3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the Academic year 2021-2022

Title of paper	Name of the author/s	Department of the teacher	Name of journal
Semi-circular corrugated tabs to control subsonic and correctly expanded sonic jets	Dr. K. Sathish Kumar	Aeronautical Engineering	Aircraft Engineering and Aerospace Technology
Numerical investigation of critical lip thickness of subsonic co-flowing jet	Dr. K. Sathish Kumar	Aeronautical Engineering	Aircraft Engineering and Aerospace Technology
Effect of carbon/Kevlar reinforcement and hybrid order on mechanical properties of glass/epoxy composites	Dr. C. R. Raajeshkrishna	Aeronautical Engineering	Advances in Materials and processing Technologies
CFD analysis on grid fins to enhance safe booster relanding system	Mr. R. KousikKumaar	Aeronautical Engineering	International Journal of Scientific and Engineering Research
Numerical analysis of supersonic co-flow jet with varying lip thickness	Dr. K. Sathish Kumar, Dr. B.R Senthil Kumar	Aeronautical Engineering	Aircraft Engineering and Aerospace Technology
Tribological behavior of AA7168 hybrid composite sheets for aerospace structures fabricated through COMPO casting	Ms. A. Senthamilselvi	Aeronautical Engineering	Advances in Materials and Processing Techniques
Effects of high temperature wear and corrosion behavior of sintered titanium reinforced with vanadium particle	Dr. P. Maniarasan Ms. A. Senthamilselvi	Aeronautical Engineering	Digest Journal of Nano materials and Bio structures
Synthesis of silver Nanoparticles Through Orange Peel Powder for Antibacterial Composite Filler Application	Dr. S. Rathinavel	Aeronautical Engineering	Journals of Polymers and the Environment
Designing of Typical Slithering Platform for Helicopter Using Composite Materials	Dr. R. Ramaswamy Dr. P. Maniarasan Mr. S. Balaji Mr. P. Karthikeyan	Aeronautical Engineering	Vidya Bharathi International Interdisciplinary Research Journal

Numerical Simulation of Shock Induced Mixing of Fuel and air in the Scramjet Combustor	Mr. J. Karthikeyan	Aeronautical Engineering	Vidya Bharathi International Interdisciplinary Research Journal
Characterization of Prickly Pear short fiber and Red Onion Peel Biocarbon Nano-Sheets Toughened Epoxy Composites	Dr. R. Ramaswamy	Aeronautical Engineering	Polymer Composites
Effect of Black Rice Husk Ash Biosilica on Mechnaical, Wear and Fatique behavior of Stacked Aloevera / Roselle and Glass Fibre Reinforced Epoxy Composites	Dr. R. Ramaswamy	Aeronautical Engineering	Polymer Composites
Investigating Mechanical Properties of Hybrid Polymer Composite Reinforced with S-Glass and Luffa Fibres	Dr. S. Selva Kumar	Aeronautical Engineering	Journal of Physics – Conference Series
Optimization and Prediction of Tribological Behaviour of Al-Fe-Si Alloy Based Nano Grain Refined Composites Using Taguchi With Response Surface Methodology	Dr. S. Balaji Dr. P. Maniiarasan	Aeronautical Engineering	Journal of Nano Materials
Investigations on Wear Behaviour of Aluminium Composites at Elevated Temperature	Dr. B.R. Senthil Kumar	Aeronautical Engineering	Advances in Materials Science and Engineering
Micro Structure and Mechanical Behaviour of Ti-6Al-4V Matrix Reinforced with WCp Developed by Squeeze Casting	Dr. B.R. Senthil Kumar	Aeronautical Engineering	Journal of Nano Materials
Investigation of Mechanical and Tribological Properties of AA6061/Gr Composties for Solar Header Pipes	Dr. B.R. Senthil Kumar	Aeronautical Engineering	Engineering Research Express
Enactment of Firefly Algorithm and Fuzzy C-Means Clustering For Consumer Request and Demand Prediction	Mr.M.Madan Mohan	computer science and engineering	International Research Journal of Engineering and Technology (IRJET)
Survival Study On Load Balancing Methods In Edge Computing With Healthcare Data	Mr.M.Madan Mohan	computer science and engineering	International Journal of Mechanical Engineering
A Wrapper based feature extraction framework based on AlexNet deep convolutional neural network parameters optimized using gradient-based optimizer for mammogram images	Dr N K Sakthivel	computer science and engineering	Concurrency Computat Pract Exper. Wiley
Influence of Advanced Blockchain Technology on digital health intervention	Dr N K Sakthivel	computer science and engineering	Bulletin of Environment, Pharmacology and Life Sciences

Selection of Optimal Thresholds in Multi-Level Thresholding Using Multi-Objective Emperor Penguin Optimization for Precise Segmentation of Mammogram Images¤	Dr S Subasree	computer science and engineering	Journal of Circuits, Systems, and Computers
A Wrapper based feature extraction framework based on AlexNet deep convolutional neural network parameters optimized using gradient-based optimizer for mammogram images	Dr S Subasree	computer science and engineering	Concurrency Computat Pract Exper. Wiley
Influence of Advanced Blockchain Technology on digital health intervention	Dr S Subasree	computer science and engineering	Bulletin of Environment, Pharmacology and Life Sciences
IoT based artificial intelligence indoor air quality monitoring system using Enabled RNN Algorithm Techniques	Mr.R.Senthilkumar	computer science and engineering	Journal of Intelligent & Fuzzy Systems
An Advanced Health Monitoring device for treating chronic diseases using IOT	Mr.A.Wasim Raja	computer science and engineering	IJME
Enactment of Firefly Algorithm and Fuzzy C-Means Clustering For Consumer Request and Demand Prediction	Mr. S. VENKATESH	computer science and engineering	International Research Journal of Engineering and Technology (IRJET)
Selection of Optimal Thresholds in Multi-Level Thresholding Using Multi-Objective Emperor Penguin Optimization for Precise Segmentation of Mammogram Images¤	Dr N K Sakthivel	computer science and engineering	Journal of Circuits, Systems, and Computers
Optimally detecting and classifying the transmission line fault in power system using hybrid technique	R.Kannan	Electrical and Electronics Engineering	ISA Transaction
Cross-Slice Radio Resource Optimization In An LTE-A Network Based On Owl Search Algorithm	R.Kannan	Electrical and Electronics Engineering	International Journal of Aquatic Science
Hybrid Renewable Energy fed Electric Vehicle Charging Station	R.Kannan	Electrical and Electronics Engineering	IEEE Explore
Optimal Design for Super Capacitor/Battery Power Management Applied in Electric Vehicle Applications : A Hybrid Methodology	R.Kannan	Electrical and Electronics Engineering	IETE Journal of Research
A new swarm intelligence optimization approach to solve power flow optimization problem incorporating conflicting and fuel cost based objective functions	Dr. S.Sakthivel, Dr L Jebaraj	Electrical and Electronics Engineering	e-Prime - Advances in Electrical Engineering, Electronics and Energy

Hybrid Bat Optimization Algorithm Applied to Optimal Reactive Power Dispatch Problems	Dr. S.Sakthivel Dr S Jaya	Electrical and Electronics Engineering	SSRG International Journal of Electrical and Electronics Engineering
Automation of Home Appliances using Advanced Light Control System	Dr.R.Anand	Electrical and Electronics Engineering	International Journal on Applications in Electrical and Electronics Engineering
Efficient Consumption of Renewable Energy using Vehicle to Grid Technology	Mrs.P.S.Meenambikai, Mr.R.Prem Kumar, Dr.R.Anand	Electrical and Electronics Engineering	International Journal on Applications in Engineering and Technology
Comparative Analysis of EMG Activity of Upper Limb Muscle Duringerent Yoga Poses	A.Arulkumar	Electrical and Electronics Engineering	International Research Journal of Engineering and Technology (IRJET)
QoS- aware Multi-objective PSO-FA based Optimizer for Uplink Radio Resource Management of LTE-A Network	Dr. M.Mano Raja Paul	Electrical and Electronics Engineering	IEEE Explore
Cross-Tier Interference Avoidance Prioritized Dynamic Resource Allocation Algorithm in Coexistence of MTC and LTEA Networks	Dr. M.Mano Raja Paul	Electrical and Electronics Engineering	NVEO Journal
Ultra-Wideband Flexible and Wearable Textile Antenna for Predicting Breast Cancer	Dr. M.Mano Raja Paul	Electrical and Electronics Engineering	IEEE Explore
Content Protection System using Matching Object for cloud based Multimedia	Dr.V.Jayaraj, T.Prabu, S.Mohan	Electronics and Communicatio n Engineering	International Journal on Applications in Engineering and Technology
A Review of Graphical Password Strategy in Smart Android Phones	Dr.V.Jayaraj, K.Nagarajan, T.Prabu , S.Mohan	Electronics and Communicatio n Engineering	International Journal on Applications in Information and Communication Engineering
VLSI usage of productive MBIST architecture utilising RLFSR	Mrs.K.Sivakami	Electronics and Communicatio n Engineering	ICTACT Journal of Microelectronics
Formulation and Ex-Vivo Evaluation of Naproxen Emulgel by Skin Irritation Test	Dr.M.A.Raja	Electronics and Communicatio n Engineering	Latin American Journal of Pharmacy

Iterative Tree Based Adaptive Threshold Techniques for Large MIMO System	Dr.R.Deepa	Electronics and Communicatio n Engineering	International Journal of Research Publication and Reviews
Contourlet Transform for Speckle Denoising	Dr.V.Jayaraj , K.Nagarajan	Electronics and Communicatio n Engineering	International Journal on Applications in Engineering and Technology
Multilevel Redundant Discrete Wavelet Transform (ML-RDWT) and optimal Red Deer algorithm (ORDA) centred approach to mitigate the effect of ICI, BER and CIR in a MIMO-OFDM System	Mr.K.Nagarajan	Electronics and Communicatio n Engineering	Wireless Personal Communications
A study on challenges faced by academicians in virtual work culture in higher education	Dr.S.Shanthi	MBA	International Journal of Multidisciplinary Educational Research (IJMER)
Emotional Intelligence of Employees at workplace	Dr.S.Shanthi	MBA	Dogo Rangsang Research Journal
A Study on Quality of Worklife Balance among Teachers during Pandemic in Thanjavur District	Dr.S.Shanthi	MBA	Dogo Rangsang Research Journal
GIG Economy In India	Dr A Vignesh	MBA	International Journal of Multidisciplinary Educational Research (IJMER)
Emotional Intelligence of Employees at workplace	Mrs. R. Yasodha	MBA	Dogo Rangsang Research Journal
Investigations on solar powered mechanical grass mower for agricultural applications	Dr.S. Jeevanantham, Dr.K.Anganan, Mr.S.Nishanth,Mr.Prave en.C. P	Mechanical Engineering	Journal of Fundamental & Comparative Research
Investigations on designing semi-automatic harvesting machine for root vegetables	Dr.V.M.M.Thilak, R.VinothKumar, A. Nandagopal, P.Bagyalakshmi	Mechanical Engineering	Journal of Fundamental & Comparative Research
Naphtholylimino-tether on β-cyclodextrin: Selective G-quadruplex DNA binding	Dr. Y. Sameena	Scince and Humanities	Journal of molecular structure
Differential interaction of Fluorescein-β-cyclodextrin conjugate to quadruplex *kit22* DNA: Inclusion of Berberine and modulation of binding	Dr. Y. Sameena	Scince and Humanities	Journal of Biomolecular Structure and Dynamics

Advances in CO2 Capture using Absorption and Adsorption Technology: A Review	Dr. R.Saravanakumar	Scince and Humanities	Journal of Emerging technologies and Innovative Research
Role of Purged Air in the Synthesis of the Mesoporous NiO/C Composite and Its Application in Wastewater Treatment	Dr. R.Saravanakumar & Dr. N. Sathiya priya	Scince and Humanities	Water, Air, & Soil Pollution
Environmental Aesthestics Displayed through God's pupose and Elevation of Nature through bibilical images	Susmi Mariam Varghese	Scince and Humanities	TIERARZTLICH E PRAXIS
Neutrosophic gpr Continuity and Neutrosophic Contra gpr Continuity in Neutrosophic Topological Spaces	K. Ramesh	Scince and Humanities	Strad Research
Microwave-Assisted hybridised WO3/V2O5 rod shape nanocomposites for electrochemical supercapacitor applications	Dr P.Periasamy	Scince and Humanities	Inorganic Chemistry communications
Structural, thermal, optical and dielectric studies of V2O5@WO3 nanocomposites prepared by microwave-assisted hydrothermal method	Dr P.Periasamy	Scince and Humanities	Applied Physics
Electronic, NLO, computational and interaction analyses of DAPVMPTFB crystals for electro-optics and electronic industrial utilities	Dr P.Periasamy	Scince and Humanities	Inorganic Chemistry communications
Cu2+ substituted Cr2O3 nanostructures prepared by microwave-assisted method: an investigation of its structural, morphological, optical, and dielectric properties	Dr.S.Shalini Packiam Kamala Dr P.Periasamy N. Sathiya priya	Scince and Humanities	Journal of Sol-gel Science and technology
Structural and electrochemical investigation of novel hybridized MnO2/V2O5 nanocomposites prepared by one-step microwave-assisted method for electrochemical supercapacitor application	Dr P.Periasamy	Scince and Humanities	Journal of Materials Science: Materials in Electronics
Enhanced properties of Zn2+ substituted Cr2O3 nanoparticles in escalating the distillate yield of acrylic pyramid solar still	Dr P.Periasamy	Scince and Humanities	Materials Today proceedings
Oscillatory Behavior of Nonlinear Fourth Order Mixed Neutral Difference Equations	Mrs. M. Buvanasankari	Scince and Humanities	Strad Research, UGC Care Group II Journal
Molecular encapsulation by eosin yellow-β-cyclodextrin conjugate: Differential binding to quadruplex and duplex DNA	Dr. Y. Sameena	Scince and Humanities	Journal of molecular structure

Mechanical and wear behaviour of TiB2-B4C reinforced Al7075 alloy hybrid composites for aerospace applications	Dr.SP.Arunkumar	Mechatronics Engineering	Advances in Materials and Processing Technologies
Investigating the effect of thermal cycling on thermal characteristics of the nano-silica based phase changing material (PCM)	Dr.SP.Arunkumar	Mechatronics Engineering	Materials Today Proceedings
Taguchi optimization of metal inert gas (MIG) welding parameters to withstand high impact load for dissimilar weld joints	Dr.SP.Arunkumar	Mechatronics Engineering	Materials Today Proceedings
Water in waste-derived oil emulsion fuel with cetane improver: Formulation, characterization and its optimization for efficient and cleaner production	Dr.SP.Arunkumar	Mechatronics Engineering	Fuel Processing Technology

Semi-circular corrugated tabs to control subsonic and correctly expanded sonic jets

Sathish Kumar K.
Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India
Senthilkumar Chidambaram
Department of Aerospace Engineering, Madras Institute of Technology, Chennai, India, and
Naren Shankar Radha Krishnan
Department of Aeronautical Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology, Chennai, India

Abstract

Purpose – This paper aims to present the jet mixing effectiveness of triangular tabs with semi-circular corrugations to control the subsonic and sonic correctly expanded jets.

Design/methodology/approach – Three semi-circular corrugated triangular tabs (Tab A, Tab B and Tab C) of equal blockage 5.11% are used, in which the corrugation locations on the tabs are varied. The offset distance between the semi-circular corrugations at the leaned edges of the triangular tabs are 0.0, 0.75 and 1.5 mm for the Tabs A, B and C, respectively. Two identical semi-circular corrugated tabs has been placed exactly 180° apart at the exit of the convergent nozzle. The pitot pressure measurements were taken to study the jet mixing characteristics of the tabs for the jet exit Mach numbers of 0.6, 0.8 and 1.0, and it is compared with the free jet.

Findings – The jet centerline pitot pressure decay reveals that, Tab A is very effective than Tab B and Tab C. For the jet exit Mach numbers of 0.6, 0.8 and 1.0, the potential core reduction for the Tab A is found to be 69.1%, 69.7% and 70.8%, respectively, when compared with the free jet.

Practical implications – The semi-circular corrugated triangular tabs were found to be more effective than the plain triangular tabs of equal blockage ratio for reducing the core length with minimum thrust loss.

Originality/value – The offset distance of the semi-circular corrugations are varied along the leaned sides of the triangular tabs, which is the novelty of this study.

Keywords Fluid dynamics, Flow control, Vortices, Corrugations

Paper type Research paper

Nomenclature

3D	= three dimensional;
D_i	= inlet diameter of the nozzle;
D_e	= exit diameter of the nozzle;
L	= length of the nozzle;
M_e	= jet exit Mach number;
p_{0s}	= total pressure in settling chamber;
p_{0t}	= total pressure measured by the pitot probe;
X/D_e	= normalized axial position;
Y/D_e	= normalized radial position in Y-direction;
Z/D_e	= normalized radial position in Z-direction;
$\% \Delta L$	= percentage decrease in potential core; and
ΔL	= potential core length.

1. Introduction

Research on high-speed jet control is of primary significance to aerospace as well as in other analogous fields. Jet is controlled for the following necessary reasons: to reduce the jet associated noise of the jet engine; to improve the combustor performance by enhancing the jet mixing with the surrounding air; to reverse the thrust direction of an aircraft during landing phase; and to control the rocket motor direction by thrust vector control. Jets can be controlled by two possible means, i.e. active control and passive control.

In this article, the jet is controlled by adopting one of the passive control techniques, i.e. by introducing the tabs at the exit of the convergent nozzle. A tab is a solid strip inserted into the passage of the flow to produce large and small-scale vortices. The vortices which are counter rotating affect the jet flow development and mass entrainment. Mass entrainment is the process of bringing the fluid mass from the ambient into the jet. In this regard, three semi-circular corrugated triangular tabs (Tab A, B and C) were used in which the semi-circular corrugations locations are varied for the study. The semi-circular corrugations are positioned on the equally leaned sides of isosceles trilateral (triangular) tabs placed exactly 180° apart

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Numerical investigation of critical lip thickness of subsonic co-flowing jet

Naren Shankar R. and Ganesan V.G.
Department of Aeronautical Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology, Chennai, India
Dilip Raja N.
Department of Mechanical Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology, Chennai, India
Sathish Kumar K.
Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India, and
Vijayaraja K.
Department of Aeronautical Engineering, KCG College of Technology, Chennai, India

Abstract

Purpose – The effect of increasing lip thickness (LT) and Mach number on subsonic co-flowing Jet (CFJ) decay at subsonic and correctly expanded sonic Mach numbers has been analysed experimentally and numerically in this study. This study aims to a critical LT below which mixing enhances and above which mixing inhibits.

Design/methodology/approach – LT is the distance, separating the primary nozzle and the secondary duct, present in the co-flowing nozzle. The CFJ with LT ranging from 2 mm to 150 mm at jet exit Mach numbers of 0.6, 0.8 and 1.0 were studied in detail. The CFJ with 2 mm LT is used for comparison. Centreline total pressure decay, centreline static pressure decay and near field flow behaviour were analysed.

Findings – The result shows that the mixing enhances until a critical limit and a further increase in the LT does not show any variation in the jet mixing. Beyond this critical limit, the secondary jet has a detrimental effect on the primary jet, which deteriorates the process of mixing. The CFJ within the critical limit experiences a significantly higher mixing. The effect of the increase in the Mach number has marginal variation in the total pressure and significant variation in static pressure along the jet axis.

Practical implications – In this study, the velocity ratio (VR) is maintained constant and the bypass ratio (BR) was varied from low value to very high values for subsonic and correctly expanded sonic. Presently, commercial aircraft engine operates under these Mach numbers and low to ultra-high BR. Hence, the present study becomes essential.

Originality/value – This is the first effort to find the critical value of LT for a constant VR for a Mach number range of 0.6 to 1.0, compressible CFJ. The CFJs with constant VR of unity and varying LT, in these Mach number range, have not been studied in the past.

Keywords Co-flowing jet, Lip thickness, Subsonic, Constant velocity ratio, Varying static pressure, Mach number

Paper type Research paper

Notation

ΔL_{pcl}	= Percentage reduction in Potential Core Length;
Δfall	= Percentage fall in total pressure in Influential Wake Zone;
ΔPs_{fall}	= Percentage fall in static pressure below atmosphere;
ΔPs_{rise}	= Percentage rise in static pressure above atmosphere;
$A_{primary}$	= Primary jet area;
bar	= Unit of pressure;
BPR	= Bypass Ratio;
CDR	= Characteristic Decay Region;
CFJ	= Co-Flowing Jet;
CFL	= Courant-Friedrichs-Lewy;
CLSP	= Centreline Static Pressure;
CLTP	= Centreline Total Pressure;
D_p	= diameter of the primary jet;
$(d_i)_{secondary}$	= Secondary jet inner diameter;
$(d_o)_{secondary}$	= Secondary jet outer diameter;
FDR	= Fully Deformed Region;
FMZ	= Fully Merged Zone;
IMZ	= Initial Merging Zone;
IWZ	= Influential Wake Zone;
IZ	= Intermediate Zone;
LT	= Lip Thickness;
M	= Mach number;

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RESEARCH ARTICLE

Effect of carbon/kevlar reinforcement and hybrid order on mechanical properties of glass/epoxy composites

D. Saravanan [a], G. Gokilakrishnan [b] and C.R. Raajeshkrishna [c]

[a]Department of Mechanical Engineering, Sir Vishveshwariah Institute of Science and Technology, Angallu, Madanapally Andhra Pradesh, India; [b]Department of Mechanical Engineering, Sri Eshwar College of Engineering, Coimbatore Tamilnadu, India; [c]Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India

ABSTRACT

Materials with high strength to weight ratio are the prime focus in material development research. These lightweight materials can replace the conventional high-density materials. The mechanical properties of epoxy laminates produced from woven reinforcements (glass, kevlar, and carbon) and their hybrid configurations (sandwich, intercalated) are examined in the current study. The composites were made using hand layup and compression moulding and are sliced into coupons and characterized as per ASTM standards and the influence of different reinforcements and their hybrid arrangement on tensile, hardness, and impact parameters evaluated and reported. The result shows the carbon epoxy laminates have the highest tensile strength, while kevlar epoxy laminates have the highest impact strength. The positive response on hybridization is noted, in particular, sandwich hybrids shows better properties compared to intercalated hybrids. The composites with the higher tensile strength fibers in the outermost layer account for elevated mechanical properties. The fiber and lamina morphology on the manufactured and fractured specimens was further investigated using the field emission scanning electron microscopy (FESEM) technique. The investigation reveals improved adhesion in the specimens. The fractured specimen shows delamination, fiber pullout (voids), and broken fibres which lower the properties of the composites.

ARTICLE HISTORY
Accepted 5 August 2021

KEYWORDS
Carbon; glass; kevlar; epoxy; hybrid composites; mechanical properties

1. Introduction

The excellent physio mechanical properties of the fibre reinforced epoxy composites paved the way for the structural applications in aerospace, automotive, sport goods, etc [1,2]. The techniques have also been recommended to minimalise the weight of the structural components in the airplanes by employing fibre reinforced epoxy composites [3]. Because of its strong bonding, physicochemical, thermal, mechanical, dielectric, and ageing qualities, epoxy is generally acknowledged matrix material for production of advanced composites, hardware components, electrical-circuit board materials, and ballistic missiles. The most common synthetic fibres are aramid, glass, polyethylene,

CONTACT C.R. Raajeshkrishna Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Nehru Gardens T.M Palayam, Coimbatore 641 105, Tamilnadu, India rajesh17171@gmail.com

CFD ANALYSIS ON GRID FINS TO ENHANCE SAFE BOOSTER RELANDING SYSTEM

S. PREETHI
Nehru Institute of Engineering and Technology, TM Palayam, Coimbatore, Tamilnadu, India
vanisasit@gmail.com
Mr. R. KOUSIK KUMAAR. M.Tech.,(PhD)
Assistant professor, Nehru Institute of Engineering and Technology, TM Palayam, Coimbatore, Tamilnadu, India
nietkousik@nehrucolleges.com

ABSTRACT

In the Boosters Relanding System, the grid fins are used to slow down the boosters safely. The grid fins structure plays a major role to reduce the velocity of rocket boosters. During the boosters relanding the grid fins creating turbulence when air passing through that. Because of this effect, the reduction of velocity will happen. In this project, the grid fins structure going to change to create more turbulence to reduce the velocity of the boosters during relanding. This structure to be analyzed by ANSYS 2021 R1 (Fluent) software to choose a suitable structure for the effective landing purpose. By the natural occurrence of turbulence will reduce the additional source wastages. Through inserting a tapered kind of grid fins will be useful to generate much drag during relanding. When the area is reduced then the pressure will increase. By designing the grid fins structure with wide opening and narrow exit (convergent nozzle) will produce more pressure at exit. While achieving more pressure, the drag will be automatically generated to cause the boosters to slow down. This project also concentrates on developing rocket boosters to reland safely so that we can achieve reducing cost, reducing manufacturing, time duration, manpower that simultaneously reduces the 50% of a cost per launch currently CPL of PSLV costs 130 crores in Indian rupees, this project reduces the CPL to 60 crores. Applying this concept will achieve an effective reland and also can use the boosters at least 6 times instead of manufacturing the new boosters.

Keywords – grid fins, relanding system, analysis, fluent

I. INTRODUCTION

The recent use of advanced Lattice grid fins is in the Heavy Falcon9 rocket, in research; it appeared that the purpose use of grid fins in the rocket as an aerodynamic braking device on the re-entry of a rocket from the space to an enhanced precious landing. The fundamental part design of the lattice grid fins allows a large amount of lifting surface to be hinged along the body of the missile with a retracting movement, which can be folded to the surface in the order to reduce the space consumption compared to the conventional plane surface design. The modern grid fins is a compact design of a control surface that promises good storability for potential tube-launch and internal carriage dispenser-launched applications. The arrangement of the internal framework of grid fins merits with high strength to weight ratios, The chord dimension with the zero hinge moment and with a small center of pressure varies over a different range of Mach number with reduces the control actuator requirement In past years, since the release of the Russian book about grid fin, this topic came with intensive investigations in the scientific community working on missile technology. Several studies carried on lattice wing some NATO countries like the USA, UK, Canada, France, and Germany.

DESIGNING PROCESS

This work approaches the software that is SOLID WORKS 2015 for designing process.

DESIGN PARAMETERS

Table 2.1Geometric details grid fins

Body length	366.0 mm
Body diameter (Ref. Length)	20.32 mm
Body cross-sectional area (Ref. Area)	324.3 mm²

Table 2.2 Geometric parameters of grid fins

Area of each cell (Standard)		25.0 mm²
Area of total grid cell (15 cells)		375.0 mm²
Chord length		5.0 mm
Web thickness		0.2 mm
Area of lifting surface	A: square	778.8 mm²
	B: triangle	723.8 mm²

Numerical analysis of supersonic co-flow jet with varying lip thickness

Sathish Kumar K
Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India
Naren.Shankar R
Department of Aeronautical Engineering, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology, Chennai, India
Anusindhiya K
School of Mechanical Engineering, Vellore Institute of Technology, Chennai, India, and
Senthil Kumar B.R
Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

Abstract

Purpose – This study aims to present the numerical study on supersonic jet mixing characteristics of the co-flow jet by varying lip thickness (LT). The LT chosen for the study is 2 mm, 7.75 mm and 15 mm.

Design/methodology/approach – The primary nozzle is designed for delivering Mach 2.0 jet, whereas the secondary nozzle is designed for delivering Mach 1.6 jet. The Nozzle pressure ratio chosen for the study is 3 and 5. To study the mixing characteristics of the co-flow jet, total pressure and Mach number measurements were taken along and normal to the jet axis. To validate the numerical results, the numerical total pressure values were also compared with the experimental result and it is proven to have a good agreement.

Findings – The results exhibit that, the 2 mm lip is shear dominant. The 7.75 mm and 15 mm lip is wake dominant. The jet interaction along the jet axis was also studied using the contours of total pressure, Mach number, turbulent kinetic energy and density gradient. The radial Mach number contours at the various axial location of the jet was also studied.

Practical implications – The effect of varying LT in exhaust nozzle plays a vital role in supersonic turbofan aircraft.

Originality/value – Supersonic co-flowing jet mixing effectiveness by varying the LT between the primary supersonic nozzle and the secondary supersonic nozzle has not been analyzed in the past.

Keywords Mach disk, Supersonic, Co-flow, Lip thickness

Paper type Research paper

Nomenclature

X/D_p = Normalized axial position in X-direction;
D_p = Exit diameter of the primary nozzle;
M_x = Jet exit Mach number in the axial direction;
CFJ = Co-flow jet;
CFD = Computational Fluid Dynamics;
Y/D_p = Normalized radial position in Y-direction;
NPR = Nozzle Pressure Ratio;
p_0 = Total pressure at inlet of CFJ;
p_{0x} = Pitot pressure (total) in the axial direction;
M_y = Jet exit Mach number in the radial direction; and
LT = Lip thickness.

1. Introduction

Supersonic jet finds application in rockets, missiles, fuel injectors, commercial and fighter jet exhausts. Supersonic co-flowing jet (CFJ) is beneficial in mixing enhancement and in jet noise reduction. It overtakes the usage of tab and chevron because there is no blockage and reduces manufacturing complexity, respectively. Casalino *et al.* (2008) documented that the jet noise reduction plays an important role in overall aircraft engine noise attenuation. Mach wave emission (MWE) and shock associated noise are the reasons for supersonic jet noise were discussed by the authors (Pao and Seiner, 1983; Tam *et al.*, 1986; Papamoschou, 1997). This MWE can be attenuated using a surrounding secondary jet. This MWE can be attenuated using a surrounding secondary jet. This is because of the shielding of the primary jet by the secondary jet. Papamoschou (1997) reported that High bypass secondary flow is more effective in reducing jet noise.

Forstall and Shapiro (1949), Williams *et al.* (1969) found that the velocity ratio between the primary and secondary jets is an important parameter that determines the shape of the mixing region. Surrounding jet elongates central jet potential core length by 68% when compared to single free jet was studied by Murakami and Papamoschou (2000). and Srinivasarao (2012), studied the under expanded jet characteristics and Sharma *et al.* (2008) studied

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Tribological behaviour of AA7168 hybrid composite sheets for aerospace structures fabricated through COMPO casting

Venkatesan S[a], Giridharan P. K.[b], Sivakumar N S[c], Sharavanan S[d], Ram Subbiah[e] and Senthamilselvi A[f]

[a]School of Mechanical Engineering, College of Engineering and Technology, Wachemo University, Hosaena, Ethiopia; [b]Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidhyapeetham, Chennai; [c]Department of Mechatronics, Tishk International University, Erbil, KRG, Iraq; [d]Mechanical Engineering, Vels Institute of Science, Technology and Advanced Studies (Vistas), Deemed to Be University, Chennai, India; [e]Mechanical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad; [f]Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

ABSTRACT

In this research work, an attempt was made to reinforce AA7168 aluminium alloy with Boron Carbide (B_4C) and Silicon Carbide (SiC) through compos casting technique. Tribological test were performed by varying weight percentage (3, 6, 9, 12%), Load (10, 20, 30, 40 N), Sliding velocity (10, 20, 30, 40 m/s) and sliding distance (1000, 2000, 3000, 4000 m). The results revealed that the wear resistance increases with addition of reinforcing particles until a saddle point of 9 wt.% owing to the formation of mechanical mixed layer. At 12%, the wear resistance reduces because of the clustering of particles. Because of the hardness of the particles, the coefficient of friction increases with increasing weight percentage. From Taguchi approach, it was revealed that percentage reinforcement was most influential factor followed by load, sliding velocity and sliding distance. The addition of particles increases the hardness and tensile strength due to the hall petch effect and orowan strengthening. WASPAS technique was utilised to optimise the input variables.

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KEYWORDS
Compo casting; WASPAS; sheet metal; tribology; hybrid composites

1. Introduction

Aluminium Metal Matrix Composite (AMMC) gaining its importance in aerospace sector owing to its enhanced material properties and strength to weight ratio [1]. Power sintering, in-situ fabrication and liquid metallurgy are the various techniques utilised for the production of composites [2–4]. Among these methods manufacturing by liquid stir casting was cost effective and suitable for mass production [5]. The particles size, volume fraction, particle shape and surface treatment are the various factors influences the homogeneous distribution of composites [6–8]. Boron Carbide (B_4C), Silicon Carbide (SiC), Aluminium oxide (Al_2O_3), Graphite (Gr), Carbon Nano Tubes (CNT) were predominantly used reinforcing materials [9–11]. The key problem in the

CONTACT Giridharan P. K. kpranandkumar@gmail.com Department of Mechanical Engineering, Amrita School of Engineering, Amrita Vishwa Vidhyapeetham, Chennai

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Effects of high temperature wear and corrosion behaviour of sintered titanium reinforced with vanadium particle

A. Senthamilselvi[a,*], P. Maniarasan[b], A. Murugarajan[c]
[a]*Assistant Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India.*
[b]*Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India.*
[c]*Professor, Department of Mechanical Engineering, Sri Ramakrishna Engineering College, Coimbatore, Tamilnadu, India.*

The present investigation deals the high temperature wear and corrosion behavior of sintered Titanium (Ti) reinforced with vanadium (V) particles with various wt. % such as 3, 6 and 9. The surface morphology followed to that elemental confirmation of the sintered composites were identified using Scanning Electron Microscope (SEM) embedded with Electron Dispersive Spectroscopy (EDS). The high temperature wear behavior of the sintered composites was evaluated using pin on disc apparatus with varying the operating temperature (50°, 100° and 150°C). By using TAFEL exploration the corrosion behavior of the composites were assessed. The results revealed that Ti reinforced with 6 % of V possessed better wear resistant and corrosion resistance properties. Furthermore, the surface morphological changes of wear and corrosion behavior after experimentation were viewed using SEM.

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Keywords: Corrosion, SEM , EDAX analysis, Ti-V composites

1. Introduction

Titanium and its alloys are commonly used in aero engines and airframe industries because of low relative density, excellent strength to density ratio and better corrosion resistance at high temperature [1]. But, due to its low thermal conductivity and high chemical activity, it is difficult to cut materials. However, during machining process titanium and its alloys are observe the tool surfaces and it creates adhesive wear.

But, titanium and its alloys are having poor tribological properties, because of its low plastic shearing resistance. The poor wear resistance strictly obstructs the applications of titanium alloys. By adding the secondary particles like hard ceramics, led to improve the wear resistance of the titanium [2]. The extensively accepted views on the wear properties of titanium and it alloys are mainly grounded on the room temperature. Fairly, some of the researchers only reported the high temperature wear behavior of titanium and its alloys. One of the researcher reported that Ti-6Al-4V alloy shows excellent wear resistant properties at the temperature range of 400°C. But, it does not mean that the titanium alloy possessed high temperature wear resistance properties [3-4]. In-order to explore the titanium alloys wear related problems, a detailed study on high temperature wear is essential.

Titanium is generally known as high corrosion resistance in wide variety of environments. This was happen, during its different environmental conditions, titanium are spontaneously formed stable and generate oxide film over the surfaces. The oxide films provides better resistance to corrosion for as long as the reliability of the film. Corrosion can be characterized by a quite uniform attack over the surface. At passive condition, the corrosion are takes place very rapidly on the titanium surfaces [5].

Many researchers are done their research on titanium alloy and the detail experimental results are summarized. Yu Liu et al. (2020) studied the instability of titanium during corrosion at

* Corresponding author: senthamilselvirresearch@gmail.com

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ORIGINAL PAPER

Synthesis of Silver Nanoparticles Through Orange Peel Powder for Antibacterial Composite Filler Applications

S. Rathinavel[1] · S. S. Saravanakumar[2]

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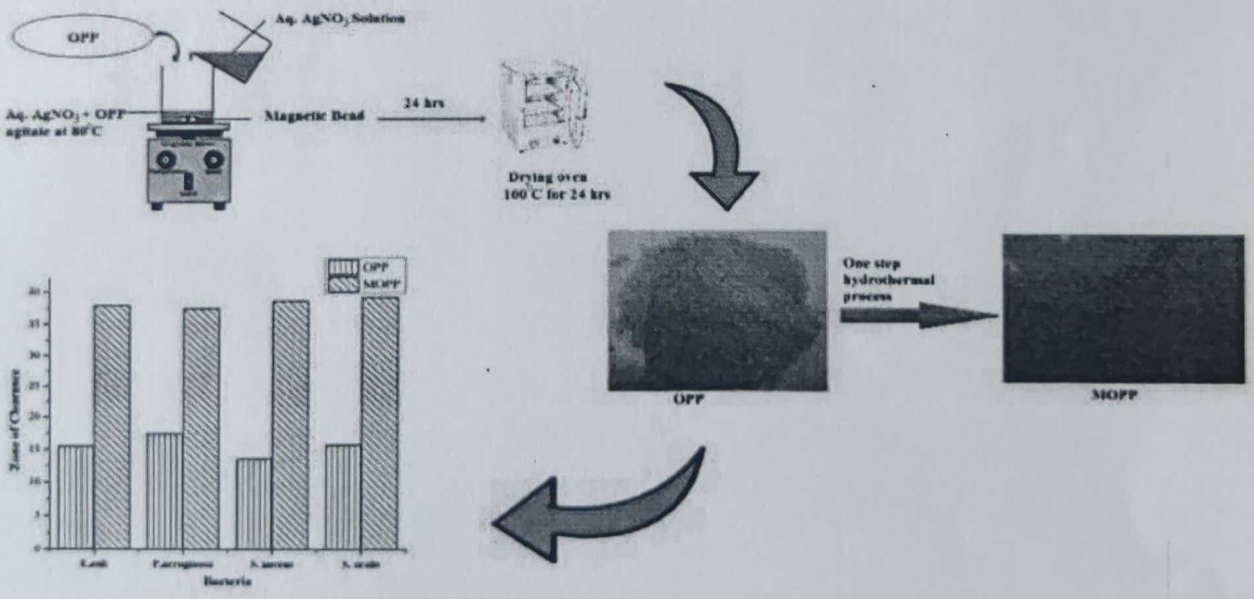
Abstract

Environmental concerns and the positive aspects of biowaste materials gained the attention of researchers to use them as filler materials in fabricating of green composites along with polymer matrices, but most of them are not suitable for extensive applications in high thermal applications. In most of the natural particulate materials are not having the ability to fight against pathogens. To overcome such barriers, a modification of biowaste—orange peel powder (OPP) by the generation of silver nanoparticles (AgNPs) is prepared with the one-step hydrothermal process. The modified Orange Peel Powder (MOPP), is then characterized by FESEM, EDX, FT-IR, XRD, and Thermal analyses. The presence of AgNPs in the MOPP is confirmed through FESEM & EDX analysis. FT-IR spectral analysis pronounced the non mutate functional groups in MOPP as compared with OPP. The generation of AgNPs in MOPP is confirmed through the XRD peaks of reflection planes at (1,1,1), (2,0,0), (2,2,0) & (3,1,1). Thermal Analysis results of TGA and DSC show the MOPP has increased thermal stability up to 363 °C. Antibacterial test against Gram-negative and Gram-positive bacteria for OPP & MOPP shows the inclusion of Ag strongly objects the pathogens. Eventually, the MOPP can be utilized as filler material along with the polymer matrix in high thermal as well as antibacterial composite filler applications.

Graphic Abstract



Keywords Orange peel powder (OPP) · Antibacterial property · Silver nanoparticles · Filler material · Thermal property

Extended author information available on the last page of the article

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DESIGNING OF TYPICAL SLITHERING PLATFORM FOR HELICOPTER USING COMPOSITE MATERIALS

Dr. R. Ramasamy[1], P. Karthikeyan[2], S. Balaji[3], Dr. P. Maniarasan[4] and A. Akash[5]
[1]Associate Professor, Aeronautical, Nehru Institute of Engineering and Technology, Coimbatore
[2,3]Assistant Professor Aeronautical, Nehru Institute of Engineering and Technology, Coimbatore
[4]Professor, Nehru Institute of Engineering and Technology, Coimbatore
[5]UG Student (Aeronautical), Nehru Institute of Engineering and Technology, Coimbatore.

ABSTRACT

One of the important operations the defense services (especially army) have to carry out during a specific mission is to transport armed troops to remote places where there is no access by road in quickest possible time. Army aviation uses the helicopters for the said mission where in the Troops are carried in the helicopter to a predetermined destination and are made to slide down the helicopter with the helicopter in hovering condition at about 200 feet to 300 feet above the ground. This operation of sliding down from the helicopter is called as slithering. SLITHERING operation essentially needs a SLITHERING BOOM firmly attached to the helicopter structure, an end fitting to attach the rope and a platform for the troops to stand before sliding. The aim of the project is to design a platform using composite materials approximating it on a simply supported beam to carry a load of 300 Kg i.e., two armed troops of 150 Kg each.

Keywords: *Slithering; Composite Materials; Helicopter; Platform.*

Introduction

Whenever it is not possible to reach certain areas by motor able road by the defense people, particularly for army, it is a general practice to take the troops in a helicopter in a hovering condition, the troops will be asked to slide down at the desired destination. This operation is called slithering operation.Slithering operation can be carried out both on skid and wheel landing gear of helicopter versions.

- Extended platform used for troops to stand before sliding and to avoid injury due to hitting of skids, when sliding down.
- A boom to hang the rope on which troops can slither down.
- A suitable rope capable of withstanding the load of two troops at a time.
- Anchoring point as a safely measure.

In the present project attempts has been made to design and developed an extended platform using composite materials and compare the advantages over metallic (conventional material) platform consisting of sheet stringers in axial and transverse direction in semi monocoque constructions. The sandwich composite constructions design not only reduces the weight but also minimizes the number of components hence enhances the safety. Use of advanced composite materials like carbon and honeycomb core provides the required strength, stiffness and dynamic properties at a minimum weight penalty.

Literature Review

Advanced Composite Main Rotor Flex Beam

The flex beam connects the main rotor to the main rotor blade. The composite flex beam is used in the bearing less rotor hubs in the main rotor system of the helicopter with evolution of advanced composites, the flexibility of designing bearing less or hinge less rotor systems become a reality

Design Details

During the design of flex beam the following consideration are needed,

- Flap-lag-torsion deformation must be accommodated through the flex beam.
- There should be balance between manoeuvrability and dynamic vibrations.
- Hub size must be kept at a minimum in order to reduce the weight and hub drag.
- In order to maximize in-plane damping, the optimum tailoring at the

NUMERICAL SIMULATION OF SHOCK INDUCED MIXING OF FUEL AND AIR IN THE SCRAMJET COMBUSTOR

Karthikeyan. J[1], Banu.T[2], K. Ganesh Babu[3] and R. Varghese C R[4]
[1]Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu
[2, 4]Nehru Institute of Technology, Coimbatore, Tamilnadu
[3]Chendhuran College of Engineering and Technology, Pudukottai , Tamilnadu
[1]karthikeyanj.aero@gmail.com, [2]banut.aero@gmail.com, [3]kgb.iitian@gmail.com,
[4]roysonrapheal@gmail.com

ABSTRACT

The combustion behaviour of fuel in the air environment is investigated for a SCRAMJET engine in the present work using commercial software package ANSYS FLUENT. The combustion of such a combination is purely governed by the mixing efficiency of fuel with air in the SCRAMJET engine. The appropriate air fuel mixture enhances the flame stabilization by increasing the flame speed within the combustor. The mixing of fuel with air is numerically simulated with modified DLR SCRAMJET engine combustor in order to study its mixing efficiencies. The numerical simulation of hydrogen fuelled SCRAMJET combustor has been carried out by steady, compressible, and two-dimensional Navier-Stokes equation with SST k-ε turbulence model using commercial CFD software package. The injection of fuel is done at three different velocities such as 100 mm/s, 150 mm/s and 200 mm/s. From the reported results, it has been identified that the formation of oblique shock waves is helpful to increase the mixing efficiency of the air and fuel. The oblique shock helps in modifying the velocity vector direction of the air in the combustor. The turbulent kinetic energy, velocity contour and static pressure clearly illustrate the role played by the oblique shock in enhancing the mixing of fuel with air.

Keywords: *SCRAMJET Engine, Navier Stoke's Equation, SST k-ω turbulence model , Air – Fuel Mixture*

Introduction

Supersonic Combustor Ramjet (SCRAMJET) a variant of ramjet where the phenomenon of combustion varies with a higher mach number. The flow of air inside a scram jet engine is generally supersonic which is major reason for the scramjet to perform well in an efficient manner at higher speeds in operation. During World War II, Germans have devoted more of their time and effort in researching towards the technological improvement of high speed rocket powered aircraft. Post to World War II, Americans continued the existing research and attained many potential breakthroughs by adopting various techniques and scientists from Germany. Still now plenty of research is ongoing to improve the mixing of air and fuel in a SCRAM jet engine combustor as the time of mixing takes place in milliseconds. The thorough and proper mixing of air fuel mixture will lead to a better combustion and generates more desired power from the engine. As the problem associated with SCRAMJET engine combustor is more demanding and highly interesting, researchers around the globe have not stopped from conducting research through their untiredless efforts even after crossing many generations. The development of commercial software packages has facilitated the experimental research for corroboration and also to have visual understanding about the mixing of air and fuel inside the combustor.Obula reddy et.al [1] studied about the effect of wavy strut fuel injector in producing the shock wave inside the combustor inorder to enhance the mixing of fuel and air for a SCRAM jet combustor. The authors have carried out the study at different mach numbers such as M = 2,4,6.Reynold's Averaged Stoke equation has been considered for the present study and the authors have reported that from shock wave generation , it is observed that the wavy wall strut provided has an appreciable effect over the augmentation in air and fuel mixing. Anthony Athithan et.al [2] analyzed the performance of ramps present in the strut based scram jet engine based upon the factors such as wall pressure combustion efficiency and total pressure loss at different locations of the combustor and to attain improvement in the design and development of strut based injection schemes. The authors have made a comparison with the baseline model by solving the problem using RANS equation coupled with SST K-ω model and eddy dissipation model. The authors have reported that the presence of ramps have produced a

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RESEARCH ARTICLE

Polymer COMPOSITES WILEY

Characterization of prickly pear short fiber and red onion peel biocarbon nanosheets toughened epoxy composites

R. Ramaswamy[1] | S. V. Gurupranes[2] | S. Kaliappan[3] | L. Natrayan[4] | Pravin P. Patil[5]

[1]Department of Aeronautical Engineering, Nehru institute of Engineering and Technology, Coimbatore, India

[2]Department of Mechanical Engineering, Dr. Mahalingam College of Engineering and Technology, Pollachi, India

[3]Department of Mechanical Engineering, Velammal Institute of Technology, Chennai, India

[4]Department of Mechanical Engineering, Saveetha School of Engineering, SIMATS, Chennai, India

[5]Department of Mechanical Engineering, Graphic Era Deemed to be University, Dehradun, India

Correspondence
R. Ramaswamy, Department of Aeronautical Engineering, Nehru institute of Engineering and Technology, Coimbatore, India.
Email: rrsamy2000@rediffmail.com

Abstract

In this research, the role of prickly pear short fiber and red onion peel wrinkled biocarbon nanosheets toughened epoxy resin composite was investigated. The main aim of this research was to find the effectiveness of adding biocarbon along with prickly pear fiber in the load-bearing, thermal and electrical conductivity behavior of the epoxy resin composite. The biocarbon nanosheets were prepared for this present investigation from red onion peel waste using the pyrolysis process. The composites were characterized by American society of testing and materials (ASTM) standards and compared with previous results. The highest tensile strength and flexural strength were observed for 3 vol.% of biocarbon nanosheets up to 60% and 40% respectively than pure epoxy. Izod impact toughness and hardness values also increased with the inclusion of reinforcements by 5 vol.% around 93% and 90% correspondingly. Similarly, relative permittivity and dielectric loss enhanced about to 6.4 and 0.74 for 5 vol.% of biocarbon nanosheets. The thermal conductivity also improved with the addition of biocarbon nanosheets and maximum values up to 0.42 W/mK. This enhanced dielectric, mechanical, and thermally active composites might be employed as a microwave shielding material in electronic devices, automotive, and industrial applications for communications equipment that require shielding material with good mechanical properties.

KEYWORDS

biocarbon, electrical properties, PMC, pyrolysis, thermal properties

1 | INTRODUCTION

The by-products of petroleum-based products and glass fibers contribute significantly to the emission of greenhouse gases into the environment.[1] The use of ecologically friendly green materials, such as those that are recyclable, biodegradable, and renewable, has lately been proposed as a means of reducing the negative effects on the environment of petroleum-based materials.[2] This is primarily due to increased environmental awareness of the various negative consequences of non-biodegradable wastes derived from petroleum-based polymers. The advancement of biodegradable and renewable materials such as natural fiber composites becomes increasingly interesting from economic and environmental perspectives.[3] Composites made up of natural fibers, or biocomposites, are mostly employed in the automotive and construction industries. Natural fibers are predominantly used in the automotive industry for interior components including door panels, seat backs, dashboards, truck

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RESEARCH ARTICLE

Polymer COMPOSITES WILEY

Effect of black rice husk ash biosilica on mechanical, wear, and fatigue behavior of stacked aloevera/roselle and glass fiber reinforced epoxy composite

Ramaswamy R.[1] | **Nagabhooshanam N.**[2] | **Manoj E.**[3] | **Thiyagu M.**[4] | **Pravin P. Patil**[5]

[1]Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

[2]Department of Mechanical Engineering, Aditya Engineering College, Surampalem, Andhra Pradesh, India

[3]Department of Automobile Engineering, Sathyabama Institute of Science and Technology, Chennai, India

[4]Institute of Mechanical Engineering, Saveetha School of Engineering, SIMATS, Chennai, India

[5]Department of Mechanical Engineering, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India

Correspondence
Ramaswamy R., Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India.
Email: rrsamy2000@rediffmail.com

Abstract

In this present study, a high-performance structural epoxy biocomposite has been prepared and characterized for its mechanical, wear, and fatigue behavior. The main aim of this research was to determine the effect of fiber stacking order and the biosilica addition in the epoxy hybrid composite when it is subjected to external loading. The research also focused on how the surface treatment process on fiber and particle affects the mechanical, wear, and fatigue behavior of composite. The biosilica particles were synthesized from black rice husks and then surface treated with 3-aminopropyltriethoxysilane. Similarly, a base treatment was applied to fiber mats and the composite laminates for this investigation were fabricated by hand layup process. It is noted that the composite designations E_{12} and E_{22} exhibited an improved tensile strength of 58, 62% and flexural strength of 45, 51% for 1.0 vol% biosilica in both staking sequence models. Similarly, in inter-laminar shear strength the composites E_2, E_{21} and E_{22} outperformed than E_1, E_{11}, and E_{12}. In terms of Izod impact toughness and hardness, composite designation E_{22} provides maximum increment of about 94% and 5%. The wear resistance of composite E_{22} exhibited lower wear loss and COF. The highest fatigue life count of 41,782 was observed for the composite designation E_{22} in tension-tension fatigue mode. Overall the stacking order R/A/G/A/R gives better results than others. These load bearing properties enhanced hybrid composites might be employed in structural, industrial, automotive, home appliance, defense, and lightweight industrial applications.

KEYWORDS

biosilica, fatigue life count, hybrid composite, inter-laminar shear strength, roselle fiber, wear

1 | INTRODUCTION

Natural fibers as a substitute for glass and carbon fibers in polymer composites have gained the attention of several academics and scientists in recent decades due to their benefits over traditional glass and carbon fibers.[1] Due to their acceptable mechanical qualities, natural fibers (e.g., jute, banana, sisal, kenaf, aleovera, hemp,

Investigating Mechanical Properties of Hybrid Polymer Composite Reinforced with S-Glass and Luffa Fibres

N.Vigneshkumar[1], N.Harikannan[2], Selvakumar S[3], P. Manoj Kumar[1*], Ram Subbiah[4], P.T.Saravanakumar[5]

[1]Department of Mechanical Engineering, KPR Institute of Engineering and Technology, Coimbatore, 641407, Tamil Nadu, India.

[2]Department of Mechanical Engineering, PSNA College of Engineering and Technology, Dindigul, 624622, Tamil Nadu, India.

[3]Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, 641105, Tamil Nadu, India.

[4]Department of Mechanical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad, 500090, Telangana, India.

[5]Department of Mechatronics Engineering, Hindusthan College of Engineering and Technology, Coimbatore, 641032, Tamil Nadu, India.

*Corresponding author: pasupathimanojkumar@gmail.com

Abstract. The mix of two different type of fibres, one is natural and another one is synthetic fibres were employed as reinforcing media in this study, and epoxy based polymer resin was employed as the matrix phase. S-glass and luffa fibres had been bonded with epoxy matrix to create a novel composite by compression moulding and to measure the effect of this hybridization in composite laminate utilising five different sequencing. To determine the mechanical characteristics of this composite material using tensile, flexural, and compression strength, a specimen named 'SL4' had shown the highest mechanical strength, resulting in a tensile properties of 253 MPa, compression strength of 234 MPa, and flexural characteristics of 237 MPa. The increment in mechanical characteristics is found to exhibiting around 20% increase comparing to the specimen having next higher value in all the properties. The results evidenced that the presence of luffa fibre layers at the interior most portion of the composite displayed the progressive values in all the investigated mechanical characteristics.

Keywords: S-Glass; luffa; composite; mechanical properties; hybrid composite.

1. Introduction

In a prepared composite material, the mix of natural and synthetic fibres can result in distinct physical and chemical characteristics. These one-of-a-kind characteristics help to boost product efficiency while lowering environmental impact [1, 2]. Natural or synthetic composites can be made separately with the corresponding fibres. A typical composite is wood, which is made up of cellulose (wood fibres) and lignin. Lignin is an ordinary pasty material that would help in binding the fibres and further, it would strengthen wood [3, 4]. Engineers create several composites in different composition of fibre and matrix material. However, the use of natural fibres along with the artificially created fibres can enhance the mechanical characteristics of the polymer based composites, significantly [5, 6].

Outside factors would almost certainly affect the loading of designed structures, and this can be expected to happen during maintenance, assembly, and administration tasks [7, 8]. One of the major unknowns in matrix polymer composites is impact resistance. Composites are extremely sensitive to

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Research Article

Optimization and Prediction of Tribological Behaviour of Al-Fe-Si Alloy-Based Nanograin-Refined Composites Using Taguchi with Response Surface Methodology

S. Balaji,[1] P. Maniarasan,[1] S. V. Alagarsamy,[2] Abdullah M. Alswieleh,[3] V. Mohanavel,[4,5] M. Ravichandran,[5,6] Byong-Hun Jeon,[7] and Haiter Lenin Allasi[8]

[1]*Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, 641 105 Tamil Nadu, India*
[2]*Department of Mechanical Engineering, Mahath Amma Institute of Engineering and Technology, Pudukkottai, 622 101 Tamil Nadu, India*
[3]*Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia*
[4]*Centre for Materials Engineering and Regenerative Medicine, Bharath Institute of Higher Education and Research, Selaiyur, Chennai, Tamil Nadu, 600073, India*
[5]*Department of Mechanical Engineering, Chandigarh University, Mohali, 140 413 Punjab, India*
[6]*Department of Mechanical Engineering, University Centre for Research & Development, Chandigarh University, Mohali, 140 413 Punjab, India*
[7]*Department of Earth Resources & Environmental Engineering, Hanyang University, 222-Wangsimni-ro, Seongdong-gu, Seoul 04763, Republic of Korea*
[8]*Department of Mechanical Engineering, WOLLO University, Kombolcha Institute of Technology, Kombolcha, Ethiopia*

Correspondence should be addressed to Haiter Lenin Allasi; drahlenin@kiot.edu.et

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Aluminium matrix composites (AMCs) are broadly used to change the monolithic materials in aviation, automotive, and defense industries owing to their superior characteristics such as specific strength with light weight, greater hardness, good wear resistance, and better thermal properties. This novel work was aimed at estimating the specific wear rate (SWR) of zirconium dioxide- (ZrO_2-) filled AA8011 (Al-Fe-Si alloy) matrix composites. A Taguchi method and response surface methodology (RSM) were used to find out the optimum range of control parameters on SWR of proposed composites. The stir casting technique was used to fabricate the composite specimens with varying proportions (5, 10, and 15 wt.%) of ZrO_2 particle addition. The wear tests were performed as per L27 orthogonal design by using a pin-on-disk apparatus under dry conditions. For this test, four control parameters such as wt.% of ZrO_2, load, disc velocity, and sliding distance each at three levels were selected. Based on the experimental results, 15 wt.% of ZrO_2, 29.43 N of load, 0.94 m/s of disc velocity, and 1000 m of sliding distance provide the minimum SWR of the developed composite sample. ANOVA result revealed that the load (49.04%) was the primary dominant factor for affecting the SWR, followed by wt.% of ZrO_2 content (29.24%), respectively. Moreover, scanning electron microscopy (SEM) analysis was performed to study the wear mechanism of worn-out surface of the composite test specimens.

1. Introduction

In the past few decades, aluminium and its alloys are essential materials for fabrication of high recital parts in engineering applications like aerospace, automotive, and defense industries due to their excellent characteristics like specific strength, light weight, high stiffness, good elastic modulus, and better thermal characteristics [1]. Among the many Al series alloys, Al-Fe-Si alloy has emerging material for various engineering structural applications owing to its unique characteristics such as high strength and hardness. However, these alloys have obtained very poor tribological properties.

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Hindawi

Research Article

Investigations on Wear Behavior of Aluminium Composites at Elevated Temperature

B. R. Senthil Kumar,[1] G. Gopalarama Subramaniyan,[2] N. Pragadish,[3] P. M. Venkatesh,[4] Soni Sanjay,[5] C. M. Velu,[6] G. Navaneethakrishnan,[7] Suresh Vellingiri,[8] and Venkatesan Govindarajan[9]

[1]*Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India*
[2]*Saveetha Engineering College, Chennai, Tamil Nadu, India*
[3]*Vel Tech Multitech, Avadi, Chennai, Tamil Nadu, India*
[4]*Vignan's Foundation for Science Technology and Research, Guntur, India*
[5]*Jabalpur Engineering College, R.G.P.V.Bhopal, Jabalpur, Madhya Pradesh, India*
[6]*Saveetha School of Engg, Saveetha Institute Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India*
[7]*QIS College of Engineering and Technology, Ongole 523272, Andhra Pradesh, India*
[8]*Department of Mechanical Engineering, Adhi College of Engineering and Technology, Kanchipuram, Tamil Nadu, India*
[9]*Department of Mechanical Engineering, Haramaya Institute of Technology, Haramaya University, Dire Dawa, Ethiopia*

Correspondence should be addressed to Venkatesan Govindarajan; venkatesanggg2011@gmail.com

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The aerospace aluminium alloy AA7050 was reinforced with Al_2O_3 of average particle size 5 m in this study using the stir casting method. To eliminate surface imperfections, AA7050/Al_2O_3 composites with varied weight percentages (0, 2, 4, 6) were manufactured, and wear tests on composites were carried out utilizing a pin-on-disc apparatus that varied load, velocity, temperature, and weight %. The tensile and hardness tests were carried out at a high temperature. The inclusion of particles enhances wear resistance by establishing a mechanically mixed layer (MML), according to the findings. The wear resistance at 300°C was 100% higher in comparison with resistance at 150°C. Because of the Orowan strengthening and Hall–Petch effect, the tensile strength and hardness of composites enhanced. Temperature, tracked by the weight % of strengthening powders, was the most important factor that influences the wear resistance of the composites. The findings showed that the material properties of AA7050/4wt%Al_2O_3 at 150°C and AA7050/2wt%Al_2O_3 at 300°C are superior than base alloy.

1. Introduction

AA7050 alloy has piqued attention across the globe in latest generations as the extremely ideal material for aerospace application, owing to its enhanced mechanical, tribological, and corrosion behavior [1]. Due to the growing need for lightweight materials in both developed and developing nations, defect-free composite materials are in high demand [2]. The quality of the materials used in any aerospace system determines its effectiveness. Some of the aerospace components manufactured by aluminium alloy are the hot plate collector, isolator, mount, thermal ducts, header pipeline, and moulding [2–5]. Since the sunlight-based header pipelines were accessible to high temperatures, it was necessary to investigate their viability at elevated temperatures [6].

Particles such as B_4C, SiC, WC, Al_2O_3, and Gr are used to strengthen aluminium alloys [7–9]. Sintering, moulding, and in situ production are the most often utilized composite manufacturing procedures [10–12]. The stir casting method was the most suitable of the numerous manufacturing procedures for mass production and uniform particle

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Research Article

Microstructure and Mechanical Behaviour of Ti-6Al-4V Matrix Reinforced with WCp Developed by Squeeze Casting

R. Sivakumar,[1] B. R. Senthil Kumar,[2] G. Gopalarama Subramaniyan,[3] M. Sivaraja,[4] M. P. Natarajan,[5] Pravin P. Patil,[6] S. Kaliappan,[7] K. P. Yuvaraj,[8] and Kassie Jemberu Abebe[9]

[1]*Department of Civil Engineering, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India*
[2]*Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India*
[3]*Department of Mechanical Engineering, Saveetha Engineering College, Chennai, India*
[4]*Centre for Materials Research, Nehru Institute of Technology, Coimbatore, India*
[5]*Department of Mechanical Engineering, Bharath Institute of Higher Education and Research, Chennai, India*
[6]*Department of Mechanical Engineering, Graphic Era Deemed to Be University, Bell Road, Clement Town, Dehradun, Uttarakhand, India*
[7]*Department of Mechanical Engineering, Velammal Institute of Technology, Chennai, Tamil Nadu, India*
[8]*Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, Tamil Nadu, India*
[9]*School of Mechanical and Industrial Engineering, Institute of Technology, Debre Markos University, Debre Markos, Ethiopia*

Correspondence should be addressed to Kassie Jemberu Abebe; kassiejemberu@gmail.com

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The aim of this study is to evaluate the wear and micro hardness of a Ti-6Al-4V matrix reinforced with 10% and 15% tungsten carbide particle (WCp) composite manufactured using the squeeze casting process. Optical microscopy is used to determine the microstructures of the composite. A pin-on-disc wear test equipment and Vickers hardness at atmospheric temperature were used to examine the wear behaviour wear rate, CoF, and micro hardness qualities of primed samples. Loads of 10 N to 80 N, velocities of 4 m/s, and distances of 1000 m to 2000 m are considered for analyzing the wear behaviour of Ti-6Al-4V composites. The wear rate values are 25.683 for 10% WCp, 30.957 for 15% WCp, and 37.683 and 30.957 for 20% WCp. A scanning electron microscope (SEM) is utilized to examine the worn surface of the composites. For 10% WCp, the CoF values are 0.82 and 0.87, and for 15% WC, 0.88 and 0.956. The micro hardness values are 692 VHN for 10% WCp and 835 VHN for 15% WCp. The wear rate, microstructure, SEM images, coefficient of friction, and hardness of TMCs for totaling reinforcing tungsten carbide particle (WCp) possessions were discovered to be improved.

1. Introduction

Importance in the development of innovative materials with elegant properties is growing on a regular basis, and composite materials, which are primarily developed of composite materials, are marketed as a simple and improved method of obtaining materials with exceptional properties [1–3]. Metal matrix composites (MMCs) are a form of manufacturing and technology material that incorporates a strong reinforcement addicted to a metal matrix to increase qualities with particular stiffness, specific strength, wear resistance, good corrosion resistance, hardness, and high elastic modulus [4, 5]. Titanium and titanium alloys have a number of unique characteristics, such as high specific strength and lightweight, which support the use of titanium and titanium alloys as a matrix material in future structures [6–8]. TMCs have a wide range of applications in the automotive, aerospace, and marine industries [6, 9].

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PAPER

Investigation on mechanical and tribological properties of AA6061/Gr composites for solar header pipes

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R Ranjith[1], V P Pradeep[2], B R Senthil Kumar[3], K Somasundaram[4] and K Lakshmi Prasad[5]

[1] Assistant Professor, SNS College of Technology, Coimbatore, Tamil Nadu, India
[2] Assistant Professor, Dr. N. G. P. Institute of Technology, Coimbatore, Tamil Nadu, India
[3] Professor, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India
[4] Associate Professor, Theni Kammavar Sangam college of Technology, Theni, Tamil Nadu, India
[5] Assistant Professor, Lakireddy Bali Reddy College Of Engineering, Krishna, Andhra Pradesh, India

E-mail: ranjith.mecs@gmail.com

Keywords: stir casting, compo casting, composites, solar header pipes, ANOVA, automotive

Abstract

Solar header pipes desire light weight material with extensive mechanical and tribological property at high temperature. In this research work, an attempt was made to reinforce AA6061 aluminium alloy with Graphite particles through Stir Casting (SC) and Compo Casting (CC) technique for solar header pipes. The uniform dispersion of reinforcing particles over the matrix was confirmed through Scanning Electron Microscope (SEM). The tensile, hardness and wear experiments were performed on composites at elevated temperature. The wear experimental runs were designed using Taguchi mixed orthogonal array by varying temperature, applied load, sliding velocity, sliding distance and reinforcing weight percentage. The composites produced through CC method exhibit 3.8% and 2.7% higher hardness and tensile strength in comparison with SC. At elevated temperature of 300 C, the composites exhibit better wear resistance owing to the formation of Mechanical Mixed Layer (MML). The wear rate of composites at elevated temperature was three times higher than the room temperature owing to reduction in density and deformation of material. ANOVA table reveals that the most influencing process parameters was temperature followed by the load and percentage reinforcement. The worn surface morphology was analyzed using SEM. Because of the improved dispersion of reinforced particles, the composites generated by CC have higher mechanical and tribological qualities at elevated temperatures, and are considered as an alternative material for solar header pipes.

Introduction

Solar energy has attracted a lot of interest throughout the world in recent decades as the most perfect renewable energy source, owing to the fact that it is safe, clean, free, and limitless [1]. Solar power production systems are rapidly expanding due to rising need for heat and electricity generation in both developed and emerging countries [2]. The effectiveness of any solar system is determined by the quality of the materials employed in it. Owing to its light weight and excellent thermal and electrical conductivity, aluminium alloy was preferred in the solar power business [3, 4]. Thermal plate collector, absorber, frame, heat pipes, header pipe and casing are some of the solar components made up of aluminium alloy [5]. Of which the solar header pipes were subjected to high temperature, hence it was required to access its feasibility at high temperature [6]. The schematic representation of solar heater and possible contacting surface of it was shown in figure 1.

Aluminium Matrix Composites (AMC) gaining importance in solar sector owing to its strength to weigh ratio and enhanced corrosion resistance [7]. Stir Casting (SC), Compo Casting (CC), squeeze casting, *in situ* fabrication and integrated stir-squeeze casting are the distinct casting method used for the production of composites [8–10]. Silicon Carbide (SiC), Boron Carbide (B_4C), Aluminium Oxide (Al_2O_3), Zirconium Oxide (ZrO_2) and graphite are the various particulates used as the reinforcing elements [11–13]. Attaining uniform distribution of particles over the

Enactment of Firefly Algorithm and Fuzzy C-Means Clustering For Consumer Request and Demand Prediction

Sruthi S Madhavan[1], Dr. M. Rajesh Babu[2], S. Venkatesh[3] and M. Madan Mohan[4]

[1]Assistant Professor, Department of AI&DS, Nehru Institute of Engineering and Technology, Coimbatore.
[2]Professor, Department of AI&DS, Nehru Institute of Engineering and Technology, Coimbatore.
[3]Assistant Professor, Department of CSE, Nehru Institute of Engineering and Technology, Coimbatore.
[4]Assistant Professor, Department of CSE, Nehru Institute of Engineering and Technology, Coimbatore.

Abstract: Day by day massive information is being added up over the World Wide Web. Utilizing and predicting related web pages as per user's interest from exponentially growing web information is becoming crucial and very critical. Web users expect relevant web pages of their interest to be retrieved at a faster pace in short time duration. So, this paper aims to present a novel methodology in finding consumer's upcoming demand and predicting future request in web page recommendation system. The baseline of the proposed methodology is, it uses a hybrid Levenberg-Marquardt firefly neural network algorithm to classify data as potential and non-potential consumers, then collects and clusters data of potential consumers using improved fuzzy C-means clustering algorithm and finally envisages the upcoming demand for the subsequent consumer. The proposed model is implemented in the operational platform of Java in Cloud Sim and can applicable for quantum computing also. The results are recorded, tabulated and analysed for various metrics like execution time, memory occupied, clustering time, clustering accuracy and recommendation accuracy. On comparative analysis with existing K-means technique, the proposed system proves to be more efficient.

Keywords: Web page recommendation, K-means clustering, Levenberg-Marquardt, firefly, neural network, classification, prediction, Quantum Computing.

1. Introduction

The usage of World Wide Web has become integral part of our life. Massive amounts of information are being added up every day leading to exponential growth of data. Due to the massive expansion of the internet and IT technology, electronic commerce is suitable, inexpensive and with no restriction in the area of space and time, it turns out to be the mainstream of populace utilization model [3]. From the voluminous amount of information, web mining techniques help to discover and analyse useful information. Such discovered knowledge is very useful for decision makers to bring relevant changes in the industry like in e-commerce to increase the productivity.

Data mining involves extracting meaningful information as per user's interests from voluminous dataset. In data mining procedure, web mining is a process which is used to extract and determine knowledge automatically from data obtainable on the web in the form of web documents, images, audios, videos etc. The foremost ideology of data mining process is to recognize possessions, picking suitable information, simplification, examining and analysing information [2]. Web mining comprises three kinds of information such as - data from internet data, log of internet access servers and web structure data [1].Depending on the type of data, web mining is categorised into

- Web content mining
- Web usage mining
- Web structure mining

Web usage mining uses web logs to extract usage patterns of users. Whereas web content mining and web structure mining uses web data content and configuration of web like hyperlinks information respectively. Knowingly or unknowingly, users provide some useful data that is recorded in the web log. Discovering user pattern from weblog will help to scale up the performance of web services. Ideally, web usage mining goes through three stages- pre-processing, pattern discovery and analysis [19].

Many times, customers are given multiple choices or overloaded with irrelevant information. Due to the enormous quantity of hosted documents on the web, progressively and consequently removing information competently and wisely is a demanding mission in online web system [10]. Depending on their entity inclination, interests and requirements, web personalization systems have materialized to get through this difficulty by supplying a personalized knowledge to consumer [11]. Web-page recommendation is a significant process in intelligent web systems. Recommender systems

SURVIVAL STUDY ON LOAD BALANCING METHODS IN EDGE COMPUTING WITH HEALTHCARE DATA

M. Madan Mohan

Research Scholar, Department of Computer Science and Engineering, Faculty of Engineering, Karpagam Academy of Higher Education,

Dr. Laxmi Raja

Assistant Professor, Department of Computer Science and Engineering, Faculty of Engineering, Karpagam Academy of Higher Education,

ABSTRACT

Edge computing was the distributed structure among enterprise utilizations by data sources such as IoT or edge servers. Edge computing is positioned among IoT devices for minimizing the latency. In order to reacts end-user necessities, IoT application selects the edge nodes. Several load balancing algorithms is developed for minimizing latency in cloud environment. Load balancing was the important feature which detects allocation as well as management strategies. Due to the diversity and heterogeneity of edge nodes, load balancing is not employed with edge computing. However, congestion was not minimized through existing load balancing methods. In order to address these issues, several load balancing methods are explained as shown below.

Keywords: Edge computing, distributed computing, load balancing, Internet of Things, diversity, heterogeneity

1. INTRODUCTION

Edge computing was the distributed structure with resources over the cloud as well as data centers. Edge computing is employed for minimizing latency. Healthcare was one of developing industries by large potential for enhancement from employment like Internet-of-Things (IoT). Edge computing was the distributed structure to move the resources over cloud. Edge computing was positioned between IoT devices and cloud to reduce latency. Load balancing was an essential feature that detects the resource allocation as well as management strategies.

2. LITERATURE REVIEW

A load balancing strategy was designed in [1] through allocation of task with help of intermediary nodes. It monitored worldwide data for achieving real-time attributes for classification. But, latency was not reduced by load balancing strategy. A mobile healthcare framework was introduced in [2] depending on edge-fog-cloud collaborative network. Edge with fog devices were used to monitor the health for analyzing the data within abnormal fitness status. But, efficiency of load balancing is not enhanced at required level by mobile healthcare framework.

An energy-aware scheduler was designed in [3] with conditional constraints for real-time streaming applications. R-CTG approach minimized latency analysis lacking to reduce efficiency of energy. But, latency was not reduced by energy-aware scheduler. M/M/c/K queuing network scheme was designed in [4] to the enhancement of IoHT. The designed model considered the medical data in edge layer to local clients through fog layer. However, the latency was not minimized by designed model.

COTBIS was developed in [5] for edge computing construction in gateway stage. IoT increased the strength as well as cleverness within video surveillance schemes. But, the latency was not reduced by COTBIS. Federated Learning (FL) was introduced in [6] for privacy-preserved collaborative model. FL has motivation for contributing (WTP) with the concealed data. However, makespan was not reduced by FL.

Edge-based hybrid network scheme was designed in [7] with hybrid routers as well as IoT gateway. It increased coverage of short-range and supported edge computing tasks. But, the load balancing efficiency was not reduced by designed architecture.

An automatic service and resource discovery mechanism was designed in [8] for efficient deployment of nano-services on IoT nodes. However, the makespan was not reduced by automatic service and resource discovery mechanism. EOESPA and RNOESPA were introduced in [9] to minimize delay. Though the delay was reduced, the load balancing was not carried out in efficient manner.

A secure framework was introduced in [10] to SDN-based edge computing. IoT were authenticated with Edge servers. It gathered the information over patients as well as transmits to Edge servers. But, the scheduling efficiency was not improved. Hybrid Priority Assigned Laxity (HPAL) was introduced in [11] to assign Virtual Machine (VM) as well as complete charge with lesser time

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RESEARCH ARTICLE

A Wrapper based feature extraction framework based on AlexNet deep convolutional neural network parameters optimized using gradient-based optimizer for mammogram images

N. K. Sakthivel[1] | S. Subasree[2] | Shaveta Malik[3] | Amit Kumar Tyagi[4]

[1]Nehru Institute of Engineering and Technology, Coimbatore, India

[2]Department of Computer Science and Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India

[3]Department of Computer Science and Engineering, Terna Engineering College, University of Mumbai, Mumbai, India

[4]School of Computer Science and Engineering, Vellore Institute of Technology, 600127, Chennai, India

Correspondence
N. K. Sakthivel, Dean, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India.
Email: drnksakthivelphd@gmail.com

Abstract

In this manuscript, a Wrapper based feature extraction framework based on AlexNet deep convolutional neural network (ADCNN) with gradient-based optimizer (GBO) is proposed for early detection of breast cancer. In this input images are occupied as mini-mammography image analysis society (MIAS) database. Then the images are pre-processed to eliminate that noises using Markov random field (MRF) method. Image features are extracted by the process of Wrapper based feature extraction framework with ADCNN. Then, the weight parameters of ADCNN are optimizing through the aid of GBO. Then the mammogram images are characterized as normal or abnormal (malignant and benign) with SVM classifier. The simulation process is implemented on MATLAB platform. The proposed ADCNN-SVM-GBO attains higher accuracy 34.64%, 28.86%, 19.86%, 24.64%, 32.86%, higher Precision 28.07%, 18.96%, 16.86%, 25.86%, 26.86%, higher recall 27.86%, 32.54%, 27.86%, 23.95%, 19.97%, and the efficiency of the proposed method FE-ADCNN-GBO-SVM is likened with the existing processes. Classification of mammograms depends features removal processes with support vector machine (FE-LBP-GLCM-SVM), breast cancer classification with global discriminate features on mammographic images (FE-GLCM-ANN), enhancing breast cancer classification with (SMOTE) technique and pectoral muscle removal on mammographic images (FE-SMOTE-RF), application of artificial intelligence depends deep learning on breast cancer screening and imaging diagnosis (FE-CNN-CDCNN) respectively.

KEYWORDS

AlexNet deep convolutional neural network, breast cancer, gradient-based optimizer Wrapper-based feature extraction unit, SVM classifier mammogram images

1 | INTRODUCTION

Nowadays, breast cancer is becoming more serious disease that affects women and carries a higher mortality rate.[1,2] Based on the WHO (World Health Organization), 450,000 patients die every year universal.[3,4] The mortality rate from breast cancer is detected using an effective screening process at initial stage of cancer.[5] The main measure for detection is to take an x-ray of the breast region known mammogram.[4] Mammography is very

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REVIEW ARTICLE **OPEN ACCESS**

Influence of Advanced Blockchain technology on digital health interventions

Prabhakara Rao Kapula[1,*], N K Sakthivel[2], K K Ramachandran[3], Gopal Ramchandra Kulkarni[4], Nabamita Deb[5]

[1]Professor, Department of ECE, B V Raju Institute of Technology, Narsapur. Telangana State
[2]Dean, Computer Science and Engineering, Nehru Institute of Engineering and Technology,Coimbatore, India
[3]Professor, Commerce/ Management Science, DR G R D College of Science, India
[4]Principal, Merchant Engineering College, Basna 384380, Gujarat, India
[5]Assistant Professor Department of Information Technology, Gauhati University
*Email : prabhakar.kapula@bvrit.ac.in

ABSTRACT

This research study clearly reflects the impacts of Blockchain technology on interventions of digital health and the major characteristics of this technology has been mentioned clearly in this context. The introduction part clearly describes the definition of Blockchain technology along with its major function in diverse filed. The key function of this technology on health care-related systems has also been analyzed in this section. The literature review part critically analyzes four major features of Blockchain technology along with its impacts on the health care sector. The other influential characteristics have also been evaluated in this context critically. After that, the various advancement in these technologies has also been mentioned that truly incentivize the incorporation of digital technologies in health sectors. The research methodology part also describes the detailed process of evaluating results about the impact of Blockchain technology on health care works. Analysis and interpretation reflect four tables and respective graphical representations of the survey results. The survey has occurred by taking 55 people. Among them some are patients and some are healthcare professionals. The discussion part analyzes the survey result as well as some real examples of Blockchain technology in health sectors. At last, a clear conclusion has been provided that supports the influence of this technology on "digital health interventions".

Keywords: *Blockchain technology, Immutability, Decentralization, distributed ledger, consensus algorithm*

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INTRODUCTION

Blockchain technology reflects a unique method through which diverse information can be easily recorded in a definite way. This technology is well developed and provides a huge level of protection to the information system. It is a unique kind of digital method by which transactions have been duplicated as well as distributed across the whole network of computer systems within the Blockchain [1]. It comprises a diverse kind of application such as compilation of huge amount of data on sales, tracking digital payments and various kinds of health care works. Many challenges have been observed in the field of appropriate patient care such as transparent interoperability, maintaining data privacy, and various kinds of technology-related issues, patient-centric data security, and proper governance of all kinds of work in the hospital and similar other managerial things. Those kinds of work have needed a huge level of accuracy as well as the accountability that can be easily provided by the implementation of unique Blockchain technology. Apart from that it also offers a huge level of patient-centric interoperability that has huge importance in all hospitals.

Immutability of the health care information that has been stored within a Blockchain hugely attracts attention and based on that information an appropriate discussion about the health condition can be achieved. Proper implementation of this Blockchain technology can easily improve the authentic management of several kinds of medical records as well as processes for claiming insurance [2]. It also hugely accelerates biomedical and different types of clinical research and also incentivizes the formation of a "healthcare data ledger".

The application of Blockchain technology totally depends on some useful characteristics of this unique technology. The major features are-decentralized management, data provenance, a huge improvement in

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Selection of Optimal Thresholds in Multi-Level Thresholding Using Multi-Objective Emperor Penguin Optimization for Precise Segmentation of Mammogram Images*

S. Subasree

Department of Computer Science and Engineering,
Nehru Institute of Engineering and Technology,
Coimbatore, Tamil Nadu, India

N. K. Sakthivel†

Nehru Institute of Engineering and Technology,
Coimbatore, Tamil Nadu, India
drnksakthivelphd@gmail.com

V. R. Balasaraswathi

Department of Networking and Communications,
School of Computing, SRM Institute of Science and Technology,
Kattankulattur, Tamil Nadu, India

Amit Kumar Tyagi

School of Computer Science and Engineering,
Vellore Institute of Technology,
Chennai, 600127, Tamil Nadu, India

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In medical image examination, image segmentation is the broadly used method. Currently, the efficient segmentation of mammogram images is the main challenge. Many methods were presented for segmenting the mammogram images, but the results are not satisfactory. In this paper, an efficient segmentation of mammogram images-based Multilevel Thresholding (MLT) method is proposed. Initially, the preprocessing step is executed for eliminating the unnecessary noises. For gaining the useful features from the mammogram images, mammogram image segmentation is carried out using multilevel thresholding method. In this paper, a novel Multi-Objective Emperor Penguin Optimization (MOEPO) algorithm is proposed for searching the multilevel greatest thresholds that segment the images into background and objects. The

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†Corresponding author.

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RESEARCH ARTICLE

WILEY

A Wrapper based feature extraction framework based on AlexNet deep convolutional neural network parameters optimized using gradient-based optimizer for mammogram images

N. K. Sakthivel[1] | S. Subasree[2] | Shaveta Malik[3] | Amit Kumar Tyagi[4]

[1]Nehru Institute of Engineering and Technology, Coimbatore, India

[2]Department of Computer Science and Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India

[3]Department of Computer Science and Engineering, Terna Engineering College, University of Mumbai, Mumbai, India

[4]School of Computer Science and Engineering, Vellore Institute of Technology, 600127, Chennai, India

Correspondence
N. K. Sakthivel, Dean, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India.
Email: drnksakthivelphd@gmail.com

Abstract

In this manuscript, a Wrapper based feature extraction framework based on AlexNet deep convolutional neural network (ADCNN) with gradient-based optimizer (GBO) is proposed for early detection of breast cancer. In this input images are occupied as mini-mammography image analysis society (MIAS) database. Then the images are pre-processed to eliminate that noises using Markov random field (MRF) method. Image features are extracted by the process of Wrapper based feature extraction framework with ADCNN. Then, the weight parameters of ADCNN are optimizing through the aid of GBO. Then the mammogram images are characterized as normal or abnormal (malignant and benign) with SVM classifier. The simulation process is implemented on MATLAB platform. The proposed ADCNN-SVM-GBO attains higher accuracy 34.64%, 28.86%, 19.86%, 24.64%, 32.86%, higher Precision 28.07%, 18.96%, 16.86%, 25.86%, 26.86%, higher recall 27.86%, 32.54%, 27.86%, 23.95%, 19.97%, and the efficiency of the proposed method FE-ADCNN-GBO-SVM is likened with the existing processes. Classification of mammograms depends features removal processes with support vector machine (FE-LBP-GLCM-SVM), breast cancer classification with global discriminate features on mammographic images (FE-GLCM-ANN), enhancing breast cancer classification with (SMOTE) technique and pectoral muscle removal on mammographic images (FE-SMOTE-RF), application of artificial intelligence depends deep learning on breast cancer screening and imaging diagnosis (FE-CNN-CDCNN) respectively.

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Prabhakara Rao Kapula[1,*], N K Sakthivel[2], K K Ramachandran[3], Gopal Ramchandra Kulkarni[4], Nabamita Deb[5]

[1]Professor, Department of ECE, B V Raju Institute of Technology, Narsapur. Telangana State
[2]Dean, Computer Science and Engineering, Nehru Institute of Engineering and Technology,Coimbatore, India
[3]Professor, Commerce/ Management Science, DR G R D College of Science, India
[4]Principal, Merchant Engineering College, Basna 384380, Gujarat, India
[5]Assistant Professor Department of Information Technology, Gauhati University
*Email : prabhakar.kapula@bvrit.ac.in

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Nehru Institute of Engg. & Technology
T.M. Palayam, Coimbatore - 641 105

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IoT based artificial intelligence indoor air quality monitoring system using enabled RNN algorithm techniques

Senthilkumar Ramachandraarjunan[a,*], Venkatakrishnan Perumalsamy[b] and Balaji Narayanan[c]
[a]*Department of Computer Science and Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India*
[b]*Department of Electronics and Communication Engineering, CMR Technical Campus, Telagana, India*
[c]*Department of Information Technology, Karpagam College of Engineering, Coimbatore, Tamilnadu, India*

Abstract. Monitoring indoor air quality stays needed for human health because people use more than 95% of air in their indoor rooms. An Intelligent Internal Air Quality Monitoring (IIAQM) system built on the Internet of Things (IoT) devices has been developed and tested in Quantanics Techserv Private Limited, Tamilnadu, India. To monitor the levels of CO_2, $PM_{2.5}$ (Particle Matters 2.5), and moisture measurement, the IIAQM model has been used to monitor the present level of air quality. The gateway collects IIAQM sensor data in a few seconds and transfers data to cloud server. Approved users can incorporate the cloud systems through mobile applications or web servers. Installation of sensor networks, instrument transformers, and IoT-powered microcontrollers will provide air quality monitoring for buildings. The proposed window controller configuration is designed with the help of a Recurrent Neural Network (RNN) to predict the air quality level in advance. If the air quality level is above the normal level, the window controller automatically will open with the help of sensor activity control system. After the AQI (Air Quality Index) becomes normal, hence the window controller is closed automatically. The air quality index, CO_2, and humidity data are visualized on the Grafana dashboard.

Keywords: Internet of things, machine learning, recurrent neural networks humidity sensor, intelligent internal air quality monitoring system

Nomenclature and Abbreviation

AC	Air Condition
IEEE	Institute of Electrical and Electronics Engineering
TDNN	Time-Delay Neural Network
IEQ	Indoor Environment Quality
MPC	Model Predictive Control
IoT	Internet of Things
ML	Machine Learning
RNN	Recurrent Neural Networks
TDN	Time-Delay Network
HS	Humidity Sensor
IIAQMS	Intelligent Internal Air Quality Monitoring System.
CO_2	Corbon Di-oxide
$PM_{2.5}$	Particle Matters 2.5 sensor
AQI	Air Quality Index
HVAC	High voltage alternating current
IHEM	Improved Home Energy Management
MCU	Micro Control Unit
DL	Deep Learning

*Corresponding author. Senthilkumar Ramachandraarjunan, Department of Computer Science and Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India. E-mail: sentinfo@gmail.com.

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An Advanced Health Monitoring Device For Treating Chronic Diseases Using Iot

N.Arun Prasath
Assistant Professor,ECE,Rathinam Technical Campus, Coimbatore

S. MuthuVijaya Pandian
Professor,EEE, VSB College of Engineering Technical Campus, Coimbatore

M.Muthukrishnaveni
Assistant Professor(Sr.Gr),S&H, Sri Ramakrishna Institute of Technology, Coimbatore

M.Karthikeyan
Ph.D Research Scholar, Anna University, Chennai

A.Wasim Raja
Assistant Professor,CSE, Nehru Institute of Engineering and Technology, Coimbatore

J.Swathi
Assistant Professor,ECE, Rathinam Technical Campus, Coimbatore

ABSTRACT:

A GSM based health assistant for people with chronic diseases proposes and implements a prototype to help people with chronic diseases. The system is composed of two components namely, wearable body area network and a microprocessor unit with GSM and GPS. This project can track certain chronic diseases namely, heart problems, asthma, apart from the chronic diseases can also track blood pressure with sensors namely, electrocardiogram (ECG) sensor, temperature sensor, heart beat sensor and blood pressure sensor. This project keeps track of the readings from the sensors and if there are some abnormalities it would send messages via GSM stored in SIM.The location of the patient can be sent using GPS.

INTRODUCTION:

The ability to move freely is highly valued by all people. However, it is sometimes difficult for a person suffering from chronic diseases as they run a risk of collapsing at random places. According to the World Health Organization's statistics, millions of people suffer from chronic diseases every day also all health parameter monitoring system,but for people living in the rural area the ICU Intensive care unit charges are not affordable. With wireless communication technology, miniaturization of sensors and internet technology, there has been considerable interest in development of wearable and wireless health monitoring systems. Most of the people would like to live a free life rather than the caged life enclosed in a room. GSM Based Health Assistant for People with Chronic Diseasesis a wearable health monitoring system. This system plays an important role in enabling ubiquitous communication between the patient and the physician which targets at ambulatory health status monitoring. Medical sensor is

Enactment of Firefly Algorithm and Fuzzy C-Means Clustering For Consumer Request and Demand Prediction

Sruthi S Madhavan[1], Dr. M. Rajesh Babu[2], S. Venkatesh[3] and M. Madan Mohan[4]

[1]Assistant Professor, Department of AI&DS, Nehru Institute of Engineering and Technology, Coimbatore.
[2]Professor, Department of AI&DS, Nehru Institute of Engineering and Technology, Coimbatore.
[3]Assistant Professor, Department of CSE, Nehru Institute of Engineering and Technology, Coimbatore.
[4]Assistant Professor, Department of CSE, Nehru Institute of Engineering and Technology, Coimbatore.

Abstract: Day by day massive information is being added up over the World Wide Web. Utilizing and predicting related web pages as per user's interest from exponentially growing web information is becoming crucial and very critical. Web users expect relevant web pages of their interest to be retrieved at a faster pace in short time duration. So, this paper aims to present a novel methodology in finding consumer's upcoming demand and predicting future request in web page recommendation system. The baseline of the proposed methodology is, it uses a hybrid Levenberg-Marquardt firefly neural network algorithm to classify data as potential and non-potential consumers, then collects and clusters data of potential consumers using improved fuzzy C-means clustering algorithm and finally envisages the upcoming demand for the subsequent consumer. The proposed model is implemented in the operational platform of Java in Cloud Sim and can applicable for quantum computing also. The results are recorded, tabulated and analysed for various metrics like execution time, memory occupied, clustering time, clustering accuracy and recommendation accuracy. On comparative analysis with existing K-means technique, the proposed system proves to be more efficient.

Keywords: Web page recommendation, K-means clustering, Levenberg-Marquardt, firefly, neural network, classification, prediction, Quantum Computing.

1. Introduction

The usage of World Wide Web has become integral part of our life. Massive amounts of information are being added up every day leading to exponential growth of data. Due to the massive expansion of the internet and IT technology, electronic commerce is suitable, inexpensive and with no restriction in the area of space and time, it turns out to be the mainstream of populace utilization model [3]. From the voluminous amount of information, web mining techniques help to discover and analyse useful information. Such discovered knowledge is very useful for decision makers to bring relevant changes in the industry like in e-commerce to increase the productivity.

Data mining involves extracting meaningful information as per user's interests from voluminous dataset. In data mining procedure, web mining is a process which is used to extract and determine knowledge automatically from data obtainable on the web in the form of web documents, images, audios, videos etc. The foremost ideology of data mining process is to recognize possessions, picking suitable information, simplification, examining and analysing information [2]. Web mining comprises three kinds of information such as - data from internet data, log of internet access servers and web structure data [1].Depending on the type of data, web mining is categorised into

- Web content mining
- Web usage mining
- Web structure mining

Web usage mining uses web logs to extract usage patterns of users. Whereas web content mining and web structure mining uses web data content and configuration of web like hyperlinks information respectively. Knowingly or unknowingly, users provide some useful data that is recorded in the web log. Discovering user pattern from weblog will help to scale up the performance of web services. Ideally, web usage mining goes through three stages- pre-processing, pattern discovery and analysis [19].

Many times, customers are given multiple choices or overloaded with irrelevant information. Due to the enormous quantity of hosted documents on the web, progressively and consequently removing information competently and wisely is a demanding mission in online web system [10]. Depending on their entity inclination, interests and requirements, web personalization systems have materialized to get through this difficulty by supplying a personalized knowledge to consumer [11]. Web-page recommendation is a significant process in intelligent web systems. Recommender systems

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Selection of Optimal Thresholds in Multi-Level Thresholding Using Multi-Objective Emperor Penguin Optimization for Precise Segmentation of Mammogram Images*

S. Subasree

Department of Computer Science and Engineering,
Nehru Institute of Engineering and Technology,
Coimbatore, Tamil Nadu, India

N. K. Sakthivel†

Nehru Institute of Engineering and Technology,
Coimbatore, Tamil Nadu, India
drnksakthivelphd@gmail.com

V. R. Balasaraswathi

Department of Networking and Communications,
School of Computing, SRM Institute of Science and Technology,
Kattankulattur, Tamil Nadu, India

Amit Kumar Tyagi

School of Computer Science and Engineering,
Vellore Institute of Technology,
Chennai, 600127, Tamil Nadu, India

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In medical image examination, image segmentation is the broadly used method. Currently, the efficient segmentation of mammogram images is the main challenge. Many methods were presented for segmenting the mammogram images, but the results are not satisfactory. In this paper, an efficient segmentation of mammogram images-based Multilevel Thresholding (MLT) method is proposed. Initially, the preprocessing step is executed for eliminating the unnecessary noises. For gaining the useful features from the mammogram images, mammogram image segmentation is carried out using multilevel thresholding method. In this paper, a novel Multi-Objective Emperor Penguin Optimization (MOEPO) algorithm is proposed for searching the multilevel greatest thresholds that segment the images into background and objects. The

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†Corresponding author.

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Research article

Optimally detecting and classifying the transmission line fault in power system using hybrid technique

P. Rajesh [a], R. Kannan [b], J. Vishnupriyan [c], B. Rajani [d]

[a] Department of Electrical and Electronics Engineering, Anna University, Chennai, India
[b] Professor, Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore-641 105, India
[c] Centre for Energy Research, Chennai Institute of Technology, Chennai 600069, Tamilnadu, India
[d] Department of Electrical and Electronics Engineering, Aditya college of Engineering & Technology, Surampalem, Andhra Pradesh, India

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Highlights

- Hybrid technique is proposed for predicts, classifies the power system transmission line faults.
- The proposed technique is the consolidation of both TSVD and HUA based RPNN.
- TSVD prepare dataset based on transmission line parameters normal and abnormal condition.
- The extracted dataset is assessed by the HUA based RPNN technique.
- The proposed technique guarantees the system with lessens complexity.

Abstract

In this paper, a hybrid system is proposed to predict and classifies the power system transmission line faults. The proposed technique is the consolidation of both the truncated singular value decomposition (TSVD) and Human urbanization algorithm (HUA) based Recurrent Perceptron Neural Network (RPNN), and hence it is named as TSVD-HUARPNN technique. TSVD is matrix decomposition, this technique qualify the outcome it as fast or not. In the

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Cross-Slice Radio Resource Optimization In An LTE-A Network Based On Owl Search Algorithm

R. Kannan[1], Leeban Moses[2], Perarasi[3], Ram Kumar Raja[4]
[1]Nehru Institute of Engineering and Technology, Coimbatore.
[2]Bannari Amman Institute of Technology
[3]Sathyamangalam, TamilNadu.
[4]King Khalid University, Abha,Saudi Arabia.

Email: [1]leebanmoses@gmail.com

Abstract. ***The phenomenal development of mobile networks and the intelligence of smart mobile devices push resource providers to gaze for more efficient management mechanisms for radio and core network resource so as to improve the clients QoS and the efficiency of traffic management. Network slicing is a technology with the built in concepts of software-defined network (SDN) and network function virtualization (NFV), which enables service providers to set up multiple independent virtual networks to support a wide range of services and applications on a single physical network. An efficientnetwork slicing resource allocation system on LTE network is proposed in this work which helps the network to manage resources allocation individually based on their desires and physiognomies. We formulated the optimal allocation of resources as a convex problem with the goal of optimizing the overall data rate function of the system. We implemented an owl-based search approach to solve the problem of process optimization and theoretically demonstrated that the approach is special and also converges to the optimal solution of the global system. The proposed solution is implemented in MATLAB and simulation results have been given to test the bandwidth and resource allocation efficiency of the distributed scheme for different users based on demand. We also contrasted their success with our proposed metaheuristic approach and without it and the results describes the increased efficiency for network slicing.***
Keywords: software-defined network, network function virtualization, convex problem, optimal allocation, metaheuristic approach.

1. INTRODUCTION

The concept of network slicing can be applied based on two types: vertical and horizontal network. Vertical slicing target supports with vertical industry and markets. It allows sharing of resources between services as well as applications to avoid and clarify an impact of traditional engineering of QoS. Horizontal slicing is a goal of progress, to expand the ability of mobile devices as well as enhance experiences of user. Horizontal slicing passes beyond the platforms as physical limits. It allows you to share resources between nodes as well as network devices, i.e., nodes / high capacity network devices divide their resources (for example, computing, communication, storage) to improve the ability of less capable network nodes / devices. A final outcome of horizontal slice is a novel generation that underlies the mobile network groups; here the terminals become nodes of mobile networks. Horizontal slicing needs the exchange of resources by air at nodes of network.

Hybrid Renewable Energy Fed Battery Electric Vehicle Charging Station

Publisher: IEEE

R. Kannan ; S. Karthikkumar ; P. Suseendhar ; S. Pragaspathy ; B. N. Ch.V. Chakravart... All Authors

Abstract

Document Sections

I. Introduction

II. Hybrid Renewable Sources for Proposed DC Microgrid and Electric Vehicles

III. Control and Charging Architecture of Proposed Electric Vehicles

IV. Experimental Verification and Discussion

V. Conclusion

Abstract: The demand for energy is growing much faster and perhaps the consumption from conventional resources have infected the environment conversely. Now, the electrical technol... **View more**

Metadata

Abstract:

The demand for energy is growing much faster and perhaps the consumption from conventional resources have infected the environment conversely. Now, the electrical technology is in the microgrid generation where it supports to access the distributed energy sources practically. This paper presents the integration of renewable energy into the public ported battery electric vehicle (EV) via microgrid technology. EV charging station fuelled by the hybrid microgrid system ensures the smooth control and active power flow in the modern distributed systems. But the clumsy and heterogeneous charging of EVs in the migrogrid system leads to the ineffectual exploitation of renewable resources under some vital circumstances. The transition towards EV promotes the development in charging station via charging architecture with multiport configurations, which will impose complexity to the microgrid further. The issues associated with the utilization of renewable resources and in-line charging of EVs in the distributed microgrid systems is addressed in this paper. Solar photovoltaic (PV) and wind energy (WE) forms the hybrid renewable system.

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Research Article

Optimal Design for Super Capacitor/Battery Power Management Applied in Electric Vehicle Applications: A Hybrid Methodology

R. Kannan, Paulthurai Rajesh & Francis H. Shajin

Published online: 22 Nov 2021

Abstract

This manuscript presents an optimal control system for energy management of the hybrid energy storage system (HESS) as battery and super capacitor (SC) on electric vehicles (EVs). The proposed system is parallel execution of levy flight with Tunicate swarm optimization. The proposed method is improved by levy flight distribution;

hence, it is named Improved Tunicate swarm optimization (ITSA). Here, the HESS method calculates the super capacitor reference voltage in terms of load dynamics

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A new swarm intelligence optimization approach to solve power flow optimization problem incorporating conflicting and fuel cost based objective functions

Luke Jebaraj [a], Sithankathan Sakthivel [b]

[a] Department of Electrical and Electronics Engineering, M.I.E.T. Engineering College, Tiruchirappalli, Tamil Nadu, India
[b] Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

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Abstract

Optimization of Power Flow (OPF) is a notable key tool pertinent to power system process, in both setting up and working phases and it is structured for a specific objective to optimize over power system variables, based on definite constraints. A new method of optimization based on swarm intelligence named Sparrow Search Algorithm (SSA), is proposed in this article to resolve the OPF problem in a most efficient way. The different equipped constraints like power balance, generator capacity, bus voltage limit and line flow, were taken into account. Shunt reactive power compensating elements and tap changing transformer settings were also incorporated in the problem formulation as control variables. The proposed SSA based OPF was constructed by several constraints, formulations and objective functions, scrutinized with higher number of cases (33 cases), for the first time, on the three well-liked IEEE networks (IEEE 30-, 57- and 118-bus) via single and weighted amount multi-objectives. The simulation result was examined and the performance and preeminence of the obtainable method was evaluated against other well-constructed recent optimization studies, reported in the literature. The percentage reduction of fuel rate, active transmission loss and deviation in voltage, were examined and compared with some most important recent studies, specified in the literature. Percentage improvement of voltage stability was also evaluated with recent studies, accounted in the literature.

Previous Next

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Original Article

Hybrid Bat Optimization Algorithm Applied to Optimal Reactive Power Dispatch Problems

S. Sakthivel Padaiyatchi[1], S. Jaya[2]

[1]*Professor, Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore. Tamilnadu, India*
[2]*Professor, Department of Electronics and Communication Engineering Annai Veilankanni's College of Engineering, Chennai, Tamilnadu, India*

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Abstract *- Security and economics of a power system are optimized by the control of reactive power dispatch from synchronous generators and var sources like SVCs installed in the system. Optimal reactive power dispatch (ORPD) is achieved by properly setting the value of control parameters. Generator bus voltages, transformer tap positions and SVC settings are the control parameters for reactive power optimization. Generally, artificial intelligence techniques are used for optimizing the values of control variables. In this work, a hybrid bat optimization algorithm based on particle swarm algorithm, namely HPSOBA, is proposed for reactive power optimization. This algorithm mimics the echolocation behavior of microbats. Microbats emit a kind of SONAR and wait for the echo that is bounced from the prey. The bats analyse the echo for understanding the location and size of the prey in their path. This behavior is copied in the new algorithm. The strength of this algorithm is tested by comparing its performance with that of the other bio-inspired algorithms like Biogeography Based Optimization (BBO). The test systems taken are the standard IEEE-30 bus and IEEE-57 bus systems. The results obtained are much encouraging.*

Keywords — *Optimal reactive power dispatch, Particle swarm optimization, Bat optimization algorithm, Loss minimization, VD minimization.*

I. INTRODUCTION

Reactive power or voltage control is a primary requisite for ensuring the security of power systems [1]-[2]. Reactive power control is possible by the installation of new var sources or by optimizing the reactive power output from synchronous generators and already installed var sources in the system. Non-optimized reactive power flow is indicated by increased real power loss in a power system. Minimization of real power loss is, therefore, necessary for optimal reactive power dispatch [3]. Another less important quantity that is adjusted to achieve this task is voltage deviation at load buses. The ORPD is a nonlinear, multiobjective and multi constrained optimization problem [4]-[5]. Finding the global best solution for this problem is not so easy.

The decision variables in this optimization problem are generator bus voltage magnitudes, transformer tap settings and var output from SVCs located in the system [6]-[7]. These control variables are non-continuous, and the problem has multiple minima and maxima. An efficient optimization algorithm is needed for attacking these kinds of problems.

Reactive power optimization is long being attempted by conventional optimization techniques such as Linear Programming (LP) [8], Nonlinear Programming (NLP) [9], Mixed-integer Programming (MIP) [10], Decomposition Technique (DT) [11], Dynamic Programming (DP) [12] has been studied. Gradient-based optimization algorithms have also been used to solve the ORPD problem [13]-[15]. These methods are incapable of handling nonlinear, discontinuous functions and constraints and problems having multiple local minimum points. Newton method has been successfully used in [16]–[18]. In all these techniques, simplifications have been done to overcome their limitations.

Recently, intelligence-based optimization methods have been proposed for engineering optimization problems. Wu, in [19], used Evolutionary Programming (EP) in a power system to accomplish optimal reactive power dispatch/voltage control. Lai in [20] showed EP is more capable of handling non-continuous and non-smooth functions comparing nonlinear programming. In [21], Lee has combined the Simple Genetic Algorithm (SGA) with successive linear programming for solving reactive power control problems. Particle Swarm Optimization (PSO) was applied in [22] for reactive power and voltage control considering voltage security assessment. In [23] Differential Evolutionary (DE) algorithm is implemented to the optimal

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Automation of Home Appliances using Advanced Light Control System

Dr.R.Anand

Abstract— This world is Full of different kind of light sources some are natural ones while others are man-made light sources. The man-made light sources have only two modes of operation that is switch on and switch off there is no intermediate level that can be set according to the people available in the room and at the end everything needs to be controlled manually. These lead to wastage of electricity and at the same time a manual control is not effective in the modern era. Hence we purpose an advanced light control system which is capable of replacing the old generation light control system. The system is implemented on an embedded platform & is equipped with a infrared sensors(IR) which gives the required input for operation .The working of our light control system is based on the count of the people in the room at that moment of time.

Keywords—Lignt Control System , Modern era, Embedded system, Electricity etc.

I. INTRODUCTION

Room automation involves the control and automation of various features of a room. It includes lighting, fan, exhaust etc. Nowadays the energy is wasted by modern people as they don't care much about energy so they use it according to their comfort. We must remember that energy is the most important aspect in every one's life, we should consider saving it. For this we can use the idea of automation.

Automation of rooms helps in optimizing energy consumption and easy usage of room operations. It optimizes energy without compromise the comfort of the user GSM module is used for remote controlling of room features by the user itself. LDR and temperature sensors help in monitoring room light and temperature conditions respectively. This data is used for automatic control of light intensity and fan speed control. PIR sensor is included for human detection and Thief alerts. Alerts are sent to user's cell phone. Shades are automated according to time and human presence.

The sound system which wakes up user in the morning also greets the user when entered to the room. Exhaust fan is provided to improve air quality. If we are bored with automation, we can always switch to manual controlling mode. By initiating the automated smart rooms we can neglect the unwanted wastage of energy.

Dr.R.Anand , Associate Professor, Department of Electrical and Electronics Engineering , Nehru Insitute of Engineering and Technology, Coimbatore, Tamilnadu (e-mail: anandrb.pk@gmail.com).

Home automation or smart home (also known as domotics or domotica) is the residential extension of building automation and involves the control and automation of lighting, heating (such as smart thermostats), ventilation, air conditioning (HVAC), and security, as well as home appliances such as washer/dryers, ovens or refrigerators/freezers that use Wi-Fi for remote monitoring. Modern systems generally consist of switches and sensors connected to a central hub sometimes called a "gateway" from which the system is controlled with a user interface that is interacted either with a wall-mounted terminal, mobile phone software, tablet computer or a web interface, often but not always via internet cloud services. These days, the web need ended up a normal interface that a significant number of gadgets use in place will improve the everyday life about numerous individuals.

Web aides us to get quick result for huge number of issues capable to interface starting with any of the remote spots which contributes with general expense decrease furthermore vitality utilization. Home mechanization might make portrayed as introduction for innovation organization in the home environment which provides straightforwardness which is more secure with its occupants.

Towards utilizing the innovation of web for Things, those examinations Furthermore execution about home mechanization have got extra Normal. Different remote advances which has the capacity to help some sort of remote information transfer, sensing also management like Bluetooth, Wi-Fi and other cell division networks would be used to enter abundant levels for discernment inside the home. It might provide an interface with home mechanization itself, by means of mobile phone or alternately the internet.

The Main objective of this work is

- Optimizing energy consumption without compromising comfort
- Automation of room functions and remote controlling
- First generation: wireless technology with proxy server, e.g. Zigbee automation; Second generation: artificial intelligence controls electrical devices, e.g. amazon echo; Third generation: robot buddy "who" interacts with humans, e.g. Robot Rovio, Roomba.
- Applications and technologies: Heating, ventilation and air conditioning (HVAC): it is possible to have remote control

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Efficient Consumption of Renewable Energy using Vehicle to Grid Technology

Mrs.P.S.Meenambikai., Assistant Professor, Dept. of EEE, DMI Engineering College,Aralvaimozhi,Kanyakumari.
Mr.R.Prem Kumar, Assistant Professor, Dept. of EEE, Rohini College Of Engineering and Technology,Kanyakumari.
Dr.R.Anand, Associate Professor, Dept. of EEE, Nehru Institute Of Engineering and Technology,Coimbatore

Abstract—An electric vehicle (EV) charge-discharge management framework for the effective utilization of photovoltaic (PV) output through coordination based on grid energy management system (GEMS). In this proposed framework, the GEMS determine an EV charge-discharge plan for reducing the residential operation cost and PV curtailment without disturbing EV usage for driving, on the basis of voltage constraint information in the grid provided by the GEMS and forecasted power profiles. Then, the GEMS controls the EV charge-discharge according to the determined plan and real-time monitored data, which is utilized for mitigating the negative effect caused by forecast errors of power profiles. The proposed framework was evaluated on the basis of the Japanese distribution system (DS) simulation model.The simulation results show the effectiveness of our proposed framework from the view point of reduction of the residential operation cost and PV curtailment

Keywords— Grid energy management system, Japanese distribution system, PV curtailment, Residential operation cost etc

I. Introduction

With environmental and climate change issues and legislation, rising energy costs, concerns about energy security and fossil energy reserves, and growing consumer expectations, plug-in electric and hybrid vehicles (PEVs) are appearing worldwide . Even though PEVs have not been widely adopted, in part because of technical limitations, social obstacles, and cost compared to conventional internal combustion engine (ICE) vehicles , PEVs have an advantage compared to self- contained hybrid electric vehicles (HEV) and ICE vehicles: a connection to the electric power grid. PEVs can serve in discharge mode as vehicle-to-grid (V2G) devices and in charge mode as grid to- vehicle (G2V) devices . The V2G concept has attracted attention from grid operators and vehicle owners. However, convenient recharging and available electricity supplies are necessary to realize the benefits of V2G capabilities.

Here reviews V2G/G2V technology and requirements, economic costs, challenges, and strategies for V2G interfaces of both individual PEVs and vehicle fleets. For purposes of the paper, "V2G" is used generically for both V2G and G2V energy flows. A range of proposed V2G concepts, services, benefits, components and power-flow technologies, individual and aggregated structures, and charging/recharging strategies are discussed. The context is PEVs whether purely electric or hybrid. It will be shown that V2G concepts that allow benefits to be shared among grid operators and vehicle owners are likely to accelerate PEV deployment. Controls and usage patterns must be evaluated for short-term and long-term impacts on battery life and utility distribution networks. PEVs can behave either as electric loads or as generators. The charging behavior of PEVs is affected by different factors such as the type of connection (unidirectional or bidirectional), geographical location, the number of PEVs being charged in a given vicinity, their charging voltage and current levels, battery status and capacity, charging duration, etc. Each vehicle can be contracted individually or as part of an aggregation.

Aggregators collect PEVs into a group to create a larger, more manageable load for the utility . These groups can act as distributed energy resources to realize ancillary services and spinning reserves. Cooperation between the grid operator and vehicle owners or aggregators is important to realize the highest possible net return. Many researchers have investigated potential benefits and costs issues of V2G concepts V2G- capable vehicles offer a possible backup for renewable power sources including wind and solar power, supporting efficient integration of intermittent power production .V2G systems can provide additional opportunities for grid operators, such as reactive power support , active power regulation, load balancing by valley filling , peak load shaving , and current harmonic filtering.

II. Block Diagram

The A virtual impedance based control strategy to reduce

Mrs.P.S.Meenambikai., Assistant Professor, Dept. of EEE, DMI Engineering College,Aralvaimozhi,Kanyakumari.
Mr.R.Prem Kumar, Assistant Professor, Dept. of EEE, Rohini College Of Engineering and Technology,Kanyakumari.
Dr.R.Anand, Associate Professor, Dept. of EEE, Nehru Institute Of Engineering and Technology,Coimbatore

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Comparative Analysis of EMG Activity of Upper Limb Muscle During Different Yoga Poses

Mr.A.Arulkumar[1], Mr. Edison Prabhu[2]

[1]Assistant Professor, Nehru Institute of Technology, Tamilnadu, Coimbatore
[2]Assistant Professor, Nehru Institute of Technology, Tamilnadu, Coimbatore

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ABSTRACT : *The objective of this study was to analyze the forearm muscle activation during upper limb yoga pose by using Surface electromyography. We investigated the muscle in the forearm like Biceps branchii, Triceps Branchii , Flexor Carpi Ulnaris and Branchioradialis during several yoga poses: (Bakasana, Mayurasana, Adho mukha Vrksasana and Tittibhasana) compared to quiet standing (mountain pose).Five healthy men and Five healthy women with more than six month of continues of continuous yoga experience who practiced at least 1h per week were recruited. EMG activity was recorded from the aforementioned muscles during mountain pose ("rest") for 50 s, five times.Subjects then performed the following yoga poses in a randomized sequence while surface EMG activity was recorded: Bakasana, Mayurasana, Adho mukha Vrksasana and Tittibhasana. EMG data were band pass filtered and the root mean square (RMS) was obtained. The peak RMS of each of the resting trials was obtained and averaged to produce an average peak resting RMS value. The study revealed significantly greater EMG activity in FCU and BR in all four poses when compared to BB and TB. In conclusion, upper limb yoga poses require increased use of the wrist musculature when compared to elbow musculature.*

Keywords: Upper limb, Surface Electromyography, Root Means Square, Yoga

1. Introduction:

Yoga is the significant exercise followed by world over to raise the health and fitness by coordinating the mind, body and spirit. Patients are requested by their health professionals to follow the yoga practice to raise the mental and physical well-being. The yoga followers reported that, the benefits (5) investigated the physical demands associated with five sitting asana. In this case, surface EMG output of the Biceps branchii, Triceps Branchii , Flexor carpi Ulnaris and Branchioradialis were analyzed. The EMG activity recorded during the poses was compared to EMG output during pullups at a self-selected constant speed. The authors concluded that the four muscles analyzed demonstrated an increase of yoga included improved blood circulations, improved respiration, improved cardiac function, improved mind well-being of concentration improvement, improvement in muscle strength and flexibility. During Yoga muscle activation is determined by Surface Electromyography in the most of the research because its simplicity to acquire the signal and moreover during other type of exercise SEMG is followed to quantify muscle activity.

Broad exploration exists researching different recovery practices utilizing surface EMG. (4)used EMG information to break down various lower arm muscle four activities. In that review, 23 "genuinely dynamic subjects" performed 4 activities (Pullups, Grip Crush, Forearm Pull and Forearm Squeeze). Subjects played out a warm up and had the option to rehearse each activity before beginning. Maximal willful isometric constriction (MVIC) information were gathered, trailed by a 5-min rest before practice testing started. The normal of this information was determined and the percent MVIC was resolved. The creators found that for each of the 4 muscles, there were genuinely critical contrasts in the mean EMG signal plentifulness across the 4 activities This data might be applied in a clinical setting when endorsing objective explicit furthest point muscles The convention utilized by (4)compliments the convention utilized in this investigation, and the creators support the requirement for additional examination with respect to surface EMG of muscle movement in explicit activities. Maybe than use MVIC, different creators have utilized pullups as a benchmark estimation to analyze strong work during yoga presents.

QoS- aware Multi-objective PSO-FA based Optimizer for Uplink Radio Resource Management of LTE-A Network

Publisher: IEEE

M.Mano Raja Paul ; T. Perarasi ; M. Leeban Moses ; P. Rahul All Authors

Abstract

Document Sections

I. Introduction

II. Related Work

III. Problem Formulation

IV. Proposed Algorithm

V. Results and Discussions

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Keywords

Abstract: Long Term Evolution Advanced (LTE-A), is a leading-edge technology that provides higher peak data rates, more consumers per cell, lower control plane latency and delivers... **View more**

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Abstract:

Long Term Evolution Advanced (LTE-A), is a leading-edge technology that provides higher peak data rates, more consumers per cell, lower control plane latency and delivers variety of Quality of Service (QoS) options which include Throughput, Packet Loss Rate, Packet Delay and the delay variation. The communication on the LTE air interface occurs between the Evolved Node B (eNB) and User Equipment (UE) and it is exceptionally imperative to deal with the resources because of the uninterrupted allocation of resources on the LTE networks. From the 3GPPLTE principles, while there is no coordination in uplink, at that juncture there would be a disputation based random access and it would be very tough administration would be a difficult job due to asymmetrical and mammoth UE transmissions. To surmount this challenge, a QoS-aware Multi-objective PSO-FA based Optimizer for Uplink Radio Resource Management of LTE-A Network is suggested in our research which eliminates the multi-objective Knapsack issue with limited modification in the class-based Resource allocation scenario. The first phase of the work would be the allocation

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Cross-Tier Interference Avoidance Prioritized Dy Resource Allocation Algorithm in Coexistence o A Networks

M. Mano Raja Paul[1], M. Leeban Moses[2], T. Perarasi[3], A. Bhuvanesh[4]

[1]Department of Electrical and Electronics Engineering, Nehru Institute of Engineering a Tamil Nadu

[2,3]Department of Electronics and Communication Engineering, Bannari Amman Sathyamangalam, Tamil Nadu

[4]Department of Electrical and Electronics Engineering, PSN College of Engineering c Tamil Nadu

Abstract

Internet of Things (IoT) is a developing perspective which provides accessibility as objects which enclose people at daily activities, like various methods of sensors, vehicle-to-vehic devices, RFID and NFC tags, etc. There are high expectations for IoT devices and networks conc quality, and long-term availability. Indeed, wireless connectivity is the most critical success fact for machine type communication (MTC) is increasing, so that the challenge for allocating resc increased. The patented nature of existing hardware devices cost of contribution space as we intermediate boxes, as well as lack of trained executive to combine as well as continue this serv Quality of Service (QoS) requirements for H2H communication and to provide data traffic for MT challenge for allocating the resources blocks to the users. A Cross-Tier Interference Avoidance Allocation algorithm is presented in this work for optimizing the problems faced by critical networks by maintaining the QoS requirements from a cross-layer design perspective. The re different combinations of Channel Quality Indicator (CQI) modes is performed and the computati terms of cell throughput and probability of delay bound violation (PBDV). Finally, the perfor mar algorithm is evaluated via numerical analysis.

Ultra-Wideband Flexible and Wearable Textile Antenna for Predicting Breast Cancer

Publisher: IEEE

M.Mano Raja Paul ; M. Leeban Moses ; T. Perarasi ; R. Kannan All Authors

Abstract

Document Sections

I. Introduction

II. Related Work

III. Ultra-Wideband Antenna Design

IV. Breast Phantom Design

V. Results and Discussions

Show Full Outline

Authors

Figures

References

Abstract: It is estimated that one after 22 women in India will get breast Cancer in their life time. The possibilities of early detection are that, it will categorize cancer while... **View more**

Metadata

Abstract:

It is estimated that one after 22 women in India will get breast Cancer in their life time. The possibilities of early detection are that, it will categorize cancer while still localized and curable, precluding not only mortality, but also reducing sickness and charges spend by them. Hence by developing an automated system for detecting the presence of cancerous tissue, analyzing the location and size of the developed dead tissue with low cost can support doctors for accurate diagnosis. The objective of this work is to design an Ultra-Wideband Textile Antenna in denim substrate of 0.75mm thickness with a dielectric constant of 1.7 for transmitting and receiving electromagnetic signals at 2.4GHz which can able to detect malignant tumor in breast cells. A breast tissue is placed between two Ultra-Wideband Wearable Textile Antenna and these two antenna act as sensors and we can basically characterize any biological tissue in terms of electrical features such as permittivity and tangent loss. Basically Biological tissue is highly non-homogenous material and is a mixture of blood Fat and many other biological components having different permittivity and

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Content Protection System using Matching Object for Cloud Based Multimedia

V.JAYARAJ , K.NAGARAJAN , T.PRABU , S.MOHAN

We propose a new idea for large-scale multimedia content protection systems. Our design leverages cloud infrastructures to provide cost efficiency, rapid deployment, scalability, and elasticity to accommodate varying workloads. The proposed system can be used to protect different multimedia content types, including 2-D videos, 3-D videos, images, audio clips, songs, and music clips. The system can be deployed on private and/or public clouds. Our system has two novel components:(i) method to create signatures of 3-D videos, and (ii) distributed matching engine for multimedia objects. The signature method creates robust and representative signatures of 3-D videos that capture the depth signals in these videos and it is computationallyefficient to compute and compare as well as it requires small storage. The distributed matching engine achieves high scalability and it is designed to support different multimedia objects. Weimplemented the proposed system and deployed it on two clouds:Amazon cloud and our private cloud. Our experiments with more than 11,000 3-D videos and 10,000 images show the highaccuracy and scalability of the proposed system. In addition, we compared our system to the protection system used by YouTube and our results show that the YouTube protection system fails to detect most copies of 3-D videos, while our system detects more than 98% of them. This comparison shows the need for the proposed 3-D signature method, since the state-of-the-art commercial system cannot handle 3-D videos.

Key Words: 3-D video, cloud applications, depth signatures, video copy detection, videofingerprinting.

Dr.V.Jayaraj Professor , Department of Electronics and Communication Engineering Nehru Institute of Engineering and Technology , Thirumalayampalayam Coimbatore - 641105
(E-Mail: vjayaraj@nehrucolleges.com)
K.Nagarajan Assistant Professor , Department of Electronics and Communication Engineering Nehru Institute of Engineering and Technology , Thirumalayampalayam Coimbatore - 641105
(E-Mail: knagarajan@nehrucolleges.com)
T.Prabu , Assistant Professor , Department of Electronics and Communication Engineering Nehru Institute of Engineering and Technology , Thirumalayampalayam Coimbatore - 641105
(E-Mail: tprabu@nehrucolleges.com)
S.Mohan Assistant Professor , Department of Electronics and Communication Engineering Nehru Institute of Engineering and Technology , Thirumalayampalayam Coimbatore - 641105
(E-Mail: smohan@nehrucolleges.com)

I.INTRODUCTION

Advances in processing and recording equipment of multimedia content as well as the availability of free online hosting sites have made it relatively easy to duplicate copyrighted materials such as videos, images, and music clips. Illegally redistributing multimedia content over the Internet can result in significant loss of revenues for content creators. Finding illegally-made copies over the Internet is a complex and computationally expensive operation, because of the sheer volume of the available multimedia content over the Internet and the complexity of comparing content to identify copies.We present a novel system for multimedia content protection on cloud infrastructures. The system can be used to protect various multimedia content types, including regular 2-D videos, new 3-D videos, images, audio clips, songs, and music clips. The system can run on private clouds, public clouds, or any combination of public-private clouds. Our design achieves rapiddeployment of content protection systems, because it is based on cloud infrastructures that can quickly provide computing hardware and software resources. The design is cost effective because it uses the computing resources on demand. The design can be scaled up and down to support varying amounts of multimedia content being protected.

The proposed system is fairly complex with multiple components,including:

(i) Crawler to download thousands of multimedia objects from online hosting sites,

(ii) Signature method to create representative fingerprints from multimedia objects, and

(iii) Distributed matching engine to store signatures of original objects and match them against query objects.

We propose novel methods for the second and third components, and we utilize off-the-shelf tools

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A Review of Graphical Password Strategy in Smart Android Phones

Dr.V.Jayaraj, K.Nagarajan, T.Prabu , S.Mohan

Abstract— In recent years, when users worldwide have mbraced smart devices in more significant numbers due to ecent advances and appealing applications, they have also ecome a target for criminals who are zealously attempting to reach protection. As a result, a significant number of attacks ave been observed on these systems. As a result, several assword-based authentication mechanisms have been roposed to counteract these attacks. Among them, the raphical password scheme is more consistent with smart evices, which are highly graphic-oriented. However, current raphical password schemes are vulnerable to various assaults, ncluding shoulder surfing, smudging, intersection attacks, and eflection attacks. Thus, the paper aims to review recently ublished papers on android smartphone graphical passwords nd identify used techniques. Moreover, they also analyze esults to understand users of such devices better to protect eir devices from unauthorized access and attacks.

Keywords— Android, Smart devices Authentication, Graphical assword, Information Security, Attacks.

I. INTRODUCTION

assword protection analysis is an essential aspect of the machine and accessible Security. Passwords have shown be challenging to be chosen by humans and not much used password schemes. Utilizing mnemonic or randomly eated passwords usually means that people choose asswords [1-5]. With the launch of smartphones and tablets, e unlock authentication options used to lock and unlock obile devices have become highly relevant in information otection [6]. There are two major dominant smartphone stems iOS, and Android, each with a native solution to unlocking. Although secondary and knowledge-based authentication, including fingerprints or face recognition, are essential, passcode-based authentication is still the primary means for mobile device security.

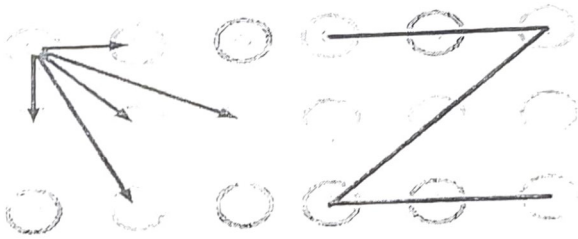

Fig. 1. Touchpoints that can be reached in a 3x3 pattern Unlock from the top left touch spot.

The iPhone's most popular passcode-based authentication mechanism is via a PIN consisting of at least 4-digit complexity (last updates may require a 6-digit). After its introduction, Android has provided a broader range of unlocking authentication methods, such as text-based passwords, PIN, facial recognition, and, most notably for this article, the graphical password pattern. Android unlocks be effective in many situations, and after they became broadly implemented, many applications have been analyzed in various contexts. In the first case, studies of unlock style authentication [7-13] showed that Android patterns remain reasonably common as an option of authentication. Various experiments [14-22] have also looked at how people select graphical login patterns on their Android devices. If there are some adjustments to the device [15, 23-25], some examples include changing the contact points, and password meters are indicators of strategies to influence preference [2, 26-28] demographic considerations in the collection [10, 29, 30]. The thesis includes a detailed overview and categorization of methods and strategies for compilation in other taxonomy documents. It provides owners of those systems with a clearer view of protecting their appliances from unwanted entry and attacks. [2, 15, 21, 31].

II. SMART ANDROID AUTHENTICATION SECURITY

An authenticator is a device used to verify a user's identification or conduct automated authentication. Through proving that he or she has ownership and control of an authenticator, an individual may authenticate to a computer device or program. The authenticator is, in the most basic

Dr V Jayaraj Professor Department of Electronics and Communication gineering, Nehru Institute of Engineering and Technology, rumalayamplayam, Coimbatore-641105 Tamilnadu,India Ph 43317834 , E-Mail metjayaraj@nehrucolleges com
K Nagarajan Assistant Professor, Department of Electronics and mmunication Engineering, Nehru Institute of Engineering and Technology, rumalayamplayam, Coimbatore-641105, Tamilnadu,India Ph 9944521649 Mail metnagarajan@nehrucolleges com
T Prabu Assistant Professor, Department of Electronics and mmunication Engineering, Nehru Institute of Engineering and Technology rumalayamplayam Coimbatore-641105 Tamilnadu India 9994870653 E-Mail metprabu@nehrucolleges com
S Mohan , Assistant Professor, Department of Electronics and mmunication Engineering, Nehru Institute of Engineering and Technology, rumalayamplayam, Coimbatore-641105, Tamilnadu,India Ph 9894572303 Mail metmohan@nehrucolleges com

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VLSI USAGE OF A PRODUCTIVE MBIST ARCHITECTURE UTILIZING RLFSR

K. Sivakami[1], P. Vijayalakshmi[2] and J. Jaya[3]
[1]Department of Electronics and Communication Engineering, Nehru Institute of Engineering and Technology, India
[2,3]Department of Electronics and Communication Engineering, Hindusthan College of Engineering and Technology, India

Abstract

This article introduces a power efficient application of FPGA created through a Memory Built in Self Test (MBIST). It has 2-bit Linear Feedback Shift Register (LFSR) array, which changes the direction of the previous process and creates high MBIST structures. This unwanted change affects all MBIST's power consumption. The proposed MBIST with LFSR ring reduces the power consumption problem. The 2-bit 2N bit model generator is connected to the 2-bit (N-2) and 2-bit 4-bit (N-2) LFSR model generator, which are separately controlled using two separate clocks with two different frequencies, creating each location address high memory test. The proposed architecture has been implemented on Vertex-4 FPGA technology in Xilinx software. The results enhance proposed design's performance when compared it with the existing design.

Keywords:

Xilinx, FPGA, Switching Activity, 2D-LFSR, Ring LFSR (RLFSR), Memory Built in Self Test (MBIST)

1. INTRODUCTION

In memory test, there are many problems with the design generator and System-On-Chips (SOC), especially power dissipation. In general, system's power dissipation is greater in test mode when compared with normal mode [23]. This is due to, consecutive vectors used in normal circuit mode, there is a significant correlation and this may not apply to the test vectors used. The decrease in correlation between continuous test vectors increase the switching function and gradually dissipates the power in the circuit. Another reason for increasing performance during testing is that test engineers can test center in parallel for reducing test usage time. This extra performance (average or maximum) can lead to problems like immediate loss of performance, quality verifying the performance and overall performance of the product, and reducing costs [26]. The use of low power tests is important in designing and testing VLSI today.

Existing work involved in developing the 2-bit 4 pattern LFSR configuration changes the model and a clock signal to reduce the use of toggle function in proposed control signal. The generated 2N-bit format is controlled by two various clocks with two various frequencies in conjunction with conventional (*N*-2)-bit $2^{(N-2)}$, bit LFSR 2bit-4 pattern etc. The transition between the two modes is reduced to toggle mode is still significantly reduced due to the configuration of the 2-bit generator, as a result of which the proposed reduction of dynamic performance [9] Apart from power dissipation in SOC [8], main issue that arises in the micronutrient technology, SOC design and leads to many thousands of gallons, especially in memories, but now integrated, together with the chip. From 2014, it is estimated that a typical 94% of the area occupied by the storage parts drawn thousands of gallons. In SOC, an important role is played by memory. Memory is a lack of a high probability of defect with regard to other types of customers and that the testing is required the remembrance. Best solution for solving small I/O pins count in circuit is BIST for Memory [2].

The BIST test pattern generator is used for generating write/read control, data bus and addresses bus signals in conventional MBIST and are applied to memory under test [1]. Memory location is indicated using address bus and in this specific memory location, operation to be performed are determined using Read/write control signal and data be to be written or read from the memory location pointed by address bus is included in data bus. The Fig.1 shows basic build in self-test structure.

In this paper highlighted the importance of models running fast and well to provide coverage for memory loss. Based on algorithms described using gallop, March, scan, etc., memory cell failure is tested using BIST engine architecture. In a MBIST, address generator is used for generating memory location address for testing faults [3]. According to the testing algorithm, address generator is designed. For MBIST, different address generators are utilized. A multiplexer and two counters combination is used in programmable MBIST as address generator [4]:[10].

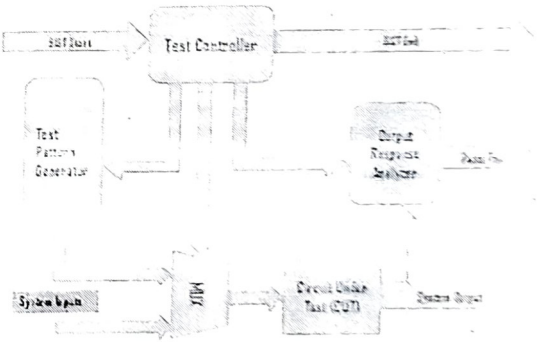

Fig.1. Basic MBIST Architecture

Built In Self-Test (BIST) engine design which is reusable is termed as joined example Generator and Checker (CPGC) [11] is executed on Intel 14nm 3DS IC. United alludes for joining MBIST and Interconnect BIST (IBIST) abilities into one BIST motor it's additionally portrayed an auto-fix innovation, which joined with deficiency discovery capacities, can actually re-map faulty memory be utilizing repetitive memory cells incorporated into DRAM [6]-[7]. It gives critical test time reserve funds in post bundle fabricating stream. CPGC additionally diminished SOC and stage power through On Die Termination (ODT)'s shut circle advancement as well as adjustment. This BIST types upholds IO, memory imperfection recognition, memory auto fix, IO interface preparing, power streamlining/preparing.

Software-Based Self-Test (SBST) is an adaptable as well as minimal effort answer for on-line March test application and blunder identification in little recollections. A SBST program

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Formulation and *Ex-Vivo* Evaluation of Naproxen Emulgel by Skin Irritation Test

Mettupalayam Annadurai RAJA [1], Saranya RAJENDRAN [2], Chamundeswari KANDASAMY [2], Ganesh Kumar GUDAS [3] & Kola VENU [1]

[1] *Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India-641105*
[2] *Dr. NGP Institute of Technology, Coimbatore, Tamilnadu, India-641048*
[3] *Sri Krupa Institute of Pharmaceutical Sciences, Siddipet, India-502277*

SUMMARY: **Emulgel is one of the recent technologies in NDDS used for dual control release of emulsion and gel for topical use. Gel formulations generally provide faster drug release compared with conventional ointments and creams. Naproxen is a well-known therapeutic agent that is used mainly for its centrally acting muscle relaxants. The aim and objective of the study is to formulate naproxen emulgel for topical application. Emulgel of naproxen, consist of Carbopol-934 or HPMC K100 as gelling agents for gel formulation and Tween 80, Span 20, for emulsion formulation. Emulgel was formulated by emulsion incorporated in gel. Naproxen loaded emulgel was formulated by using o/w emulsion because of lower solubility in water. Lemon grass oil, *Arachis* oil, and menthol were used as a penetration enhancer in emulgel formulation. Optimized formulation was evaluated for physical examination, swelling index, skin irritation study, extrudability study, drug content determination, spreadability, globule size determination, and *in vitro* drug release, rheological study. Optimized formulation gave drug release 98.98% for 12 h. The selected gel formulations were found to show no redness of skin and no skin irritation. The formulation was found to be safe when topically applied.**

RESUMEN: Emulgel es una de las tecnologías recientes en NDDS que se utiliza para la liberación de doble control de emulsión y gel para uso tópico. Las formulaciones en gel generalmente proporcionan una liberación de fármaco más rápida en comparación con las pomadas y cremas convencionales. El naproxeno es un agente terapéutico bien conocido que se utiliza principalmente por sus relajantes musculares de acción central. El propósito y objetivo del estudio es formular emulgel de naproxeno para aplicación tópica. El emulgel de naproxeno contiene Carbopol-934 o HPMC K100 como agentes gelificantes para formulación en gel y Tween 80, Span 20, para formulación en emulsión. Emulgel se formuló mediante emulsión incorporada en gel. El emulgel cargado con naproxeno se formuló usando una emulsión o/w debido a su menor solubilidad en agua. El aceite de hierba de limón, el aceite de *Arachis* y el mentol se utilizaron como potenciadores de la penetración en la formulación de emulgel. La formulación optimizada se evaluó para examen físico, índice de hinchazón, estudio de irritación de la piel, estudio de extrusión, determinación del contenido de fármaco, capacidad de esparcimiento, determinación del tamaño de glóbulos y liberación de fármaco *in vitro*, estudio reológico. La formulación optimizada proporcionó una liberación de fármaco del 98,98% durante 12 h. Se encontró que las formulaciones de gel seleccionadas no mostraban enrojecimiento de la piel ni irritación de la piel. Se encontró que la formulación era segura cuando se aplicaba tópicamente.

INTRODUCTION

The delivery of drugs across the skin is gaining wide acceptance among patients and termed as topical drug delivery. It is a viable administration route for peptide, low molecular weight therapeutic agents susceptible to first pass metabolism. Topical drug delivery is referred to as a localized drug delivery system anywhere in the body through ophthalmic, rectal, vaginal and skin as topical routes. Skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system. In developing a transdermal delivery system, two criteria are

KEY WORDS: emulgel, *ex vivo*, irritancy test, naproxen, spreadability.

* Author for correspondence should be addressed. *E-mail*: venupharmacology@gmail.com

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Iterative Tree Based Adaptive Threshold Techniques for Large MIMO System

Dr. R.Deepa

Department of ECE,Nehru Institute of Engineering and Technology,Coimbatore, T.N.,India
ecedeepa@gmail.com

ABSTRACT

An iterative tree based decoding technique for large multiple-input multiple-output systems is proposed. The BER performance and computational complexity of the iterative tree based sphere decoder with adaptive threshold is analyzed and compared. Specifically, the adaptive threshold is based on the signal-to-noise ratio and index of the layer. The ratio between the first and second smallest accumulated path metrics at each layer is also exploited to determine the threshold value.

Keywords: MIMO, ML decoder, tree based approach, sphere decoder

INTRODUCTION

Of all communication services available today, wireless services are having a dramatic impact on our personal and professional lives. In wireless communication, single input single output system (SISO) came into action in the year 1948. Single input single output systems refer to a simple control system with only one input and one output, employing single antenna at both the transmitter and receiver ends. In the last few years, wireless services have become more and more important. The growing demand of multimedia services and the growth of Internet related contents lead to increasing interest to high speed communications, network capacity and performance. The available radio spectrum is limited and the communication capacity needs cannot be met without a significant increase in communication spectral efficiency. Several options like higher bandwidth, optimized modulation or even code-multiplex systems offer practically limited potential to increase the spectral efficiency. Significant further advances in spectral efficiency are available through increasing the number of antennas either at the transmitter or at the receiver and at the both ends.

Single input multiple output systems (SIMO) and multiple input single output systems (MISO) which consists of single transmitter antenna and multiple receiver antennae multiple transmitter antennae and single receiving antennae respectively. MIMO (Multiple Input Multiple Output) Systems consists multiple antennas both at the transmitter and the receiver ends. One of the several forms of Smart Antenna Technology is the use of multiple antennas at both the transmitter and receiver to improve the system performance. MIMO gives significant increase in data transmission without additional bandwidth or transmit power [1]. MIMO transmits and receives two or more data streams through a single radio channel. This means the system can deliver two or more times the data rate per channel. By allowing this multiple streaming, wireless data capacity is multiplied without any additional frequency spectrum. Some of the standards like IEEE 802.11n, 4G and IEEE 802.11 Wireless LAN standards use MIMO technology.

Large multiple-input multiple-output (MIMO) systems have received enormous attention from researchers in the field of wireless communication for their high spectral and power efficiency [1]. However, the promised benefits of large MIMO are expensive in terms of computational complexity at the receiver compared to the conventional MIMO systems [1,2]. In conventional MIMO systems, to simplify the exhaustive search of the optimal maximum likelihood (ML) receiver, a sphere decoder (SD) can be employed, which only searches for the ML solution inside a sphere to reduce computational complexity

Maximum likelihood (ML) detection over Gaussian multiple input-multiple output (MIMO) channels can achieve the lowest Bit Error Rate (BER) for a given scenario, but at the expense of prohibitive complexity [2]. Thus, there is a continuous search for computationally efficient detectors, such as the Sphere Decoding (SD) algorithms, which are a set of tree search detectors with reduced complexity compared to the ML exhaustive search detector due to setting a radius constraint [2]. These algorithms perform a closest lattice point search for each component of the received vector, which is feasible due to the fact that the constellation set to which the transmitted symbols belong is known in advance. The existing SD algorithms can be implemented to operate within a finite set of real numbers, thus called Real Sphere Decoders (RSD) [3], or to perform the search directly within a finite set of complex numbers commonly known

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Contourlet Transform for Speckle Denoising

Dr.V.Jayaraj , K.Nagarajan

***Abstract*—**In image processing, considering fields like remote ensing and medical applications, Speckle (Multiplicative) noise ominates which affects the valuable features and important iformation of the image. To denoise an image, various transforms e used. But they are not efficient in case of preserving the edges hich is the important factor in image processing for Image enoising. In this paper we have used the new algorithm based on the ansformation named 'Contourlet Transform'. This algorithm is ore efficient than the wavelet algorithm in Image Denoising articularly for the removal of speckle noise. The parameters onsidered for comparing the wavelet and Contourlet Transforms are NR and IEF. The results show that this proposed algorithm utperforms the wavelet in terms of SNR, IEF values and visual rspective as well.

Keywords— Denoising, Contourlet Transform, SNR etc.

I. Introduction

n Remote sensing applications, the major problem arises with the Speckle noise. Speckle noise degrades the quality f the image and affects the performance of important image ocessing techniques such as detection, segmentation, and assification. Till now it's believed that Wavelet Transform is ited for denoising the Speckle noise. But using this proposed gorithm based on Contourlet Transform, we can achieve tter results comparatively.

Contourlet Transform

The Contourlet transform [2] is a directional transform hich is capable of capturing contour and fine details in a age. The approach in this transformation starts with the screte domain construction and then sparse expansion in the ntinuous domain. The main difference between Contourlet d other transformations is that, in this new transformation aplacian pyramid [4] along with the Directional Filter Banks , 3] are used. As a result, this not only detects the edge scontinuities, but also converts all these discontinuities into ntinuous domain. The figure below illustrates the ntourlet Transformation, in which the input image consists frequency components like LL (Low Low), LH (Low gh), HL (High Low), and HH (High Low). The Laplacian ramid at each level generates a Low pass output (LL) and a nd pass output (LH, HL, and HH). The Band pass output is then passed into Directional Filter Bank [1, 3] which results in Contourlet coefficients. The Low pass output is again passed through the Laplacian Pyramid [4] to obtain more coefficients and this is done till the fine details of the image are obtained.

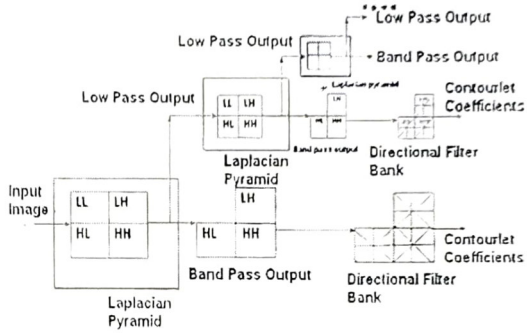

Fig 1.1 Illustration of Contourlet Transform

The Contourlet Transform [2] of a signal 'x' is calculated by passing it through a series of low pass and band pass filters. The output of these two filters are required to calculate the Contourlet coefficients.

$$Y_{low}[n] = \sum_{k=-\infty}^{\infty} x[k]g[2n-k] \qquad 1.1$$

$$Y_{band}[n] = \sum_{k=-\infty}^{\infty} x[k]h[2n-k] \qquad 1.2$$

Equation 1.1 and 1.2 are the outputs of the filter and are the contourlet coefficients. The Low pass and Band pass filters are used for Contourlet decomposition.

II. DENOISING ALGORITHM

A common approach for image denoising is to convert the noisy image into a transform domain such as the wavelet and Contourlet domain, and then compare the transform coefficients with a fixed threshold. We propose an algorithm which defines a new threshold value to eliminate the corrupted pixels

Dr V.Jayaraj , Professor & Head , Department of Electronics and mmunication Engineering , Nehru Institute of Engineering and Technology, mbatore, Tamilnadu.
K.Nagarajan, Assistant Professor, Department of Electronics and mmunication Engineering , Nehru Institute of Engineering and Technology, mbatore, Tamilnadu.

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Multilevel Redundant Discrete Wavelet Transform (ML-RDWT) and Optimal Red Deer Algorithm (ORDA) Centred Approach to Mitigate the Effect of ICI, BER and CIR in a MIMO-OFDM System

K. Nagarajan[1] · S. Sophia[2]

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Abstract

Nowadays, there is a great demand for ultra-high data rate (UHDR) transmission on most 5th generation wireless networks. In this concern, the multiple-input multiple-output orthogonal frequency division multiplexing (MIMO-OFDM) scheme is used on a large scale to achieve UHDR transmission with reduced inter-symbol interference (ISI) and inter-carrier interference (ICI). Discrete wavelet transform-based OFDM (DWT-OFDM) provides better orthogonality due to presence of orthogonal wavelets, which mitigates the effects caused by ISI and ICI. Also, it has extended bandwidth than the traditional OFDM systems. But a major drawback in this system is that it suffers from down sampling. The down-sampling effect reduces the actual size of the input bit streams. As a result, the system performance is degraded. For solving this problem, a multilevel redundant discrete wavelet transform (ML-RDWT) is used instead of DWT to achieve improved spectral performance. Here, complex down-sampling operation is eliminated. From the simulation outcomes, it is clearly viewed that effects caused by ICI, ISI and BER are mitigated by improving the performance of CIR. The proposed method employs optimal red deer algorithm (ORDA) to locate the optimized weights for the ICI cancellation system. This algorithm enhances the spectral efficiency by achieving high CIR with reduced BER, ISI and ICI. The BER in the proposed MIMO-ML-RDWT-OFDM-ORDA method is 68%, 76%, 38% and 75%, which is very low when compared to the BER in the existing techniques like MIMO-DWT-OFDM-RDA, MIMO-RNS-OFDM-PNMA, MIMO-OFDM-BMA and MIMO-OFDM-ICIMA. The ISI in the proposed method is 94%, 91%, 95% low when compared to the ISI in the existing techniques. The ICI in the proposed work is 71%, 57%, 73% and 86% low when compared to the ICI in the existing techniques. Therefore, the general performance of the proposed MIMO-ML-RDWT-OFDM-ORDA method is improved in an efficient way with less complexity, error rate and processing delay.

Keywords MIMO-OFDM systems · Multi-level Redundant Discrete Wavelet Transform · Inter Carrier Interference · Inter symbol interference · Bit-error rate · Carrier-to-interference power ratio · Down-Sampling · Optimal red deer algorithm

✉ K. Nagarajan
knagarajan0711@gmail.com

Extended author information available on the last page of the article

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A STUDY ON CHALLENGES FACED BY ACADEMICIANS IN VIRTUAL WORKCULTURE IN HIGHER EDUCATION

[1]R. Yasodha, [2]Dr. S. Shanthi and [3]S. Sukanya
[1&3]Assistant Professor and [2]Professor
[1,2&3]Nehru Institute of Engineering and Technology
Coimbatore, Tamil Nadu, India

Abstract

The severity of COVID-19 has called the education world to make a transition into cyberspace education to support the continuity of teaching and learning. The government has come up with several initiatives for the continuation of education, which include adopting thesynchronous and asynchronous modes of online T&L. Thus Virtual work has become a compulsion in higher education institutions and is being arrayed in educational establishments throughout the world. As Academicians are the key players in Higher education in preparing online classes, this research looks into the challenges that arose before they conducted the sessions virtually. This study focuses on challenges faced in Higher Education for adapting to virtual Teaching and learning process by interviewing the Academicians. Eight themes emerged in this Study; namely, time, environment, technological access, interest, knowledge, technological skills, course design, and communication self-efficacy. This study proposes problems that can be further researched forbetter improvement in virtual work culture.

Keywords: COVID-19, Online Teaching and Learning, Academicians, Virtual Work Culture, Higher Education.

Introduction

The COVID-19 pandemic has affected education drastically as the worldwide closure of learning institutions. With the advent of technology, academics are facing the challenges of acquiring and implementing IT skills for the purposes of teaching. According to some distinguished researchers that internet is a perfect tool of learning that offers flexibility and practicality to learners at the same time offering endless opportunities for innovate teaching (Appleborne, 1999; Moos and Azevedo, 2009; Zhang et al., 2004; Huddlestone and Pike, 2008; Wang and Wang, 2009; Hardaker and Singh, 2011; Macharia and Pelser, 2012).

Other researchers stated for some of the reasons for virtual learning success is that virtual learning systems would likely to encourage student learning resulting in a higher level of student engagement (Hiltz, 1993; Wang and Wang, 2009; Hardaker and Singh, 2011;Macharia and Pelser, 2012).

Since then, many research articles and case studies have been completed on how best to use the technology. The vast majority of the research is focused on the needs of the student. Ever more ideas, recommendations and solutions have been developed to improve student learning. For example, Macharia and Pelser's (2012) study of computing technology in Kenyan Higher Education formed valuable insights into the reasons that influence virtual learning acceptance by students, the study provided new ideas for higher education management for dissemination and infusion of computing technology for the purposes of learning. They concluded that the availability and access to computing technology, the quality and character of the institution leaders play an essential role to the success in virtual learning diffusion.

However, very little research has been undertaken that discusses the perspective of the academicians compared to students' perspective. This is at a time when administrators and academic managers are increasingly pressuring academic staff to incorporate technology into teaching for more active learning (Steele and Hudson, 2001; Eynon, 2005; Olaniran, 2006).

Literature Review

Gudbjorg (2014), the work virtually generates work-life balance and wellbeing of employees.Employees with a positive attitude feel good about options given and who they feel about virtual working.

Jindon Zhang (2016), virtual working helps in creating employee satisfaction and employee productivity.

Kimberly K. Merriman (2007), a virtual employment relationship, is essential for the development of the entire process of virtual working.

Judith G Oakley (1998), virtual teams face lots of challenges in leadership process and autonomy. The leadership process plays an essential role in the virtual setting **Christine Uber Grosse (2002)**; virtual workers must take more concern for the communication

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg & Technology
T.M.Palayam, Coimbatore - 641 ...

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"EMOTIONAL INTELLIGENCE OF EMPLOYEES AT WORK PLACE"

Dr.S.Shanthi, Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
Mrs. S.Sukanya Assistant Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
Mrs. R.Yasodha, Assistant Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore

ABSTRACT

Emotional Intelligence is a set of qualities and competencies that captures a broad collection of individual skills and dispositions, usually referred to as soft skills or inter and intra-personal skills, that are outside the traditional areas of specific knowledge, general intelligence, and technical or professional skills. Emotions are an intrinsic part of our biological makeup, and every morning they march into the office with us and influence our behavior. Emotional intelligence consists of five factors: Knowing one's emotions, managing emotions, motivating one, recognizing emotions in others, and handling relationships. Researchers today are interested in finding the effects of emotional intelligence on employees and thereby, organizations, and analyzing the various other facets of EQ. Emotional intelligence improves individual and organizational performance. It plays a significant role in the kind of work an employee produces, and the relationship he or she enjoys in the organization.

INTRODUCTION

Emotional intelligence (EI), emotional quotient (EQ) and emotional intelligence quotient (EIQ), is the capability of individuals to recognize their own emotions and those of others, discern between different feelings and label them appropriately, use emotional information to guide thinking and behavior, and adjust emotions to adapt to environments. Although the term first appeared in 1964, it gained popularity in the 1995 best-selling book Emotional Intelligence, written by science journalist Daniel Goleman.

Goleman defined EI as the array of skills and characteristics that drive leadership performance. Emotional Intelligence allows us to think more creatively and to use our emotions to solve problems. Emotional Intelligence probably overlaps to some extent with general intelligence. The emotionally intelligent person is skilled in four areas: Identifying emotions, using emotions, understanding emotions, and regulating emotions.

PROBLEM STATEMENT

Emotional intelligence has been a widely researched area. Present study is aimed to understand the emotional intelligence of employees and to examine the determinants of emotional intelligence of employees at work place.

OBJECTIVES OF THE STUDY

- To know the extent of employee's awareness towards emotional intelligence.
- To know the differences across demographics and work – life balance.
- To know the association between emotional intelligence and work - life balance.
- To know the association between demographics and emotional intelligence.

LITERATURE REVIEW

Gryn (2010): studied the relationship between EI traits of 268 call center leaders and their job performance in a medical aid administration organization in Johannesburg, South Africa.

The study found no significant association between overall EI and job performance of the call center leaders.

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A STUDY ON QUALITY OF WORK LIFE BALANCE AMONG TEACHERS DURING PANDEMIC IN THANJAVUR DISTRICT

Dr.S.Shanthi, Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
Mrs. R.Yasodha, Assistant Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
Mrs. S.Sukanya Assistant Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore

ABSTRACT

The study was conducted among the teaching professionals during global pandemic COVID 19 in Thanjavur District. This study is an attempt to explore the tough challenges faced by the respondents in maintaining a balance between their personal and professional life. The study is based on primary data. A sample of 160 respondents was selected by convenience sampling method. The various factors affecting the quality work-life balance of respondents havebeen examined in this study.

Keywords: Work-Life Balance, Pandemic, Covid -19

INTRODUCTION

Today, in the fast running phase of life, people really find it difficult to manage a balance between the pressures of work place and the duties of a home-maker, be it a male or female.

Quality of Work-life balance is about finding the right balance between work and life,and about feeling comfortable with both work and family commitments. In today's time, people are suffering on the account of lack or absence of work-life balance. Technology has made it possible for people to work at the ease of their homes round the clock. Due to COVID19 when people have been restricted within the confines of their homes. Dissatisfaction with working life affects the teachers some time or another, regardless of position or status. The frustration, boredom and anger common to teachers can be costly to both individuals and organizations. Adapting to a strategy where an emotional intelligence becomes the lead factor would help achieve equilibrium of Work-Life Management.

LITERATURE REVIEW

Alfred M. Dockery and Sherry Bawa (2018), "When two words collude: Working from home and family functioning in Australia" published in International Labor Review in which researchers worked on to analyze the effect of employees working from home on their partners' assessments of Family functioning using Australian household panel data. Where they found that there is the negative effect of the presence of children, and notably of younger children on the measures of family functioning.

PrithwirajChoudhury, Wesley W. Loo and Xina Li (2020), "Working (From Home) During a Crisis: Online Social Contributions by workers during the Corona virus Shock" published in Harvard Business School which focuses on whether workers who continued to work (albeit from home) during this crisis were constrained in their ability to make social contributions and exhibited disproportionately greater psychic costs compared to workers who could not WFH. The Study demonstrates that WFH workers make disproportionately greater online contributions to socially helpful topics such as remote work best practices and yet face disproportionately higher psychic costs and possibly time famine. managers might consider awarding WFH workers temporal flexibility in the form of a few "free hours" to engage in online contributions and other "virtual water coolers" in order to deal with work-life [illegible] work-life balance.

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg & Technology
T.M.Palayam, Coimbatore - 641 105.

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GIG ECONOMY IN INDIA

[1]Dr. A. VIGNESH, [2]Mrs. C. SARANYA

[1]Assistant Professor, Department of Management Studies, Nehru Institute of Engineering and Technology, Coimbatore

[2]Independent Consultant, Karaikudi

ABSTRACT

'Gig economy' is one of the most commonly used phrases in today's business world. The gig economy's impact at work is widespread and felt across industries. It has radically transformed how people are engaged at work and has resulted in a fundamental shift in the way our economy runs. Men are being replaced by machines, many conventional companies are being replaced by e-commerce firms. Millennial is entering the workforce, it's inevitable that the old skills are being replaced by new skills, and how can one ignore the transition of digitalization? The today's business world is in a transition phase, and India is also affected to these new transitions. Comparing with other countries India is a country with one of the world's largest demographic dividends and is the hottest market with rising people disposable income. Similarly, working for the same company for your whole career is a thing of the past. Working on your own terms is a new trend in the workplace. This article states the current trends in the gig economy, as well as its benefits and drawbacks in both the global and Indian contexts.

Keywords: Gig economy, Gig Worker

INTRODUCTION

The widespread usage of the internet and the growing use of smartphones have made it possible to connect online users from all over the world via digital platforms. This allows businesses to communicate their personnel requirements and communicate with remote online workers via digital channels (Healy et al.,2017). In today's digital world, these tendencies make the gig economy increasingly relevant and prominent. The gig economy is a free market system in which businesses hire independent workers for a specific project or service engagement (Techtarget, 2020). A full-time employment has been a tradition for years; but, with an increasing number of people entering the workforce each year, digital disruption, and the recent economic slump, many potential job seekers are unable to acquire permanent positions (Manyika et al., 2016).

GIG ECONOMY

The gig economy can be defined as a labour relationship in which one party is a service seeker, or a consumer who has a need for a specific task, and the other party is a service provider, or a gig worker who can complete that task. In today's economy, tech-enabled platforms connect customers with gig workers so they can hire services on a temporary basis. Self-employed, freelancers, independent contributors, and part-time workers are all examples of gig workers. This project-based gig economy allows the service provider to reduce overhead costs while also allowing gig workers to be compensated for specific tasks rather than a fixed pay. As a result, making the transition from a full-time 9-to-5 work to an on-demand, freelancing, and task-based economy might be.

LITERATURE REVIEW

The nature of work in the gig economy, according to Cambridge Dictionary (2020), is "a form of working centred on workers having temporary jobs or doing several bits of work, each paid independently, rather than working for an employer." According to a study, it is a new manifestation of Taylorism in the form of micro-fragmentation of the labour market based

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"EMOTIONAL INTELLIGENCE OF EMPLOYEES AT WORK PLACE"

Dr.S.Shanthi, Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
Mrs. S.Sukanya Assistant Professor, MBA, Nehru Institute of Engineering and Technology, Coimbatore
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Emotional Intelligence is a set of qualities and competencies that captures a broad collection of individual skills and dispositions, usually referred to as soft skills or inter and intra-personal skills, that are outside the traditional areas of specific knowledge, general intelligence, and technical or professional skills. Emotions are an intrinsic part of our biological makeup, and every morning they march into the office with us and influence our behavior. Emotional intelligence consists of five factors: Knowing one's emotions, managing emotions, motivating one, recognizing emotions in others, and handling relationships. Researchers today are interested in finding the effects of emotional intelligence on employees and thereby, organizations, and analyzing the various other facets of EQ. Emotional intelligence improves individual and organizational performance. It plays a significant role in the kind of work an employee produces, and the relationship he or she enjoys in the organization.

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INVESTIGATIONS ON SOLAR POWERED MECHANICAL GRASS MOWER FOR AGRICULTURAL APPLICATIONS

Dr.S. Jeevanantham Associate Professor, Nehru Institute of Engineering & Technology, Coimbatore, India
Dr.K.Anganan Professor, Nehru Institute of Engineering & Technology, Coimbatore, India
S.Nishanth, Praveen.C. P Assistant Professor, Nehru Institute of Engineering & Technology, Coimbatore, India

ABSTRACT

Solar powered grass mower blade cuts the lawn at even length. There are even more sophisticated devices available in every field. But less power consumption becomes essential for future. Solar grass cutter is a useful device which is very simple in construction and fabrication. It is used to maintain and upkeep lawns in gardens, schools and colleges. We have made some changes in the existing machine to make its application easier at reduced cost. Unskilled operation can operate easily and maintain the lawn very fine and uniform surface look. This machine perform multi-purpose operation at a same time with required speed & this machine is automatic which is controlled or operated by motor in which run with the help of current. Also in old methods lack of uniformity of the remaining grass. Also due to the use of engine powered machines increases the air and noise pollution also this grass cutter require maintenance.

Keywords: Solar grass cutter, Farming, Agriculture, Weed removal

1. INTRODUCTION

Grass mower machines have become more popular today. Most common machines are used for soft grass furnishing. The main parts of the Grass cutting machines are DC motor, relay switch for controlling motor, Battery for charging it through solar panel. It is placed in a suitable machine structure [1]. The motors having 1500rpm and 30rpm are connected to the electric supply by the use of a roll of wire. The linear blades are attached in this machine. Working principle of the grass cutter is providing a high speed rotation to the blade, which helps to cut the grass [2]. The blade will get kinetic energy while increasing the rpm. The cutting edges are very smooth and accurate. Also electric grass cutting machines are much easier to be used in garden, lawn and grass fields. Grass cutting machines are the best available option in the industry. With the help of a lawn mower which is a machine with revolving blades to help us cutting lawns at even length, people can easily maintain and beautify their lawns and gardens without any hassle[3]. Now a day, there are plenty of options starting from the simplest push along mower to the most advanced electric grass cutting machine. According to world energy report, we get around 80% of our energy from conventional fossil fuels like oil (36%), natural gas (21%) and coal (23%). It is well known that the time is not so far when all these sources will be completely exhausted. So, alternative sources should be used to avoid energy crisis in the nearby future [4].

2. LITERATURE REVIEW

The newly fabricated and developed solar grass-cutter runs on solar power and comprises of various parts such as solar plate, 12V D.C battery, 12 Volt D.C motor and cutting blades for grass cutting. Solar Plate is mounted on an upper part of solar grass cutter because the sun rays falls directly on the solar plate and the solar plate is connected to the battery directly for charging purpose [5]. Then begin the rotation of the motor in the clockwise or anticlockwise direction depending upon the connection or as per the requirement. The round shaft is connected to the motor which in turn is connected from the cutting blade. The round shaft transfers the motion of the motor to the cutting blade [6]. The project completely focuses on the designing of an appropriate operating system. Solar power is quickly becoming one of fossil fuels or one can say leading alternative energy sources, with

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INVESTIGATIONS ON DESIGNING SEMI-AUTOMATIC HARVESTING MACHINE FOR ROOT VEGETABLES

Dr.V.M.M.Thilak Associate Professor, Nehru Institute of Engineering & Technology, Coimbatore, **R.VinothKumar, A. Nandagopal, P.Bagyalakshmi** Assistant Professor, Nehru Institute of Engineering & Technology, Coimbatore, India

ABSTRACT

Root vegetables such as ginger are the significant agricultural commodity manufactured in India. When the harvest comes, people still use a very simple method for harvesting ginger by using hoes, pickaxe, and other farming equipment's. The farmers complain about the need of so many work forces for harvesting while the labour cost is getting increased and the time spent for harvesting process is too long. Although there is an alternative of imported ginger harvesting machines, those machines are not compatible with the farming environment in India, having a high initial and maintenance cost. This machine can be used in any farming condition in India and can be prepared at village level. This machine has three main parts namely, ginger digger, screener, and power transmission system. This project is focusing on design and fabrication ginger harvesting machine. The screener will not only separate ginger from soil but also not let the ginger get harmed. The screener also uses for collectible part, to make this machine need some power transmission system from the engine. This machine needs Auto front petrol engine with rotation speed 20 - 25 rpm approximately with the aid of gear reduction.
Keywords - Ginger, Farming Environment, Digger, Screener and Power Transmission System.

1.INTRODUCTION

In the global market, India is a leading producer of root vegetables in the world and during 2012-13 the country produced 7.45 lakh tones of the spice from an area of 157,839 hectares. They are cultivated in most of the states in India [1]. However, states namely Karnataka, Orissa, Assam, Meghalaya, Arunachal Pradesh and Gujarat together contribute 65 percent to the country's total production. Specially, Ginger originated in Asia and now grows in several parts of the world. The root of the plant is harvested for many culinary and medicinal uses. It can be used in many forms and is edible raw as well as cooked. One of the most common uses of ginger is to relieve nausea and other gastric ailments. A flowering plant is actually the root of the ginger plant that is harvested. A single root can have many offshoots above ground. The portion of the plant above ground has slender stalks with long leaves that come to a point. The flowers grow in clusters and are green and purple. Ginger is a tropical plant that is found in the Caribbean, India, Southeast Asia, and West Africa. Though the full name is root ginger, it is usually just called ginger. Traditionally ginger plant is harvested manually to get the ginger out of ground. But it consumes more time and more physical exertion of worker. It is necessary to introduce machine to harvest to reduce time consumption and human efforts. A machine of this nature can be fabricated at village level application in India such as to harvest at minimum time and a minimum cost, to get ginger as quickly as possible from the field, to reduce the physical exertion, to avoid physical damage to Ginger, to reduce manpower and to ensure the safety to labours.

2. LITERATURE REVIEW

The tractor drawn ginger harvester cum elevator was developed with an objective to have mechanical means for harvesting of ginger crop. The components were designed and developed keeping in view the relevant crop, soil and machine parameters. The machine consisted of main frame, digging blade, depth gauge wheel, vibration unit, power transmission system, and conveying mechanism. The performance evaluation of developed machine was evaluated at Chitta village of Bidar district of Karnataka State. The experiment was undertaken in red clay soil; the observed moisture content was 13.50 per cent moisture content (db.) at the time of harvesting. The size of the experiment plot was 0.2 ha was taken for observations. During field testing of machines, draft, digging efficiency, per cent damage of ginger rhizome and fuel consumption, separation index and conveying efficiency were calculated. The theoretical field capacity, actual field capacity and field efficiency

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Naphtholylimino-tether on β-cyclodextrin: Selective G-quadruplex DNA binding

Soundarapandian Suganthi [a], Aleyamma Alexander [b], Archana Sumohan Pillai [b], Israel VMV Enoch [a, b], Sameena Yousuf [c]

[a] Department of Applied Chemistry, Karunya Institute of Technology and Sciences (Deemed University), Coimbatore, Tamil Nadu 641114, India

[b] Centre for Nanoscience and Genomics, Karunya Institute of Technology and Sciences (Deemed University), Coimbatore, Tamil Nadu 641114, India

[c] Department of Science and Humanities, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu 641114, India

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Highlights

- A naphtholyl derivative of β-cyclodextrin is synthesized.
- It binds to duplex and the quadruplexes with different binding strengths.
- The naphtholyl derivative forms a 1:1 stoichiometric host: guest complex with berberine.
- The naphtholyl derivative of β-CD is a selective quadruplex binder.
- The host: guest complex also binds with the DNA targets with variable binding affinities.

Abstract

Guanine-rich sequences of DNA are located in certain important functional positions of the genome including the telomeric part. We explore the interactions of a naphtholylimino derivative of β-cyclodextrin with various G-quadruplex and duplex DNAs, probed by spectroscopic methods. The cyclodextrin derivative is characterized using FT-IR, NMR, and mass spectroscopy. The binding constant values for interaction of the modified β-CD with c-kit, c-myc, and telo sequences and calf thymus DNA are reported. The binding constants show a variation depending upon the type of DNA. The naphtholylimino derivative forms a host: guest complex with a G-quadruplex binder, Berberine. The complex's stoichiometry of binding is 1: 1. The mode of binding of the Berberine molecule to the host is investigated by ROESY. UV–vis and fluorescence spectroscopy are employed to investigate the interaction of the Berberine-complexed

S. Shakthi

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Research Article

Differential interaction of Fluorescein-β-cyclodextrin conjugate to quadruplex *kit22* DNA: Inclusion of Berberine and modulation of binding

Suganthi Soundarapandian, Aleyamma Alexander, Archana Sumohan Pillai, Varnitha Manikandan, **Israel V. M. V. Enoch** & **Sameena Yousuf**

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Abstract

Clinical applicability of G-quadruplexes as anticancer drugs is an area of current interest. Identification of supramolecular systems for selective targeting G-quartets is particularly intriguing. In this work, the DNA binder Berberine is encapsulated inside the molecular cavity of the synthesised host structure, Fluoresecein-β-cyclodextrin conjugate. The host: guest complex is characterized and the mode of binding is optimized using two dimensional rotating-frame Overhauser effect spectroscopy. The conjugate is examined for its binding to quadruplex DNAs viz..

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An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Advances in CO_2 Capture using Absorption and Adsorption Technology: A Review

Dr.Saravanakumar[1], Sachin Kumar[2], Nithin[2] , Aditya Krishna[2]

[1]Assistant professor, Nehru institute of Engineering and Technology, Coimbatore, Tamilnadu

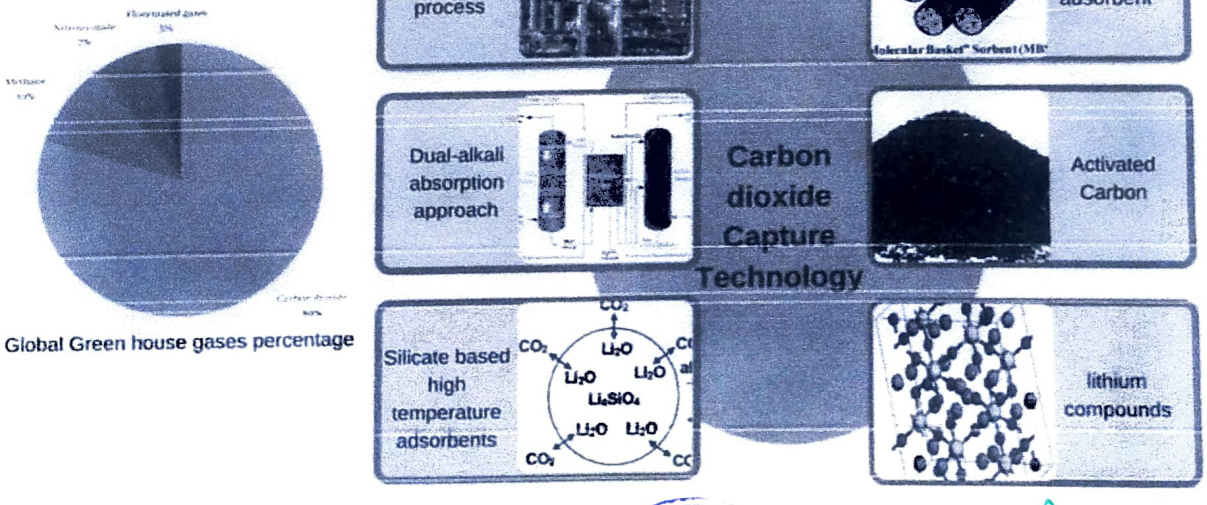
[2]Student, Peepal prodigy school, Coimbatore, Tamilnadu.

Corresponding Author: saravanan.chem111@gmail.com

ABSTRACT: The CO_2 capture from flue gas which is emitted from the power plants, is one of the important way to reduce greenhouse gases. The flue gas from coal-fired power stations can be removed by Absorption process using solvents and by Adsorption processes using solid sorbents. This article reviews the progress made in CO_2 separation completely. A variety of promising sorbents such amine, ammonium, activated carbonaceous materials, microporous/ mesoporous lithium based silicates, carbonates for the removal of CO_2 from the flue gas streams have been reviewed. A wide ranging review and analysis of the literature of CO_2 has been carried out to update the recent progress. A comparison of different sorbents efficiency is made with current research efforts to progress of carbon capture.

KEYWORDS: CO_2 capture, Amine absorption, Activated carbon, Li based adsorbents, Ammonium absorption.

GRAPHICAL ABSTRACT:



NEHRU INSTITUTE OF ENGINEERING & TECHNOLOGY T.M. Palayam, Coimbatore-105

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 105.

Role of Purged Air On Synthesis of Mesoporous NiO/C Composite And Its Application On Waste Water Treatment

Saravanakumar Ramalingam
GCT: Government College of Technology
Muthukumaran Karpagasundaram
GCT: Government College of Technology
Sivasankari Chandrasekaran
GCT: Government College of Technology
Sathiyapriya Narayanan
NIET: Nehru Institute of Engineering and Technology
Kathiresan Sakthipandi (sakthipandi@gmail.com)
SRM TRP Engineering College https://orcid.org/0000-0003-3126-0991

Research Article

Keywords: Role of dissolved gases, NiO/Carbon, Carbon composite, Pb(II) ion removal, Heavy metal ions, adsorption

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NEHRU INSTITUTE OF ENGG. & TECHNOLOGY T.M. Palayam, Coimbatore-105.

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg & Technology
T.M.Palayam, Coimbatore - 641 105.

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[illegible] Issue [illegible] 2022

Environmental Aesthetics Displayed through God's Purpose and Elevation of Nature through Biblical Images.

1Ms Susmi Mariam Varghese, 2 *Dr.K .Deepa

1 Assistant Professor, Department of Science and Humanities.

Nehru Institute of Engineering &Technology, Coimbatore

2 Assistant Professor, Department of English

Sri Visalakshi College for Women, Udumalpet

1susmidbtech@gmail.com

2deepaenglit1@gmail.com

Abstract

When we go through the glorious splendor of all time's universal literature, The Bible. The Lord has illustrated various truths and morals by using natural elements. The immediate surroundings of characters and landscape are exploited in a precise manner to unravel the eternal reality. As we circumnavigate the books of both the testaments we get a glimpse of God's love being expressed through the image of a lamb in the hand of shepherd who loves and cares it splendidly.

All the parables of Jesus Christ either render natural resources or man within the framework of his surroundings or some aesthetical qualities that represent real complex life issues.

God's aesthetics is well drawn and felt in all the elements in the environment and we take it as the raw materials for the formation of our literary products. Environmental elements and organisms display aesthetic splendor and when they are taken as the framework of literature, they engender moral evaluations and reflections.

The Bible promises us that we will be blessed if we honor the role of being careful managers of God's creation but will suffer if we disobey this command. Aesthetic appreciation of nature was brought into scripture by various authors who lived across the globe spread in different time frames. God's immense knowledge can be explored through nature and knowing his creations leads us to rediscover God.

Keywords: Environmental elements, rediscover, display, natural resources, framework, universal, evaluations, reality, aesthetics, surroundings, scripture.

NEHRU INSTITUTE OF ENGG. & TECHNOLOGY
T.M. Palayam, Coimbatore-105.

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg & Technology
T.M.Palayam, Coimbatore - 641 105.

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Neutrosophic gpr Continuity and Neutrosophic Contra gpr Continuity in Neutrosophic Topological Spaces

K. Ramesh[1] and I. Mohammed Ali Jaffer[2]

[1]Research Scholar, Department of Mathematics, Government Arts College, Udumalpet - 642126, Tamilnadu, India
[2]Assistant Professor, Department of Mathematics, Government Arts College, Udumalpet - 642126, Tamilnadu, India

Abstract—. **The intention of this research paper is to introduce and develop the concept of neutrosophic gpr continuous mapping, neutrosophic gpr irresolute mapping, neutrosophic contra gpr continuous mapping and neutrosophic contra gpr irresolute mapping in neutrosophic topological spaces. The interrelations between the new mappings and existing mappings are also established with the suitable examples.**

Keywords—**Neutrosophic generalized pre regular closed set, neutrosophic gpr continuous mapping, neutrosophic contra gpr continuous mapping and neutrosophic contra gpr irresolute mapping.**

AMS Subject Classifications: 54A40, 03E72.

I. Introduction

In 1965, L.A.Zadeh [21] introduced the notion of fuzzy sets [FS]. It shows the degree of membership of the element in a set X. Later, fuzzy topological space was introduced by C.L. Chang [3] in 1968. In 1986, K.Atanassov [2] introduced the notion of intuitionistic fuzzy sets [IFS], where the degree of membership and degree of non-membership are discussed. Later, Intuitionistic fuzzy topological spaces was introduced by Coker [4] in 1997. In 2010, Florentin Smarandache [9] defined the Neutrosophic set on three components, namely Truth (membership), Indeterminacy, Falsehood (non-membership). In 2012, A. A Salama and S. A. Alblowi [18] introduced the concept of Neutrosophic topological space by using Neutrosophic sets. A. A. Salama [19] introduced Neutrosophic closed set and Neutrosophic continuous function in Neutrosophic topological spaces. I.Mohammed Ali Jaffer and K.Ramesh [14] introduced Neutrosophic generalized pre regular closed sets in Neutrosophic topological spaces. Ekici and Etienne kerre [8] introduced contra continuous mapping in fuzzy topological spaces in 2006. Intuitionistic fuzzy contra continuous mapping was introduced by Kresteska and Ekici [13]. Dhavaseelan introduced the concept of Generalized Neutrosophic Contra Continuity [6] and Neutrosophic generalized α contra-continuity [7]. Prishka [16] introduced Contra α Generalized Continuous Mappings in Neutrosophic Topological Spaces. In this direction, we introduce the concept of neutrosophic gpr continuous mapping, neutrosophic gpr irresolute mapping, neutrosophic contra gpr continuous mapping and neutrosophic contra gpr irresolute mapping in neutrosophic topological spaces. Further, the interrelations among the concepts introduced are established with interesting counter examples.

II. Preliminaries

We recall some basic definitions that are used in the sequel.

Definition 2.1: [18] Let X be a non-empty fixed set. A Neutrosophic set (NS for short) A in X is an object having the form $A = \{\langle x, \mu_A(x), \sigma_A(x), \nu_A(x)\rangle : x \in X\}$ where the functions $\mu_A(x)$, $\sigma_A(x)$ and $\nu_A(x)$ represent the degree of membership, degree of indeterminacy and the degree of non-membership respectively of each element $x \in X$ to the set A.

Remark 2.2: [18] A Neutrosophic set $A = \{\langle x, \mu_A(x), \sigma_A(x), \nu_A(x)\rangle : x \square X\}$ can be identified to an ordered triple $A = \langle \mu_A(x), \sigma_A(x), \nu_A(x)\rangle$ in non-standard unit interval $]^-0, 1^+[$ on X.

NEHRU INSTITUTE OF ENGG. & TECHNOLOGY T.M. Palayam, Coimbatore-105.

Dr. P. MANIIARASAN
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 105.

Inorganic Chemistry Communications
Volume 133, November 2021, 108927

Microwave-Assisted hybridised WO_3/V_2O_5 rod shape nanocomposites for electrochemical supercapacitor applications

K. Latha [a, b], S. Anbuselvi [a], P. Periasamy [c], R. Sudha [d], D. Velmurugan [e]

https://doi.org/10.1016/j.inoche.2021.108927

Highlights

- Pure V_2O_5 and WO_3/V_2O_5 nanocomposite were prepared by microwave assisted method.
- Rod shape morphology was observed.
- Pure V_2O_5 and WO_3/V_2O_5 nanocomposite showed the maximum capacitance of 95F/g and 386F/g.
- The capacitance retention was 104% with the 99% of Columbic efficiency.

Abstract

Electrochemical supercapacitors are prominent energy storage devices owing to their superior capacitive behaviour and matchless power and energy density with excellent cyclic stability. In this report, we have prepared the rod shape WO_3/V_2O_5 nanocomposite by the microwave-assisted method. XRD analysis confirmed the rhombohedral and orthorhombic phase structure of V_2O_5 and WO_3. Various functional groups associated with V_2O_5 and WO_3 compounds were studied by FTIR spectrum. Surface and morphological image analysis demonstrated rod shape morphology. Surface area (22.798 m^2/g), pore volume (0.137 cc/g) and particle size (18 nm) were analyzed by BET analysis. The pure V_2O_5 nanostructure exhibited maximum specific capacitance of 150F/g in 1 M H_2SO_4 electrolyte which was enhanced to 260, 265 and 386F/g respectively for various wt.% of WO_3 added V_2O_5 nanocomposites. The long cyclic test showed 104 % of capacitance retention over 5,000 cycles with 99 % columbic efficiency.

Graphical abstract

WO_3/V_2O_5 nanocomposites were prepared by microwave assisted method and 6 wt% of WO_3 loaded V_2O_5 nanocomposite showed well grown rod shape and highest capacitance of 386F/g in 1M H_2SO_4 electrolyte. The capacity retention analysis showed 104% over 5000 cycle with the 99% of Columbic efficiency. The prepared WO_3/V_2O_5 nanocomposite would be suitable for energy storage deceives (supercapacitor) and photocatalyst for hydrogen production.

Published: 27 November 2021

Structural, thermal, optical and dielectric studies of V_2O_5@WO_3 nanocomposites prepared by microwave-assisted hydrothermal method

P. Periasamy, T. Krishnakumar, B. Selvakumar, K. Gurushankar, K. Senthilkannan & Murthy Chavali

Applied Physics A **127**, Article number: 959 (2021)

Abstract

The twenty-first century has been witnessing much development in the technological aspect, particularly in optoelectronic device. In this continuation, we have prepared V_2O_5@WO_3 nanocomposites for dielectric application. The proposed titled composites were prepared by a simple and cost-effective microwave-assisted wet chemical method. Subsequently, as-prepared composites were investigated by various characterization techniques. The structural and morphological analysis showed aggregated grain and rapid grain growth. The presence of functional group and elemental analysis were studied. The thermal analysis showed the thermal stability of as-prepared material. The dielectric studies demonstrated excellent dielectric behaviour with respect to temperature and frequency which would meet the required quality for optoelectronics application.

Inorganic Chemistry Communications
Volume 133, November 2021, 108972

Electronic, NLO, computational and interaction analyses of DAPVMPTFB crystals for electro-optics and electronic industrial utilities

M. Iyanar [a], M. Kolanjinathan [b], K. SenthilKannan [c] ✉, P. Baskaran [b], P. Periasamy [d] ✉

https://doi.org/10.1016/j.inoche.2021.108972

Highlights

- DAPVMPTFB organic NLO crystals are grown by slow evaporation method.
- The NLO performance was 1.15 times higher than the KDP specimen.
- The enhanced dielectrical behavior was observed.
- Molecular structure of NLO crystal was established by computational method.

Abstract

2-{2-(4-Diethylamino-phenyl)-vinyl}-1-methyl-pyridinium-tetrafluoroborate(DAPVMPTFB) organic non linear optical (NLO) crystals are grown by slow evaporation method and analyzed for XRD, carbon hydrogen nitrogen sulphur and oxygen (CHNSO) analyzer, computational, influx and dielectric studies. X-ray diffraction (XRD) analysis demonstrated the lattice parameters (a-7.8969 Å, b-20.4867 Å, c-11.1989 Å, α = γ as 90° and β as 92.407°). The chemical formula of the as-synthesized crystal is $C_{18}H_{23}BF_4N_2$. The presences of

Original Paper: Nano-structured materials (particles, fibers, colloids, composites, etc.)
Published: 13 August 2021

Cu^{2+} substituted Cr_2O_3 nanostructures prepared by microwave-assisted method: an investigation of its structural, morphological, optical, and dielectric properties

K. Mohanapandian, S. Shalini Packiam Kamala, P. Periasamy, V. Sathiya Priya, B. Selvakumar & K. Senthilkannan

Journal of Sol-Gel Science and Technology **99**, 546–556 (2021)

Abstract

We have reported the preparation and characterization of both pure and Cu^{2+} doped Cr_2O_3 nanoparticles with different dopant concentrations by the simple, cost-effective microwave-assisted method. As-prepared samples have undergone various characterizations to get an insight into the Cr_2O_3 nanoparticles. The XRD pattern showed the rhombohedral phase structure of Cr_2O_3 with an average particle size of ±14 nm. The surface and morphology analysis (FESEM and TEM) revealed a nearly spherical shape with an average particle size of 30–50 nm and the presence of the elemental composition of Cr and Cu was confirmed by the EDAX spectrum. The optical properties (UV–Vis and PL spectra) of Cr_2O_3 nanostructures were also studied, and results were found to support our further

Published: 17 August 2021

Structural and electrochemical investigation of novel hybridized MnO_2/V_2O_5 nanocomposites prepared by one-step microwave-assisted method for electrochemical supercapacitor application

K. Latha, S. Anbuselvi ✉, P. Periasamy, R. Sudha & D. Velmurugan

Journal of Materials Science: Materials in Electronics
32, 23293–23308 (2021)

Abstract

Pure V_2O_5 and MnO_2/V_2O_5 hybrid nanocomposites were synthesized by microwave-assisted method for electrochemical supercapacitor application. X-ray diffraction analysis showed the orthorhombic structure for pure V_2O_5 and MnO_2/V_2O_5 nanocomposites that showed the mixed state of the

Materials Today: Proceedings
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Enhanced properties of Zn^{2+} substituted Cr_2O_3 nanoparticles in escalating the distillate yield of acrylic pyramid solar still

V. Shanmugapriya [a], K. Mohanapandian [b], P. Periasamy [c], K. Senthilkannan [d], K. Amudha [e], B. Selvakumar [a]

https://doi.org/10.1016/j.matpr.2021.07.352

Abstract

Thermophysical analysis of acrylic pyramid solar still with and without Zn^{2+} substituted Cr_2O_3 nanoparticle had been analysed. Synthesised pure and Zn^{2+} doped Cr_2O_3 nanoparticle with different dopant concentrations is used along with the black absorber paint as an additional source in enhancing the heat transfer in the solar still. Heat transfer modes, efficiency (instantaneous and overall) and thermophysical properties are predicted for solar still with and without $Zn2^{+}$ substituted Cr_2O_3 nanoparticles.

XRD confirms the rhombohedral phase with average particle size of pure and Zn doped Cr_2O_3 around ± 14 nm and ± 12 nm respectively. Surface morphology showed nearly spherical shape with loosely agglomerated and the presence of Cr and Zn was confirmed by EDAX analysis. Dielectric measurements showed enhanced dielectric constant and electrical conductivity as the function of temperature at different frequency range. Performance ratio observed during the study is in the range of 2.11 to 10.125 for solar still alone, 2.38 to 11.9 % for solar still with pure Cr_2O_3 nanomaterial, 2.38 % to 12.87 % for solar still with 2.5 mol.% Zn^{2+} doped Cr_2O_3 nanomaterial, 2.46 % to 13.22 % for solar still with 5 mol.% Zn^{2+} doped Cr_2O_3 nanomaterial and 2.54 % to 13.67 % for solar still combined with 7.5 mol.% Zn^{2+} doped Cr_2O_3 nanomateria

Average daily output of solar still was found to be 2.366 L/day, 3.147 L/day, 3.299 L/day, 3.3761 L/day and 3.628 L/day for pyramid solar still under five modes of study. Efficiency of the still was calculated as 18.29%, 21.15%, 21.88%, 22.32% and 23.48% for pyramid solar still under five modes of study. It is found that the

Oscillatory Behavior of Nonlinear Fourth Order Mixed Neutral Difference Equations

S. Kaleeswari[1] and M. Buvanasankari[2]

[1]Department of Mathematics, Nallamuthu Gounder Mahalingam College, Pollachi, Coimbatore, Tamilnadu, India.
[2]Department of Mathematics, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India.

ABSTRACT

The goal of this research is to illustrate the oscillatory criteria for nonlinear fourth order difference of equation with mixed neutral terms of the form

$$\Delta(q_1(n)(\Delta^3 z(n))^{\alpha_1}) = q_2(n)y^{\alpha_2}(n-m+1) + q_3(n)y^{\alpha_3}(n+m^*)$$

where $z(n) = y(n) + q_4(n)y^{\alpha_4}(n-k) + q_5(n)y^{\alpha_5}(n-k)$.

Here $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ **are the ratios of odd positive integers** $\alpha_1 \geq 1$, q_1, q_2, q_3, q_4, q_5 **are positive sequences and** $m, m^*, k \in \mathbb{N}$ **are such that** $m > 3, m^* > 3, k < m-2$. **With the help of comparison techniques, we are able to acquire some novel oscillations results. Examples are presented to exhibit the significance of the outcome.**

Keywords: nonlinear, oscillation , comparison techniques, fourth order, mixed neutral terms.

2020 MSC: 39A10

1. INTRODUCTION

The problem of generating oscillation dynamics for mixed neutral difference equations has already received a great deal of interest in recent decades, owing to the fact that these kinds of equations emerge in the investigation of mathematical biology, economics and social, and many other fields of mathematical applications [1, 2, 11, 12, 17]. The references addressed therein and [4, 20, 22, 23, 26] provide some fascinating new findings on the oscillatory nature of second order difference equations.

After reviewing the literature, it was determined that "every solution is either oscillatory or tends to zero monotonically". To the best of our knowledge, there are no published reports in the existing research that guarantee all solutions are oscillatory for the 4th order mixed neutral difference equations.

Based on this, the objectives of this report is to provide some novel oscillation parameters for the equation of the form

$$\Delta\left(q_1(n)(\Delta^3 z(n))^{\alpha_1}\right) = q_2(n)y^{\alpha_2}(n-m+1) + q_3(n)y^{\alpha_3}(n+m^*) \tag{1}$$

where $z(n) = y(n) + q_4(n)y^{\alpha_4}(n-k) + q_5(n)y^{\alpha_5}(n-k)$.

via comparing first-order equations with known oscillatory phenomena, or by comparing second order difference equations with neutral terms. The reader can refer to [5, 6, 7] for relevant results on oscillation theory applications.

In this contexts, the following criteria are typically considered:

(i) $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$ are the ratios of odd positive integers $\alpha_1 \geq 1$.

(ii) $q_1, q_2, q_3, q_4, q_5 : Z \to (0, \infty)$ are sequences.

(iii) m, m*,k $\in$ N are such that m > 3, m*> 3 , k < m – 2.

"If a solution to "Equation (1)" is neither eventually negative nor eventually positive, it is termed oscillatory otherwise considered as non-oscillatory". "If all of the solutions of "Equation (1)" are oscillatory, then the equation is oscillatory as well".

The aim of this work is to generate adequate conditions for "Equation (1)" to oscillate whenever

ScienceDirect

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Molecular encapsulation by eosin yellow-β-cyclodextrin conjugate: Differential binding to quadruplex and duplex DNA

Suganthi Soundarapandian [a], Aleyamma Alexander [b], Archana Sumohan Pillai [b], Varnitha Manikantan [b], Sameena Yousuf [c], Israel VMV Enoch [b]

[a] Department of Applied Chemistry, Karunya Institute of Technology and Sciences (Deemed-to-be University), Coimbatore, Tamil Nadu 641114, India

[b] Centre for Nanoscience & Genomics, Karunya Institute of Technology and Sciences (Deemed-to-be University), Coimbatore, Tamil Nadu 641114, India

[c] Department of Science and Humanities, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu 641105, India

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Highlights

- An eosin yellow-β-CD conjugate is synthesized.
- The CD conjugate binds to both the duplex and the quadruplexes.
- Berberine forms a host: guest complex with the conjugate.
- The inclusion complex binds to the duplex and the quadruplexes with different strengths.

Abstract

G-Quadruplexes exist in cells and are involved in several cancer-related processes. Thus, G-quadruplex binding is an effective way of aiming at cancer cells. In this paper, the binding of a new β-cyclodextrin conjugate, eosin yellow-CD, with quadruplex DNAs viz., *kit22*, *myc22*, *telo24* and duplex calf-thymus DNA, is studied by UV–vis and fluorescence spectroscopic methods. Berberine, a known G-quadruplex binder, is loaded in the modified cyclodextrin. The binding constant of the host: guest complex is 1.9×10^6 mol^{-1} dm^3. The proximity of the protons of the conjugate and Berberine with those of the internal cavity of β-cyclodextrin in the conjugate is confirmed by two-dimensional rotating-frame Overhauser effect spectroscopy. The conjugate displays a quenching of fluorescence selectively to the quadruplex *kit22* and *telo24* that contrasts the spectral characteristics of the ligand-bound complexes of *myc*22 and ctDNA. The Stern-Volmer quenching constants are 1.08×10^6 mol^{-1} dm^3 and 1.6×10^6 mol^{-1} dm^3, respectively for binding to *kit22* and *telo24*. The duplex ctDNA exhibits an enhanced fluorescence in the absence and the presence of Berberine complex, whereas the

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INVESTIGATIONS ON DESIGNING SEMI-AUTOMATIC HARVESTING MACHINE FOR ROOT VEGETABLES

Dr.V.M.M.Thilak Associate Professor, Nehru Institute of Engineering & Technology, Coimbatore, **R.VinothKumar, A. Nandagopal, P.Bagyalakshmi** Assistant Professor, Nehru Institute of Engineering & Technology, Coimbatore, India

ABSTRACT

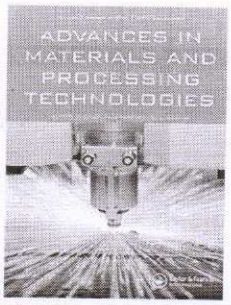
Root vegetables such as ginger are the significant agricultural commodity manufactured in India. When the harvest comes, people still use a very simple method for harvesting ginger by using hoes, pickaxe, and other farming equipment's. The farmers complain about the need of so many work forces for harvesting while the labour cost is getting increased and the time spent for harvesting process is too long. Although there is an alternative of imported ginger harvesting machines, those machines are not compatible with the farming environment in India, having a high initial and maintenance cost. This machine can be used in any farming condition in India and can be prepared at village level. This machine has three main parts namely, ginger digger, screener, and power transmission system. This project is focusing on design and fabrication ginger harvesting machine. The screener will not only separate ginger from soil but also not let the ginger get harmed. The screener also uses for collectible part, to make this machine need some power transmission system from the engine. This machine needs Auto front petrol engine with rotation speed 20 - 25 rpm approximately with the aid of gear reduction.
Keywords - Ginger, Farming Environment, Digger, Screener and Power Transmission System.

1.INTRODUCTION

In the global market, India is a leading producer of root vegetables in the world and during 2012-13 the country produced 7.45 lakh tones of the spice from an area of 157,839 hectares. They are cultivated in most of the states in India [1]. However, states namely Karnataka, Orissa, Assam, Meghalaya, Arunachal Pradesh and Gujarat together contribute 65 percent to the country's total production. Specially, Ginger originated in Asia and now grows in several parts of the world. The root of the plant is harvested for many culinary and medicinal uses. It can be used in many forms and is edible raw as well as cooked. One of the most common uses of ginger is to relieve nausea and other gastric ailments. A flowering plant is actually the root of the ginger plant that is harvested. A single root can have many offshoots above ground. The portion of the plant above ground has slender stalks with long leaves that come to a point. The flowers grow in clusters and are green and purple. Ginger is a tropical plant that is found in the Caribbean, India, Southeast Asia, and West Africa. Though the full name is root ginger, it is usually just called ginger. Traditionally ginger plant is harvested manually to get the ginger out of ground. But it consumes more time and more physical exertion of worker. It is necessary to introduce machine to harvest to reduce time consumption and human efforts. A machine of this nature can be fabricated at village level application in India such as to harvest at minimum time and a minimum cost, to get ginger as quickly as possible from the field, to reduce the physical exertion, to avoid physical damage to Ginger, to reduce manpower and to ensure the safety to labours.

2. LITERATURE REVIEW

The tractor drawn ginger harvester cum elevator was developed with an objective to have mechanical means for harvesting of ginger crop. The components were designed and developed keeping in view the relevant crop, soil and machine parameters. The machine consisted of a main frame, digging blade, depth gauge wheel, vibration unit, power transmission system, and conveying mechanism. The performance evaluation of developed machine was evaluated at Chitta village of Bidar district of Karnataka State. The experiment was undertaken in red clay soil; the observed moisture content was 13.50 per cent moisture content (db.) at the time of harvesting. The size of the experiment plot was 0.2 ha was taken for observations. During field testing of machines, draft, digging efficiency, per cent damage of ginger rhizome and fuel consumption, separation index and conveying efficiency were calculated. The theoretical field capacity, actual field capacity and field efficiency



Advances in Materials and Processing Technologies

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Mechanical and wear behaviour of TiB_2-B_4C reinforced Al7075 alloy hybrid composites for aerospace applications

R. MALKIYA Rasalin Prince, D. Arulkirubakaran, Tapas Debnath, S. P. Arunkumar, N. Bagath Singh, R. B. Jeen Robert & I. Living Prephet

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Investigating the effect of thermal cycling on thermal characteristics of the nano-silica based phase changing material (PCM)

P.T. Saravanakumar [a,*], S.P. Arunkumar [b], B. Brailson Mansingh [c], P. Manoj Kumar [d,*], Ram Subbiah [e], Vimal Kumar Eswarlal [f]

[a] Department of Automobile Engineering, Hindusthan Institute of Technology, Coimbatore 641032, Tamil Nadu, India
[b] Department of Mechatronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore 641105, Tamil Nadu, India
[c] Department of Mechanical Engineering, Sri Ramakrishna Engineering College, Coimbatore 641022, Tamil Nadu, India
[d] Department of Mechanical Engineering, KPR Institute of Engineering and Technology, Coimbatore 641407, Tamil Nadu, India
[e] Department of Mechanical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad 500090, Telangana, India
[f] Mangla Smart Energy Solutions (P) Ltd., Tirupur 641604, Tamilnadu, India

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Nano-silica
Thermal cycling of PCM
Thermal properties of PCM

ABSTRACT

Reliable thermal storage has become a critical factor for renewable energy-based thermal systems such as solar thermal collectors, because the incoming energy is inconsistent with time and, hence, an efficient energy management mechanism is required. Therefore, the collection of maximum possible energy during their availability and their uniform distribution during the lagging period has been the topic of research in recent times. The nano-enhanced phase changing materials (nano-PCMs) are recognized to be the eminent energy storage materials in terms of their thermal storage characteristics. However, their reliability over the period of thermal cycles is yet again in an interrogation. In this work, the nano-silica based paraffin was prepared through the dispersion of nano-silica in paraffin at three different lower volume fractions (0.5 vol%, 1.0 vol% and 2.0 vol%). Then, the thermal consistency and thermal properties of nano-silica/PCM such as latent heat, melting and solidifying temperatures were investigated using different instruments, namely thermogravimetric analyzer (TGA) and differential scanning calorimetry (DSC) after initial preparation and after 100 thermal cycles. The findings evidence that the nano-silica/PCMs are having good thermal consistency even after 100 thermal cycles up to a volume fraction of 1.0%. The deterioration of the properties has become prominent after 1.0% volume of nano-silica in paraffin.

Selection and peer-review under responsibility of the scientific committee of the 2nd International Conference on Functional Material, Manufacturing and Performances

1. Introduction

Energy is critical to a nation's economic success and development. The domestic, industrial, and commercial sectors all utilize a significant amount of energy. Industries have grown at a breakneck pace in recent years, resulting in increasing energy consumption. Despite increased energy output, the growing demand for energy has outpaced supply [1–3]. Energy scarcity and inconsistent energy supply hinder society's development. Energy demand growth and peak shortages have had a detrimental effect on a variety of industries [4–6]. Renewable energy sources have emerged as a critical alternative, owing to increased energy consumption, volatility in the price of fossil fuels, climate mitigation, and an impending energy crisis due to fossil fuel depletion. However, because the performance of renewable energy systems is unpredictable, strong, dependable, and efficient solutions are required [7–9].

Recently, thermal energy storage (TES) has been presented as a critical technology for enhancing the energy efficiency of renewable energy conversion systems, particularly solar thermal systems, for balancing the supply–demand issue [10,11]. TES is a crucial technology for renewable energy and other energy systems because it can improve their efficiency, especially by spanning the gap between the catchment of energy and their needs [12,13]. Thus, TES is vital in boosting the share of various forms of renewable energy in regions and countries' energy mix. Sensible storage

* Corresponding authors.
E-mail addresses: ptscfd@gmail.com (P.T. Saravanakumar), pasupathimanojkumar@gmail.com (P. Manoj Kumar).

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Taguchi optimization of metal inert gas (MIG) welding parameters to withstand high impact load for dissimilar weld joints

SP. Arunkumar [a], C. Prabha [b], Rajasekaran Saminathan [c], Jabril A. Khamaj [d], M. Viswanath [e], C. Kevin Paul Ivan [f], Ram Subbiah [g,*], P. Manoj Kumar [h]

[a] Department of Mechatronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore 641105, Tamil Nadu, India
[b] Department of Mechanical Engineering, Arjun College of Technology, Coimbatore 642120, Tamil Nadu, India
[c] Department of Mechanical Engineering, College of Engineering, Jazan University, Saudi Arabia
[d] Department of Mechanical Engineering, College of Engineering, Jazan University, Saudi Arabia
[e] Department of Mechanical Engineering, Hindusthan Institute of Technology, Coimbatore 641032, Tamil Nadu, India
[f] Heat Transfer Equipments (P) Limited, Coimbatore 641021, Tamil Nadu, India
[g] Department of Mechanical Engineering, Gokaraju Rangaraju Institute of Engineering and Technology, Hyderabad 500090, Telangana, India
[h] Department of Mechanical Engineering, KPR Institute of Engineering and Technology, Coimbatore 641407, Tamil Nadu, India

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ABSTRACT

The welding of two different kinds of metals has found greater applications and use in several fields of manufacturing in present days. A387 is a sort of grade steel used in the fabrication of pressure vessels that are widely used in applications requiring high thermal stability, such as heat exchangers, boilers, and pressure containers in the petroleum industry, among others. Additionally, in the majority of cases, it is necessary to attach A387 to stainless steel in the aforementioned applications. Metal Inert Gas (MIG) welding is a common method of connecting metals in industries. However, process factors such as welding voltage, current rating, as well as the weld bevel angle are critical for achieving a high-quality weld and appropriate mechanical qualities. The purpose of this work is to improve the critical variables of welding, viz., the welding voltage, current rating as well as, the weld bevel angle, in order to get higher impact strength when connecting dissimilar materials, such as A387 steel alloy and SS316 grade stainless steel, by means of Taguchi's well-known orthogonal array with L_9 Arrays. The optimal combination was found to be 140 A welding current, 20 V welding voltage, and 50° angle of bevel for achieving the highest impact strength. Additionally, ANOVA was employed to assess the most influential process variable that has a substantial effect on the weld joint's impact strength. The outcomes demonstrated that the most important variable affecting the welded joint's impact strength was welding current, trailed by welding voltage.

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1. Introduction

The welding of different metals is gaining attention in the modern era due to the demand for lightweight, low-cost, and high-strength constructions [1,2]. The evolution of industrial requirements is another driving element that necessitates the combining of different metals. Welding is a well-known process of fusing metals together to create strong and dependable junctions [3,4]. In the case of welding different metals, the metals to be fused must be communally soluble. Furthermore, an additional filler material that is easily soluble in primary metals should be employed to provide the desired strength and appearance. Typically, industries such as petroleum refineries, boiler manufacturers, and producers of heat exchanger engage the connecting processes of various steel alloys with different types of alloys, necessitating the requisite of a proficient welding process to seam the various kinds of metals as and when required. The fabrication of heat exchangers, boilers drums, and pressure containers uses stainless steel and other mild steels [5,6]. Due to the high mechanical strength of A387 steel alloy grade, it has been used in several components such as pressure containers, pipelines in petroleum refineries, drums of boilers

* Corresponding author.
E-mail address: ram4msrm@gmail.com (R. Subbiah).

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Water in waste-derived oil emulsion fuel with cetane improver: Formulation, characterization and its optimization for efficient and cleaner production

Suresh Vellaiyan [a,*], Arunkumar Subbiah [b], Shanmugavel Kuppusamy [c], Saravanan Subramanian [d], Yuvarajan Devarajan [e,f]

[a] Department of Mechanical Engineering, CK College of Engineering and Technology, Cuddalore, Tamilnadu, India
[b] Department of Mechatronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India
[c] Department of Mechanical Engineering, Sona College of Technology, Salem, India
[d] Department of Electrical and Electronics Engineering, CK College of Engineering and Technology, Cuddalore, Tamilnadu, India
[e] Department of Automobile Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India
[f] Department of Thermal Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India

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ABSTRACT

The present study aims to formulate the water emulsified waste-derived biodiesel with cetane improver and find its optimum concentration for an efficient and cleaner production from the diesel engines. A waste-derived Lemon peel oil (LPO) is emulsified in diesel fuel along with water, and 2-Ethylhexyl nitrate (EHN). Four levels of each parameter have been chosen for the fuel preparation. The experiments are performed in a naturally aspirated diesel engine at maximum brake power conditions based on the L_{16} orthogonal array. A grey-relational analysis is opted to optimize the performances and emissions responses, and the statistical influence of the operating parameters is estimated based on the analysis of variance. A comprehensive study has also been conducted to understand the improvement in performance and emission parameters at the optimum level. From the results, the optimum condition of LPO, water, and EHN is identified as 20%, 10%, and 2%, respectively. The water concentration in base fuel has a contribution of 65.94% on overall engine behavior, whereas the contribution of LPO and EHN is 26.72% and 7.34%, respectively. Besides, the confirmation experiment at the optimum condition shows that the signal-to-noise ratio is improved by 40.8% compared to the initial best condition.

1. Introduction

The availability of fossil fuels in the world is an infinite quantity and will run out in a few decades. The majority of transportation sectors in the world still completely depend on fossil fuels. The pollution caused by fossil fuel combustion leads to global warming, climate change, and health endanger. To overcome the above issues, researchers have appreciated renewable energy since 2011, and its commercialization is increased every year. Renewables 2020 Global Status Report states that 32% of total renewable energy is utilized for the transportation sector, in which the contribution of biofuels is 3.1% [1]. Renewable energy also played a vital role in other sectors such as thermal comfort in buildings and the industrial heating/cooling process.

Biofuels have a significant contribution to renewable energy sectors and are mainly classified as first, second, and third-generation biofuels. First-generation biofuels are mainly from food crops such as palm, corn, sugarcane, and rapeseed, which are having a direct conflict with the natural food chain [2–5]. Though the second-generation biofuels such as rubber seed, mahua, and neem overcome the negative impacts of the first-generation biofuels, the manufacturing cost related to a sophisticated downstream process, and use of water and land are huge challenges [6–9]. Micro-algae, a third-generation biofuel having a

Abbreviation: BP, Brake Power; BSFC, Brake Specific Fuel Consumption; BMEP, Brake Mean Effective Pressure; BTE, Brake Thermal Efficiency; CO, Carbon monoxide; DoF, Degree of Freedom; EHN, 2-Ethylhexyl nitrate; GC–MS, Gas Chromatography-Mass Spectrometry; GRC, Grey Relational Coefficient; GRG, Grey Relational Grade; HC, Hydrocarbon; HLB, Hydrophilic-Lipophilic Balance; IDP, Ignition Delay Period; LPO, Lemon Peel Oil; MS_S, Mean Sum of Square; ND, Normal diesel; NO_x, Oxides of Nitrogen; S/N, Signal-to-Noise; SS_T, Total Sum of Square.

* Corresponding author.
E-mail address: mailsuresh.vellaiyan@gmail.com (S. Vellaiyan).

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