characteristics of clays are due to unusual molecular structure of water in soil deposits and adsorbed water. Such plasticity nature can be reduced effectively by polymers than traditional soil stabilizers such as cement and lime. Various literature reviews and previous studies reveal that promising results are achieved by adopting polymer impregnation of soils as soil stabilization technique.

Expansive soils cause significant damage to structures and roadways by cyclically shrinking and swelling within the active zone. Conventionally the volume change behaviour of soil is measured either by using shrinkage characteristics or swelling characteristics. [1]. Stabilization of highly expansive clay is, in particular an area of major interest to the construction community due to excess swelling and shrinkage experienced by this clay upon changes in moisture content [2].

Polymer based binders are attractive stabilization

candidates when compared to traditionally used binder, namely, Portland cement. Polymer stabilized soil samples displayed a more ductile behaviour while undergoing deformation. This attribute is especially desirable in pavement design and construction. Increase of strength resulting from polymer stabilization, the increase in toughness indicates that the polymer stabilized soil will have higher resistance to crack propagation. Increase in total energy is an indication of flexibility and ductility that the polymer adds to the soil and thus makes it less susceptible to abrupt damage under repeated loads [3].

Compared to traditional cement, geo-polymer is an environmental-friendly cementitious material for self-solidification/ stabilization of heavy metal wastes [4]. Polymer addition to surface aggregate leads to stabilization of existing aggregates and improved bonding between adjacent aggregates mainly through their adsorption on the outer surface of soil particles. Use of synthetic organic polymer as soil conditioners started as early as 1950 [5]. Chemicals as a soil stabilizer has been used to improve the strength due to low cost and relatively wide applicability compared to standard stabilizers [6]. Stabilization of expansive soil by the addition of lime is an ancient art and age old practice [7]. Stabilization with lime was only marginally effective in improving its properties [8]. With lime treatment, plasticity index of expansive soil decreases from approximately 400 to just 50%. This substantial reduction in plasticity index suggests that the soil itself changed. Lime generally improves the engineering performance of soils. However in some cases lime has been reported to have an adverse effect. [9]. Cement stabilization is not effective in certain types of organic soils, soils rich with sulphates and chlorides [10].

These findings confirm that there is great potential for polymers in stabilization of black cotton soils than routine soil conditioners, namely, cement and lime. In this paper an attempt is made to assess the effect of Polymeric resins such as sodium silicate, epoxy resin and polyvinyl alcohol on geotechnical properties of black cotton soil.

II. MATERIALS AND METHODS

In the present study, black cotton soil is chosen as the soil medium and polymeric resins have been used for the purpose of stabilization. Brief details of the materials are presented in the following.

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Impact Behavior of Ferrocement Slabs with High Strength Mortar

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Abstract

Developing countries have an increasing the building construction using various alternate materials due to materials constraint. Building construction in developing countries are undertaken as a combination of alternative materials and reducing the structure sizes to economize costs. In this regards, the investigation of ferrocement slabs subjected to impact test. A total of 4 slabs were casted and tested, the size of these slabs are of 300mm x 300mm x 25mm. These slabs were cast by varying the number and size of reinforcing mesh layers. Cement mortar matrix mix for ferrocement slabs was finalized by developing 5 mixes of high strength mortar. A mix of ratio 1:1 mortar with 90% cement, 10% silica fume and M-sand gives the compressive strength of 80-90MPa, therefore it is adopted as a best mix for ferrocement slab. Further welded mesh of 2 and 4 layers of 60mm and 30mm openings were used as reinforcement for these slabs. The results concluded that impact strength and energy were increases with increased in mesh layers and mesh size.

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Index Terms; Ferrocement slabs, Welded and wire mesh, High strength mortar, Impact energy..

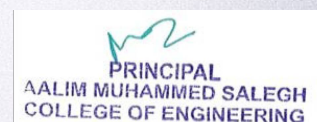
I. INTRODUCTION

In India, Developing Countries are needed more infrastructures for various purpose like residential, educational, commercial, industrials and IT sectors. In this connection, to develop above mentioned all the sectors need the buildings. Developing countries are an increasing the building construction using various alternate materials due to materials constraint [1]. Building construction in Developing countries is undertaken as a combination of

alternative materials and reducing the structure sizes to economize costs. Alternative construction materials were using to develop the Civil Engineering structures. In most of the countries "The ferrocement slab is directly helping to low income group peoples for constructing their house". The Ferrocement technique and application invented and patented by Joseph-Louis, in the year 1852, in France. The patent called "Ferro - cement", which translates into, "iron-cement". Most common material is ferrocement. This ferrocement is

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Prediction of Potholes for PMGSY Roads in India

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Abstract:

Potholes are indicating the performance of pavements. Potholes directly affect safety, travelling time and Vehicle Operating Cost (VOC). In this study, performance prediction of pothole model for Pradhan Mantri Gram Sadak Yojana (PMGSY) in the state of Tamil Nadu, India. To evaluate the progression of potholes is the universal performance indicator of flexible pavements. Globally more prediction models were developed till today. Not all the models are applicable for all pavements. Many models are implemented only for the standard road with high traffic volume of highways. The standard models are dependent on local condition variable parameters of pavement, which are soil strength, pavement material composition and traffic. In this study, Multiple Linear Regression Analysis (MLRA) technique is proposed to evaluate the performance prediction of PMGSY roads. The model includes variable and distress parameter cracking prediction in India. Based on the results, this prediction model can be recommended as a decision-supporting tool for road maintenance on PMGSY roads

Article History

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Keywords: Potholes, Cracking, Multiple linear regression techniques, PMGSY road, Ground truth verification

I. INTRODUCTION

In India, the road network is nearly 5.4 million km of length of roads [1]. India is in second place of the largest road network in all over the world. Indian highways have the six categories such as (i) Expressway, (ii) National Highways (NH), (iii) State Highways (SH), (iv) Other District Roads (ODR), (v) Village Roads (VR) and (vi) PMGSY Roads. Presently, total length of PMGSY roads in India is around 18, 31,043 km [2]. PMGSY road is an important part of every country. PMGSY roads are indirectly connecting with the agricultural production

sector. Rural roads connect with small villages and each other. All rural villages are easy to connect and

Accessible through rural roads. Agricultural products are easy to carry to urban area through rural roads. Good rural roads reduce the lead charge, It indirectly reduces the final product cost. The road is a direct connection of social, cultural, safety and the border of the nation. Rural roads directly help the door to door services for rural peoples for education, employment and medicine. Poverty is one of the Non-curable diseases of rural areas in India [3]; PMGSY roads play a vital role in poverty reduction.



Multilevel sentiment analysis using domain thesaurus

K. Priya¹ · K. Dinakaran² · P. Valarmathie³Received: 4 December 2019 / Accepted: 28 March 2020
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Abstract

The main aspects or features of products are identified through aspect extraction. Sentiment analysis is performed for the source domain, which is referred as the product. Then, the source domain is mapped to target domain, which is referred to as the hotel, via a process called multidomain sentiment classification. A sentiment sensitive domain thesaurus makes the words alignment for the words that are expressing the same sentiments from two different domains. Then a rank is given for products as well as hotels- with the help of features that are present in history of reviews of consumers. The user may easily get the idea for shopping ideas by seeing star ratings on a website. Product recommendations and service recommendations for hotels will be given to the user. Based on each feature or aspect of the product positive and negative opinions are identified. Health-related problems are identified with the help of the patient's history. For the purpose of medical treatment, 47% of online users search for treatment procedures on the Internet based on the field of bioinformatics. The purpose of opinion mining is to separate positive and negative opinions regarding the aspects of the object. The important decision here is, how to select the correct source domain to have an adaptation to a given target domain. The source and target domain share same sentiment words. For example, the electronics domain can be adapted for the kitchen Domain. Electronics products, such as televisions, fans, grinders, blenders, refrigerators, washing machines, are considered under the electronics domain. The cutting aspect of blenders is sharp under electronics domain can be related to knives under the kitchen domain. The kitchen domain is the target domain. If the above kitchen domain is the target domain, then the ranking is performed based on the history of reviews from online users for kitchen based products.

Keywords Cross domain · Multidomain classification · Sensitive embedding · Domain thesaurus · Aspect ranking · Opinion mining · Multilevel sentiment analysis · Spectral feature alignment · Hotel Recommendation · Product rating

1 Introduction

E-Commerce is currently being used by many people given its convince and time saving features. Many retail websites are encouraging consumers to provide reviews based on various features of the products. Datasets are obtained through user generated posts present in social media and customer reviews. The format of the datasets includes text, audio, image or video. Sentiment analysis is useful in social media networks as well as in customer support to determine what a customer thinks about a specific product or topic. Blogging and instant messaging are combined to form micro blogging. Short messages are created, posted and are shared with an audience online. Microblogging is one of the faster ways to communication with people online, e.g., Twitter, Facebook and Instagram. Aspects can also be called features (Liu and Cheng 2007). Opinion mining analyses text into positive, negative and neutral types of text under affective computing

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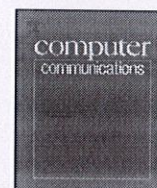
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Protection on Wireless Sensor Network from Clone Attack using the SDN-Enabled Hybrid Clone Node Detection Mechanisms



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- Performance analysis
- Hybrid clone node detection
- Key distribution
- Wireless sensor network
- SDN
- QoS

ABSTRACT

WSN is an infrastructure less network that consists of mobile nodes that communicate with each other over wireless links. WSN is vulnerable to the node replication attack (clone attack). Attackers through compromising one sensor node replicate many clones having the same identity (ID) from the compromised node, and place these clones in various places of network. Clones contain all the credentials of legitimate member so appears authentic. This makes the conventional cryptographic tools useless and clone detection difficult. Once the node replication attack has been successful it can help the attacker to exploit almost all of the network operations, like routing, data collection, and key distribution, and also to help launch various other attacks such as black hole, wormhole etc. This proposed work therefore attempts a SDN based mechanism that implements a network level route analysis and time-based analysis methods which involves a low cost timely monitoring of the environment to identify and avoid redundant nodes which may be caused due to cloning attack. Thus, the SDN based cyber security applications are most useful in this situation. The implementation of this SDN based mechanism in WSN helps in maintaining and improving the QoS (Quality of service) constraints. The hybrid clone node detection (HCND) mechanism helps to detect the clone node present in the wireless network. This is to perform efficient clone detection in such a way to eliminate cloning attack in proactive fashion. To detect clones locally as well as across geographical region through cost effective identity verification procedure. This method helps to protect the wireless sensor network from the node identity replicas using the superimposed SDIS junction code. The node identity replicas help to choose the credible path for successful transmissions. The superimposed method is to be used for retrieval of information from node participating on the network. To thwart cluster of attacks hosted from the clones, by removing the hosting clones. The simulation result shows that there is the performance analysis of various parameters such as false positive, false negative ratio analysis, precision analysis, recall analysis and detection analysis.

1. Introduction

The wireless sensor network is defined as a network of devices which is to communicate the details gathered from a monitored field with a way of wireless links. The information is to be forwarded through multiple nodes within the gateway. This data is to be connected to other networks like wireless Ethernet. It consists of base stations and various numbers of nodes. This network is to be used to diagnose physical or environment conditions such as sound, pressure, temperature and co operatively which is pass information through the network to a main location. In the radio communication networks, the wireless sensor network has the various number structures with various topologies. In the wireless sensor network, there are various attacks are to be presented according to the different criteria such as domain of the attackers or the techniques which are to be used in attacks. There are two major categories are to be classified which are according the

interruption of communication like passive attacks and active attacks. For this, software defined network is an efficient one for enhancing security against attack by maintaining QoS.

1.1. Clone Attack

The wireless sensor network is most vulnerable which the severe attack that is clone attack is. This method helps to detect the clone attacks which are present in the wireless sensor networks. There are various centralized and distributed techniques such as on the detection of clones in sensor networks using random key pre distribution, detecting node clones in sensor networks, real time detection of clone attacks in wireless sensor network, hierarchical node replication attacks detection in wireless sensor network, compressed sensing based clone identification in the sensor networks, fast detection of replica node

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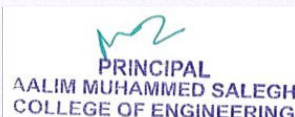
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ANALYSIS OF UDEMY COURSES BASED ON MACHINE LEARNING ALGORITHM

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Abstract

The main objective of this study is to examine the impact of number of subscribers based on the price, number of reviews, number of lectures and content duration of Udeemy courses. For that collected the dataset of course id, course title, price, number of subscribers, number of reviews, number of lectures, level, content duration and subject of the Udeemy courses. After that created the training and testing dataset to provide accurate evaluation. A simple linear regression fits the linear model with coefficients taken to minimize the error between the independent variables and dependent variables by the linear approximation using sklearn package to model the data. Finally evaluation of the model is compared the different model evaluation metrics of Mean Absolute Error, Mean Squared Error and Root Mean Squared Error for the features taken to improve the number of subscribers in Udeemy course.

Keywords: Udeemy course, Simple Linear Regression, sklearn and Evaluation Matrices

1. Introduction

Machine Learning is the most powerful technology in today's world and a tool to predict future events and perform all kinds of decision making activities. Main idea behind this machine learning is to build a model from the dataset and features taken. The process of machine learning involves data collection to collect the data that the algorithm to learn, data preprocessing is to format data and extracting important features, training is a phase where the algorithm learns the data given by data collection and data pre processing steps, evaluation is the phase to test the model accuracy and tuning is the phase to fine tune the model for improving the performance of a model.

There are different types of machine learning algorithms; mainly they are classified into three categories Supervised, Unsupervised and Reinforcement algorithms.

In supervised learning the labeled data is provided of past input and output pairs during the leaning process to teach the model should behave, when a new input is given then the future output will be predicted based on the training. The output of the supervised learning model in the form of finite set and also in real world values these are handled by classification and regression respectively. Classification is to group the similar data points into different section and regression is to predict a continuous valued output based on the trained values. In this type of algorithm the learning makes the algorithm gain experiences which can be used to predict the output from the unseen data. These experiences help in

Survey on Automatically Mining Query Facets

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Abstract

Mining query facets extracts the knowledge from search results and summarized to provide useful information. Mining query facets extracts the query facets from the search results and summarized to provide useful information. The Query Facets are the multiple groups of words or phrases which are obtained from the content covered by the given query. Query log is the record of valuable information which provide query facets related to user's search queries on the internet. The query facet searching is an exploratory searching mechanism which refines the search results based on the faceted taxonomy. This paper focus on various techniques involved in mining query facets from the search results. This paper focus on obtaining useful query facets to the user in the search results.

Keywords: Query facets, Extraction, Summarization

1. Introduction

Data mining is the powerful technology to analyze the data from different places and locations and that information is summarized to provide better information to the user. Data mining analyze the data stored in data warehouse. Data mining is also known as Knowledge Discovery in Databases, which extracts the data from Data warehouse and the data are processed to evaluate patterns and provide useful knowledge to the user in an efficient manner. Data mining mines the data using two learning approaches such as supervised and unsupervised. In supervised learning, relationship is established among dependent variable and explanatory variables. In unsupervised learning, there is no distinction between dependent variable and explanatory variable [28], [29]. Searching query facets on search engine is an exploratory searching mechanism, which iteratively refine the search results based on faceted taxonomy. Faceted search analyze the models and framework to rank the facets based on exploratory searching mechanism. Exploratory based faceted search iteratively refine the search results by facets. Faceted search is also known as faceted browsing which is a subset of faceted taxonomy. Faceted search rank the important terms by using independent facet and correlated facet [30]. Mining extracts the raw data available in the web pages and they are processed to provide useful information to the user in an efficient manner and that satisfies the user needs [31]. The purpose of using web in day to day life is widely increased to access the information from web information retrieval. Query log is the record of useful knowledge which provides query facets related to the user's search queries on the internet. The search engine submits the user's query from different perspectives. A query facet is a set of items that describe and summarize an important aspect of a query. The query facets are also known as a word or a phrase. A query may have

OBJECT ASSIMILATION USING MACHINE LEARNING ALGORITHMS FROM RADAR DATA

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ABSTRACT

In this paper we use the history tracked data from known resources as knowledge, identifying characteristics of the target from new detection is the requirement. Target identification from radar data will be the end product of any radar tracked data (Range, Azimuth, elevation and SNR). The trained model will identify the target nature and size.

Keywords: Radar Tracking, Range, Azimuth, elevation, SNR.

I. INTRODUCTION

Radars are used for the detection of aircrafts, ships, weather system. It uses electromagnetic wave region to detect the location, height, intensity, movement of moving and non moving targets. The time taken in to and fro journey of the electromagnetic waves gives the range of targets. The amount of return power provides the information about the intensity of weather systems, azimuth and elevation.

Multi Object Tracking Radar is an L-Band active phased array radar designed to track multiple targets. It is long space skin mode tracking 0.25m² RCS target up to range of 1000 km. MOTR can track more than 10 simultaneous targets using single agile beam.

This paper focuses on MOTR Radar data to identify the target which is difficult task for wide variety of observed surfaces. Radar data consists of Range, Azimuth, elevation and Signal to Noise Ratio (SNR). From range and SNR correlation target size can be classified. From SNR variation alone in single track duration, target nature can be established.

Using standard libraries in python machine learning algorithms have become more realizable models. Expected deliverables are a trained data model using any of the available regression (or) classification model in python. This model should be trained on MOTR tracked data. New data from the radar should be classified. Timing and hardware resources required for the model in real time should be evaluated.

II. DATA PROCUREMENT

Data contain signals from several target observations with L-Band Active phase Array Radar. First pre-processing step was to configure the signal segmentation. An L-Band instrument using an electronically steerable radar antenna is suited meet these needs. The T/R module



Efficient routing in UASN during the thermohaline environment condition to improve the propagation delay and throughput

N. Hemavathy¹ · P. Indumathi² · N. R. Shanker³

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Abstract

In underwater acoustic sensor network (UASN), the challenging issues are bandwidth, higher propagation delay and heavy packet loss during data transmission. The issues can be solved through efficient routing algorithms. The existing UASN routing algorithms have larger latency in the network link and high rate of packet loss because of the salinity and temperature in the water at different depths. The salinity and temperature changes according to the depth and called as thermohaline circulation. In this paper, convex directional flooding optimisation (CDFO) algorithm improves the latency, throughput and lifetime of the nodes in the network under thermohaline condition and longshore drift from longshore current, which consist of transportation of sediments. The CDFO combines the convex optimisation and directional flooding-based routing algorithm, convex optimisation helps in identification of the hidden nodes in the network and strong communication links are established through polynomial time and semantic analysis and directional flooding algorithm reduces the packet loss and increases the network throughput. The routing protocol has implemented in ns2-AquaSim simulator and test bed for measurement of the performance metrics of the UASN.

Keywords Routing · Directional flooding · Convex optimisation · Propagation delay · Throughput

1 Introduction

Wireless sensor network (WSN) consists of nodes with sensors spatially distributed for monitoring the environment. The WSN system comprises wireless transceiver, which enables node to connect to other wireless transceivers. The different WSN transceivers available are IEEE802.11-WIFI, IEEE 802.15.4 (2.4 GHz) and radio frequency working at 900 MHz. The WSN systems have become popular due to the stand-alone nature of the node.

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The WSN node deploys for applications such as wildlife monitoring, border surveillance, monitoring underwater oil, gas pipelines monitoring, climate change monitoring, and oceanography. In oceanography, the oil and gas pipelines that lie in deep sea are vulnerable to hydrostatic pressure which increases by 14.5 psi for every 33 feet in the sea level. The constant hydrostatic pressure reduces the structural integrity of gas and oil pipelines. Hence, underwater sensor nodes are deployed at key locations to monitor structural changes in the pipeline. In addition, unmanned vehicles deploy underwater to collect data from sensor nodes. The different types of underwater communication technique exist for data transmission such as underwater optical communication, acoustic underwater communication and RF underwater communication.

In cognitive acoustic network, transmitted data degrade due to water turbidity and ambient light. Data transfer is done via acoustic medium to maximise end-to-end throughput in the multi-hop acoustic network. The acoustic modem transmits data at 1 kHz to 40 kHz. The acoustic underwater communication affects maritime creatures such as dolphins, which communicate at 200 Hz to 24 kHz. (Li et al. 2017). The acoustic modem comprises a hydrophone,





Geometric distortion and mixed pixel elimination via TDYWT image enhancement for precise spatial measurement to avoid land survey error modeling

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Abstract

In remote sensing, land cover classification of vegetation and water area from satellite image play a vital role for rural and urban planning and development. Existing algorithms of land cover classification require more sample image datasets for training. For existing algorithms, land cover classification of vegetation and water area is a challenging task because of mixed pixel and geometric distortion over boundary and curvature region. Mixed pixel affects the precise classification and measurement of land cover. Geometric distortion arises due to frame of isotropic and angular selectivity during image acquisition and affects the contour of land cover. In this paper, the proposed transverse dyadic wavelet transform (TDyWT) enhances and classifies vegetation and water area in land cover from LANDSAT image without training datasets. The proposed TDyWT uses Haar wavelet for decomposition and Burt 5×7 wavelet for reconstruction. The TDyWT enhances the contour, curvature, and boundary of vegetation and water area in LANDSAT image due to reversible and lifting properties of wavelet. TDyWT removes geometric distortion and spatial scale error of mixed pixel. In traditional land surveying spatial scale error reduction eliminates through total station and error modeling techniques. From the results, the proposed TDyWT algorithm classifies the area of subclass of vegetation and water with the 95% of accuracy with respect to ground truth survey methods.

Keywords Remote sensing · Land cover classification · Geometric distortion · Transverse dyadic wavelet transform

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1 Introduction

Remote sensing is the science of obtaining information of earth surface from satellites. Satellite sensor observes the reflected radiation from earth surface such as vegetation, water body, and objects and converts to image. Satellite image sensor is classified as passive and active. The passive sensor utilizes the sun radiation as the source, whereas active sensor has self-source radiation such as microwave, LF, and HF for image acquisition. For example, European ERS-2 satellite consists of active sensor such as synthetic-aperture radar (SAR), and LANDSAT satellite has passive sensor such as Thematic Mapper (TM), Enhanced Thematic Mapper Plus (ETM+), and Operational Land Imager (OLI) for image acquisition. The acquired satellite image analyzes for various applications such as change detection, land survey, weather, and disaster forecasting. Prior to image analysis acquired image process with various algorithms such as median, hybrid, and spatial filter for the removal of noise such as speckle and Gaussian. However,







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Research Article

Improving Packet Delivery Performance in Water Column Variations through LOCAN in Underwater Acoustic Sensor Network

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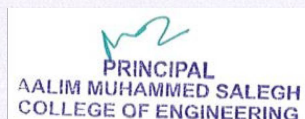
This paper proposes Lion Optimized Cognitive Acoustic Network (LOCAN) to reduce packet delay and packet loss during packet transmission in Underwater Acoustic Sensor Network (UWASN). Packet delay and packet loss in UWASN are because of water column variations such as Doppler effect and geometric spreading (GS). Doppler effect forms due to sensor node's motion and sea surface variations such as salinity and temperature. Geometric spreading (GS) occurs due to sediment drift wave fronts and frequent changes in node's location and depth. Water column variations change the amplitude of sound propagation, causing channel coherence and multipath interference, which affect packet transmission. The existing UWASN algorithms focus only on temperature and salinity variations. In LOCAN, channel selection through Lion Optimization Algorithm solves the problems of water column variation and improves the battery life, network lifetime, and throughput. The proposed algorithms show a better result in terms of efficiency, when compared to existing UWASN algorithms.

1. Introduction

In UWASN, acoustic signal propagates through water column variations, direct, surface, and bottom reflected path. The propagating acoustic signal interacts with different water column variations. The water column variations are spatial and temporal. The spatial variations are Doppler effect and temperature. The temporal variations (TV) are GS, salinity, and other multipath path interaction on the surface or bottom of the sea surface. The Doppler effect forms due to the water surface variations and movement of sensor nodes. The Doppler effects affect the acoustic signal sound intensity by defocusing and bending the signal and create a noncoherent communication between the acoustic nodes. The water column variations cause the time spreading of acoustic signal which leads to multipath interference. The multipath interference affects the packet transmission in UWASN. The GS leads to acoustical signal attenuation due to change in the location of the node and sedimentation drift. The change in

the distance of the nodes can be due to water column variations such as solitons, eddies, internal waves, and internal tides. The sedimentation drift waves which carry sand particles reduce the magnitude of acoustic signal, affect the direction of signals, and change the nodes' location.

In UWASN, high energy consumption and packet delivery are challenging tasks for nodes in the network. The source node in the acoustic network determines the forwarding relay set based on the forwarder's local information. Fuzzy logic-based relay selection scheme is used for the determination of the relay node. The forwarding relay node set is determined after checking the channel link of the neighboring nodes. In the channel link, the data rate, and node's depth based on the source node, neighbor node is added in the relay set or else discarded. From the relay set, fuzzy logic-based relay selection is used for selection of the optimum relay. Fuzzy logic algorithm performs based on two inputs, namely, Packet Delivery Probability (PDP) and Energy Consumption Ratio (ECR).



A Condition Monitoring System Based On Dyadic Wavelet Transform Using Thermal Image

S. Senthilraj, N. R. Shanker

Abstract: Wavelet analysis is broadly and effectively utilized in image processing and analysis. Because of the simple and fast algorithm, the dyadic wavelet transform has generally used. A dyadic wavelet transform gives an excellent output because of the different levels of the wavelet coefficient of the image. The proposed method presents an optimal value such as mean, standard deviation and entropy for the decomposition and reconstruction of the thermal image. The original results demonstrate which technique can find the induction motor faults clearly and effectively.

Keyword: Thermal image, wavelet analysis, dyadic wavelet transform.

I. INTRODUCTION

Electrical associated faults are generally occurring fault in the induction motor which will acquire more heat on both rotor and stator windings. This results in the decrease of induction motor life time. To formulate the protection system, the operation of induction motor during electrical faults are examined by both experimental and simulation methods. To detect the motor faults fastly an IR thermography camera is introduced. The thermal camera absorbs induction motor emitting infrared radiation in a non-contact way, and also the motor temperature is obtained. The IR thermal camera can produce an image of the thermal pattern known as thermogram, in which each pixel of the image has a temperature value and a pseudo-colour allotted to an arbitrary palette colours. At induction motors, a broken rotor bars faults are detected by calculating the spectral signature of the stator currents, especially the sidebands across the supplying line frequency. The amplitude of the basic frequency (50 Hz) is extensively more than the sideband amplitude. The major issue in the motor current signature analysis is to demodulate or remove the signature frequency elements under fundamental frequency. So to solve the issue a new transform demodulation algorithm is introduced. By utilizing this algorithm, three-phase currents are changed to a magnetic-torque (M-T) coordinates. Algorithm is discovered to the signature frequency elements, is demodulated in magnetising and torque-creating currents found because of transformation. Hence, the pair demodulated M-T currents offer is utilized to remove increased signature frequency elements fault, and early induction motor fault detection are comfortable to realise. With the experimental and simulated information of the broken rotor bars, demonstrates the introduced algorithm

remove elaborate fault signature frequency elements, and then understand early fault of the induction motors [1].

A new technique is introduced to detect rotor eccentricity faults in a closed-loop drive-associated induction motor. Dissimilar a line-sustained electric motor, the eccentricity fault signals will be in current and also the voltage of a drive-associated motor. Interim, since speed and subsequently the mechanical load can vary wide in factors speed approach, the amplitudes of the fault signals change as needs. Artificial neural networks are utilized to detect study the complex relationship among the operating conditions and eccentricity-associated harmonic amplitudes. Neural network can forecast threshold related to operating condition, which is utilized to forecast the motor condition. Neural network is instructed and tested with information possessed on drive-associated 4-pole, 7.5 Hp, three-phase induction motors. The exploratory solutions approve the detection technique is possible above the entire range of operating conditions of the exploratory motors [2].

A non-invasive method analysis gear tooth surface faults depends on stator current space vector examination is introduced. Torque oscillation account is delivered by gear tooth surface; harm fault in mechanical torque is tested by determined electrical machine which is fundamentally examined. This account comprises of mechanical effect created by fault adopted damped oscillation that is recognised between mechanical scheme torsional common frequency and damping factor. Across hypothetical improvements, demonstrated that periodic conduct of specific shape present fault-associated frequencies in harmonics and stator current, so entire number product of rotation frequency in stator current space vector prompt frequency. Fault signature identified with the gear tooth surface harm fault is forecasted across number of simulation. A simulation outcome is approved between tests that are showing conceivable non-invasive gear tooth surface harm fault detection with a fault affectability equivalent to invasive techniques. Committed test format, given a 250W squirrel-cage three-phase induction machine shaft-associated with a single-stage gear is utilized [3]. The traditional multiple single classification (MUSIC) technique is broadly utilized at induction machine fault identification and determination. The technique will remove important frequencies, however, can't supply exact amplitude

Analysis and Design of a Giromill Type Vertical Axis Wind Turbine for a Low Wind Profile Urban Area

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Abstract: This paper analyses the design parameters of giromill type vertical axis wind turbine in QBlade and Mat lab Simulink software with an appropriate practical demonstration. The significant factors like Reynolds number, numbers of blades, aspect ratio, and wake module analysis were carried out to design a wind turbine to enhance maximum power at 2 m/s wind speed. The classical 4 digit symmetrical, unsymmetrical NACA series airfoil are taken to analyze Glide ratio with proposed D shaped airfoil and it produces high lift forces at low wind speed. Based on the significant results obtained a virtual VAWT model was constructed in a Simulink which endorses QBlade analysis results. Two VAWTs with an aspect ratio of 2.5 and 0.75 were constructed with 1kW PMDC generator to validate the simulation results. The results exhibit that the low aspect ratio of 0.75, odd number blades like 3 or 5 with D shaped airfoil enables to catch more downwind and it improves the VAWT model has maximum energy efficiency to 50.49 % more than the 2.5 high aspect ratio wind turbines.

Keywords: Giromill, Glide ratio, Aspect ratio, Wake module analysis, Virtual VAWT model, PMDC generator.

1. Introduction

A wind turbine is a machine used to convert the kinetic energy of wind into electrical energy. There are two types of a wind turbine which produce electrical energy from the wind: they are horizontal-axis wind turbine (HAWT) and vertical-axis wind turbine (VAWT). The VAWT has a growing interest in power generation nowadays because it is simple construction, low cost, self-starting at low wind speed. It always orients towards the wind direction means that it is capable of capturing wind from any direction and generates electrical energy at low wind speeds and do not require yaw mechanism [1-2]. Regular wind turbines operate wind speeds between 10 m/s to 25 m/s but small wind turbines have been designed to operate even at 2 m/s. It produces lower noise level only 27-37 dB, suitable for our living condition. The VAWT mounted lower to the ground making it easy for maintenance if needed and can build at locations on the taller structures, such as the horizontal type can't. The VAWT located at the top of buildings as they do not suffer from changing wind direction and the simplicity of

design produces better response even they face a turbulence flow [3]. The VAWT is mainly classified into two types; Savonius and Darrieus type. The Savonius turbine generates the electricity through the drag force but Darrieus wind turbine rotors are based on lift force. Two bladed Savonius turbine is more efficient than three blades Savonius with higher power coefficient under the same operating condition [4-5].

Darrieus turbine has more efficient power coefficient than the Savonius turbine at low wind speed but it suffers from the self-starting problem. Power coefficient of a hybrid turbine is 0.23 at low wind speed which is higher than the Savonius and Darrieus turbine [6]. The H type or Giromill type VAWTs are particularly well suited to residential wind power generation for some inherent advantages in comparing with their HAWT counterparts also it can withstand turbulent wind flow [7-9].

The selection of the airfoil plays an important role in achieving better wind turbine aerodynamic performance. One attractive advantage of VAWTs is that the blades can have a constant shape along their length and, unlike HAWTs, there is no need in twisting the blade as every section of the blade is subjected to the same wind speed. This allows an easier design, fabrication and replication of the blade which can influence in a cost reduction and is one of the main reasons to design the wind turbine with this rotor configuration.

The H type VAWTs uses, symmetric airfoils from the NACA 4-digit series like NACA0012, 0018, 0020 are commonly employed because only for these airfoils aerodynamic characteristics are the most well documented [10]. The aim of the recent researches is to maximize the annual Energy to optimize the power coefficient by suitable selection of blade profiles [11].

For a fixed cross-sectional area of the turbine, to optimize the curve of the power coefficient it is possible to use different airfoil sections and/or rotors with different aspect ratio because the VAWT that is much wider than tall is more efficient [12-13]. This discussion portrays why VAWT suitable for generating electrical energy for household application at rural and urban areas in a country like India which has huge potential and interest for the wind energy. The organization of the various section of this paper for the proposed work described in Fig 1.



Spam Detection In Sms Using Machine Learning Through Text Mining

M.Rubin Julis, S.Alagesan

Abstract: The development of the cell phone clients has prompted a sensational increment in SMS spam messages. Despite the fact that in many parts of the world, versatile informing channel is right now viewed as "spotless" and trusted, on the complexity ongoing reports obviously show that the volume of cell phone spam is drastically expanding step by step. It is a developing mishap particularly in the Middle East and Asia. SMS spam separating is a similarly late errand to arrangement such an issue. It acquires numerous worries and convenient solutions from SMS spam separating. Anyway it fronts its own specific issues and issues. This paper moves to deal with the undertaking of sifting versatile messages as Ham or Spam for the Indian Users by adding Indian messages to the overall accessible SMS dataset. The paper examinations distinctive machine learning classifiers on vast corpus of SMS messages for individuals.

Keywords: Machine Learning, SMS, Spam Detection, Text Mining

I. INTRODUCTION

In the most recent decade the consistent development of the spam marvel, to be specific the mass conveyance of spontaneous messages, essentially of business nature, yet in addition with hostile substance, has turned into a principle issue of the SMS benefit for Internet specialist co-ops (ISP), corporate and private clients. Late reviews revealed that more than 60% of all SMS movement is spam. Spam causes SMS frameworks to encounter over-burdens in speed and server stockpiling limit, with an expansion in yearly cost for partnerships of more than several billions of dollars. Furthermore, phishing spam messages are a genuine danger for the security of end clients, since they attempt to persuade them to surrender individual data like passwords and record numbers, using parody messages which are taken on the appearance of originating from trustworthy on-line organizations, for example, establishments. Despite the fact that it is generally trusted that an adjustment in Internet conventions can be the successful answer for the spam issue, it is recognized that cannot be accomplished in a brief timeframe. Various types of arrangements have in this manner been proposed up until this point, of conservative, authoritative (for instance the CAN-SPAM act in the U.S.) and innovative nature. The last specifically comprises of the utilization of channels introduced at ISP email servers or on the customer side, whose point is to distinguish and naturally erase, or fittingly deal with, spam messages. Server-side channels are considered to be important to lighten the spam issue (Geer, 2004; Holmes, 2005), notwithstanding their disadvantages: for example they can prompt transfer speed over-burden since they work at the recipient side. At first, hostile to spam channels were basically in view of catchphrase discovery in email's subject and body. Be that as it may, spammers efficiently acquaint changes with the qualities of their messages to dodge channels,

which thus push the development of spam channels towards more mind boggling techniques. Traps utilized by spammers can be subdivided into two classes. At the vehicle level, they misuse vulnerabilities of mail servers (like open transfers) to stay away from sender distinguishing proof, and include counterfeit data or blunders in headers. At the substance level, spammers utilize content darkening procedures to stay away from programmed discovery of average spam catchphrases, for instance by incorrect spelling words and inserting HTML labels inside words. At present, spam channels are comprised of various modules which dissect a diverse highlights of messages (to be specific sender address, header, content, and so on).

II. RELATED WORK

Spam refer to the term, which is related to undesired content with low quality information, [1]. Spam referred to the major drawback of mobile business. When comes to the spam detection in campus network[3]they done the analysis using Incremental Learning. For Collecting Spam detection on web pages [4]. Moreover Sending out of Spam messages was also analyzed under [5]. Data Collection was done privately by a limited company. From the data Collection. There also antispam filter system evolved. Many parallel and distributed computing system has also processed this spam system. Machine learning algorithm provides accurate result. Text Mining done separates ham and spam separately.

III. METHODOLOGY

A. Text Mining

Text mining, conjointly spoken as text data processing, roughly corresponding to text analytics, is that the method of account high- quality data from text. High-quality data is often derived through the fashioning of patterns and trends through suggests that like applied mathematics pattern learning. Text mining sometimes involves the method of structuring the input text (usually parsing, at the side of the addition of some derived linguistic options and also the removal of others, and sequent insertion into a database), derivation patterns among the structured information, and at last analysis and interpretation of the output. 'High quality' in text mining sometimes refers to some combination of connection, novelty, and powerfulness. Typical text mining tasks include text categorization, text clustering, concept/entity extraction,

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Accident Prevention By Eye-Gaze Tracking Using Imaging Constraints

Dr.M.Amanullah, R.Lavanya.

Abstract: This paper comes as a response to the fact that, more and more accidents are caused by people who fall asleep at the wheels. Eye tracking is one of the most important aspects in driver assistance systems, tracking an eye plays a major role as eyes hold more information about gaze, attention and fatigue level of drivers. This plays a vital role in the ADAS systems. The number of times the driver blinks will be taken into account for identification of the driver's drowsiness. The direction of where the driver is looking will be estimated according to the location of the driver's eye gaze. The developed algorithm was implemented using Open-CV in order to create a portable system. This system is designed with alarm indication to wake up the driver on the wheels using the buzzer and the vibrator attached to the steering wheel. If the person is inebriated, the vehicle would stop.

Keywords: fatigue, inebriated, soberness, ADAS, drowsiness, Open-CV

I. INTRODUCTION

A report by WHO (World Health Organization) shows that about 1.56 million people die as a result of road accident around the world[1]. The US National Highway Traffic Safety Administration (NHTSA) estimated that fatigue driving was a factor in 2.2-2.6 percent of total fatal crashes annually during the period through 2009-2013[2]. There are many studies related to the advance driver assistance system. However most researches focuses on collision avoidance and drug intake. There are less developed systems for monitoring status of driver. In this paper, the status of driver is measured through eye gaze tracking[1]. This paper has used Open-CV (Open Source Computer Vision) Library to incorporate Image Processing into a wide variety of coding languages. It has C++, C, and Python interfaces running on Windows, Linux, Android and Mac. In the existing system, there are no effective methods to identify or to monitor the driver's fatigue or sleep level. Most of the tragic accidents in highways are occurring mainly due to the drowsiness of drivers. In existing systems, the alcohol meter is used to test driver's status while driving. But it is used to test only the person who is inebriated and it can't control the driver's sleep or fatigue related accidents. There are no techniques used to find the concentration of human while driving[4]. Object Detection using Haar cascade classifiers based approach is effective object detection. This approach is based on machine learning where a cascade function is trained with a number of positive images and negative images[7]. Then the trained images are used to detect other images which are captured in real-time. The image detection here is used with face detection, especially with eyes. Initially, the classifier is trained with a large number of positive image and negative image by using the algorithm.

Then it is necessary to extract features from it. The lack of concentration of drivers are also lead to accidents, the eye images are detected even when not facing with wind shield and talking to next person for a long time. Then the driver is alerted while driving.

II CAUSE OF ACCIDENTS

Distracted drivers are the main cause of accidents. Distracted drivers are the ones whose attention gets diverted from the road due to mobile phones, conversing with the person beside. They get distracted even by the roadside fights or any other political meetings[13]. By concentrating on these issues the drivers collide with other vehicles. Distracted driving result in horrific accident. Our research work presents the idea to keep the drivers alert without getting distracted. A driver's state of vigilance can also be characterized by indirect vehicle behavior lateral position, steering wheel movement time to line crossing[3].

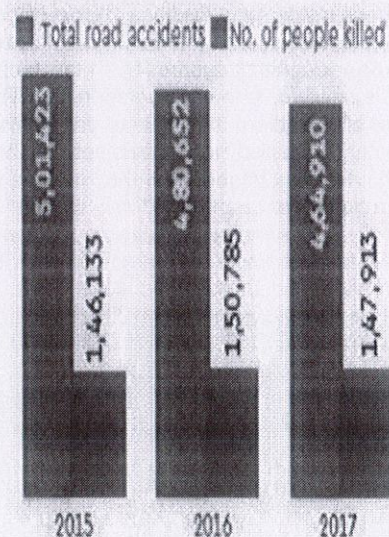


Figure 1. Statistics of road accidents

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III EXISTING SYSTEM

In existing system, there is a lack of techniques to sense fatigue level of drivers. This leads to drowsiness of the



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Effect of laser remelting on the microstructure and mechanical properties of meta inert gas welded low carbon mild steel

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In this study, laser remelting has been performed on the Metal Inert Gas welded (MIG) low carbon mild steel at varying laser power inputs (400 W & 600 W). To investigate the influence of laser remelting on the joint properties, optical microscope observation, scanning electron microscope observation, microhardness measurement and mechanical tests have been conducted. The experimental results revealed that the surface appearance of the laser remelted MIG welded joints have been found to be smooth and the microstructure of its fusion zone possesses fine equiaxed dendrites as compared with that of the MIG welded joints. In addition, the fracture surface of the laser melting carried at low power (400 W) on the MIG welded joint has exhibited a ductile fracture whereas, the MIG welded joint has undergone brittle fracture. The laser remelting carried out at 400 W on the MIG welded joint has resulted in 12% increase in both the ultimate tensile strength and percentage of elongation as compared to that of the MIG welded joint and this has been ascribed to the presence of equiaxed grains in the microstructure.

Keywords: Laser remelting, Microstructure; Hardness, Tensile test, Fractography

1 Introduction

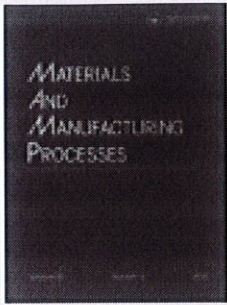
Metal Inert Gas welding (MIG) has been traditionally employed for joining low carbon mild steel which is being often used in the construction of bridges, ships and automobile applications¹⁻⁵. Previous studies have revealed that the toughness of the weldment is greatly reduced by the formation of more than 77% ferrite phase in the low carbon mild steel⁶. Besides, the mechanical properties of the arc welded joints were affected due to the presence of coarse grains and wider heat affected zone^{7,8}. Hence, refinement of grains in the weldment is of prime importance. Several grain refinement techniques such as weld pool stirring, electromagnetic stirring, ultrasonic vibration, Arc pulsation and Arc oscillation are available to counteract the above effect⁹⁻¹¹. Jia Liu *et al.* have performed ultrasonic vibration in Laser-MIG hybrid welding and observed a significant refinement in the microstructure which in turn has led to the higher tensile strength of the joint¹². The treatment of the pulse current on the Gas Metal Arc Welded Joints has restrained the dendritic growth resulting in fine grains¹³. The microstructure of AZ series Mg alloys welded by arc welding with or without ultrasonic vibration is studied and the

mechanisms of grain refinement in the welding process are discussed in detail¹⁴. The influence of various process parameters like the Voltage applied, Current, Welding speed have been studied extensively and the various response output obtained based on its microstructure, fatigue resistance have been critically assessed by Rishav Sen *et al.*¹⁵. The research work carried out by Gural *et al.* have suggested that the increase in welding parameters, such as Heat Input and Welding speed can also results in the formation of equiaxed grains¹⁶. Senthil kumar *et al.* have demonstrated that the presence of equiaxed grains in the microstructure of welded AA 6061 Aluminium has led to significant improvement in the tensile strength¹⁷. Most recent work carried out by Devandranath Ramkumar *et al.* have demonstrated that the low energy shock peening carried out in the Haste alloy C-276 welds have resulted in the remarkable improvement of tensile strength of the welded joints by shifting the location of tensile failures away from the fusion zone¹⁸. Despite, several routes are available to refine the microstructures of the weldments; laser surface remelting can be considered as the best technique as it has received much attention in modifying the surface of plasma sprayed ceramic coatings. For instance, it is obvious from various studies that the laser remelting plays a

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Selective laser ablation of CFRP composite to enhance adhesion bonding

Ramkumar Sathiyamurthy & Muthukannan Duraiselvam

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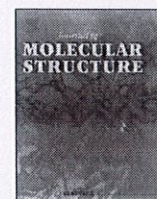
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Mixed ligand ternary complexes of Co(II), Ni(II), Cu(II) and Zn(II) and their structural characterization, electrochemical, theoretical and biological studies

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ABSTRACT

This research work was emphasized about synthesis of mixed ligands of Co(II), Ni(II), Cu(II) and Zn(II) complexes of the type [M(L)(phen)] **1–4** and [M(L)(bpy)] **5–8** where, L = potassium (S, E)-2-((5-bromo-2-hydroxybenzylidene)amino)propanoate (derived from 5-bromosalicylaldehyde and L-alanine), phen = 1, 10 phenanthroline and bpy = 2, 2'-bipyridyl. Both phen and bpy act as an auxiliary ligand. The synthesized metal(II) complexes characterized by a spectral technique like CHN analysis, electronic spectroscopy, FT-IR, NMR, ESI-Mass spectrometry, EPR, Powdered X-ray diffractometry, and cyclic voltammetry. From spectral arguments, the geometry of complexes displayed five coordination through Schiff base ligand (ONO) and diimine (NN) donor and expected to give the distorted square pyramidal geometry around metal atoms. *In vitro* cytotoxicity of the Cu(II) complexes (**3** and **7**) were checked by MTT assay towards three cancer cell lines such as human lung cancer (A549), cervical cancer (HeLa), human breast cancer (MCF-7) and one normal cell line like nontumorigenic human dermal fibroblast cell line (NHDF). The cell viability of those complexes showed an only a moderate effect on cancerous cells when compared with the drug cisplatin. In the molecular docking studies, all the metal(II) complexes showed hydrogen bond, hydrophobic and π - π stacking interaction with active sites of human thymidylate synthase receptor. Furthermore, Frontier molecular orbital analysis (HOMO-LUMO) was accomplished by Density functional theory using B3LYP/3-21G** basis sets to understand the chemical stability of the complexes.

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1. Introduction

Transition metal complexes play an important role and own significant biological activities against pathogens, diabetes, and cancer [1–3]. A recent development of many Schiff bases and its complexes showed multiple applications in the field of pharmacology, material science, photochemistry [4] and electrochemistry [5]. The metal based Schiff base compounds finer inhibition against tumor cells, which have been attracted by many pharmacologists and bioinorganic chemists' interest being the success of platinum centered antitumor agents [6–8]. Among various metal complexes, researchers ideally chosen on copper centered metal complexes for cytotoxicity due to their greater stability, physiological activities

and less toxic in nature.

It is understandable that Schiff base containing metal complexes considered important chelates because they're the easiest way of synthesis and also characterized both chemically and thermally stable compounds. Among them, metal complexes, Schiff based metal(II) complexes achieved to a great extent because of their use as models in varied biological systems [9–11]. Mostly, the Schiff base ligands favor coordination towards dissimilar metals and capable of stabilizing various oxidation states. Besides amino acid based Schiff base is of massive attention by reason of their potential activity and distinct biologic importance [12–16]. Transition metal(II) complexes with Schiff bases derived from a choice of aldehydes and amines have been investigated in various biological fields [17–23]. However, only moderate attention has been found system acquiring amino acid based Schiff bases [24–27].

In order to develop a new series of mixed ligand ternary complexes, we have synthesized Cu(II), Ni(II), Co(II) and Zn(II) Schiff

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