

**3.3.2 Number of research papers per teachers in the Journals notified on UGC website during the year 2022-2023**

Title of paper	Name of the author/s	Department of the teacher	Name of journal	ISSN number
Effect of varying velocity ratio and separation distance on thin lip coaxial jet	Dr. K. Sathish Kumar	Aeronautical Engineering	Aircraft Engineering and Aerospace Technology	0002-2667
Investigation of Spray and Droplet Characteristics of Spray Nozzles	Dr. K. Sathish Kumar	Aeronautical Engineering	International Journal of Vehicle Structures and Systems	0975-3060
Hybrid Intelligent Controller Design and Stability Analysis for Controlling Boeing-767 Dynamics using Matlab	Dr. K. Sathish Kumar	Aeronautical Engineering	International Journal of Vehicle Structures and Systems	0975-3060
Effect of bypass ratio on sonic underexpanded co-flow jets with finite lip thickness	Dr. K. Sathish Kumar	Aeronautical Engineering	International Journal of Turbo and Jet Engines	0334-0082
Turbine blade analysis using different alloy	Dr. A. Sankaran, Mr. J. Karthikeyan, Mr. M. Kesavan	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616
Methods of drag reduction by modifying landing gear system in fighter aircraft	Dr. A. Sankaran, Dr. S. Rathinavel	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616
Performance Optimization of Convergent-Divergent Nozzle under Different Inlet Conditions	Mr. R. Koushik Kumaar	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616
Investigation of Material Properties of Natural and Synthetic Fiber Hybrid Composite Material	Mr. R. Koushik Kumaar	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616
Turbulence characteristics of truncated chevron nozzle	Dr. K. Sathish Kumar, Dr. A. Sankaran	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616
Jet decay characteristics of truncated chevron nozzle	Dr. K. Sathish Kumar, Dr. A. Sankaran	Aeronautical Engineering	American Institute of Physics – Conference Proceedings	1551-7616



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Microstructure 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	1687-4129
Worn Surface Analysis and Wear Map Mechanism of AA4032 Composites	Dr. S. Rathinavel	Aeronautical Engineering	Journal of Testing and Evaluation	0090-3973
Investigations on Wear Behaviour of Aluminium Composites at Elevated Temperature	Dr. B.R. Senthil Kumar	Aeronautical Engineering	Advances in Materials Science and Engineering	1687-8442
Pear Cactus Fiber with Onion Sheath Bio Carbon Nano Sheet Toughened Epoxy Composites Mechanical, thermal and Electrical Properties	Dr. R. Ramaswamy	Aeronautical Engineering	Biomass Conversion and Bio Refinery	2190-6823
Grey Relational Analysis and Surface Texture Analysis of Al-Based Metal Matrix Composites	Dr. S. Rathinavel	Aeronautical Engineering	Journal of Materials Research and Technology	2238-7854
A Machine Learning Approach for Plant leaf Disease Detection using Convolution Neural Network (CNN)	Dr. V T Krishnaprasath Dr. S. Arunkumar	Artificial Intelligence and Data Science	International Journal on Applications in Engineering and Technology	2455 - 0523
A Malicious Uniform Resource Locator (URL) Detection and Classification using Deep Learning Techniques	Dr. V T Krishnaprasath Dr. S. Arunkumar	Artificial Intelligence and Data Science	International Journal on Applications in Information and Communication Engineering	2394 - 6237
Machine Learning Techniques for detecting and recognising emotions by facial expressions	Dr.Sarojini Yarramsetti	Computer Science and Business Systems	European Chemical Bulletin	2063-5346
Social Media Marketing: A study on impact of Social media on marketing a brand	P.Priyadarshini	Computer Science and Business Systems	European Chemical Bulletin	2063-5346
An Extensive Study Using the Beetle Swarm Method to Optimize Single and Multiple Objectives of Various Optimal Power Flow Problems	K Sriram, SP Mangaiyarkarasi, S Sakthivel, L Jebaraj	Electrical and Electronics Engineering	International Transactions on Electrical Energy Systems	2050-7038



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Optimization of location and rating of unified power flow controllers for congestion management	Dr.S.Sakthivel	Electrical and Electronics Engineering	Indonesian Journal of Electrical Engineering and Computer Science	2502-4752
Balanced Standalone Clustering Unit Commitment Solution for Smart Grid Using Probability Algorithms	Dr.R.Kannan	Electrical and Electronics Engineering	ENERGY SOURCES, PART-A: Recovery, Utilization and Environmental Effects	1556-7036 1556-7230
Energy Management in Plugin Hybrid Electric Vehicles with Hybrid Energy Storage system using Hybrid Approach	Dr.R.Kannan	Electrical and Electronics Engineering	Energy Technology: Generation, Conversion, Storage, Distribution	2194-4296
Self Computational Emotional Learning Based Intelligent Controller for Induction Motor Drive using Variable Structure Control	Dr.R.Kannan	Electrical and Electronics Engineering	International Journal on Applications in Engineering and Technology	2455 - 0523
Role based access control Mechanism for cloud using ESTMP	Dr.R.Kannan	Electrical and Electronics Engineering	International Journal on Applications in Basic and Applied Sciences	2455-1007
Employee Competency and Understanding Capability in Gear manufacturing Companies in Coimbatore	Dr. P.T. Vijaya Rajakumar, Mrs. R. Yasodha	Master of Business Administration	Asian Journal of Management	0976-495X
Employees perspective on digital banking	Dr.A.Vignesh	Master of Business Administration	Asian Journal of Management	0976-495X
A study on impact of work from home on work life balance during COVID-19	Dr. P.T. Vijaya Rajakumar	Master of Business Administration	Webology	1735-188X
Experimental investigation and machinability behaviour on synthesized titanium composite	Mr.R.Vinod Kumar, Dr.J.Maniraj	Mechanical Engineering	Journal of ceramic processing research	1229-9162
Investigations on mechanical possessions of coconut fibre protected with epoxy and polyester mixtures	Dr.S.Jeevanantham, Dr.V.M.M.Thilak, Mr.R.Vinothkumar	Mechanical Engineering	Madhya Bharati	0974-0066



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Design and Investigation of efficient and water preserving automatic dish washer machine	Dr.V.M.M.Thilak, Dr.S.Jeevanantham, Dr.P.Senthil Kumar	Mechanical Engineering	Journal of Oriental Institute	0030-5324
Investigations and Optimization of process parameters for Improving surface quality in the Internal Grinding of EN31 Steel	Dr.S. Jeevanantham, Dr.N.Manikanda Prabu, Dr.M.Santhosh, Mr.S.Nishanth, Mr.Athisaya Sagaya Rajan.A	Mechanical Engineering	European Chemical Bulletin	2063-5046
Neutrosophic generalized pre regular connectedness	Dr.K. Ramesh	Science and Humanities	Conference on Mathematical Sciences and Applications in Engineering	030002-1-030002-8;
Suppressing The Rayleigh-Taylor Instability With An Alternating Magnetic Field	Dr.P.T.Hemamalini	Science and Humanities	European Chemical Bulletin	2063-5346
Solvothermal synthesis of magnetically separable Co-ZnO nanowires for visible light driven photocatalytic applications	Dr.V.Rohini	Science and Humanities	Physica B: Condensed Matter	1873-2135
Influence of succinic acid species on structural, spectroscopic,optical, Z-scan, frequency doubling, photoconductivity and antibacterial properties of glycine single crystals	Dr.N. Sathiya priya	Science and Humanities	Digest Journal of Nanomaterials and Biostructures	1842-3582
Impetus Yield of Acrylic Top Cover Pyramid Solar still due to Furthered Thermal Conductivity of MnO ₂ and PANI-MnO ₂ Nanocomposite Materials	Dr P.Periasamy	Science and Humanities	Material Science Forum	1662-9752
On Some New Continuous Mapping and Compactness Neutrosophic Topological Spaces	K. Ramesh	Science and Humanities	International Journal Mathematics Trends and Technology	2231-5373
Energy, environmental and economic assessment of waste-derived lemon peel oil intermingled with high intense water and cetane improver	Dr.SP.Arunkumar	Mechatronics Engineering	Sustainable Energy Technologies and Assessments	2213-1396



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Mechanical and wear behaviour of TiB ₂ -B ₄ C reinforced Al7075 alloy hybrid composites for aerospace applications	Dr.SP.Arunkumar	Mechatronics Engineering	Advances in Materials and Processing Technologies	2374-0698
Analysis of data with possible ways for charging the battery of electrical two wheeler	Dr.M.Balakrishnan	Mechatronics Engineering	Eur. Chem. Bull.	2381 – 2385
A Graphical System Design for Analysing Medical Images and Its Applications	Dr.D.Nageswari	Electronics and Communication Engineering	Neuro Quantology	1303-5150
Breast lesion identification and categorization using mammography screening based on combined convolutional recursive neural network framework with parameters optimized using multi-objective seagull optimization algorithm	Dr. N. K. Sakthivel & Dr. S. Subasree	Computer Science and Engineering	Concurrency and Computation: Practice and Experience	1532-0634
Remote Intelligent System for Monitoring and Control of Water Distribution Network Using Remote I/O Module for Smart City	Dr.S.Sivakumar	Computer Science and Engineering	IEEE Conference	2272-0845
An Energy-Efficient Routing of Mobile Sensor Nodes using Black Widow Optimized Routing Protocol	Ms. S. Priya	Computer Science and Engineering	TELEMATIQUE	1856-4194
An analysis of spam mail K-Means clustering algorithm	Mr.K.Nagarajan, Mr.V.Vinothkumar, Mr.M.Muhammed Hasim, Mr.T.Prabhu	Electronics and Communication Engineering	International journal on applications of Engineering and Technology	2455-0523
faster region-based convolutional neural network with you only look once multi stage caries lesion from oral panoramnic X-ray images	Dr V Jayaraj	Electronics and Communication Engineering	Expert systems	1468-0394
Identification of an account spammer or non-spammer with accuracy	Mr.K.Nagarajan, Mr.V.Vinothkumar, Mr.M.Muhammed Hasim, Mr.T.Prabhu	Electronics and Communication Engineering	International journal on applications of Engineering and Technology	2455-0523



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An Energy Efficient Routing of Mobile Sensor Nodes using Black Widow Optimized Routing Protocol	Dr V Jayaraj, Mrs K Sivakami	Electronics and Communication Engineering	YMER	0044-0477
A Graphical System Design for Analysing Medical Images and Its Applications	Dr.D.Nageswari	Electronics and Communication Engineering	Neuro Quantology	1303-5150
A Novel Smart Traffic Light Controlling System by Image Processing Technique	Mr.T Prabu, Mr.S Mohan, Mr K Nagarajan	Electronics and Communication Engineering	YMER	0044-0477
Design and Development of IOT Based Water and Calamity Management Technique by Implementing a Hybrid Classification Approach	Mr.Mohan S	Electronics and Communication Engineering	Advanced Engineering Science	2096-3246
Novel Double Modular Redundancy Based Fault Tolerant FIR Filter for Image Denoising	Mrs Vaisakhi V	Electronics and Communication Engineering	Computer Systems Science & Engineering	0267-6192
Disease Prediction with Recommendation System using Deep Learning	Mrs. Deepa S M, Mrs. Sivakami K, Mrs. Revathi N	Electronics and Communication Engineering	YMER	0044-0477

Effect of varying velocity ratio and separation distance on thin lip coaxial jet

Naren Shankar Radha Krishnan, Irish Angelin S. and Ganesan V.G.

Department of Aeronautical Engineering, Vel Tech Rangarajan Dr. Sagunthala R&D Institute of Science and Technology, Chennai, India, and

Sathish Kumar K.

Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

Abstract

Purpose – In comparison to a nozzle with a larger/finite separation distance (Thanigaiarasu *et al.*, 2019), a thin-lip nozzle (Srinivasarao *et al.*, 2017) minimizes drag. Coaxial nozzles with thin lips are an appropriate tool for studying high subsonic jets because it does not create a dominant re-circulation zone. This study aims to analyze the characteristic of separation distances, between primary and secondary nozzles, within the range of 0.7–3.2 mm which can be considered a thin lip.

Design/methodology/approach – A separation distance of 0.7 (Papamoschou, 2004), 1.7 and 2.65 mm (Lovaraju and Rathakrishnan, 2011) is considered for the present study. The main nozzle exit Mach number is maintained at a subsonic condition of Mach 0.6, and the co-flowing nozzle exit Mach number is varied from 0% (secondary jet stopped/single jet) to 100% (Mach 0.6) in steps of 20% with respect to the main nozzle exit Mach number. A comparison was made between these velocity ratios for all three lip thicknesses in the present study. Design mesh and analysis were done by using Gambit 2.6.4 and Fluent 6.12. Velocity contours and turbulence contours were studied for qualitative analysis.

Findings – When lip thickness increases from 0.7 to 2.65 mm, the potential core length (PCL) of the primary jet decreases marginally. Additionally, the PCL of the primary jet elongates significantly as the velocity ratio increases. The primary shear layer is dominant at 20% co-flow (20 PCF), less dominant at 60% co-flow (60 PCF) and almost disappeared at 100% co-flow (100 PCF). Concurrently, the secondary shear layer almost disappeared in 20 PCF, dominant in 60 PCF and more dominant in 100 PCF. Different zones such as initial merging, intermediate and fully merged zones are quantitatively and qualitatively analyzed.

Practical implications – Co-flow nozzle is used in turbofan engine exhaust. The scaled-down model of a turbofan engine has been analyzed. Core length is directly proportional to the jet noise. The PCL signifies the jet noise reduction in a high-speed jet. For a low-velocity ratio, the potential core is reduced and hence can reduce the jet noise. At the same time, as the velocity ratio increases, the mass flow rate of the coaxial increases. The increase in the mass flow increases the thrust of the engine. The aircraft engine designer should analyze the requirement of the aircraft and choose the optimal velocity ratio coaxial nozzle for the engine exhaust (Papamoschou, 2004).

Originality/value – There have been many research studies carried out previously at various lip thickness such as 0.4 (Georgiadis, 2003), 0.7 (Papamoschou, 2004), 1.5 (Srinivasarao *et al.*, 2014a), 1.7 (Sharma *et al.*, 2008), 2 (Naren, Thanigaiarasu and Rathakrishnan, 2016), 2.65 (Lovaraju and Rathakrishnan, 2011), 3 (Inturi *et al.*, 2022) and 3.2 mm (Perumal *et al.*, 2020). However, there is no proper study to vary the lip thickness in this range from 0.7 to 3.2 mm to understand the flow behavior of a co-flowing jet.

Keywords Thin lip co-flowing jet, Separation distance, Velocity ratio, Mixing enhancement, Subsonic jet

Paper type Research paper

Nomenclature

Symbols

- D_p = primary nozzle exit diameter (mm);
 $k-\omega$ = Turbulent Kinetic Energy (Joule) – Turbulent Dissipation (Joule);
 M = freestream Mach number (no unit);
 M_e = exit Mach number (no unit);
 R = coordinate along the radial jet (mm);
RSM = Reynolds-stress model;
SA = Spalart-Allmaras;
SST = shear-stress transport; and

X = coordinate along the jet axis (mm).

Definitions, Acronyms and Abbreviations

- CDR = Characteristic decay region;
CFD = Computational fluid dynamics;

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Dr. P. MANI ARASAN

Principal

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

Investigation of Spray and Droplet Characteristics of Spray Nozzles

D.S.R. Samundi^{a,b}, K. Sunayani^a, V. Nithyasree^a, A. Monisha^a, S. Chary^a and K.S. Kumar^c

^aDept. of Aero. Engg., Bharath Inst. of Higher Education and Research, Chennai, Tamil Nadu, India

^bCorresponding Author, Email: surekharathi.aero@bharathuniv.ac.in

^cDept. of Aero. Engg., Nehru Inst. of Engg. and Tech., Coimbatore, Tamil Nadu, India

ABSTRACT:

The study was focused on investigating the spray and droplet characteristics of spiral and flat-fan nozzles computationally. The Spiral nozzle and the flat-fan nozzle are generally used in fire suppression application. The computational analysis had been carried out in ANSYS. The nozzle parameters like spray pattern, spray flow rate, impact, weber number were examined at different pressures say 1 bar to 3 bar. During this study the volume fraction of air and water were maintained equally. The spray pattern of spiral nozzle is not uniform and the droplets produced from the spray are coarse. The flat-fan nozzle produces a solid-cone pattern spray with oval impact area with a width of approximately $\frac{1}{2}$ of its length. The flat-fan nozzle has higher spray flow rates and higher sprays impact than the spiral nozzles. The spiral nozzle acquires the maximum spray angle and the minimum droplet size and hence it is considered as highly efficient spray nozzle.

KEYWORDS:

Spray characteristics; Weber number; Spiral nozzle; Flat-fan nozzle

CITATION:

D.S.R. Samundi, K. Sunayani, V. Nithyasree, A. Monisha, S. Chary and K.S. Kumar. 2022. Investigation of Spray and Droplet Characteristics of Spray Nozzles, *Int. J. Vehicle Structures & Sys.*, 14(7), 906-911. doi:10.4273/ijvss.14.7.16.

1. Introduction

Spray nozzles play an important role in fire-fighting and a variety of industrial applications, including crop dusting, food coating, textile humidification, continuous casting cooling, exhaust scrubbers and so on. Spray nozzles have been the subject of intensive design work for decades, resulting in highly engineered devices of many forms and shapes. Fire is destructive and the smoke it produces creates a toxic and hazardous environment. The swift fire detection and suppression can save millions of lives, thousands of injuries and billions of dollars in property damage. The explosion of the Hawaii volcano in 2018 stimulates us to create an efficient and appropriate fire suppression system. In 2018, 8.5 million acres of land burned across the United States, an amount greater than a state. According to the California Department of Forestry and Fire Protection (Cal Fire) and the National Interagency Fire Centre (NIFC), the wildfire season in California is the deadliest, with 8,527 fires burning over 1,893,913 acres as of December 21, 2018. The flames cost more than 350 crores to put out, including 179.2 crores in firefighting costs. The researchers have been devising ways to produce a good suppression system that can overcome all the shortcomings of the present for as long as fire suppression and extinguishment have safeguarded our lives and property.

Hollow cone spray exhaust is used in the current fire suppression system. Spraying systems are widely employed in a variety of applications, ranging from home to defence. One of these types is fire retardant. Pure water or a compound known as Foscheck (80 %

water + 10 % ammonia phosphate and sulphate ions) can be used as a fire retardant. The fire-fighting aircrafts have the entrance of the fire suppression system either in the fuselage or at the tail portion. The usefulness of a water mist system in fire suppression was explained by Liu [1]. Spray properties such as droplet sizes, water droplet distribution, spray dynamics and flux density [2] that influence the efficiency of the fire suppression system have been discussed. They have also discussed about the fire, such as fuel shielding, fire size and ventilation. They have concluded that the enclosure effect and the dynamic mixing caused by the discharge of water mist have an impact on the effectiveness of water mist in fire suppression. The effect of injecting the compressed air into a flowing foam solution i.e., the Compressed Air Foam (CAF) technology was studied by

Kim et al [3]. They have concluded that the very small expansion ratios of the compressed-air foams and the uniform sized air bubbles have exceptional fire-fighting capabilities. Kalata et al [4] have carried out the experimental and computational analysis on a spiral nozzle to examine the air atomization [5]. They have used PDPA and LSI techniques to measure the drop size and the droplet distribution. Zbigniew [6] in his paper discussed the features of various flat fan nozzle based on the droplet size. Studies related to jet flow control using tabs and variation in lip thickness of the nozzles were also reported by Kumar and Chidambaram [7, 8] and Sathish et al [9, 10] respectively. The authors studied the jet mixing characteristics of the jet emanated from the nozzles. The current study had been carried out to analyse the variation of nozzle characteristics with increasing pressure. The spiral nozzle and flat-fan nozzle

Hybrid Intelligent Controller Design and Stability Analysis for Controlling Boeing-767 Dynamics using Matlab

G. Namdeo^a, K. Arulmozhi^{a,b} and K.S. Kumar^c

^aDept. of Aero. Engg., Hindustan Institute of Tech. & Sci., Chennai, Tamil Nadu, India

^bCorresponding Author, Email: karulmozhi@hindustanuniv.ac.in

^cDept. of Aero. Engg., Nehru Institute of Engg. and Tech., Coimbatore, Tamil Nadu, India

ABSTRACT:

The main objective of this research is to provide better controlling and stability to B767 aircraft, where a study of elevators for pitch control for the described longitudinal movement is conducted. Intelligent controllers are designed and introduced to the surfaces of the linearized model of B767 aircraft, to identify the performance level based on time response and stability analysis by using different transfer functions. Self-tuning PID Controller and designed hybrid intelligent controller with a combination of PID controller and fuzzy controller are proposed along with few sensors installation to obtain results. A comparative assessment and quantitative analysis of controllers are carried out using MATLAB Simulink. This research has shown that the performance of the aircraft has improved significantly.

KEYWORDS:

Aircraft; Pitch, Elevators; Intelligent controllers; Proportional-integral-derivative; Fuzzy;

CITATION:

G. Namdeo, K. Arulmozhi and K.S. Kumar. 2022. Hybrid Intelligent Controller Design and Stability Analysis for Controlling Boeing-767 Dynamics using Matlab, *Int. J. Vehicle Structures & Systems*, 14(7), 931-935. doi:10.4273/ijvss.14.7.20.

1. Introduction

An aircraft consists of a number of systems, namely the aircraft structural system including control surfaces and undercarriage, avionics and instruments, the aircraft power plant including the engine, propeller, ignition and the fuel system, the aircraft electrical systems and vacuum systems [1]. One of the key factors in the wright brother's achievement of building the first heavier-than-air aircraft was their insight that a functional airplane would require a mastery of three disciplines: lift, propulsion and control. Whereas the first two had been studied to some success by earlier pioneers such as Sir George Cayley, Otto Lilienthal, Octave Chanute, Samuel Langley and others, the question of control seemed to have fallen by the wayside in the early days of aviation. Even though the wright brothers built their own little wind tunnel to experiment with different airfoil shapes and also built their own lightweight engine [improving propulsion] for the wright flyer, a bigger innovation was the control system they installed on the aircraft [2].

Mechanical or manually operated flight control systems are the most basic method of controlling an aircraft. They were used in early aircraft and are currently used in small aircraft where the aerodynamic forces are not excessive. Increases in the control surface area required by large aircraft or higher loads caused by high airspeeds in small aircraft lead to a large increase in the forces needed to move them, consequently complicated mechanical gearing arrangements were developed to extract maximum mechanical advantage in order to reduce the forces required from the pilots [1].

The term "intelligent control" may be loosely used to denote a control technique that can be carried out using the "intelligence" of a human who is knowledgeable in the particular domain of control. In this definition, constraints pertaining to limitations of sensory and actuation capabilities and information processing speeds of humans are not considered. It follows that if a human in the control loop can properly control a plant, then that system would be a good candidate for intelligent control [3]. Information abstraction and knowledge-based decision making that incorporates abstracted information are considered important in intelligent control.

Unlike conventional control, intelligent control techniques possess capabilities of effectively dealing with incomplete information concerning the plant and its environment and unexpected or unfamiliar conditions. The term PID stands for proportional integral derivative and it is one kind of device used to control different process variables like pressure, flow, temperature and speed in industrial applications. In this controller, a control loop feedback device is used to regulate all the process variables [4]. This type of control is used to drive a system in the direction of an objective location otherwise level. It is almost everywhere for temperature control and used in scientific processes, automation & myriad chemical. In this controller, closed-loop feedback is used to maintain the real output from a method like close to the objective otherwise output at the fix point if possible. The PID controller design with control modes is used. Fuzzy logic is useful in representing human knowledge in a specific domain of application and in reasoning with that knowledge to make useful inferences

Naren Shankar Radha Krishnan, Sathish Kumar Kumar*, Vijayaraja Kengaiyah,
Senthilkumar Chidambaram and Ethirajan Rathakrishnan

Effect of bypass ratio on sonic underexpanded co-flow jets with finite lip thickness

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Abstract: The characteristics of a sonic under-expanded coaxial jet with lip thickness $1.5D_p$ (where D_p is the exit diameter of primary jet equals 10 mm) with the primary jet operating at nozzle pressure ratio (NPR) of 3, 4 and 5. For NPR 3 operating primary jet, the secondary jet operates at NPR 2.5, 1.4 and 1.27. For primary jet NPR 4, the secondary jet operating NPR is 3.2, 1.6 and 1.4. For NPR 5 primary jet, the secondary jet NPR is 3.8, 1.89 and 1.52. The study is performed using a co-flow nozzle of bypass ratio (BR) 6.4, 1.4 and 0.7. The core length of the primary jet is used as a measure to quantify the mixing of the primary jet in the presence of coaxial jet. The shock structure present in the near field was viewed using shadowgraph technique. Centreline pitot pressure distribution, radial spread and waves present in the jet core were analyzed. The results show that the mixing associated with the high bypass coaxial jet is superior to the low bypass coaxial jet. This mixing superiority associated with high bypass coaxial jet prevails all levels of expansion.

Keywords: coaxial flow; jet core; primary jet; secondary jet; shadowgraph; sonic jet.

*Corresponding author: Sathish Kumar Kumar, Associate Professor, Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India, E-mail: satz_aero@yahoo.com

Naren Shankar Radha Krishnan, Department of Aeronautical Engineering, Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology, Chennai, India, E-mail: nrarenshankar@gmail.com. <https://orcid.org/0000-0002-3363-4478>

Vijayaraja Kengaiyah, Department of Aeronautical Engineering, KCG College of Technology, Chennai, India, E-mail: kvijayaraja@gmail.com

Senthilkumar Chidambaram, Department of Aerospace Engineering, Madras Institute of Technology, Chennai, India, E-mail: cskumar34@gmail.com

Ethirajan Rathakrishnan, Department of Aerospace Engineering, Indian Institute of Technology, Kanpur, India, E-mail: erath@iitk.ac.in

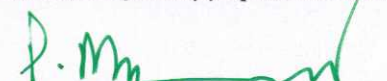
Introduction

Aircraft jet noise reduction is the key factor not only for passenger comfort but also for the comfort of the people residing in and around aerodromes [1–5]. Papamoschou [6], reported that, Mach Wave Radiation (MWR) causes noisier supersonic co-flowing jet (CFJ) than subsonic CFJ. Coaxial jet with central jet Mach 1.5 and surrounding jet from a diameter ratios $D_s/D_p = 1.4$ (low bypass) and $D_s/D_p = 1.7$ (high bypass) were studied. A high bypass CFJ ($D_s/D_p = 1.7$) was more effective in eliminating MWR than low bypass CFJ. In addition to MWR, choked nozzles contribute shock associated noise arising from shock wave/convective eddy interaction [7]. Coaxial jet can reduce MWR by shielding central jet eddies with surrounding jet [8].

It is well established that, for CFJ with substantial width secondary nozzle/duct, the velocity ratio/bypass ratio variation can enhance mixing and reduce noise [9–11]. Lip thickness is defined as the distance separating primary nozzle and secondary duct. Interestingly, coaxial jet with thick lip thickness of 10 mm [12] reduces noise about 3 dB compared to thin lip (0.7 mm) co-flow [13]. For a similar CFJ nozzle, Thanigaiarasu et al. [14], performed mixing studies for a constant finite lip thickness of 10 mm and varying bypass ratio of 6.4, 1.4 and 0.7. The authors proved that, increasing bypass ratio shortens core length and alters near field axial static pressure variation upto about 11% above and below atmospheric pressure.

Naren et al. numerically [15] and experimentally [16, 17] varied lip thickness namely 2 mm, 10 and 15 mm. They found that increasing lip thickness reduces core length of the primary jet and varies near field static pressure. Further studies revealed optimum range of lip thickness for constant bypass ratio CFJ (10–25 mm) and constant velocity ratio CFJ (10 mm to around 80 mm) [18–20].

Lovaraju and Rathakrishnan [21], analysed characteristics of coaxial jets with lip thickness 2.65 mm, bypass ratio 0.45, at subsonic, correctly expanded sonic and sonic under-expanded jets. The authors found that, the surrounding jet shields the primary jet at all Mach numbers and elongating the primary jet potential core. Srinivasarao


Dr. P. MANI ARASAN

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

Turbine Blade Analysis Using Different Alloy

A. Sankaran^{1,a)}, P. Deepak kumar¹, J. Karthikeyan¹, M. Kesavan¹,
A. Senthamilselvi¹, P. Karthikeyan¹ and K. Sundararaj²

¹Department of Aeronautical Engineering, Nehru Institute of Engineering & Technology, Coimbatore, India
²Department of Aeronautical Engineering, Kumaraguru College of Technology, Coimbatore - 641049, Tamilnadu, India

^{a)}Corresponding author: sankaran30@gmail.com

Abstract. Gas turbines play a serious role in aviation due to their high power-to-weight ratios and compactness in comparison to other conventional power generating units. The principal characteristic of the turbine blade is imparting power to or extracting it from numerous fluid streams. Turbine blades are exposed to a mix of high operating temperatures, centrifugal and bending loads due to shock loads as well as erosive/corrosive effects during operation. These operating conditions make the blades most vulnerable to failure and demand periodic inspection which adversely affects the general operational costs. In this paper, we present a study of problems related to gas turbine blades and by taking fatigue into consideration, we present a framework that successfully uses a combination of Reverse Engineering (RE) and finite element analysis (FEA) to model, analyses and optimizes different material properties which has an optimal performance of gas turbine blades for aircraft engines. Thermal fatigue and stress analysis are carried out and fatigue life cycles of different alloys are calculated

Keywords: Gas Turbine, turbine blade, material fatigue, alloys Performance, finite element analysis, Reverse Engineering (RE)

INTRODUCTION

The word "turbine" is associated with spinning. It is taken from the Latin word for a spinning top "turbines" [1]. The turbine traces its history back to Hero of Alexandria, who in AD 62 demonstrated a device he names Aeolipile. The power generated by the combustion created flow through a nozzle to the turbine wheel. John Barber's concept was sound, but given the technology of that day, the device could not create sufficient power to compress the air and the gas and have energy left to provide valuable work. In the ideal condition Gasses passing through the gas turbine undergo three thermodynamic processes. These are isentropic compression, isobaric (constant pressure) combustion, an isentropic expansion. Together these make up the Brayton cycle. A gas turbine having a single-spool-split output shaft also named a split-shaft mechanical drive gas turbine driving a free power turbine. The compressor and turbine component shaft is connected to the turbine shaft's power output and is also coupled aerodynamically. It is more accessible to starts and to cool the turbine blades. The aerodynamic couplings are advantageous. By integrating a singular dynamic helicopter/deliver interface simulation with the rain go with the flow cycle counting method, fatigue spectra, together with all viable probe load instances beneath the wide range of running and environmental situations, have been evolved with a self-belief stage of more than 99. 9%: otherwise, they would be almost unobtainable, even though restricted sea trial trying out. The absence of fatigue endurance limit data for full-size nitride crankshafts made up of 4340 vacuum arc remelting steel was explicitly noted by the Federal Aviation Administration. Both nitriding and size effects are known to increase fatigue strength typically reported for 4340 vacuum arc reflow steel using non-nitriding rotating-beam cylindrical specimens.[2, 3]. The model, which takes into account the influence of cyclical stresses on pitting, is based on the total service life approach, which takes into account all process stages, and is tested on the aircraft aluminium alloy 2024T3.

Methods of Drag Reduction by Modifying Landing Gear System in Fighter Aircraft

Surendra Kumar Yadav¹, A. Sankaran^{2,a}, Sovan Samanta³, S. Rathinavel²,
P. Karthikeyan², P. Deepak kumar² and K. Sundararaj⁴

¹Department of Mechanical Engineering, Prince ShriVenkateshwara Padmawathy Engineering College, Panmar, Chennai 600127, India

²Department of Aeronautical Engineering, Nehru Institute of Engineering & Technology, Coimbatore, India

³Department of Mechanical Engineering, Prince Dr. K. Vasudevan College of Engineering and Technology Chennai, India

⁴Department of aeronautical Engineering, Kumaraguru College of Technology, Coimbatore - 641049, Tamilnadu, India

^aCorresponding author: sankaran30@gmail.com

Abstract. In the present paper, the effect of the change of position and change of dimension (modification) of the landing gear on the drag reduction of the fighter aircraft have been studied. Modeling of the landing gear of model 1 to model 4, have been done using Catia V5 and numerical simulation have performed using CFD to evaluate the coefficient of drag, velocity, turbulence intensity and static pressure. The modification of landing gear results in a reduction of the drag coefficient. The drag coefficient for model 1 was found 1.37. Whereas, for model 4 the drag coefficient was reduced to 0.46. The maximum drag reduction was achieved for model 4 is about 66%. The drag reduction of fighter aircraft would directly affect the fuel consumption, range, and endurance of the fighter aircraft.

Keywords: drag coefficient; modification of landing gear; turbulence intensity

INTRODUCTION

The landing gear is a typical component of an aircraft. It is an undesirable part of an aircraft in terms of aerodynamics and weight but unavoidable for the operation of aircraft. Landing gears create a considerable amount of parasite drag during take-off and landing. The design of landing gear has come across a long way from simple fixed landing gear to retractable landing gear that has modernized aircraft performance. The design of landing gear is always considered as a challenge, compromise between the stability of the aircraft during take-off and landing, the weight of aircraft and aerodynamic impact has to be found.

Fixed type landing gear system produces about 35-40% of the total drag. Cowling has been done to reduce the drag in fixed type of landing gear. Finally they foot up into the next level named as retraction method shown in figure 1 & 2, this retraction method completely avoid the parasite drag occurred on the landing gear section at the crushing position. But, in the take off position maximum amount of parasite drag is in the landing gear section. Some measure problems have been faced, when the main landing gear was attached with wing. Too long strut lengths are required and wing must be strong enough to withstand the load of the landing gear. On the other hand extra space is required under the wing for the use of retraction type of landing gear and this result to decrease wing lift. That's why; the main landing gear is attached to the fuselage and retracts into the fuselage. In-order to reduce the weight and modify the aerodynamic body fighter aircrafts landing gear is designed similar to F-16.

The landing gear is an essential component of an aeroplane. It acts as a shock and energy absorber during landing related to the ground operations. Kruger W et al. [1] constructed several types of metering pins, optimized

Performance Optimization of Convergent – Divergent Nozzle under Different Inlet Conditions

R. Kousik Kumar^{1,a}, M. Senthil kumar², S. Chandrasekar¹ and N. R. Gowtham¹

¹Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore – 641 105, India

² Department of Aeronautical Engineering, Kumaraguru College of Technology, Coimbatore – 641 049, India

^a Corresponding author: kousikrangaraj@gmail.com

Abstract. The objective of this work is to design a CD nozzle (Convergent-Divergent Nozzle) with the help of 3D modeling software and to fabricate a model of the same scale. Three models with same inlet and throat diameter are taken. The only difference between them is the exit diameter. The flow parameters are analyzed both analytically and experimentally. From the literature survey we can find that, there lies an effect of Nozzle Pressure Ratio (NPR) on the exit velocity of the nozzle. Therefore, these models are tested at different inlet pressures. The data that are acquired analytically and experimentally are fed into software tool for optimization. Response surface model is created to find the amount of variation between the analytic outcome and experimental outcome. Through series of calculation in the software tool an optimum value for the NPR is found. The optimum NPR thus found is the NPR for which the exit velocity is highest. Thus, choosing such NPR for operation increases exit velocity of the nozzle which in turn increases the velocity of the vehicle. Thereby increasing the efficiency of the nozzle.

Keywords: Optimization technique, RSM, C-D nozzle, NPR, Inlet pressure, Area ratio.

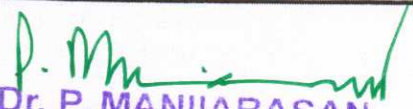
INTRODUCTION

In this work, the Performance Optimization of Convergent-Divergent Nozzle under Different Inlet Conditions was determined. And for optimizing better result among these different inlet conditions the technique called Response Surface Methodology is used. Here, the nozzles with three different exit radiuses [9.2, 9.4, and 9.6] were taken as the model and it had been calculated through Analytical calculation, Experimental calculation. Then those calculated results were optimized by Response Surface Methodology for the better result [1-12].

LITERATURE REVIEW

Design and CFD analysis of shockwave over supersonic CD nozzle by Kousik Kumar.R and Kesavan.M, [1]. This paper tells the basic operation convergent nozzle, divergent nozzle and convergent – divergent nozzles and also explaining about the shock wave over supersonic C-D nozzle. CFD Analysis of C-D nozzle by Malay S Patel, D Mane and Manikant Raman [7]. This paper providing the concepts of pressure, temperature, velocity and area ratio variation along the C-D nozzle and also explaining about the design parameter of the C-D nozzle.

Overview on the Response Surface Methodology (RSM) in Extraction Processes by Mohamed Amin, Khairul and Anwar Mohamad [5]. This paper shows how to identify the independent factors affects the designing and operation of the model, and also indicates which one of the factors is more influence the model, which means to get the optimum results among these factors.


Dr. P. MANI ARASAN

Principal

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

Investigation of Material Properties of Natural and Synthetic Fiber Hybrid Composite Material

R. Kousik Kumar^{1,a)}, M. Senthil Kumar², S. Sabariarun¹, V. Sathish¹,
S. Srikaanth¹ and S. Vimal¹

¹Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore – 641 105, India

²Department of Aeronautical Engineering, Kumaraguru College of Technology, Coimbatore – 641 049, India

^{a)}Corresponding author: kousikrangaraj@gmail.com

Abstract. For the last decade, many composites have been used in various applications and industries. Many types of fibre-based composites are present, which comes under two categories such as natural and synthetic fibre-based composites. Now-a-days, most of the natural fibre composite replaces synthetic fibre composite, due to their inexpensiveness, easy to manufacture, eco-friendly, biodegradable, abundance, improved surface finish, low weight, renewable source, etc. Density, mechanical properties, high water absorption and durability of natural fibre composite might be lower compared to the synthetic fibre composite but the moisture absorption of natural fibre can be improved by chemical treatment. The fibre used here are Bamboo, Banana, Jute and E-Glass fibre. For chemical treatment Con. Sodium Hydroxide solution (NaOH) is used. In this paper, hybrid composite is fabricated by hand layup process using natural and synthetic fibre as Sandwich type keeping glass fibre as upper and lower layer which is a safe and gives better surface finish replacing the existing plastics used in aircraft interiors. Thus, determining the mechanical properties of the seven composition of the composite sample by undertaking tensile test, flexural test, impact test, water absorption test and finalizing which of these composition is best for aerospace application. Sample 1 consisting of Bamboo-5%, Banana-15%, Jute-10%, Glass fibre-10%, Epoxy Resin-60% shows high tensile strength, impact strength, followed by Sample 4 consisting of Bamboo-10%, Banana-10%, Jute-10%, Glass fibre-10%, Epoxy-60% shows high flexural strength.

Keywords: Bamboo, Banana, Jute, E-glass fibre, Natural-synthetic hybrid composites, Epoxy resin.

1. INTRODUCTION

Composite material is made up of two or more materials with different mechanical and chemical properties combined with the help of resin. Due to the development of fibre such as cotton or silk, the advantages of banana stem in industry decreases, but in few years, the commercial value of it has increased. The banana fibre was considered an agricultural waste, but now it is a good material needed for various convenient products. The banana fibre also called Musa fibre; it is one of the strongest natural fibre available. It is mainly composed of cellulose hemicellulose and lignin. Banana fibre clothing are very comfortable and not likely to trigger allergies, it has grease proof, water, fire and heat resistance. It has a better tensile strength than other organic fibre. Bamboo produces regenerative cellulose fibre called bamboo fibre. Starchy pulp is produced from bamboo stem and leaves, through a process of alkaline hydrolysis and multiphase bleaching. It is made of 100% bamboo pulp fibre. It is softer than cotton and similar to cashmere and silk. Due to its micro holes, its moisture absorption is double that of a cotton. Bamboo fibre produces bio degradable. Mainly use in clothing such as tight T-shirt, underwear, socks. It has antibacterial nature, so it is used in sanitary material such as bandages, mask, surgical clothes, etc., 100% of bamboo fibre yarn shows great elasticity, nearly 20%.

Jute is long, soft and shiny, they can be spin into coarse, strong threads. It is produced from flowering plant in genus Corchorus, which is mallow family, malvaceae, it is the most affordable fibre second only to cotton. It is

Turbulence Characteristics of Truncated Chevron Nozzle

K. Sathish Kumar^{1a)}, A. Sankaran¹, R. Nikilan¹, M. Gerith¹, F. Asif Mohammed¹,
G. Vengatesan¹, K. Anu Sindhiya² and K. Sundararaj³

¹Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, India-641 105.

²School of Mechanical Engineering, Vellore Institute of Technology - Chennai, India - 600 127.

³Department of Aeronautical Engineering, Kumaraguru College of Technology, India - 641049.

^{a)}Corresponding author: nietdrksathishkumar@nchrucolleges.com

Abstract. This paper discusses the Computational Fluid Dynamic study on the turbulence characteristics of chevron nozzle with truncated petals. To study the turbulence characteristics of the jet, truncated chevron nozzle with 6 petals and plain chevron nozzle with six petals is chosen. For the exit Mach number of 1.0, the turbulence kinetic energy that varies along the axis of the jet is measured for the truncated chevron nozzle and it compared with the plain chevron nozzle. The turbulence kinetic energy for the truncated chevron nozzle is more at the near field of the jet when compared to the plain chevron nozzle. The increase in the turbulence is due to the vortices of mixed sizes initiated from the edges of the petals of truncated chevron nozzle. The turbulence kinetic energy at various locations on the axis of the jet is also studied for the jet exit Mach number of 1.0.

Keywords: Petals, Vortices, Truncated, Turbulence.

INTRODUCTION

In the recent past there were numerous studies documenting the jet mixing and acoustics characteristics of chevron nozzles. Some of the passive techniques used to augment the jet mixing and reducing the jet acoustics are the use of tabs, grooves, notches, multiple nozzle etc., [1-3]. The chevron nozzles when fitted at the exhaust of a jet engine, proves to be a promising in effectively enhancing its mixing capabilities and reducing the jet's acoustic characteristics when compared to other nozzle types. When the jet is emanated from the nozzle, the chevron petals generates the vortices of different sizes along the stream wise direction [4-10]. There were also many studies documented the modifications made in the chevron nozzle to reduce the acoustic levels chevron nozzle. This article mainly discusses the turbulence characteristics of the truncated chevron nozzle. The truncated chevron petals were chosen in order to study the possibility in enhancements of turbulent kinetic energy (TKE) characteristics. By truncating the normal chevron petal, additional sharp edges are formed, which leads to the creation of more number of vortices.

METHODOLOGY

Nozzle Design

Figure 1, represents the plain chevron nozzle and the truncated chevron nozzle with six petals and were designed using CATIA, as per the dimensions given in table 1.

Jet Decay Characteristics of Truncated Chevron Nozzle

K. Sathish Kumar^{1a)}, A. Sankaran¹, R. Nikilan¹, M. Gerith¹, F. Asif Mohammed¹,
G. Vengatesan¹, K. Anu Sindhiya² and K. Sundararaj³

¹Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, India-641 105.

²School of Mechanical Engineering, Vellore Institute of Technology – Chennai, India - 600 127.

³Department of Aeronautical Engineering, Kumaraguru College of Technology, India - 641049.

^{a)}Corresponding author: nietdrksathishkumar@nehrucolleges.com

Abstract. This article presents the numerical study on the jet decay characteristics of truncated chevron nozzle. Six tooth truncated chevron nozzle and plain chevron nozzle is chosen for the study. The total pressure corresponding to the exit Mach number of 1.0, is measured along and normal to the jet axis for the truncated chevron nozzle and is compared with the plain chevron nozzle. The truncated chevron nozzle reduces the core up to 18% when compared with the normal chevron nozzle. The reduction in the core is mainly due to the varying size vortices generated by the truncated edges of the truncated chevron nozzle. The jet spread characteristics of the truncated chevron nozzle procured at various locations of the jet in the axial direction, reinforces and validates the core reduction percentage.

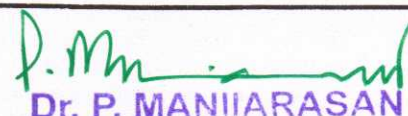
Keywords: Chevrons, Truncated, Tooth, Mixing, Jet

INTRODUCTION

Jet mixing study was carried out by many researchers in the recent past. The use of tabs, grooves, notches, multiple nozzle etc., are some of the means to control the jet to enhance the jet mixing [1-3]. The use of chevron nozzle in the aircraft engine exhaust has the better jet mixing and jet acoustic characteristics than other nozzle types. The authors [4-10] documented that, all the petals of the chevron, generates a vortices in the jet flow direction. There were also many modifications done on the chevron nozzle to reduce the jet acoustic levels of the chevron nozzle. This study mainly focusses on the jet mixing characteristics of the truncated chevron nozzle.

METHODOLOGY

The length and exit diameter of the six tooth truncated chevron nozzle and the plain chevron nozzle is 10mm and 12mm respectively. The length of the tooth is 15mm. At the exit of the nozzle, domain diameter of eight times the exit diameter and length of 25 times the exit diameter is fixed to study the jet flow development numerically. Both the nozzles were designed as per the dimensions using CATIA. The unstructured tetra hedra mesh of about 1375636 nodes and 6898695 elements is done using ANSYS ICEMCFD. Grid independency study is carried out to improve the result accuracy and to eliminate the deviation due to meshing. The solver used for the study to solve the flow equations is ANSYS CFX. At the nozzle inlet the pressure inlet of 1.9 bar is given as the boundary condition. For the nozzle adiabatic no slip wall condition is given and at the domain inlet and the sides, opening condition with 1 atm pressure and at the domain outlet, pressure outlet condition with 1atm is given. The turbulence model chosen for the study is Shear Stress Transport [11]. The convergence criteria for the solution accuracy are set as 0.0001. The centerline total pressure decay of the baseline nozzle obtained from the numerical study is validated against the experimental results. The results correlate exceptionally well with each other.


Dr. P. MANI ARASAN

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

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 Abebe⁹

¹Department of Civil Engineering, E.G.S. Pillay Engineering College, Nagapattinam, Tamil Nadu, India

²Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

³Department of Mechanical Engineering, Saveetha Engineering College, Chennai, India

⁴Centre for Materials Research, Nehru Institute of Technology, Coimbatore, India

⁵Department of Mechanical Engineering, Bharath Institute of Higher Education and Research, Chennai, India

⁶Department of Mechanical Engineering, Graphic Era Deemed to Be University, Bell Road, Clement Town, Dehradun, Uttarakhand, India

⁷Department of Mechanical Engineering, Velammal Institute of Technology, Chennai, Tamil Nadu, India

⁸Department of Mechanical Engineering, Sri Krishna College of Engineering and Technology, Coimbatore, Tamil Nadu, India

⁹School 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 rein-

forcement 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].



Dr. P. MANIWARAN
Principal

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



Senthilkumar Thangarajan Sivasankaran,¹ Senthil Kumar Shanmugakani,²
Vignesh Kumar Vijayakumar,³ Rathinavel Subbiah,⁴
Seivarajan Lakshmanan,⁵ and Nagaprasad Nagaraj⁶

Worn Surface Analysis and Wear Map Mechanism of AA4032 Composites

Reference

S. Thangarajan Sivasankaran, S. K. Shanmugakani, V. K. Vijayakumar, R. Subbiah, S. Lakshmanan, and N. Nagaraj, "Worn Surface Analysis and Wear Map Mechanism of AA4032 Composites," *Journal of Testing and Evaluation* <https://doi.org/10.1520/JTE20220149>

ABSTRACT

The present research work exhibits the effect of reinforcement particles on the mechanical and wear properties of AA4032 hybrid and unhybrid metal matrix composites (MMCs). The unhybrid MMCs were prepared by incorporating titanium carbide (TiC) particles onto the AA4032, whereas the hybrid MMCs were prepared by the addition of hexagonal boron nitride (h-BN) particles to unhybrid AA4032-TiC composite. The tribological study conducted on the composites reveals that the wear rate was augmented at a higher applied load because of the formation of plastic deformation with some cracks. The generation of shear stress at an elevated applied load increases the coefficient of friction (COF). However, the addition of TiC and h-BN particles decreases the COF and wear rate because of the abrasion resistance and self-lubrication property of TiC and h-BN, respectively. The wear mechanism map study confirms that the hybrid MMCs have better wear resistance properties than the unhybrid MMCs with minimum delamination.

Keywords

AA4032, h-BN, wear rate, coefficient of friction, wear mechanism map

Introduction

Metal matrix composites (MMCs) attract attention because of their good strength-to-weight ratio, better thermal characteristics, and improved wear-resistant properties in high-temperature applications such as racing car engines, turbine blades, brakes, clutches, and bearings. AA4032 is the most preferred material in manufacturing racing cars,

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¹ Department of Mechanical Engineering, K. Ramakrishnan College of Technology, Samayapuram, Tiruchirappalli, 621112, Tamil Nadu, India (Corresponding author), e-mail: senthilk.kumar6@gmail.com, <https://orcid.org/0000-0003-2498-0480>

² Department of Mechanical Engineering, SRM Institute of Science and Technology, Tiruchirappalli Campus, Tiruchirappalli 621105, Tamil Nadu, India, <https://orcid.org/0000-0003-0837-531X>

³ Department of Mechanical Engineering, St. Joseph College of Engineering, Chennai 602117, Tamil Nadu, India, <https://orcid.org/0000-0001-5720-7250>


DR. P. MANI ARASAN

Principal

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

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 Govindarajan⁹

¹Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India

²Saveetha Engineering College, Chennai, Tamil Nadu, India

³Vel Tech Multitech, Avadi, Chennai, Tamil Nadu, India

⁴Vignan's Foundation for Science Technology and Research, Guntur, India

⁵Jabalpur Engineering College, R.G.P.V.Bhopal, Jabalpur, Madhya Pradesh, India

⁶Saveetha School of Engg, Saveetha Institute Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

⁷QIS College of Engineering and Technology, Ongole 523272, Andhra Pradesh, India

⁸Department of Mechanical Engineering, Adhi College of Engineering and Technology, Kanchipuram, Tamil Nadu, India

⁹Department 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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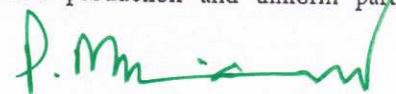
The aerospace aluminium alloy AA7050 was reinforced with Al_2O_3 of average particle size 5 μm in this study using the stir casting method. To eliminate surface imperfections, AA7050/ Al_2O_3 composites with varied weight percentages (0, 2, 4, 6) were manufactured, and wear tests on composites were carried 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


Dr. P. MANI ARASAN
Principal

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



Pear cactus fiber with onion sheath biocarbon nanosheet toughened epoxy composite: mechanical, thermal, and electrical properties

Ramaswamy R¹ · Kaliappan S² · Natrayan L³ · Pravin P. Patil⁴

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Abstract

This study explored the effectiveness of hardened epoxy containing pear cactus fiber and onion sheath biocarbon nanosheet. Mechanical, dielectric, and thermal properties of pear cactus epoxy composites containing varying volumes of biocarbon nanosheet are the focus of this investigation. For this study, biocarbon was extracted by pyrolysis from red onion peel. For 3 vol.% of biocarbon, tensile strength was up to 63%, and flexural strength was up to 44% higher than pure epoxy. The addition of reinforcements boosted the Izod impact toughness and hardness values by around 5 volume percent to roughly 94% and 92%, respectively. When biocarbon made up 5% of a material's volume, improvements in dielectric constant and loss were around 5.8 and 0.23, respectively. The inclusion of biocarbon increased the thermal conductivity to a high of 0.44 W/mK. These composites might be used as a shielding material because to their improved dielectric, mechanical, and thermal activities.

Keywords Polymer composite · Biochar · Pyrolysis · Mechanical properties · Thermal properties · Electrical properties

1 Introduction

Greenhouse gases released into the atmosphere are exacerbated by the combustion of petroleum and the production of glass fibers [1]. Recent proposals have suggested using green materials that are less harmful to the environment than those made from petroleum [2]. Economically and ecologically, it is becoming more intriguing to see the development of biodegradable and renewable materials like natural fiber composites [3, 4]. Biocomposites, or composites manufactured from natural fibers, are widely used in the automotive and construction sectors. Door panels, seat backs, dashboards, truck liners, headliners, decking, railing,

window and frame construction, and so on are all common places to find natural fibers in automobiles. Biocomposites have minimal flammability and good tensile strength, as has been shown [5]. Instead of using synthetic fibers, natural fibers like flax, hemp, and jute can be utilized to reinforce thermoset or thermoplastic polymers. The most common thermoplastic matrices for natural fibers are polypropylene and polyethylene; however, thermosets like phenolic and polyesters are sometimes employed [6]. The extensive list of ingredients needed to make thermoset composites including base resin, curing agents, catalysts, flowing agents, and hardeners makes thermoplastics an attractive alternative as matrix materials for composites [7]. Among normally used natural fibers, the pear cactus is a new arrival. It is abundant, cheaper, and easy to process and economically sound [8]. This pear cactus is from a high leafy green plant group that usually grows in dry lands. It contains nails on the leaf to self-defend. By retting process, the fibers of pear cactus could be prepared for composite-making processes [9].

By heating and curing the composite materials, a highly cross-linked three-dimensional network structure is produced. As a result of their cross-linking, these structures are very strong, solvent-resistant, and creep-resistant [10, 11]. But high-performance polymeric materials may need both fiber reinforcing and particle strengthening to obtain

✉ Ramaswamy R
rrsamy2000@rediffmail.com

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

² Department of Mechanical Engineering, Velammal Institute of Technology, Chennai, India

³ Department of Mechanical Engineering, Saveetha School of Engineering, SIMATS, Chennai, India

⁴ Department of Mechanical Engineering, Graphic Era Deemed to Be University, Bell Road, Dehradun, Uttarakhand, India

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Dr. P. MANI ARASAN
Principal

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

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Original Article

Grey relational analysis and surface texture analysis of Al-based metal matrix composites



S. Senthil Kumar ^a, T.S. Senthilkumar ^b, P. Pitchipoo ^c,
Yagya Dutta Dwivedi ^d, N. Nagaprasad ^e, Kuldeep K Saxena ^f,
S. Rathinavel ^g, Sayed M Eldin ^h, Krishnaraj Ramaswamy ^{i,j,*}

^a Department of Mechanical Engineering, SRM Institute of Science and Technology, Tiruchirappalli Campus, Tiruchirappalli, 621 105, India

^b Department of Mechanical Engineering, K. Ramakrishnan College of Technology, Tiruchirappalli, 621 112, India

^c Department of Mechanical Engineering, PSR Engineering College, Sevalpatti, 626 140, India

^d Department of Aeronautical Engineering, Institute of Aeronautical Engineering, Dundigal, Hyderabad, 500 043, India

^e Department of Mechanical Engineering, ULTRA College of Engineering and Technology, Madurai, 625 104, India

^f Division of Research and Development, Lovely Professional University, Phagwada, 144 402, India

^g Department of Aeronautical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, 641 105, India

^h Center of Research, Faculty of Engineering, Future University in Egypt, New Cairo, 11835, Egypt

ⁱ Centre for Excellence-Indigenous Knowledge, Innovative Technology Transfer and Entrepreneurship, Dambi Dollo University, Ethiopia

^j Department of Mechanical Engineering, College of Engineering and Technology, Dambi Dollo University, Ethiopia

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ABSTRACT

The investigation found that the incorporation of MoS₂ particles as reinforcement in Al–4% Mg material results in an increase in density and microhardness. The composite with 4% Mg and 6% MoS₂ exhibited the highest percentage increase in the density up to 8.04%, and the highest percentage increase in the microhardness value of up to 33% as compared to the pure Aluminium. The pin-on-disc wear test revealed that the wear loss of the Al–Mg alloy is reduced by adding MoS₂ particles as reinforcement. The wear loss decreases by 16.03% for the composite with 4% Mg and 6% MoS₂. SEM analysis showed that the composite with higher MoS₂ content (6%) exhibits a smoother worn surface. However, WEDM machining of the composite materials at higher levels of peak current, pulse on time, and gap voltage resulted in poor surface quality with more craters and micro voids. The sliding distance (m) was found to be the most significant parameter for wear output parameters, contributing to 57.05%–59.08% of the materials in samples 1 to 5. Similarly, the pulse on time (μs) was the most significant parameter for WEDM output parameters, contributing 46.29%–80.33% for the materials in samples 1 to 5. The study concluded that the PM route is an effective method for producing Al–Mg–MoS₂ composites, which can improve the wear resistance of the Al–Mg alloy, and that WEDM parameters need to be optimized to achieve a better surface finish.

* Corresponding author.

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Dr. P. MANIWARAN
Principal

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

A Machine Learning Approach for Plant leaf Disease Detection using Convolution Neural Network (CNN)

Dr. V T Krishnaprasath

Assistant Professor,
Department of Artificial Intelligence and Data Science
Nehru Institute of Engineering and Technology
Coimbatore, India

Dr. S. Arunkumar

Assistant Professor,
Department of Electrical and Electronics Engineering
Nehru Institute of Engineering and Technology
Coimbatore, India

Abstract— The timely identification and early prevention of plant diseases are essential for improving production. In this paper, deep convolutional neural network (CNN) models are implemented to identify and diagnose diseases in plants from their leaves, since CNNs have achieved impressive results in the field of machine vision. Standard CNN models require a large number of parameters and higher computation cost. In this paper, we replaced standard convolution with depth=separable convolution, which reduces the parameter number and computation cost. The implemented models were trained with an open dataset consisting of 14 different plant species, and 38 different categorical disease classes and healthy plant leaves. To evaluate the performance of the models, different parameters such as batch size, dropout, and different numbers of epochs were incorporated. The implemented models achieved a disease-classification accuracy rates of 98.42%, 99.11%, 97.02%, and 99.56% using InceptionV3, InceptionResNetV2, MobileNetV2, and EfficientNetB0, respectively, which were greater than that of traditional handcrafted-feature-based approaches. In comparison with other deep-learning models, the implemented model achieved better performance in terms of accuracy and it required less training time. Moreover, the MobileNetV2 architecture is compatible with mobile devices using the optimized parameter. The

accuracy results in the identification of diseases showed that the deep CNN model is promising and can greatly impact the efficient identification of the diseases, and may have potential in the detection of diseases in real-time agricultural systems.

Keywords: artificial intelligence; convolutional neural network; deep learning; machine learning.

I. INTRODUCTION

The automated identification of plant diseases based on plant leaves is a major landmark in the field of agriculture. Moreover, the early and timely identification of plant diseases positively impacts crop yield and quality [1]. Due to the cultivation of a large number of crop products, even an agriculturist and pathologist may often fail to identify the diseases in plants by visualizing disease-affected leaves. However, in the rural areas of developing countries, visual observation is still the primary approach of disease identification [2]. It also requires continuous monitoring by experts. In remote areas, farmers may need to travel far to consult an expert, which is time-consuming and expensive [3,4]. Automated computational systems for the detection and diagnosis of plant diseases assist farmers and agronomists with their high throughput and precision.

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Dr. P. MANI ARASAN

Principal

Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 012.

A Malicious Uniform Resource Locator (URL) Detection and Classification using Deep Learning Techniques

Dr. V T Krishnaprasath

Assistant Professor,

Department of Artificial Intelligence and Data Science
 Nehru Institute of Engineering and Technology
 Coimbatore, India

Dr. S. Arunkumar

Assistant Professor,

Department of Electrical and Electronics Engineering
 Nehru Institute of Engineering and Technology
 Coimbatore, India

Abstract— Currently, the risk of network information insecurity is increasing rapidly in number and level of danger. The methods mostly used by hackers today is to attack end-to-end technology and exploit human vulnerabilities. These techniques include social engineering, phishing, pharming, etc. One of the steps in conducting these attacks is to deceive users with malicious Uniform Resource Locators (URLs). As a results, malicious URL detection is of great interest nowadays. There have been several scientific studies showing a number of methods to detect malicious URLs based on machine learning and deep learning techniques. In this paper, we propose a malicious URL detection method using machine learning techniques based on our proposed URL behaviors and attributes. Moreover, bigdata technology is also exploited to improve the capability of detection malicious URLs based on abnormal behaviors. In short, the proposed detection system consists of a new set of URLs features and behaviors, a machine learning algorithm, and a bigdata technology. The experimental results show that the proposed URL attributes and behavior can help improve the ability to detect malicious URL significantly. This is suggested that the proposed system may be considered as an optimized and friendly used solution for malicious URL detection.

Keywords— URL; malicious URL detection; feature extraction; feature selection; machine learning

I. INTRODUCTION

Uniform Resource Locator (URL) is used to refer to resources on the Internet. In [1], Sahoo et al. presented about the characteristics and two basic components of the URL as: protocol

identifier, which indicates what protocol to use, and resource name, which specifies the IP address or the domain name where the resource is located. It can be seen that each URL has a specific structure and format. Attackers often try to change one or more components of the URL's structure to deceive users for spreading their malicious URL. Malicious URLs are known as links that adversely affect users. These URLs will redirect users to resources or pages on which attackers can execute codes on users' computers, redirect users to unwanted sites, malicious website, or other phishing site, or malware download. Malicious URLs can also be hidden in download links that are deemed safe and can spread quickly through file and message sharing in shared networks. Some attack techniques that use malicious URLs include [2, 3, 4]: Drive-by Download, Phishing and Social Engineering, and Spam.

According to statistics presented in [5], in 2019, the attacks using spreading malicious URL technique are ranked first among the 10 most common attack techniques. Especially, according to this statistic, the three main URL spreading techniques, which are malicious URLs, botnet URLs, and phishing URLs, increase in number of attacks as well as dangerlevel.

Dr. P. MANI ARASAN
 Principal

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



MACHINE LEARNING TECHNIQUES FOR DETECTING AND RECOGNISING EMOTIONS BY FACIAL EXPRESSIONS

Dr. Sarojini Yarramsetti¹, Dr. Shiney Chib², Vaishali Singh³, Galiveeti Poornima⁴,
Mrs. Rupali Suraskar⁵, Dillip Narayan Sahu^{6*}

¹Associate Professor, Department of CSBS, Nehru Institute of Engineering and Technology,
Coimbatore, India.

²Director, Department of Management, Datta Meghe Institute of Management Studies,
Nagpur, India.

³Assistant Professor, Department of Computer Science & Engineering (CSE), Ambalika
Institute of Management and Technology (AIMT), Lucknow, UP, India.

⁴Assistant Professor, School of CSE & IS, Presidency University, Bangalore, Karnataka,
India.

⁵Teaching Associate, Department of Electronic, Larsen and Toubro Edutech, Nagpur,
Maharashtra, India.

^{6*}Assistant Professor, Department of MCA, Gangadhar Meher University, Odisha, India.
Email: dillip1seminar@gmail.com

Abstract

Non-verbal communication, such as facial expression, also includes the use of body language and vocal inflection to communicate emotion. Facial expressions may be used to many different purposes. Computer science, Biotechnology, Psychology, Chemistry, and Pharmacy all get additional interest as a result of face expression recognition. Expressions used in HCI studies to better understand human-computer interactions. Facial expression identification paves the way for precise extraction of emotional characteristics. Static picture facial expression identification methods neglect the dynamic and static properties of facial organs and muscle movements, as well as the geometry and visual elements of facial emotions. By performing patch matching procedures and choosing critical patches, we are able to overcome this constraint utilising extracted 3D Gabor features based on patches. Positive findings from the testing phase include an increased Correct Recognition Rate (CRR), better performance when taking facial characteristics and bodily movements into account, fewer incorrect face registrations, and shorter processing time. The suggested method provided the greatest CRR on the JAFFE and Cohn-Kanade AU-Coded Facial Expression datasets, establishing a clear advantage above state-of-the-art methods.

Keywords: human-computer interaction, emotion detection, and automated facial expression recognition systems.

1. Introduction

Because human emotion is employed in a wide variety of real-time applications, the study of methods to automatically recognise facial emotions is an important area of research. In general, human express his/her emotions in interpersonal communications through various

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Dr. P. MANI ARASAN
Principal

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



**SOCIAL MEDIA MARKETING; A STUDY ON
IMPACT OF SOCIAL MEDIA ON MARKETING A BRAND**

Dr. K. Priyatharsini

Assistant Professor, Department of Management, Sakthi Institute of Information
and Management Studies, Pollachi - 642001.

Priyadarshini.siims.mba@gmail.com

Dr.A.Giri Prakash,

Assistant Professor, Department of Management, Sakthi Institute of Information
and Management Studies, Pollachi - 642001.

Giriprakash.siims.mba@gmail.com

P. Priyadharsini

Assistant professor, CS&BS,

Nehru Institute of Engineering and Technology, Coimbatore

dillip1paper@gmail.com

Dr. K. Latha

Professor, BCom (CS)

Hindusthan College of Arts and Science, Coimbatore

lathak158@gmail.com

DR. Subramani Lenin

Assistant Professor, Department of Commerce, College of Science and
Humanities, SRM Institute of Science and Technology, Kattankulathur, 603203

lenin.mgt@gmail.com

Tripti Tiwari

Assistant Professor, Department of Management Studies,
Bharati Vidyapeeth (Deemed to be University) Institute of Management and
Research, A-4, Rohtak Road, Paschim Vihar, New Delhi

tripti.tiwari@bharativedyapeeth.edu

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Dr. P. MANI ARASAN

Principal

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

Research Article

An Extensive Study Using the Beetle Swarm Method to Optimize Single and Multiple Objectives of Various Optimal Power Flow Problems

K. Sriram¹, S. P. Mangaiyarkarasi², S. Sakthivel³, and L. Jebaraj⁴

¹Department of Electrical and Electronics Engineering, St. Anne's College of Engineering and Technology, Panruti, Tamil Nadu, India

²Department of Electrical and Electronics Engineering, University College of Engineering, Panruti, Tamil Nadu, India

³Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu, India

⁴Department of Electrical and Electronics Engineering, P.S.R. Engineering College, Sivakasi, Tamil Nadu, India

Correspondence should be addressed to K. Sriram; sriram.pse@gmail.com

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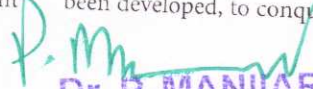
An electric energy generation system, under the economic operation mode, is an imperative mission in the power system function. This article deals with the use of beetle swarm optimization algorithm (BSOA), for optimal power flow (OPF) solution, in an effective approach. BSOA is a competent optimization technique, to handle multimodal, nonlinear, and nondifferentiable objective functions. The proposed OPF is modeled by numerous objective functions, formulations with constraints, examined with thirty-one different cases, on the three distinguished test systems (IEEE 30, 57, and 118-bus), using single and weighted sum multiobjectives. Six new multiobjective cases are also studied. The control variables, such as real generation of power, tap setting ratio of transformers, bus voltages magnitudes, and the values of shunt capacitor, are also optimized. Potency and robustness of this proposed method were investigated and evaluated with more recent findings reported in the literature. This extensive study revealed the preeminence of the presented technique, applied to OPF problem, with intricate and nonsmooth objective functions.

1. Introduction

OPF is a strategic method, to enhance the electrical energy quality, at minimum cost, in a deregulated, nonlinear, and multidimensional power scheme, that is large level and complex constrained optimization problem, in electric power system [1, 2]. OPF is also a successful tool, to improve the effectiveness of the system parameters such as stability of voltage, voltage profile, and reduce the emission [3]. OPF manages the control variable under discrete and continuous mode, to optimize the necessary objective functions by fulfilling the operating constraints [4]. Numerous arithmetical-based predictable indoctrination techniques, such as augmented Lagrangian method [5], the augmented Lagrangian and barrier combined with reduced gradient

method [6], nonlinear- and linear-based programming [7–10], quadratic programming [11], voltage rectangular coordinate-based interior point method, using voltage rectangular coordinates [12], sequential unconstrained minimization technique [13], and Benders decomposition [14], have been executed successfully in past decades, for solving OPF problems successfully. The comprehensive surveys of different conventional methods, to solve OPF problems, have been reported [15–17]. Owing to the intricacy of computational operation and deprived convergence, a lot of these conventional methods were not appropriate for producing efficient results, under various constraints and multiobjective functions.

Nowadays, numerous nature-inspired algorithms have been developed, to conquer these drawbacks of conventional


Dr. P. MANI ARASAN
Principal

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

Optimization of location and rating of unified power flow controllers for congestion management

Vengadesan Alagapuri¹, Ashok Bakkiyaraj Radhakrishnan¹, Sakthivel Sithangkathan²,
Jayanthi Kalikrishnan³

¹Department of Electrical Engineering, Annamalai University, Chidambaram, India

²Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

³Department of Computer Application, Government Arts and Science College, Chidambaram, India

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ABSTRACT

Large number of contracted power exchanges among sellers and purchasers, in a deregulated power market causes transmission line congestion. Congestion of lines undermines the security and economy of power networks. Flexible AC transmission system (FACTS) devices are introduced at appropriate spots to change the power flow in order to keep the flow of the lines within their capability. In this work, the most commonly used unified power flow controller (UPFC) is proposed for achievement of changing the line flow and for easing congestion from the over loaded lines. The size and site of UPFC controllers significantly impact their performance in congestion management task. The location and size of the UPFC devices are to be optimized by using an optimization algorithm. Whale optimization algorithm (WOA) is exploited in this effort for realizing the aim of determination of site and size of the FACTS converters. The present method has lesser quantity of variables which are tuned to get best outcomes. The suggested WOA based technique is executed on the IEEE 57 bus system. The outcomes comparison is made with particle swarm optimization algorithm (PSO) and firefly algorithm (FFA) and the better improved outcomes are found.

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Corresponding Author:

Sakthivel Sithangkathan
Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology
Coimbatore, Tamil Nadu, India
Email: sithansakthi@gmail.com

1. INTRODUCTION

In a liberated power system, the role of generation, transmission and distribution are involved by three separate companies, generation by GENCOs, transmission by TRANSCO and distribution by DISCOs [1]. Rivalry is created by having large number of GENCOs and DISCOs in power markets. Transmission framework is owned by an independent system operator (ISO) because of reasons of economy and precise control.

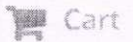
Load requirement is growing at a quicker amount in contrast to the extension in transmission structures. Huge amount of bilateral and multilateral agreements causes transmission line overloads [2]. In the event, if the agreed exchanges are not controlled, a few lines in specific regions might become over loaded, this is named as congestion [3]. The major challenge in expansion of new lines is acquiring of lands and requirement of large amount of investment [4].

Boosting the exploitation of offered transmission ability is easily accomplished by introducing flexible AC transmission system (FACTS) compensators [5]. The expanded utilization of these FACTS gadgets is as a result of two reasons. The advanced powers electronic technologies have made these gadgets are more



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

Balanced Standalone Clustering Unit Commitment Solution for Smart Grid Using Probability Algorithms

Kannan Ramasamy , Manoraja Paul Moses, Mathankumar Manoharan & Sanjeevikumar Padmanaban 

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ABSTRACT

For a smart grid system operating with clustered generating units, the challenge usually lies in the optimal scheduling of energy resources. Thus, the improvement of a unit commitment problem gains importance in the present power network. In this paper, a novel probability algorithm is proposed for solving the unit commitment problem, in which five separate units from a four-cluster group are operated for one day. This is done with the aim of optimizing the characteristics such as optional units, generation,

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Research Article

Energy Management in Plugin Hybrid Electric Vehicles with Hybrid Energy Storage System Using Hybrid Approach

Kannan Ramasamy ✉, Kalaivani Chandramohan, Devadasu Ghanta

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Abstract

Herein, an optimal control approach for the energy management of hybrid energy storage system (HESS) like battery, supercapacitor (SC), and integrated charging unit in plugin hybrid electric vehicle (PHEV) is proposed. The proposed approach is the combination of both the jellyfish search optimizer (JS) and gradient boosting decision tree algorithm (GBDT) and it is termed as JS-GBDT approach. The high energy density battery and high power density SC are combined for satisfying the demand of vehicle. To balance the charging, an uncontrolled rectifier with DC to DC buck converter, and to guarantee smooth transition of energy, two bidirectional DC–DC buck–boost converters are utilized. To meet the load requirements, GBDT approach predicts and integrates the total power supply and the charging level of the power source. The output voltage regulation, reference generation, and smooth tracking of current are performed by the energy management of PHEV using JS approach. The proposed methodology is executed on MATLAB/Simulink working platform. The performance of the HESS is evaluated by utilizing the comparison analysis with existing systems. From the analysis, the proposed approach provides less stress for primary and secondary sources and improves the charging unit performance and enhances the battery life.

Conflict of Interest



Dr. P. MANIARASAN
Principal

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

Self Computational Emotional Learning Based Intelligent Controller for Induction Motor Drive using Variable Structure Control

*¹Dr. R.Kannan , ²Dr.R.Anand, ³Dr.S.Daison Stallon, ⁴Dr.Sobha Manakkal

*^{1,2,3}Department of EEE, Nehru Institute of Engineering and Technology, Tamilnadu, India
nieteeehod@nehrucolleges.com

⁴Department of EEE, Nehru College of Engineering and Research Centre, Kerala, India.

Abstract:

In this paper novel self computational emotional learning based intelligent controller (SCELIC) is proposed for induction motor control. Variable structure control is a method proposed for an induction motor to offer reliable performance even with the robust and fast changes in the parameters of the motor. To improve the performance of the system, this article proposes a SCELIC controller as a speed controller in VSC. The design is simple and easy to be implemented. Matlab / Simulink based simulation model is developed to examine the effectiveness of the proposed drive. Performance of a drive using SCELIC VSC is analysed and compared with artificial intelligent adaptive neuro fuzzy in VSC. Reliability of the drive is examined under various conditions such as various speeds and various loads.

Keywords: Induction Motor, variable structure controller, SCELIC, ANFIS

1. Introduction:

Induction motors are widely used in domestic and industrial applications. Though induction motor establishes a theoretically challenging control problem, meanwhile the dynamical system is extremely coupled, nonlinear and multivariable. Variable structure controller (VSC) is a method to control the system with nonlinearities¹. In the previous decade, many researchers focused on the variable structure control strategy for the control of the ac servo drive systems^{2, 3}. Application of conventional PI controllers in motor control delivers decent concert only in case of linear progressions whose precise model is identified.

Fuzzy logic controller-based induction motor control is analyzed in various control schemes like field-oriented control^{4, 5}, variable voltage/ frequency control⁶, variable frequency control⁷, direct torque and flux control⁸ and variable structure control⁹. Similarly, the artificial neural network controller is also studied for the above methods of control of an induction motor¹⁰⁻¹³. Adaptive neuro fuzzy is an advanced control algorithm which offers better performance than fuzzy and ANN since it has advantages of both controllers¹⁴.

An emotional learning algorithm is an artificial intelligence control method imitates human brain introduced by Lucas in 2004¹⁵. An emotional controller is examined in control of numerous motors like an induction motor, BLDC motor and permanent magnet synchronous motor. In this paper novel Self Computational Emotional Learning based Intelligent Controller (SCELIC) is proposed for VSC control of induction motor, which is an improved form of conventional emotional controller. Performance SCELIC is compared with the ANFIS based VSC control of induction motor.

Role Based Access Control Mechanism for Cloud Using ESTMP

Dr. R.Kannan, Dr.Sobha Manakkal

Abstract— Cloud computing has been envisioned as the next generation information technology (IT) architecture for enterprises, due to its long list of unprecedented advantages in the IT history: on-demand self-service, ubiquitous network access, location independent resource pooling, rapid resource elasticity, usage-based pricing and transference of risk. In this project, we propose a secure data sharing scheme, which can achieve secure key distribution and data sharing for dynamic group. The main contributions of our scheme include: We provide a secure way for key distribution without any secure communication channels. The users can securely obtain their private keys from group manager without any Certificate Authorities due to the verification for the public key of the user. Our scheme can achieve fine-grained access control, with the help of the group user list, any user in the group can use the source in the cloud and revoked users cannot access the cloud again after they are revoked. We propose a secure data sharing scheme which can be protected from collusion attack. The revoked users can not be able to get the original data files once they are revoked even if they conspire with the untrusted cloud. Our scheme can achieve secure user revocation with the help of polynomial function. Our scheme is able to support dynamic groups efficiently, when a new user joins in the group or a user is revoked from the group, the private keys of the other users do not need to be recomputed and updated.

Keywords— Cloud Computing, Security, Data sharing, Multi-Start Anti-Collusion, ESTMP

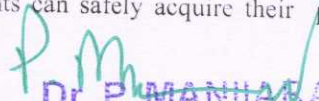
I. INTRODUCTION

Distributed computing, or something being in the cloud, is an expression used to depict an assortment of various sorts of processing ideas that include countless associated through a continuous correspondence system, for example, the Internet. In science, distributed computing is an equivalent word for dispersed processing over a system and means the capacity to run a program on many associated PCs in the meantime. The expression is additionally more usually used to allude to organize based administrations which have all the earmarks of being given by genuine server equipment, which in actuality are served up by virtual equipment, reenacted by programming running on at least one genuine machines. Such virtual servers don't physically exist and can in this manner be moved around and scaled up (or down) on the fly without influencing the end

client—apparently, rather like a cloud. The prominence of the term can be credited to its utilization in advertising to offer facilitated benefits in the feeling of use administration provisioning that run customer server programming on a remote area. Distributed computing has been imagined as the cutting edge data innovation (IT) engineering for undertakings, because of its not insignificant rundown of phenomenal points of interest in the IT history: on-request self-benefit, pervasive system get to, area autonomous asset pooling, fast asset versatility, utilization based evaluating and transference of hazard. As a problematic innovation with significant ramifications, distributed computing is changing the very way of how organizations utilize data innovation. One major part of this outlook changing is that information are being incorporated or outsourced to the cloud. From clients' point of view, including both people and IT endeavors, putting away information remotely to the cloud in an adaptable on-request way brings engaging advantages: help of the weight for capacity administration, widespread information access with area freedom, and evasion of capital use on equipment, programming, and faculty systems for upkeeps, and so forth., In the past, we utilized first provable information ownership (PDP) component to perform open inspecting is intended to check the accuracy of information put away in an unconfided in server, without recovering the whole information. Advancing a stage, Wang et al. (alluded to as WWRL in this paper) is intended to build an open evaluating instrument for cloud information, so that amid open reviewing, the substance of private information having a place with an individual client is not unveiled to the outsider reviewer. Information is not in a scrambled organization. Here we have a few downsides are just character is considered to check the collector while accepting the documents. Likewise for re-encryption handle, there is no confirmation to check the demand whether it is sent from recipient or not. Without computerized signature, this framework can't ready to do the ideal beneficiary confirmation to get the document. To overcome above past issues we utilized adjusted methods. In this venture, we propose a safe information sharing plan, which can accomplish secure key conveyance and information sharing for element aggregate. The primary commitments of our plan include: We give a protected approach to key dissemination with no safe correspondence channels. The clients can safely acquire their private keys from gathering

Dr. R.Kannan , Department of EEE, Nehru Institute of Engineering and Technology, Tamilnadu, India. (Email nieteeehod@nehrucolleges.com)

Dr.Sobha Manakkal, Department of EEE, Nehru College of Engineering and Research Centre, Kerala, India


Dr. P. MANIKASAN
Principal

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

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RESEARCH ARTICLE

Employee Competency and Understanding Capability in Gear Manufacturing Companies in Coimbatore, Tamil Nadu

P.T. Vijaya Rajakumar¹, R. Yasodha^{2*}

¹Professor and Director, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu.

²Assistant Professor, Nehru Institute of Engineering and Technology, Coimbatore, Tamil Nadu.

*Corresponding Author E-mail: yasodha1507@gmail.com

ABSTRACT:

Competency-based human resources planning serves as a link between human resource management and the overall strategic plan of an organization. Competencies are defined as observable abilities, skills, knowledge, motivations or traits defined in terms of the behavior's needed for successful job performance. Competency-based management supports the integration of human resources planning with business planning by allowing organizations to assess the current human resource capacity based on their competencies against the capacity needed to achieve the vision, mission and business goals of the organization. Targeted human resource strategies, plans and programs to address gaps are then designed, developed and implemented to close the gaps. Employee competency management is critical for organizations that seek to align their work force with business objectives. However, ensuring that organization staff members have the proper skills and competencies to consistently perform the tasks may pose a challenge. This study was conducted to evaluate current strengths and needs of an organization and then to implement the necessary corrective actions. Employee competency and understanding is the ability of an individual to do a job properly. A competency is a set of defined behaviors that provide a structured guide enabling the identification, evaluation and development of the behaviors in individual employees. The main objectives of this study is to know the reasons why employee competency and understanding capability occurs, to identify the factors which make employees dissatisfied, to know the satisfactory level of employees towards their job and proficiency level and ability to find the areas where manufacturing industries are lagging behind.

KEYWORDS: Competence, Motivation, Organization, Manufacturing.

INTRODUCTION:

Competence is the ability of an individual to do a job properly. A competency is a set of defined behavior that provide a structured guide enabling the identification, evaluation and development of the behaviour in individual employees. Competency based human resources planning serves as a link between human resources management and the overall strategic plan of an organization.

Efficient management of the workforce becomes one of the major focuses of human resource experts in every organization since the advancement of globalization.

The change that occurred in the technological as well as administrative aspects leads improvement in employee skills. Employee productivity and growth becomes the major challenges faced by human resource experts which enables them to focus on the competencies of employees. Competency is not a new concept of the era but it becomes a recent practice of the organizations due to certain developments in this direction.

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Assessing and measuring your employees' performance and productivity and discussing your findings with them,

Dr. P. MANI ARASAN
Principal

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



RESEARCH ARTICLE

Employees Perspective on Digital Banking

A. Vignesh

Assistant Professor, Department of Management Studies, Nehru Institute of Engineering and Technology,
Coimbatore.

*Corresponding Author E-mail: vigneshmba23@gmail.com

ABSTRACT:

India's public and private sector banks are quickly adopting digital banking. To stimulate customer participation in e-commerce, they are offering classic products as well as innovating and developing new ones. It does, however, present both obstacles and opportunities. The study's main goal is to learn about bankers' perspectives on digital banking as well as employees' perceptions on digital banking-based services and their efficacy. The study is exploratory as well as analytical. A standardized questionnaire was created to gather data on issues such as digital banking implementation obstacles, training, skill enhancement, and customer satisfaction.

KEYWORDS: Digital banking, Information Technology, Banks, Employee perception, India.

INTRODUCTION:

The term "digital banking" refers to internet banking that eliminates the need for paper documents like cheques, pay-in slips, and Demand Drafts. It refers to the ability to do all banking transactions on the internet. You can now access and do all regular banking activities without needing to physically visit a bank location 24 hours a day, seven days a week. Digital banking can be done on a laptop, tablet, or smartphone. This is how India's digital banking system works.

Most significant advantages of Digital Banking:

- Cash withdrawal
- Getting statements
- Paying the bills
- Investments
- Mobile Banking
- Keeping track of transactions
- Cheques transactions etc.

STATEMENT OF PROBLEM:

Despite all of the breakthroughs and improvements in digital banking, there are some hazards and issues to be aware of. This research attempts to assess the effectiveness of digital banking among employees in order to establish their attitudes toward the technology.

RESEARCH OBJECTIVES:

1. To know the employees perception on digital banking.
2. To identify the factors that affect employees acceptance of digitalization in banking sector.
3. To know the employees satisfaction level of service qualities offered in bank.

REVIEW OF LITERATURE:

Dr. M. Rifaya Meeral, M. Valli Mayil and R. Padmaja3 (2016), In India's public and private sector institutions, banking is rapidly disseminating. They are distributing their existing commodities as well as designing and producing new ones to increase user interaction in e-commerce. However, it does bring both challenges and opportunities. The primary purpose of the research is to learn about bankers' thoughts on digital banking, as well as workers' perceptions of digital banking based services and their efficacy. The research is both exploratory and analytical.

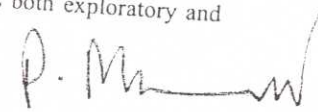
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Dr. P. MANIARASAN

Principal

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



Dr. P. MANIARASAN

Principal

A Study On Impact Of Work From Home On Work Life Balance During Covid-19

DR. G.BHUVANESWARI¹, GOKUL.K², Dr. P.T.VIJAYA RAJAKUMAR³

¹Professor, Sree Narayana Guru Institute Of Management Studies, Coimbatore, India.

²Assistant Professor, Bannariamman Institute Of Technology, Sathyamangalam, India.

³Professor&Director, Nehru Institute Of Engineering And Technology, Coimbatore, India.

ABSTRACT

In ancient times, work and personal life are considered as separate. But the present scenario, it has been interrelated with each other and considered to be the important criteria which decides the family well-being and work effectiveness. Now the pandemic situation COVID-19 leads the life of the employee with no differentiation between work and personal life. Usually, employees face difficult to balance their work-life. In India, following the working hours is typically rare and it is just in a notice board. Even after office time many employees are work with a laptop and office files. Their mind is completely baggage with a work-related task allotted to them. So, they cannot able to turn sight on their families. Even if they turn sight on them, it was not with affection and care instead of that they expose their frustration. This problem was continuing day by day even many technologies grown up, many policies were reframed, etc. Especially during COVID-19, companies decided to get the work from home. This paper tries to find the impact of work from home on work life balance of the employees during Covid 19.

Keywords: WFH, Work life Balance, Covid-19.

1. INTRODUCTION

In traditional way of working systems, there was no connections between work and personal life. But , in this competitive environment, it is obviously found that the work life and personal life are highly correlated to achieve the work place efficiency and family well-being. Unfortunately, the

Experimental investigation and machinability behavior on synthesized titanium composite

R. Vinothkumar^{a,*}, J. Maniraj^b and V.S. Thangarasu^c

^aDepartment of Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu 641105, India

^bDepartment of Mechanical Engineering, Kalaingar Karunanidhi Institute of Technology, Coimbatore, Tamilnadu 641402, India

^cDepartment of Mechanical Engineering, Indra Ganesan College of Engineering, Tiruchirappalli, Tamilnadu 620012, India

The current study aims to describe the experimental examination and ultrasonic machinability behavior of the titanium composite, which is synthesized by a casting technique. Tungsten carbide (WC) works as reinforcing particles and adds 6% of the titanium alloy's weight. Material properties, characterization, and alloy composition are examined by mechanical testing, scanning electron microscopy (SEM), and energy dispersive x-ray analysis (EDAX), respectively. Rate of metal removal (RMR) and surface finish (SF) are evaluated by the variation of ultrasonic machining (USM) input constraints such as power rating, slurry concentration, and grit size. Ultrasonic machining parameters and desired responses are optimized using the Taguchi technique. The ultrasonically machined surface and its microstructural analysis are investigated using atomic force microscopy (AFM). The desirable RMR was attained at a power rating of 450 W, a 20% slurry concentration, and a grit size of 400. Surface finish was reached at a power rating of 150 W, 15% slurry concentration, and grit size of 400.

Keywords: Titanium composite, Tungsten carbide, Rate of metal removal, Ultrasonic machining, Atomic force microscopy.

Introduction

Titanium alloy has excellent material properties such as formability, corrosion resistance, and high impact toughness. It is utilized in automobile components, aircraft structural, medical, and marine sectors. Metal removal processes rely on the amplitude of vibration and abrasive concentration. The USM input limitations have enhanced the machining quality characteristics [1]. Controlling the cutting force using ultrasonic vibrations improved the rate of metal removal and surface quality of the machined surface [2, 3]. The rate of metal removal and surface roughness were significantly impacted by vibration and tool feed. Microscopic examination was used to investigate the surface topography of the machined surface [4]. By using several unconventional machining techniques, the machinability properties of titanium and its alloy were studied. The ultrasonic vibrations affected the roughness of the surface [5]. The vibrations generated by the USM transducer determine the tool feed, which has the most impact on the circularity of the holes [6]. The developed model was utilized to predict cutting force and feed. The minimum surface roughness was achieved at lower feed rate [7]. Taguchi optimization was used to improve ultrasonic machining performance and attain

the desirable characteristics of the response parameters [8].

This research work is dealing with the ultra sonic machining of synthesized titanium composite and its response factors are optimized by Taguchi approach. The machined surface and its micro structural analysis are investigated by SEM and AFM images.

Experimental Method and Material

Material

A titanium metal matrix composite reinforced with 6% tungsten carbide was fabricated using 99% pure titanium as the base material. Titanium has excellent mechanical strength, machinability, and corrosion resistance. Tungsten carbide was used as a reinforced material, and its size was roughly 40 microns. The chemical composition of the titanium was presented in Table 1.

Methods

Stir casting is the best process to make titanium metal matrix composites enhanced with tungsten carbide particles. Stirrer speed, temperature and composition of alloying elements are affected the fabrication of

Table 1. Elemental composition of Titanium.

Ti	Fe	O	C	N	H
99.32	0.305	0.25	0.08	0.03	0.015

*Corresponding author
Tel.: +919944121507
E-mail: ar.vinothmech@gmail.com

INVESTIGATIONS ON MECHANICAL POSSESSIONS OF COCONUT FIBRE PROTECTED WITH EPOXY AND POLYESTER MIXTURES

Dr.S. Jeevanantham, Dr.V.M.M.Thilak Associate Professor, Department of Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore.

Mr.R.Vinoth Kumar Assistant Professor, Department of Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore.

ABSTRACT

Nowadays Fibre-reinforced polymer composites play a predominant role for a longer time in a wide variety of applications for their high specific strength and modulus. The fibre which serves as reinforcement in reinforced polymer is in the form of natural fibres. Natural fibres are not only strong and lightweight but it also relatively very low cost. The present work deals with comparison on the development and characterization of reinforcing the matrix (Epoxy resin & Polyester resin) with natural fibre (Coconut fibre). The natural fibres were exposed to chemical treatment (NaOH) before manufacturing of laminates and the pretreated fibres are tested and the fibres were chopped into 3mm, 5mm, 7mm and 10mm before reinforcement. Samples of coconut-Epoxy and Coconut Polyester laminate were manufactured using hand layup method were the fibres are dispersed randomly.

Specimens were cut from the fabricated and laminate according to the ASTM standard for different experiments. Tensile test, flexural test, and Impact test samples were cut in the desired shape and its results were observed, compared with epoxy and polyester composites to perceive the properties of composites.

Keywords: Coconut fibres, Epoxy resin, Polyester resin, hand-layup, compression moulding, Mechanical Properties.

1. Introduction

A composite is a material made by combining two or more dissimilar materials in such a way that the resultant material is endowed with properties superior to any of its parental ones. Fibre-reinforced composites, owing to their superior properties, are usually applied in different fields like defense, aerospace, engineering applications, sports goods, etc. Nowadays, natural fibre composites have gained increasing interest due to their eco-friendly properties. A lot of work has been done by researchers based on these natural fibres. Natural fibres such as jute, sisal, silk and coir are inexpensive, abundant and renewable, lightweight, with low density, high toughness, and biodegradable. Natural fibre reinforced polymer composites have raised great attentions and interests among materials scientists and engineers in recent years due to the considerations of developing an environmental friendly material and partly replacing currently used glass or carbon fibres in fibre reinforced composites. They are high specific strength and modulus materials, low prices, recyclable, easy available in some countries, etc. M. Brahmakumar, et al [1] used Coconut fibre as reinforcement in low density polyethylene. The effect of natural waxy surface layer of the fibre on fibre/matrix interfacial bonding and composite properties has been studied by single fibre pull-out test and evaluating the tensile properties of oriented discontinuous fibre composites. The waxy layer provided good fibre–matrix bond such that removal of the layer resulted in drastic decrease of the fibre pull-out stress, increase of the critical fibre length and corresponding decrease in tensile strength and modulus of the composites. The waxy layer of polymeric nature also exhibited a stronger effect on interfacial bonding than by grafted layer of a C15 long-chain alkyl molecule onto the wax-free fibre. The morphological features of the fibre along with its surface compatibility with the matrix favours oriented flow of relatively long fibres along with the molten matrix during extrusion. N.S.M. El-Tayeb [2] explored the possibility of using this natural fibre to reinforce polyester and thus


Dr. P. MANI ARASAN
Faculty
Nehru Institute of Engineering & Technology
T.M.Palayam, Coimbatore - 641 105.

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**DESIGN AND INVESTIGATION OF EFFICIENT AND WATER PRESERVING AUTOMATIC
DISH WASHER MACHINE**

Dr.V.M.M.Thilak, Dr.S.Jeevanantham, Dr.P.Senthil Kumar, Associate Professor, Department of
Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore.

Abstract

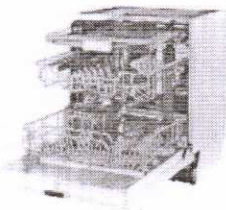
In early days the dish plates were cleaned only by manual and it may consume more time so that the dish cannot be served properly within time so in order to avoid the time consumption and effort of the human the following project is introduced. The objective of this project is to wash the dish plates automatically. Our dish washing machine are different from other old dish washing machines. The existing old machines are cleaning all the plates in one process. So that our machine's process is varied by using conveyor and the dish plates are cleaned when it is in motion. This project is to reduce the effort of man power in hotel and restaurants. We use this project to save time. This project deals with the fabrication of a simple model to overcome those problems. This project consist of following components are uses dc motors, pump, and water tank and battery, spur gear, chain drive, brush. The cost of this machine is considerably less and more effective in working. The usage of this machine in restaurants can make the foods to be delivered in time to customers. This may make the restaurant's standard to be good among the customers and people.


Key words: cleaning all the plates, more effective, less time, standard to good among

1. Introduction

In this project we are fabricating the automatic dish washing machine. This equipment is very helpful for hotels, restaurants and also home applications. This equipment is considerably less in cost and good efficient in working the objective of this project is to wash the dish plates by an automatic system. This project is used to reduce the man power in hotel and restaurants. In this project, an attempt has been mad to reduce the consumption of time. [2] Moreover, the emphasis was made for the cleanliness and hygienics of the plate which ensure the good will of the restaurant. [3]It is found that the project not only reduces human resources and time, but also reduces the consumption of water and detergents, which in turn reduces the running cost and scarcity of water. This project deals with the fabrication of a simple model to overcome the above said problems. This project consists of following materials such as dc motors, pump, and water tank and battery, spur gear, chain drive, brush.

2. literature review




Dr. P. MANIARASAN
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 106.

P. Mani 38

Dr. P. MANIARAS

Principal

Nehru Institute of Engg. & Technology
T.M. Parayam, Coimbatore - 641 100.

Investigations and Optimization of process parameters for Improving surface quality in the Internal Grinding of EN31 Steel

Section A-Research paper



Investigations and Optimization of process parameters for Improving surface quality in the Internal Grinding of EN31 Steel

S. Jeevanantham¹, N. Manikanda Prabu², M. Santhosh³, S. Nishanth⁴, Athisaya Sagaya Rajan.A⁵

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ABSTRACT

In an industry Internal Grinding is one of the most important machining processes. In this process surface quality is most expected outcome to obtain the better result. Due to complexity and nonlinearity optimization of grinding process is a challenging task. From the literature, it was noted that many of the researchers were focused on only external surfaces of a component for improving its surface quality. It is identified that very few papers deliberated the characteristics of internal grinding process which indicates that, there is a considerable research potential in improving the product quality and process performance of internal grinding. This paper aims to optimize the internal grinding process parameters to increase the expected surface quality and process performance. Similar to external surface grinding process, internal surface grinding is also influenced by parameters such as cutting speed, feed and depth of cut. Considering the variance in optimized results, different samples of EN31 steel are taken into this experimental study. From the literature, it is identified that commonly used engineering materials in many engineering applications are EN 31 Steel. The various machining parameters such as feed, cutting speed, depth of cut were monitored to analyze the process responses such as surface quality. The effect of input and output parameters was described through the “signal to noise ratio” (SNR) and “analysis of variance (ANOVA)” using Minitab 18 software. The machining parameters were optimized through Taguchi method and Genetic Algorithm tools. By analyzing the final results, optimum working conditions are recommended to improved surface quality with respect to selected input process parameters.

^{1,3,4,5}Department of Mechanical Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India.

²Department of Mechanical Engineering, Mahaguru Institute of Technology, Kattachira, Alappuzha, Kerala India.

Mail: jeevanantham694@gmail.com

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1. INTRODUCTION

George et al., (2013) This seminar presents the experimental work/project done on studying the


Dr. P. MANIWARAN
Principal

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

Neutrosophic Generalized Pre Regular Connectedness

K. Ramesh^{1, a)} and I. Mohammed Ali Jaffer^{2, b)}

¹Department of Mathematics, Nehru Institute of Engineering & Technology, Coimbatore - 641105, Tamil Nadu, India.

²Department of Mathematics, Government Arts College, Udumalpet - 642126, Tamilnadu, India.

^{a)} Corresponding author: ramesh251989@gmail.com
^{b)} jaffermathsgac@gmail.com

Abstract: Scope of this paper is to extend the notion of NgprConnected spaces and NgprConnected between Neutrosophic sets. Further, the works is extending to Ngprsuper connected space in NTSS and study its properties. Also, establish the relation between the newly introduced connectedness and already existing connectedness in NTSS.

Keywords: Neutrosophic Topology, Ngpr closed set, NgprConnected space, NgprSuper connected space and NgprConnectedness between Neutrosophic sets.

1. INTRODUCTION

In 1965, Zadeh [12] introduced the concept of Fuzzy set and in 1968, C. L. Chang [3] introduced Fuzzy topological spaces. Later, Atanassov [2] coined the notions of intuitionistic fuzzy sets in 1986, where the degree of membership and degree of non-membership are discussed. In 1997, Coker [4] proposed the notion of IFTSS. Florentin Smarandache [5] developed the concept of Neutrosophic set as a generalization of Fuzzy sets and Intuitionistic Fuzzy sets. In 2012, Salama A.A and Alblowi [9] introduced Neutrosophic topological space by using Neutrosophic sets. This gives lot of investigations among researchers. In 2019, Mohammed Ali Jaffer et al. [6] introduced NGPRCSs in NTSS. The notion of connectedness is one of the major principal in Neutrosophic topological properties that are used to distinguish the Neutrosophic topological spaces. In this article, we introduce the concept of NgprConnected spaces and NgprConnected between neutrosophic sets. Also establish the relation between the newly introduced connectedness and already existing connectedness in Neutrosophic topological spaces.

2. PRELIMINARIES

Definition 1: [9] Given H is a non-empty set. A Neutrosophic set (NS for short) C in H is of the form $C = \{ \langle h, \mu_c(h), \sigma_c(h), \nu_c(h) \rangle : h \in H \}$ where the functions $\mu_c(h)$, $\sigma_c(h)$ and $\nu_c(h)$ represents the degree of membership, the degree of indeterminacy and the degree of non-membership respectively.

Remark 1: [9] A NS $C = \{ \langle h, \mu_c(h), \sigma_c(h), \nu_c(h) \rangle : h \in H \}$ is defined to be an ordered triple $C = \langle h, \mu_c(h), \sigma_c(h), \nu_c(h) \rangle$ in non-standard unit interval $]0, 1^+]$ on H .

Remark 2: [9] We use the symbol $C = \langle h, \mu_c, \sigma_c, \nu_c \rangle$ for the neutrosophic set $C = \{ \langle h, \mu_c(h), \sigma_c(h), \nu_c(h) \rangle : h \in H \}$.

Definition 2: [9] Given H is a NS and $C = \{ \langle x, \mu_c(h), \sigma_c(h), \nu_c(h) \rangle : h \in H \}$, $D = \{ \langle h, \mu_D(h), \sigma_D(h), \nu_D(h) \rangle : h \in H \}$ are NSs. Then $C \cap D$ may be defined as:



SUPPRESSING THE RAYLEIGH-TAYLOR INSTABILITY WITH AN ALTERNATING MAGNETIC FIELD

P. T. Hemamalini*

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Abstract

The model is to learn the impact of alternating magnetic field on the interface of two superposed magnetic fluids with the normal rotation through a nonlinear perturbation analysis. A nonlinear instability due to streaming superposed magnetic fluids with rotation and an alternating magnetic field studied by the technique of multiple scales. Making use of boundary conditions, the solutions of the linearized equations of motion culminates to the linear dispersion relation.

Keywords: Magnetic fluids, Linear Dispersion Relation, Schrodinger Equation, Alternating Magnetic field, Technique of Multiple Scales.

*Professor, HoD, Department of Science and Humanities Nehru Institute of Engineering and Technology Coimbatore-641 105 Tamilnadu.

Corresponding Author : P. T. Hemamalini

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A handwritten signature in blue ink, appearing to read 'P. Mani Arasan'.

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

A small handwritten mark or signature in the bottom left corner of the page.



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Solvothermal synthesis of magnetically separable Co-ZnO nanowires for visible light driven photocatalytic applications


Sridhar Sampath^a, Rohini V.^b, Karthik Chinnasamy^c, Parasuraman Ponnusamy^d, Sivasakthi Thangarasau^e, Woo Kyoung Kim^f, Vasudeva reddy minnam reddy^f, Mohd Shkir^{g, h, i}, F. Maiz^{h, j}

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

Abstract

Magnetically retrievable Cobalt doped ZnO nanowires were synthesised by simple solvothermal method. The prepared Co-ZnO nanowires were analysed with several characterization instruments such as FESEM, XRD, FTIR, VSM, UV-vis spectroscopy, XPS and PL spectroscopy. No other phase has been identified besides wurtzite phase, according to the structural analysis of pure ZnO and Co-ZnO nanowires. As the concentration of Co doping increased, ZnO nanowires' band gap energy dropped. Moreover, ZnO's absorption peak has a minor wavelength shift toward longer wavelengths. Green light emission was detected by PL analysis of ZnO nanowires and also the PL intensity of ZnO nanowires was decreased after cobalt doping. Co-ZnO nanowires exhibited ferromagnetic property. The coercivity and retentivity of Co-ZnO nanowires were increased with increase of Cobalt concentration. Improved visible light photocatalytic activity for the breakdown of methyl orange dye was achieved by Co-ZnO nanowires.

Introduction

Water contamination is a significant environmental issue and concern to human health in the modern world. This is brought on by the quickening development of the economies, industries, and people. In comparison to other water contaminants, organic dyes are one of the most significant sources of environmental contamination. A number of sectors, including those that generate paper and paperboard, rubber and plastic, process food, make textiles, and tan leather, utilise more than 100,000 commercial dyes annually. In many nations, highly coloured dyeing effluent has been a significant environmental problem. Dye wastewater has been treated using a variety of techniques, including adsorption, membrane separation, coagulation, advanced oxidation, etc. The Advanced Oxidation Processes, a typical form of heterogeneous photocatalysis, offer promising strategies for removing organic contaminants and transforming them into

Influence of succinic acid species on structural, spectroscopic, optical, Z-scan, frequency doubling, photoconductivity and antibacterial properties of glycine single crystals

N. S. Priya^a, S. A. Chudar Azhagan^{b,*}

^aDepartment of Physics, Nehru Institute of Engineering and Technology, Coimbatore, India

^bDepartment of Physics, Government College of Technology, Coimbatore, India

With succinic acid as an additive, glycine single crystals were grown by conventional solvent slow evaporation route. Effect of succinic acid on the growth, optical and dielectric properties of glycine polymorphs has been investigated. The occurrence of functional groups has been identified by vibrational FTIR spectrophotometer. The low value of dielectric constant and dielectric loss at higher frequency range attested the grown crystal for frequency doubling applications. The laser damage threshold energy of the grown crystal was calculated. Third order nonlinear susceptibility $\chi^{(3)}$ (esu) of succinic acid added glycine crystals were evaluated from Z-scan experiment.

(Received August 14, 2022; Accepted January 12, 2023)

Keywords: γ -glycine, Succinic acid, Dielectric material, Photonic applications

Dr. P. MANI ARASAN
Principal

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

1. Introduction

The search for new sophisticated NLO materials is a fundamental part of current research to extend the science and communication technology. The ferroelectric materials have extensive variety of industrial applications in optoelectronics field such as capacitors, military services, actuators, telecommunications, non-volatile memory devices, automatic access control systems, high-performance gate insulators and medical equipment's etc [1-2]. Ferroelectric materials become favored materials in a broad range of electronic and mechatronic devices owing to their well-defined dielectric, piezoelectric and pyroelectric properties. Ferroelectric materials with Nonlinear Optical (NLO) property have been a great deal of interest in recent years due to their potential applications in the domain of optoelectronics and photonic technologies. Ferroelectric succinic acid possesses good pyroelectric properties. Succinic acid is a naturally exist organic material that belongs to dicarboxylic acid created as an intermediate of the tricarboxylic acid cycle. It has been generally used in biological and industrial applications and also it has been used as a matrix in infrared (IR) MALDI analytical methods [3-4]. Currently, succinic acid crystals widely used for fabrication of high electron mobility transistor (HEMT). Combination of succinic acid with organic material improved their ferroelectric property [5]. Among the polymorphic crystals, Amino acid glycine is the simplest one which exhibits three different polymorphic forms in ambient conditions viz. α -glycine, β -glycine and γ -glycine. Organic and inorganic complexes of glycine have recently fascinated attraction to scientific community owing to their ferroelectric, dielectric and nonlinear optical properties. The strong piezo-electric and nonlinear optical effect exhibited by γ -glycine crystals [6-8]. The nonlinear and dielectric response of glycine polymorphs is an important parameter for device fabrication applications. For manufacturing nonlinear optical devices, the material ought to have low dielectric constant and low dielectric loss in the higher frequency region. In addition to this decrease R_c delay in microelectronics industry. Now a day's various researchers reported some significant properties of γ -glycine single crystals [9-12]. Thus, in the present investigation, γ -glycine single crystals have been harvested from the succinic acid additive environment.

*Corresponding author: anbuchudarazhagan@gmail.com
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Impetus Yield of Acrylic Top Cover Pyramid Solar Still Due to Furthered Thermal Conductivity of MnO₂ and PANI-MnO₂ Nanocomposite Materials

B. Selvakumar^{1,a*}, P. Periyasamy^{2,b}, S. Vijayalakshmi^{3,c}
and S. Arunachalam^{4,d}

¹Dept. of Physics, Sri Eshwar College of Engineering, Coimbatore, Tamil Nadu, India

²Dept. of Physics, Nehru College of Engineering and Technology, Coimbatore, Tamil Nadu, India

³Dept. of Physics, Sri S Ramasamy Naidu Memorial College, Sattur, Tamil Nadu, India

⁴Dept. of Chemistry, Saveetha School of Engineering, Saveetha Institute of Technical and Medical Sciences, Chennai, Tamil Nadu, India

^asolarselva@gmail.com, ^bperiasamy.nano@gmail.com, ^cdrskvani@gmail.com,
^ddrarunachalam.s@gmail.com

Keywords: MnO₂, PANI-MnO₂, Pyramid Solar Still (PSS), Temperature, Distillate



Abstract. Attempts to study the effect of blend MnO₂ and PANI-MnO₂ nanocomposites in enhancing the distillate yield of an acrylic Pyramid Solar Still (PSS) is carried out. Synthesized nanocomposites assorted with black paint to improve the absorption efficiency. Size of the synthesized MnO₂ is found to be 35nm. SEM image infers particles are aggregates with random shape. Thermal analysis of distillate yield confirms the formation of nanocomposite with improved thermal stability of the PANI.

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

Distillate yield is observed around 0.484 litre/0.25m², 0.568 litre/0.25m² and 0.615 litre/0.25m² still without and with MnO₂ and PANI-MnO₂ nanocomposites. Average efficiency is found to be 23.05%, 26.63% and 28.52% under three modes. Efficiency of the PSS coated nanocomposite material is amended due to the absorption properties of MnO₂ and PANI-MnO₂. Performance ratio under three modes are found to be 5.52 %, 6.44 % and 6.93 %. Results concluded that SVP and LH plays a major role in enhancing the distillate yield.

Introduction

Global fresh water shortage is an alarming issue particularly in remote areas of arid and semi-arid regions. Problem is more severe in desert countries where fresh water shortage for domestic and agricultural use is a serious problem. Abundant and freely available high intensity solar energy can be used as an ideal technology to solve the fresh water crisis in these regions. Fresh water resources such as rivers, lakes and ponds are exploited at fast rate due to rapid growth of industrialization and population explosion. One of the effective ways of converting the brackish or saline water is by means of evaporating it using the freely available solar energy.

Solar energy, the naturally abundant clean and inexhaustible energy would be more economical than the use of remnant energy sources. Solar stills can effortlessly endow with enough water for commodity purpose where saline (or) brackish water is profuse.

Effective use of active solar distillation integrated with solar collectors with heat exchangers had been analyzed [1, 2] for enhancing the system performance without and with top cover cooling. Average daily production is found to be 24% privileged than the basin solar still. Experimental study of single and double compartment model solar still [3] had been carried out for alcohol distillation. Influence of top cover cooling of basin solar still on its transient performance had been analyzed [4, 5] and the results inferred increase in 10% of yield rate. Numerical simulations for Condensation irrigation (CI) system in water production had been carried out [6] and yield observed with capacity of 1.8 kg/m. Single-sided vertical solar still analyzed under desert climatic conditions had been studied [7, 8] with yield observed from 0.275 to 1.31 l/m² and efficiency ranging from 7.85 to 21.19%. Transient investigation of still coupled with FPC had been studied [9, 10] and the



Original Article

On Some New Continuous Mapping and Compactness in Neutrosophic Topological Spaces

K. Ramesh¹ and I. Mohammed Ali Jaffer²

¹Department of Mathematics, Nehru Institute of Engineering & Technology, Coimbatore - 641 105, Tamil Nadu, India.

²Department of Mathematics, Government Arts College, Udumalpet - 642 126, Tamilnadu, India.

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Abstract - The intention of this article is to introduce and develop the concept of Neutrosophic almost gpr continuous mappings. Neutrosophic almost gpr closed mappings using NGPRCS and the interrelations between the new mappings and existing mappings are established. Also we extend our study to Neutrosophic gpr compactness in Neutrosophic topological spaces.

Keywords - Neutrosophic topology, Neutrosophic Point, NGPRCS, Neutrosophic almost gpr continuous mappings, Neutrosophic almost gpr closed mappings and Neutrosophic gpr compactness.

AMS Subject Classifications: 54A40, 03E72.

1. Introduction

In 1965, L.A.Zadeh [17] 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 [6] defined the Neutrosophic set on three components, namely Truth (membership), Indeterminacy, Falsehood (non-membership). In 2012, A. A Salama and S. A. Alblowi [14] introduced the concept of Neutrosophic topological space by using Neutrosophic sets. A. A. Salama [15] introduced Neutrosophic closed set and Neutrosophic continuous function in Neutrosophic topological spaces. I.Mohammed Ali Jaffer and K.Ramesh [10] introduced Neutrosophic generalized pre regular closed sets in Neutrosophic topological spaces. Wadei Al-Omeri and Saeid Jafari [16] introduced Generalized Closed Sets, Generalized Pre-Closed, Generalized connectedness and Generalized compactness in Neutrosophic Topological Spaces. Parimala M et al [12] introduced Neutrosophic $\alpha\psi$ Homeomorphism in Neutrosophic Topological Spaces

In this direction, we introduce the concept of Neutrosophic almost gpr continuous mappings, Neutrosophic almost gpr closed mappings and the interrelations among these mappings and existing mappings in Neutrosophic topological spaces are established. Further we extend our study to the concept of Neutrosophic gpr compactness in Neutrosophic topological spaces.

2. Preliminaries

Definition 2.1: [14] Let X be a non-empty fixed set. A Neutrosophic set (NS for short) A in X is an object having the form $A = \{(x, \mu_A(x), \sigma_A(x), \nu_A(x)) : x \in X\}$ 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 .

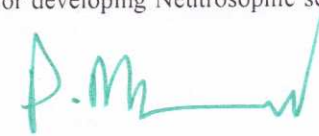
Remark 2.2: [14] A Neutrosophic set $A = \{(x, \mu_A(x), \sigma_A(x), \nu_A(x)) : x \in X\}$ can be identified to an ordered triple $A = (\mu_A(x), \sigma_A(x), \nu_A(x))$ in non-standard unit interval $]^{-0, 1^+]$ on X .

Remark 2.3: [14] For the sake of simplicity, we shall use the symbol $A = (\mu_A, \sigma_A, \nu_A)$ for the Neutrosophic set $A = \{(x, \mu_A(x), \sigma_A(x), \nu_A(x)) : x \in X\}$.

Example 2.4: [14] Every IFS A is a non-empty set in X is obviously a NS having the form $A = \{(x, \mu_A(x), 1 - (\mu_A(x) + \nu_A(x)), \nu_A(x)) : x \in X\}$. Since our main purpose is to construct the tools for developing Neutrosophic set and Neutrosophic topology, we must introduce the NS 0_N and 1_N in X as follows:



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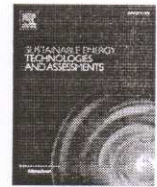
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T.M.Palayam, Coimbatore - 641 105.





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Sustainable Energy Technologies and Assessments

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Energy, environmental and economic assessment of waste-derived lemon peel oil intermingled with high intense water and cetane improver

Suresh Vellaiyan^{a,*}, Muralidharan Kandasamy^b, Arunkumar Subbiah^c, Yuvarajan Devarajan^d^a Department of Sustainable Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India^b Department of Mechanical Engineering, Sona College of Technology, Salem, Tamilnadu, India^c Department of Mechatronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India^d Department of Thermal Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India

ARTICLE INFO

Keywords:

Lemon peel waste
Water emulsion
Cetane improver
Energy assessment
Environmental assessment
Economic assessment

ABSTRACT

Waste-to-energy and its utilization in the commercial field have received wider attention in recent years. Lemon peel oil (LPO), a food waste by-product is used for this study to produce bioenergy, and a novel approach has been attempted to improve energy and environmental efficiency. The LPO was blended with different percentages of water and 2-Ethylhexyl nitrate (EHN) and the energy, environmental and economic assessments were carried out. The outcomes show that LPO dominates the normal diesel in all aspects, except for NOx emission, and 10% of water in LPO (10WLPO) improves the overall performance. Meanwhile, this trend is reversed for 20% water in LPO (20WLPO) due to a longer ignition delay period and low cetane numbers. EHN plays a vital role in fuel modification and EHN blended 20WLPO significantly improves the engine characteristics, and the engine behavior is identical to 10WLPO. The cost-benefit analysis shows that 10WLPO fuel significantly reduces the running cost compared to LPO, and the cost is further reduced to 12% while the LPO is blended with EHN.

Introduction

Fossil fuel consumption is increasing rapidly every year as demand is directly proportional to the total population growth. Billions of liters are consumed every year, leading to a scarcity of diesel fuel in a few decades [1]. Though the entire world is trying to move towards alternative power sources, diesel power is mandatory and should be existed for many decades, especially for heavy vehicles. The complete replacement for fossil fuel and its commercialization in a prescribed time limit is not worth considering [2]. Hence, alternative fuel sources need the present scenario to take off the diesel fuel crisis. Apart from that, the developed alternative diesel fuels should meet the stringent emissions regulation developed by the Board of National Emission Regulation Authorities (BNERA) to save the environment [3].

Biodiesel is preferred as a potential alternative source for existing diesel fuel as biodiesel can be partially or fully replaced instead of diesel. Plenty of valuable studies have been conducted by many researchers in the domain of first-second-and third-generation biodiesels. The main sources of first-generation biodiesel are edible oils such as palm, soybean, corn, and rapeseed oils [4,5]. Though these oils are renewable and environmentally friendly, oil production competes with food crops

which leads to food-energy conflict. The non-edible oils are primary sources of second-generation biodiesels that have some potential benefits compared to first-generation biodiesels, such as effective land utilization, and do not affect the environmental food chain. Jatropha, Karanja, Rubber seed, Pine, Eucalyptus, and Mahua oils are common second-generation biodiesels [6–8]. These biodiesels required sophisticated downstream processing techniques that lead to high production costs. The additional challenges in second-generation biodiesels are the water and land-use competition and uncertainty for long-term production [9]. Micro-algae are identified as third-generation biodiesel, which is having a distinctive yield compared to others. Though the micro-algae do not have any conflict in the environmental food chain, the algae biomass production is insufficient for commercialization, and the production cost is not economically viable [9].

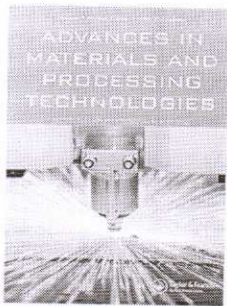
In recent years, bio-alcohols are getting much attention in the renewable energy sectors due to their positive environmental impacts compared to fossil fuels. The alcohol blended base fuel significantly improves the burning efficiency due to enriched oxygen content and results in low emissions formation [10]. Isobutanol, 1-hexanol, *n*-octanol, *n*-propanol, *n*-butanol, *n*-pentanol, and cyclohexanol are commonly recommended by many researchers to blend with fossil fuel and other

* Corresponding author at: Department of Sustainable Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India.
E-mail address: suresh.vellaiyan@gmail.com (S. Vellaiyan).

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



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



ANALYSIS OF DATA WITH POSSIBLE WAYS FORCHARGING THE BATTERY OF ELECTRICALTWO WHEELER

P.Sureshkumar^{1*}, Dr.J.Niresh², R.S.Prakash³, Dr.M.Balakrishnan⁴, T.Nithyanandhan⁵,
B.Nandhakumar⁶

Abstract

The idea of electric cars is not new to us; the first one is known to have existed in the late 1890s. Nevertheless, due to conventional vehicles dominance in the commercial sector, electric vehicles were long ignored and repressed. Petroleum fuels, which are not renewable and not very environmentally friendly, are used to fuel conventional automobiles. We have reached a point where a brighter future cannot rely on these quickly diminishing non-renewable sources of energy. Hence, we must create and use renewable energy sources that are clean, non-polluting, and never run out. People didn't begin to see the necessity for electric automobiles until the late 1960s. As a superior alternative to traditional automobiles, electric vehicle is eco-friendly and more effective.

Keywords: Electric bicycle, electric motorcycle, smart electric bicycle, regenerative motor, and power control unit.

^{1*}Assistant Professor Department of Mechanical Engineering JCT College of Engineering and Technology Coimbatore, Email: mr.surace.be@gmail.com

²Assistant Professor Department of Automobile Engineering PSG College Of Technology Coimbatore.

³Assistant Professor Department of Automobile Engineering Hindusthan College of Engineering & Technology, Coimbatore.

⁴Assistant Professor Department of Mechatronics Engineering Nehru Institute of Engineering & Technology Coimbatore.

⁵Assistant Professor of Department of Mechanical Engineering Sri Krishna College of Technology Coimbatore.

⁶PG Student of Department of Mechanical Engineering Sri Krishna College of Technology Coimbatore.

***Corresponding Author:** P.Sureshkumar

*Assistant Professor Department of Mechanical Engineering JCT College of Engineering and Technology Coimbatore, Email: mr.surace.be@gmail.com

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Dr. P. MANI ARASAN

Principal

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

An Energy-Efficient Routing of Mobile Sensor Nodes using Black Widow Optimized Routing Protocol

PDF (<https://www.provinciajournal.com/index.php/telematique/article/view/678/568>)

Keywords:

Mobile node, Reference node, Routing protocols, Black widow optimization, cluster, cluster head, energy-efficiency, and received signal strength indication are all terms used to describe wireless sensor networks.

S. Arunkumar

Assistant Professor- SG Department of Electrical and Electronics Engineering, Nehru Institute of Engineering and Technology, Coimbatore, India

S. Aravind Kumar

Graphics hardware engineer Intel Technologies India pvt ltd

S. Priya

Assistant Professor- SG, Department of Computer Science and Engineering, Nehru Institute of Engineering and Technology, Coimbatore

P. Vinodh Kumar

Assistant Professor, Department of Eee Coimbatore Institute Of Technology, Coimbatore

Abstract

Wireless sensor network (WSN) has involved in the development of the technology in today's world. But the energy restrictions of the nodes have the impact in many field. The extant cluster based energy efficient routing, consumes large amount of energy since the cluster head itself is a network node, from the cluster head. This tends to failure of the node sooner and also, the number of cluster on the network is not predicted that makes complexity of the system model. Hence, this article brings the reference node to make the manual cluster on the network, which reduces the energy consumed by the cluster head as in other models. The reference node finds the number of path available for the mobile node to transmit the data by considering the congestion and retransmission, which allows the node to lose its energy. Then black widow optimized routing protocol find the optimal path to

Dr. P. MANIARASAN

Principal

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

Breast lesion identification and categorization using mammography screening based on combined convolutional recursive neural network framework with parameters optimized using multi-objective seagull optimization algorithm

N. K. Sakthivel ✉, S. Subasree, Pachhaimmal Alias Priya M, Amit Kumar Tyagi

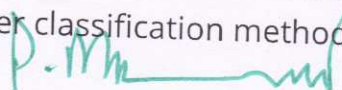
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<https://doi.org/10.1002/cpe.7348>

Summary

In recent years, a number of learning methods have been adopted for classifying the mammogram images, which helps the early detection and diagnosis of breast cancer. The breast lesion identification and categorization using mammography screening based on combined convolutional neural network and recursive neural network (CRNN) framework with parameters optimized using multi-objective seagull optimization algorithm (BLIC-CRNN-MOSOA) is proposed in this article. Initially, the unnecessary noise components are taken away from the mammogram images and the quality of the images are enhanced based on altered phase preserving dynamic range compression filtering approach. Then, the deep CRNN model with weight parameters optimized using multi-objective seagull optimization algorithm is adopted for classifying the mammogram images into three categories: (i) normal, (ii) benign, and (iii) malignant masses. The proposed BLIC-CRNN-MOSOA approach is executed in MATLAB platform, and its performance is compared with other deep learning classification approaches. Then the simulation performance of the proposed BLIC-CRNN-MOSOA method attains higher accuracy 99.67%, 98.38%, and 97.45%, higher sensitivity 98.33%, 89.34%, and 88.96%, higher specificity 93.15%, 91.25%, and 92.88% compared with existing methods, like BLIC-FrCN, BLIC-ICS-ELM, and BLIC-DCNN-BO. By this, the proposed method achieves higher classification accuracy with less misclassified error. Finally, the simulation results show that the proposed method is more efficient than the other classification methods.

CONFLICT OF INTEREST


Dr. P. MANIARASAN
Principal
Nehru Institute of Engg. & Technology
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Remote Intelligent System for Monitoring and Control of Water Distribution Network Using Remote I/O Module for Smart City

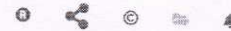
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Abstract

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- II. Methodology
- III. System Design
- IV. Water Management Algorithm
- V. Design And Implimentation Of Proposed System

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Abstract:

The need for drinking water is very essential in today's world. The government has been adopting a variety of measures to save drinking water and spend it economically. It is everyone's duty to save water and use it sparingly. Water is wasted due to breakage of the water pipe, excessive use of water, measurement in a faulty instrument and so on. The leakage of water from the pipeline and the usage of water is intelligently detected and measured by PLC - Remote I/O Module based system. Each house or utility is installed with intelligent flow meters and the inputs or readings are collected from the individual meters by water distribution board via the IoT. Faults and other abnormal conditions are identified instantaneously, and the health of the distribution system is monitored by SCADA.

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D. P. Mani

DR. P. MANIARASAN

Principal

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

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An Analysis of Spam Mail Using K-Means Clustering Algorithm

Mr K.Nagarajan, Mr. V. Vinod Kumar , Mr. M. Mohammedkasim , Mr. T Prabu

Abstract— Email is a method of exchanging digital messages between people using digital devices such as computers, tablets and mobile phones. Email spam also known as junk email is unsolicited bulk messages send through email. The use of spam has been growing in popularity since 1990s and is a problem faced by most email users. Recipients of spam often have had their email addresses obtained by spambots which are automated programs that crawl the internet looking for email addresses. Origin blacklisting is used to detect and filter these kinds of emails. The sources of emails are provided by origin detection. In this origin identity, the spam blocking system finds the source and if any source matches with the user identity, the spammer is blocked to send email. But the system cannot check the contents of spam. The Propose system verifies the mail contents. If the spam content matches with the spam database cluster, then it blocked while sending to receiver. In this system blocks the mail and prevents the flow of data in a network. The porter stemmer and k-means clustering algorithms are using in this propose system.

Keywords Origin blacklist, Porter stemmer , K-Means clustering

I. INTRODUCTION

Email is the one of the most important application of network users. But Mail has facing problems like Hacking attacks, phishing attacks and malicious attacks to attempt fraud and deception motivation. They are using the emails to obtain personal credentials of user financial gain. The genuine contents of mail may include the Phishing URLs to steal the useful data which is also known as Spam. Spammers use the Spambots to create email distribution lists. Typically the Spammer sends an email to millions of email addresses, with the expectation that only a small number will respond or interact with the messages. Fraudulent spam also comes in the forms of phishing mails, which are emails disguised as official communication from banks, online payment processors or any

other organizations a user may trust. The spam mail may also deliver other types of malware through file attachments or scripts, or contain links to website s hosting malware. There are many types of spam filtering techniques such as List based techniques, content based techniques, challenge –response, keyword-based filtering, etc. The content based techniques, which are very popular techniques to avoid spam mails. The spam emails are evaluated for terms or words to detect as spam or legitimate mail. These techniques consist of both Word based and heuristic filters. Word based, which block mail as a spam, if the mail has certain word having spamicity character. The spam mails contain the words that are rarely used in legitimate mails. So it can be easy to block the spam mails. Then the heuristics filters, which outperforms the normal word based filter. Mostly the score and point is criteria to classify the mail as spam or legitimate. Heuristic filters make use of different types of algorithms to examine the emails.

II. PROPOSED SYSTEM

In this paper, we examine whether we can find malicious networks in a systematic manner using existing blacklists. The systematic detecting of disproportionately malicious networks may be used to build to determine if the networks are harboring a significant amount of malicious activity. These kind of metrics may offer several practical benefits. ISBs could use them to build identification of malicious networks into their peering agreements also when receiving traffic, the destination network mite prioritize traffic based on the cleanliness of Ass, which can help metrics to estimate.

As a simple and powerful statistical method, this is consisting of desirable features. This can minimizes the num of observations required to reach the decision among all the non sequential and sequential statistical tests with greater error rates. This means that the spam detection system can identify the spam content or not by using Data Mining techniques. The users of the system can be selecting the desired thresholds, weight and term frequency is computed to detect the spam content. The propose system efficiently identify the spam data and spam mail will be blocked to overcomes the network and zombies attack. By using this method, It can be improves the network performance and the network traffic is reduced with secure authentication. Once the administrator verifies the message as spam monitors the spam sender and stores their activity in the routing table which helps to easily find the spam

Mr K. Nagarajan, Assistant Professor, Department of Electronics And Communication Engineering, Nehru institute of Engineering and Technology, Coimbatore, India. (Email Id : naguambani@gmail.com)

Mr Vinod Kumar V, Assistant Professor, Department of Electronics And Communication Engineering, Nehru institute of Engineering and Technology, Coimbatore, India. (Email Id: vinodvijayan0289@gmail.com)

Mr. Mohammedkasim M, Assistant Professor, Department of Electronics And Communication Engineering, Nehru institute of Engineering and Technology, Coimbatore, India. (Email Id : mohammedkasim1983@gmail.com)

Mr. T Prabu, Assistant Professor (SG), Department of Electronics And Communication Engineering, Nehru institute of Engineering and Technology, Coimbatore, India. (Email Id : tprabu19@gmail.com)


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ORIGINAL ARTICLE

Faster Region-based Convolutional Neural Networks with You Only Look Once multi-stage caries lesion from oral panoramic X-ray images

Jayaraj Velusamy, T. Rajajegan, Sini Anna Alex, M. Ashok, A. V. R. Mayuri✉, Siripuri Kiran

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Dr. P. MANIRAJAN
Principal
Naras Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 106

Abstract

Neural networks and artificial intelligence find more applications in dentistry. It treats dental caries, the most prevalent type of dental illness worldwide. Even though dental caries can be prevented and treated, they typically cause dental discomfort and tooth loss. For dental caries to be treated quickly and effectively, comprehensive detection may be needed, a combination of techniques that include eye inspection, probing, using a dental probe, and using a hand-held mirror, and the individual application of each of these techniques, can quickly identify large caries cavities. Long-established caries detection techniques help to locate only partially hidden but still accessible holes. Deep learning (DL) techniques have produced remarkable diagnostic results in radiology. This study aimed to classify various radiographic extensions on panoramic films using DL techniques, identify caries lesions using these techniques, and compare the results to those of dentists with extensive training. Faster region-based convolutional neural networks (R-CNN) is a newly discovered field of medical research that is rapidly expanding and has produced outstanding results in diagnosing and prognosis of pathology and radiology conditions. In this study, dental cavities were detected and analysed using periapical radiographs to evaluate the accuracy of the Faster R-CNN algorithm. Because these three caries were derived from the oral panoramic images, we designed You Only Look Once Version 3 (YOLOv3) as a U-shaped network with a large-scale axial attention module. We also compare the effectiveness of YOLOv3's segmentation to that of other industrial standards. Experiments show that our proposed method, Fast R-CNN–YOLOv3, achieves higher accuracy in segmenting the three distinct caries level. The proposed model (R-CNN–YOLOv3) achieved an effective result with a precision of 97.183%.

Identification of an Account as Spammer or Non-Spammer with Accuracy


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

Dr K.Nagarajan, Mr. V. Vinod Kumar , Mr. M. Mohammedkasim , Mr. T Prabu

Abstract— Online reviews have a huge impact on the customer's choice for purchase. These reviews are being read and affects a lot of user decision whether to buy a product or not. There are a lot of reviews based on a product majority of which turns out to be fake written by people to defame a product, which is often created by the competitors of a particular product. The present research concentrates on spam detection and categorizing them from these reviews. We have found that the studies can be classified into three groups that focus on methods to detect fake reviews, individual spammers and group fraudsters. Different techniques have been used for the detection of fake reviews, and block them. In this study a novel framework to improve NetSpam method is proposed. The reviews are analysed by the admin and if found spam, the user is blocked from access his account. The results shows that it is more efficient in preventing people from creating fake reviews, whereas existing methods defines which is a fake review and which is not.

Keyword- Fake reviews, Reviewers, E-Commerce, Products, and Items.

I. INTRODUCTION

Twenty first Century is the era of technology, where even a baby is born directly towards the face of a camera in Skype call or IMO. Technology and devices have made a huge space for itself in our daily life. With the invention of applications and websites evolving day by day people find it easier to access devices to get information rather than moving out. There the e-commerce sector has grown tremendously to our lives.

Online shopping sites are increasing day by day with advent of new materials made available online. Every sites and applications are adding new features to it, tempting the consumers to buy their products. Reviews hold an important part in a customer's decision to buy a product, if the reviews are found to be positive, chances that a user purchases it is high but in other case if the review turns out to be negative it

has reverse impact on the users choice.

The reviews written to change users' perception of how good a product or a service are considered as spam, and are often written in exchange for money. 20% of the reviews in the Yelp website are actually spam reviews.

The widespread impact of customer reviews has raised spam (review) issues on the websites containing customer reviews. As anyone can post anything on the review box, people are carefree to type anything in the review box irrespective of the product. Some reviews are based on the usage of the product, some are based on the features of the product, some can be even based on the comparison of the products, and some may be based on nothing related to them.

Researchers have developed various detection techniques for fake reviews in past years to preserve the accuracy of opinion-mining results, real customers and true vendors. The important task is distinguishing between fake reviews and real reviews. To identify literature concerning "fake review", background study on related journals and conference papers were done. The terms used for searching the related works were spam detection, fake reviews, and opinion mining, fraudulent reviews. The papers were selected on the basis of its relation with the base paper related to Net Spam.

Online social media entries are not filtered, anyone can post anything in fraction of seconds it spreads widely until or unless a report is filed against it, it is not verified. The amounts of abusive comments are also to be considered and the user needs to be blocked to type certain words in their typing window. The websites like shtyle have a feature which prevents the user from typing certain dataset so that even if the user types the word it either is seen in the screen as * or dot, it doesn't get printed in the same manner as the user have typed.

The websites like Amazon provides reliability on a comment by providing "Amazon Verified Purchase" tag and Yelp.com removes the suspicious review by using heuristic rules. There are still ways how a fake reviewer can escape the eyes of detection system. Some of the reviewers are trained in writing fake reviews which go undetected; to get them to the spotlight an alternative method used is the socializing behaviour of the user. The websites allow users to put trusted tag on a particular user based on the review, helpfulness tags etc. are also used by websites. Some users tend to put reviews and not socialize much and some may be socially inactive and still post reviews.

The lazy users are few who comment and socialize not frequently but once in a while. The activity logs of a user is

Dr. K. Nagarajan, Assistant Professor, Department of Electronics And Communication Engineering, Nehru Institute of Engineering and Technology - Coimbatore, India. (Email Id : naguambanite@gmail.com)

Mr Vinod Kumar V, Assistant Professor, Department of Electronics And Communication Engineering, Nehru Institute of Engineering and Technology - Coimbatore, India. (Email Id : vinodvjayant299@gmail.com)

Mr. Mohammedkasim M, Assistant Professor, Department of Electronics And Communication Engineering, Nehru Institute of Engineering and Technology - Coimbatore, India. (Email Id : mohammedkasim1983@gmail.com)

Mr. T. Prabu, Assistant Professor (SG), Department of Electronics And Communication Engineering, Nehru Institute of Engineering and Technology - Coimbatore, India. (Email Id : tprabu19@gmail.com)

An Energy-Efficient Routing of Mobile Sensor Nodes using Black Widow Optimized Routing Protocol

V.Jayaraj¹, K.Sivakami², S.Saraswathy³

^{1,2} Department of Electronics and Communication Engineering, Nehru Institute of Engineering and Technology, Tamilnadu, India.

nietjayaraj@nehrucolleges.com, nietsivakami@nehrucolleges.com

³ Department of Computer Science, Nehru Arts and Science College, Tamilnadu, India.

nietjayaraj@nehrucolleges.com, nietsivakami@nehrucolleges.com
nascaraswathy@nehrucolleges.com

Abstract

Wireless sensor network (WSN) has involved in the development of the technology in today's world. But the energy restrictions of the nodes have the impact in use of the network in many field. The extant cluster based energy efficient routing, consumes large amount of energy from the cluster head since the cluster head is also a node in the network. This tends to failure of the node sooner and also, the number of cluster on the network is not predicted that makes complexity of the system model. Hence, this article brings the reference node to make the manual cluster on the network, which reduces the energy consumed by the cluster head as in other models. The reference node finds the number of path available for the mobile node to transmit the data by considering the congestion and retransmission, which allows the node to lose its energy. Then black widow optimized routing protocol find the optimal path to transmit the data with received signal strength indicator (RSSI). The parameters of the model are analyzed against the extant protocols. The energy consumed in the network is 60J for 4000 rounds at the same time none of the node is dead and total of 50 mobile nodes are alive on the network by inhibiting the throughput of 99.23%, which is not happened on the state-of-the-art models..

Keywords: Wireless sensor network, Mobile node, Reference node, Routing protocols, Black widow optimization, cluster, cluster head, energy-efficiency, received signal strength indicator.

1. Introduction

Wireless sensor network (WSN) is an extensive topic to study due to its advantage over rising technology mainly for monitoring purpose. Due to its habitat it is usually used in agriculture, medicine, military etc. nowadays it is used in the field of power monitoring systems also [1]. For varied application of sensor network the sensor characteristics also varied like dynamic or static nodes [2, 3] used on the network. And also, some applications needs the location if the sensor node mainly in case of mobile WSN [4]. By considering all those requirement several studies are made by the researchers. But due to the limited capability of the sensor node the entire network faces several issues [5].

The sensor node has processing unit, transceiver and sensing system [6, 7], which are operated by the limited capacity unit named as battery [8]. The charging of the battery of the node is not possible at every time and for every application; hence the working of the nodes should be made by the energy-efficient manner [9]. If any nodes are failed to do their respective duties then the whole network will suffer and does not exhibit the robust network [10]. The node may drain much of the energies during the data transmission by



Dr. P. MANIHARASA

Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 100.



A Graphical System Design for Analysing Medical Images and its Applications

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N. K. Darwante¹, Dr. D. Nageswari², Ms Jalshree.M³, Dr Rama Chalthanya Tanguturi⁴,
M. K. Mariam Bee⁵, Dr. C M Velu⁶

¹Associate Professor, Department of Electronics & Telecommunication, Sanjivani College of Engineering, Kopergaon, Affiliated to Savitribai Phule Pune University, Pune, Maharashtra, India.

²Assistant Professor, Department of BCE, Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu, India.

³Assistant Professor (SrG), Department of Electronics and Communication Engineering, Sri Ramakrishna Engineering College, Coimbatore, Tamilnadu, India.

⁴Professor, Department of Computer Science and engineering, PACE Institute Of Technology and Sciences, Ongole, Andhra Pradesh, India.

⁵Assistant Professor, Department of ECE/ Robotics, Saveetha School of Engineering, Saveetha Institute Of Medical And Technical Sciences, Chennai, Tamilnadu, India.

⁶Professor, Department of Computer Science and Engineering, Saveetha School of Engineering, Saveetha University, SIMATS, Chennai, Tamilnadu, India.

Abstract

An image, such as a picture or video frame, serves as the input for image processing, a subset of signal processing; the output of image processing might be another image or a collection of parameters or characteristics of the original image. The term is often used to describe the process of modifying an input picture so that it meets the needs of a certain application. Devices designed specifically for imaging emit signals that may be interpreted as images. Since the time of Galileo Galilei and Isaac Newton, one of the primary goals of scientific research has been the development and improvement of imaging technologies. When comparing digital computers to analogue electrical and optical information processing systems, the fact that no hardware changes are required when reprogramming digital computers to do new jobs is by far the most significant benefit of digital computers. The same computer may be used to provide a solution to any issue by picking or building the right software to run on it. With this quality, digital computers are also a great tool for handling picture signals. Integrating digital computers into imaging systems enables them to execute any operation, not only the element-wise and integral signal transformations typical of analogue optics, such as spatial and temporal Fourier analysis, signal convolution, and correlation. This allows for the integration of optical information processing with digital signal processing, hence removing the former's primary constraint. The end outcome, information about intermediate steps, etc. of the system are all shown on a GUI for the user's convenience. Verification of the developed system was performed on 110 X-ray pictures, 59 of which were PTB and 51 of which were NON-TB. The algorithm accurately identified 49 cases of tuberculosis and 55 instances of NON-TB. Therefore, we conclude that the detection accuracy is 94.5%.

Keywords: Image processing, Graphical System, Digital Computers, Convolution, Fourier analysis.

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1. Introduction

To put it simply, image processing is any kind of signal processing where a visual representation of some kind (a picture, for example, or a video

frame) is used as input, and the result may be another image or a collection of image-related features or parameters. The term is often used to describe the process of modifying an input



A NOVEL SMART TRAFFIC LIGHT CONTROLLING SYSTEM BY IMAGE PROCESSING TECHNIQUE

T. Prabu¹, Dr. K. Srinivasan², S. Mohan³ & K. Nagarajan⁴

¹ Asst. Professor, Department of ECE, Nehru Institute of Engineering and Technology, Coimbatore.

² Professor & Head, Department of E&I, Sri RamaKrishna Engineering college, Coimbatore.

³ Asst. Professor, Department of ECE, Nehru Institute of Engineering and Technology, Coimbatore.

⁴ Asst. Professor, Department of ECE, Nehru Institute of Engineering and Technology, Coimbatore.

1tprabu19@gmail.com

2srineekvasan@gmail.com

3smohan2507@gmail.com

4naguambani@gmail.com

ABSTRACT:

Traffic is the important trouble going through all over the world. Today as a result there is an amplification in the range of the cars. The proliferation in the wide variety of the cars resulted from the need of a smart system that should correctly manages the traffic congestion on the ground work of its density. In the growth of the public population electronic transport system plays a major role. The smart road traffic control can be used in real time. This paper includes an introduction to the electronic traffic control process. The objective of the system proposed is to provide emergency services with the least traffic routes. This system often detects and tracks emergency vehicles location in real time and warns the TCC (Traffic control centre). The proposed approach is also used for controlling the traffic light system in the emergency situations.

1. INTRODUCTION


Various studies and surveys estimated the bulk traffic congestion on a daily basis or traffic jams occur because of traffic light system. Traffic congestion is nothing but an additional waste of time from one's daily routine. It is noticed that most of the traffic congestion is occur during the morning and late afternoon. Basically during that time the students and employers go to school, college, University or office so they also be late for their office or institutions at traffic light spot. When time and resources from the current infrastructures are steadily increasing, sophisticated traffic management becomes increasingly common in the future. The reality that road users are constantly rising. Preventing unnecessary traffic jams would be both socially and economically beneficial. Our novel smart traffic light network has been designed to address the congestion problem of the country's metropolitan cities for reducing the economic cost and saving time. By decreasing the congestion of cities we can also decrease the extra waste of energy like CNG, Petroleum for special case electricity also. Developing countries such as India have extremely high population with an estimated GDP of 6 billion and whose resources spend the majority on imports of oil and energy, it cannot waste a commodity of this value.



Dr. P. MANIARASU
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 100.

**DESIGN AND DEVELOPMENT OF IOT BASED WATER AND CALAMITY
MANAGEMENT TECHNIQUE BY IMPLEMENTING A HYBRID CLASSIFICATION
APPROACH****¹Mr. Sushant Kumar Pattnaik**Assistant Professor, Department of ECE, Silicon Institute of Technology, Bhubaneswar
sushanta.pattnaik@silicon.ac.in**²Subhakar Mattupalli**Assistant Professor, Department of CSE (Data Science), Nagarjuna College of Engineering and
Technology, Mudugurki, Devanahalli, Bangalore - 562210
skpbabu@gmail.com**³Dr. Prakash Chandra Behera**Assistant Professor, Department of Sciences, St. Claret College, Bangalore.
prakash@claretecollege.edu.in**⁴T.Saravanan,**Assistant professor, Department of information technology, Jeppiaar Engineering College, Chennai
- 600119
saranme63@gmail.com**⁵Ms. Saniya Bhalerao**Assistant Professor, Department of Pharmaceutics, MET Institute of Pharmacy, Bhujbal
Knowledge City, Adgoan, Nashik, Maharashtra 422003.
Saniya.bhalerao@gmail.com**⁶Mr. S. Mohan,**Assistant Professor, Department of Electronics and Communication Engineering,
Nehru Institute of Engineering and Technology, Coimbatore, Tamilnadu -641105
smohan2507@gmail.com**⁷Dr. D. Stalin David,**Associate Professor, Department of Information Technology,
Veltech Multitech Dr.RR Dr.SR Engineering College, Avadi, Chennai-600062
sdstalindavid707@gmail.com**ABSTRACT:**

Floods have destroyed infrastructure worth millions of dollars in the past, and this is still an issue today. Despite all of the research, there is currently no single, worldwide system that can be used to gather data, store it, analyze it, and predict floods. Researchers all across the world are


Dr. P. MANI ARASA
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 100.



Novel Double Modular Redundancy Based Fault-Tolerant FIR Filter for Image Denoising

V. S. Vaisakhi^{1,*} and D. Surendran²

¹Department of Electronics and Communication Engineering, Nehru Institute of Engineering and Technology, Coimbatore, 641105, India
²Department of Computer Science and Engineering, KPR Institute of Engineering and Technology, Coimbatore, 641105, India

*Corresponding Author: V. S. Vaisakhi. Email: vaisakhivs71@gmail.com

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Abstract: In signal processing and communication systems, digital filters are widely employed. In some circumstances, the reliability of those systems is crucial, necessitating the use of fault tolerant filter implementations. Many strategies have been presented throughout the years to achieve fault tolerance by utilising the structure and properties of the filters. As technology advances, more complicated systems with several filters become possible. Some of the filters in those complicated systems frequently function in parallel, for example, by applying the same filter to various input signals. Recently, a simple strategy for achieving fault tolerance that takes advantage of the availability of parallel filters was given. Many fault-tolerant ways that take advantage of the filter's structure and properties have been proposed throughout the years. The primary idea is to use structured authentication scan chains to study the internal states of finite impulse response (FIR) components in order to detect and recover the exact state of faulty modules through the state of non-faulty modules. Finally, a simple solution of Double modular redundancy (DMR) based fault tolerance was developed that takes advantage of the availability of parallel filters for image denoising. This approach is expanded in this short to display how parallel filters can be protected using error correction codes (ECCs) in which each filter is comparable to a bit in a standard ECC. "Advanced error recovery for parallel systems," the suggested technique, can find and eliminate hidden defects in FIR modules, and also restore the system from multiple failures impacting two FIR modules. From the implementation, Xilinx ISE 14.7 was found to have given significant error reduction capability in the fault calculations and reduction in the area which reduces the cost of implementation. Faults were introduced in all the outputs of the functional filters and found that the fault in every output is corrected.

Keywords: Fault tolerance; filters; efficiency; redundancy; image denoising; error correction codes; double modular redundancy

1 Introduction

Embedded systems are becoming more prevalent in security applications such as aircraft, control systems, and patient life-support monitoring. Both time and fault tolerance are usually required in this



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

Disease Prediction with Recommendation system using Deep learning

Deepa S M¹, Sivakami K², Revathi N³, Dr. T. Jayaprakash⁴

Assistant Professor/ECE, Nehru Institute of Engineering and Technology

Assistant Professor/ECE, Nehru Institute of Engineering and Technology

Assistant Professor/ECE, Nehru Institute of Engineering and Technology

Professor, Department of Science and Humanities, Nehru Institute of Technology.

nictdeepa@nehrucolleges.com, ksivakami@gmail.com,

nictrevathi@nehrucolleges.com, nitjayaprakash@nehrucolleges.com

Abstract

Health and medicine has gained a lot of importance in today's digital world, where evolving technology is being used to fight against almost all the known diseases thoroughly. But, according to reports, more than two lakh people in China and one lakh in United States of America are dead every year due to the mistakes made while prescribing errors. This paper aims to propose a system which takes as input the symptoms from the patient to predict the disease, which is followed by recommending the correct medicine. This system consists of database system module where disease dataset contains attributes like "DiseaseID", "Disease", "Symptoms" and "count of occurrences" and drug dataset has additional attributes such as "drug" and "drug_rating". In the data preparation module, a new dataframe is created where each disease with its associated symptom is given "1" and "0" if it is not the symptom related. After all these steps of preprocessing are performed on the raw dataset, the dataset is now ready to be acted upon by a machine learning algorithm. Models like Decision Tree, Random Forest and Naive Bayes were applied on the training-dataset. Entire knowledge database was fitted in models and it was seen if not much dataset is used Random Forest and Naive Bayes classifiers showed 84% accuracy whereas Decision Tree gives 92%. But Random Forest also gives accuracy similar to Decision Tree for large dataset. Hence for disease prediction we use Decision Tree. The recommendation is done on the basis of the rating of the drug. After this, only the drug with the highest rating is included in a newly formed dataset and the rest of the drugs are ignored. The system is implemented for user access by making use of Tkinter a python GUI Library for constructing the desktop end user interface.


This paper deals with the design and implementation of a system which performs the function of prediction of diseases and the recommendation of medicines, which adds to the capabilities of the present systems in health infrastructure.

Keywords: A Decision tree map, classification algorithms and data mining

1. Introduction

1.1 Proposed System

Statistics show that more than 70% of Indians are prone to general body maladies every 3 months. Quite often any people do not realize that the usual body ailment could lead to side effects to something really dreadful, 26% of the people surrenders to death because of



Dr. P. MANIWARASAIAH
Principal
Nehru Institute of Engg. & Technology
T.M.Palayam, Coimbatore - 641 103.