



## **AAA COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai)

**(An ISO 9001:2015 Certified Institution)**

Kamarajar Educational Road,  
Amathur, Sivakasi – 626 005.

### **3.3.4 Number of research papers per teacher in the Journals notified on UGC website during the last five years**

#### **INDEX**

<b>S.No.</b>	<b>Content</b>	<b>Page No.</b>
1.	E copies of front page of research paper per teacher	2-81



## Soft fuzzy computing to medical image compression in wireless sensor network-based tele medicine system

R. Sheeja<sup>1</sup> · J. Sutha<sup>2</sup>

Received: 2 November 2018 / Revised: 1 January 2019 / Accepted: 15 January 2019  
Published online: 19 February 2019  
© Springer Science+Business Media, LLC, part of Springer Nature 2019

### Abstract

Wireless sensor network can be used to construct a telemedicine scheme to bring together the patient data and expansion of medical conveniences when disaster occurs. The Remote Medical Monitoring (RMM) scheme of the disaster period can be constructed using the Health care center (CC), Wireless sensor nodes and a few Primary health care centers (PHC). The sensor nodes possess the capacity of making communication between patients and PHCs. This type of WSN experiences limited lifetime problem due to the limited battery energy and transmission of medical data in large quantity. This paper proposes a new and novel WSN based Disaster Rescue Telemedicine Scheme to minimize energy consumption and to maximize network lifetime. The proposed method reaches this milestone using three novel algorithms namely 'Network clustering using Non-border CH oriented Genetic algorithm, Fuzzy rules and Kernel FCM (NCNBGF)', 'High gain MDC algorithm (HGMDCA)' and 'Critical node handling using job limiting and job shifting (CJLS)'. The principal technologies used in this paper are Network node clustering, Medical image compression and Critical state node energy management to elongate the life period of WSN. The Simulation results prove that the proposed method amplifies the WSN topology lifetime to a significant level than the earlier versions. The Existing methods compared in this paper holds only 20% energy at the round 80, the proposed method stays with 43% of energy.

**Keywords** Genetic algorithm · Remote medical monitoring · Wireless sensor network · Fuzzy logic · Image compression

### 1 Introduction

The communication Networks which are not rely by the use of wires or any electronic connections between, are called Wireless Sensor Networks [29]. The WSN are applied in

---

✉ R. Sheeja  
researchsheeja@gmail.com

<sup>1</sup> Saveetha School of Engineering, Computer Science and Engineering, Thandanthi, Chennai, India

<sup>2</sup> AAA College of Engineering and Technology, Amathur, Sivakasi, India

Scientific Paper

## A simple multi-feature based stereoscopic medical image retrieval system

K.A. SHAHEER ABUBACKER<sup>1</sup>, J. SUTHA<sup>2</sup>, K.A. SHAHUL HAMEED<sup>3</sup><sup>1</sup>Anna University, Chennai, Tamilnadu, India<sup>2</sup>Department of CSE, AAA College of Engineering & Technology, Sivakasi, Tamilnadu, India<sup>3</sup>Department of ECE, Sethu Institute of Technology, Palloor, Kariyapatti, Tamilnadu, India<sup>\*</sup>E-mail address: contactabu@yahoo.com

(received 11 November 2018; revised 28 January 2019; accepted 14 February 2019)

### Abstract

This paper describes a method of retrieving stereoscopic medical images from the database that consists of feature extraction, similarity measure, and re-ranking of retrieved images. This method retrieves similar images of the query image from the database and re-ranks them according to the disparity map. The performance is evaluated using the metrics namely average retrieval precision (APR) and average retrieval rate (ARR). According to the performance outcomes, the multi-feature based image retrieval using Mahalanobis distance measure has produced better result compared to other distance measures namely Euclidean, Minkowski, the sum of absolute difference (SAD) and the sum of squared absolute difference (SSAD). Therefore, the stereo image retrieval systems presented has high potential in biomedical image storage and retrieval systems.

**Key words:** stereoscopic image retrieval, feature extraction, similarity measure, disparity map, average retrieval precision, average retrieval rate

### Introduction

Recently, stereoscopic imaging systems have become popular in the field of biomedical sciences after the effective usages in breast cancer screening and diagnosis, and also guided surgeries [1,2]. In the therapeutic field, a large volume of stereo images needs to be stored as well as retrieved to give the required information at the right time in order to improve the quality and effectiveness of the clinical process. The content-based image retrieval (CBIR) has been widely used in many applications to retrieve image information from the database that uses features such as keyword or tag and domain-specific features [3]. Several works related to medical CBIR have been shown in the literature [4,5]. However, most of the works aimed at a particular imaging modality and also task-specific [6].

Stereoscopic image retrieval (SIR) is considered as one of the most challenging works since they involve the nature of imaging device, modality, and complexity, and comparatively few works have been reported. For example, Ayoubi Karim et al. have developed a new SIR system based on complex wavelet coefficient and evaluated the performance in terms of time, cost and the retrieval rates [7]. Yang Cao et al. have proposed an automatic tag saliency-ranking algorithm for stereo images [8]. In this paper, a novel method has been proposed to segment the two images into meaningful regions

and then, the multi-instance learning algorithm is used to annotate tags on region-level. These tags are re-ranked according to 3-D saliency values. A. Chaker et al. proposed the two retrieval method based on visual contents and the disparity information of the stereo images [9]. In this work, univariate and bivariate models are used separately to retrieve the images. The datasets used in most of the works are taken from natural scenes, objects and SPOT5 scenes. To the best of our knowledge, there is no work reported in medical SIR. In this paper, we have presented the SIR system for medical images. This paper is organized as follows; section II describes the methods used in the retrieval method, section III presents the performance outcomes and the conclusions are given in section IV.

### Methodology

The system for medical stereoscopic image retrieval framework is shown in Figure 1. The dataset of medical stereo images has been created by Carestream workstation that consist of volume rendered MRI and CT anatomical images with different resolutions. The features such as color, texture and disparity map of all the images are extracted to create a feature database. In order to retrieve the image, the same features are obtained from the query image and compared with the feature vectors in the database.

**Performance Analysis of Two-Optimal Methods for Shortest Path Cost Analysis and Route Aggregation for Object Tracking Applications in WSN**

<sup>1</sup>Mrs.P.Krishnaveni, <sup>2</sup>Dr.J.Sutha

<sup>1</sup>Assistant Professor (Sr Grade), Department of Computer Science and Engineering, Sethu Institute of Technology, Pallur,  
Kariyapatti - 620115, Mail id: vsmgrovind@gmail.com

<sup>2</sup>Professor & Head, Department of Computer Science and Engineering, AAA college of Engineering and Technology, Kananjar,  
Educational Road, Aranthi (V), Srirangam - Varadhinagar Main Road, Mail id: sutha\_shad@yahoo.co.in

**Abstract**

The number of applications based on Wireless Sensor Networks (WSN) used in day to day life. A particular application of WSN is object tracking where it used to track and locate a specific object by deploying users. One of the main challenges is to identify and track objects in remote areas with energy efficiency. The main problem considered in this paper is, route optimization by minimal energy consumption based optimal path selection for object tracking. The optimization method is used to reduce the original power consumptions of the sensor nodes. In Two-Optimal Methods (TOM), Dijkstra's and Modified Floyd-Warshall's (MFW) algorithms are used here for shortest path selection. TOM is efficient because of using the best functionalities from Dijkstra and FW algorithms. Both algorithms used in TOM are simulated in Network Simulator software and the results verified. The simulation results obtained using Dijkstra, SA and MFW algorithms are compared for verifying and evaluating their performance. From the comparison, it is noticed that MFW is better than Dijkstra's and FW regarding energy consumption, throughput, Packet Delivery Ratio, and packet loss.

**Keywords:** Wireless Sensor Network, Remote Application, Object Tracking, Optimization, Dijkstra Algorithm, Floyd Warshall's Algorithm.

**Introduction**

In recent days, using advanced technologies incorporating various heterogeneous sensor devices with decreased power consumption cost and time leads to create applications for future

ITC 1/48

Journal of Information Technology  
and Control

Vol. 48 / No. 1 / 2019

pp. 47-57

DOI: 10.5755/j01.itc.48.1.20909

**A Hybrid Algorithm for Multi-Objective Optimization of  
Minimizing Makespan and Total Flow Time in Permutation  
Flow Shop Scheduling Problems**

Received 2018/06/08

Accepted after revision 2018/09/27

<http://dx.doi.org/10.5755/j01.itc.48.1.20909>

# A Hybrid Algorithm for Multi-Objective Optimization of Minimizing Makespan and Total Flow Time in Permutation Flow Shop Scheduling Problems

**R. B. Jeen Robert**

Faculty of Mechanical Engineering, AAA College of Engineering and Technology, Amathur, Sivakasi -626005, India; phone: +91 9488081212; e-mail: jeenbrobert@gmail.com

**R. Rajkumar**

Faculty of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi -626005, Virudhunagar Dist, India; phone: +91 9486359435; e-mail: rrkumaran@gmail.com

**Corresponding author:** jeenbrobert@gmail.com

In this work, a hybrid algorithm has been proposed to solve bi-objective permutation flow shop scheduling problem. The primary concern of flow shop scheduling problem considered in this work is to obtain the best sequence, which minimizes the makespan and the total flow time of all jobs. Bi-objective issues are comprehended by doling out uniform weight to every objective function in view of its preference or determining every competent solutions. In the flow shop scheduling environment, many meta-heuristic algorithms have been used to find optimal or near-optimal solutions due to the computational cost of determining exact solutions. This work provides a hybridization of genetic algorithm and simulated annealing algorithm (HGASA) based multi-objective optimization algorithm for flow shop scheduling. The proposed HGASA algorithm is used to solve a bi-objective problem that minimizes the makespan and the total flow time. The performance of the proposed algorithm is demonstrated by applying it to benchmark problems available in the OR-Library. The test results show that the HGASA algorithm performed better in terms of searching quality and efficiency than other meta-heuristic algorithms.

**KEYWORDS:** Permutation Flow shop scheduling, Hybrid algorithm, Makespan, Total Flow time, Benchmark.

**MULTI-OBJECTIVE OPTIMIZATION USING HYBRID  
ALGORITHM AND ITS APPLICATION TO SCHEDULING  
IN FLOW SHOPS**

**Robert Bellabai Jeen Robert, Ramasubbu Rajkumar\***

*(Submitted by Academician I. Popchev on June 18, 2018)*

**Abstract**

In this paper, a hybrid algorithm has been developed to solve the permutation flow shop scheduling problem. For the effective working of the proposed hybrid algorithm, genetic algorithm is combined with the simulated annealing algorithm. In the genetic algorithm, the initial population is created by utilizing the prominent Nawaz, Enscore & Ham (NEH) heuristic. Here, the problem is optimized by considering three criteria, makespan, total flow time and machine idle time and the equivalent weights of makespan, total flow time and machine idle time are considered. Since these issues are not known firmly NP-hard, Hybrid Genetic Algorithm Simulated Annealing (HGASA) based meta-heuristic approach is proposed. The execution of the proposed HGASA algorithm is shown by applying it to the standard benchmark problem accessible in the OR-Library. Calculation results in view of some change flow shop scheduling benchmark problem demonstrate that the HGASA gives better solution compared to Multi Objective Improved Genetic Algorithm (MOIGA).

**Key words:** scheduling, flow shop, hybrid algorithm, makespan, total flow time, machine idle time

**1. Introduction.** The Permutation Flow Shop Scheduling Problem (PF-SSP) is an imperative part of scheduling in the manufacturing system and it has been broadly utilized as a part of the actual production, particularly in one-piece large-scale manufacturing. NAWAZ, ENSCORE, and HAM, [7] NEH is one of best useful heuristic algorithms, which first assigned needs on every job in view of the

# Materials Research Express



## PAPER

### ZnO nanoparticles impregnated polymer composite as superhydrophobic anti-corrosive coating for Aluminium-6061 alloy

RECEIVED  
17 November 2018

REVISED  
21 March 2019

ACCEPTED FOR PUBLICATION  
2 April 2019

PUBLISHED  
12 April 2019

R B Jeen Robert<sup>1</sup>, G S Hikkur<sup>2</sup>, K Jeyasubramanian<sup>3</sup>, J Jacobjose<sup>4</sup> and R Malkiya Rasalin Prince<sup>5</sup>

<sup>1</sup> Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakasi -626005, Tamilnadu, India

<sup>2</sup> Faculty of Allied Health Sciences, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education (CARE), Kelambakkam, Chennai -603103, India

<sup>3</sup> Department of Chemistry, Mepco Schlenk Engineering College, Sivakasi -626005, Tamilnadu, India

<sup>4</sup> Industrial Safety Engineering, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi -626005, Tamilnadu, India

<sup>5</sup> Department of Mechanical Engineering, Ponjesy College of Engineering, Nagercoil -629003, Tamilnadu, India

E-mail: [kjeyaa@mepcoeng.ac.in](mailto:kjeyaa@mepcoeng.ac.in)

**Keywords:** super-hydrophobic coating, polymer nanocomposite, ZnO Nps, corrosion resistant coating, electrochemical impedance spectroscopy

## Abstract

This work emphasizes the preparation, characterization and anti-corrosive behavior of super-hydrophobic (SH) polymer nanocomposite (PNC) coating developed on Al-6061 alloy. The SH nature is achieved on Al-6061 alloy by coating a mixture containing polyvinyl chloride (PVC), copper stearate (CS) and ZnO nanoparticles (Nps). The structural and molecular characterizations of ZnO Nps, CS, PVC, and PNCs are performed employing XRD, FESEM, FTIR, etc. The influence of average roughness of the surface towards the SH behavior achieved by varying the wt% of ZnO Nps from 0.5 wt% to 2.5 wt% has been assessed from the AFM images. The water contact angle of PNC incorporated with 2.5 wt% of ZnO Nps (PNC-5) exhibits  $154^\circ$  which is used as corrosion resistant coating for Al-6061. Potentiodynamic polarization and electrochemical impedance spectroscopic analysis are performed for bare and PNC-5 coated Al-6061 in 3.5 % NaCl as the electrolyte. The corrosion rate of Al-6061 is decreased from 23.75 mpy to 0.2253 mpy while coating PNC-5. Important parameters such as corrosion protection efficiency, corrosion current density, polarization resistance, charge transfer resistance, double layer capacitance, etc. are evaluated and found that the air trapping phenomenon of SH surface is responsible for the effective corrosion resistance behavior.

## 1. Introduction

Excluding noble metals, all metals undergo corrosion since to attain its stable state the metals are spontaneously oxidized in the environment. When atmospheric moisture reaches the surfaces of the metallic structures, it fuels the formation of their relevant ions [1] which in turn results in the formation of its most stable oxide. Apart from water molecules, the factors that influence the corrosion process are climate variation, thermal fluctuation (day and night), pollutants present in the environment, corrosive elements such as acidic or alkaline moiety, etc [2–4]. Of course, Al forms a protective oxide layer over its surface spontaneously on reaction with oxygen and moisture present in air produces  $Al_2O_3$ , which is able to protect the Al surface from corrosion even in an aqueous environment [5]. Even though Al is inert in the aqueous environment, its protective oxide film cannot endure the reaction when chloride ions come in contact [6]. In the presence of chloride ions, pitting corrosion occurs where the chloride ions infiltrate into the oxide layer, undergoes a chemical reaction and convert the metal into its compounds such as  $AlCl_3$ . This  $AlCl_3$  dissolves into the aqueous solution and provides space for further corrosion results in the growth of pit [7]. For improving the mechanical and structural properties, Al is used in the alloy forms. Some of the grades of Al alloys in 6xxx series are most widely used in shipbuilding, coastal equipment, and desalination of seawater [8]. Especially, Al-6061 alloys are used in structural applications in marine industries because of their desirable mechanical properties [9]. However, Al alloys have reduced

# Survey on Feature Extraction using Neural Networks to Classify Remote Sensing Images

**T. Gladima Nisia**

*Assistant Professor*

*Department of Information Technology*

*AAA College of Engg & Tech., Sivakasi, Tamil Nadu*

**Dr. S. Rajesh**

*Associate Professor*

*Department of Information Technology*

*AAA College of Engg & Tech., Sivakasi, Tamil Nadu*

## Abstract

Remote Sensing (RS) image classification is one of the key research areas in the image processing field. The main important part of this classification is the efficient extraction of features from the RS image. The feature extraction process is also a complex process. In earlier days, there are some kind of features extracted like spectral features. But, while considering the spatial domain of the RS image, it contains more information than the spectral features. So, spectral features dominated the classification area for few years. Many researches were conducted to still improve the classification accuracy. Thus, it resulted in the extraction of features using the different neural networks, which proved to increase the accuracy. This paper surveys and discuss the different works at different duration carried out by researchers to extract the features using neural networks. Also, this survey provides a marginal overview for the future research and improvements.

**Keywords-** Remote Sensing, Feature Extraction, Neural Networks, Spatial Feature, Spectral Feature

## I. INTRODUCTION

In the recent years, the classification of remote sensing images is found to be a very attractive field for the researchers. The RS image contains lots of information in every single pixel. So, using the remote sensing image the land use mapping and land cover mapping is done. The land cover area is the earth cover which consist of forest, water, bare land, saline land, mountain range etc. The land use is the land cover area converted into a built environment such as residential buildings, commercial buildings, transport and agricultural land. To better understand the land cover/land use mapping let us consider the remotely sensed image of a geographical location. The land cover/ land use has to be identified and classified.

Land-cover and land-use information are required for many different kinds of spatial planning, from urban planning at a local level up to regional development. They play an important role in agricultural policy making. For proper management of natural resources, the land-cover data is important. They are increasingly needed for the assessment of impacts of economic development on the environment. Hence, at various geographical levels they are fundamental for guiding decision making. The Earth's surface is changing at different levels namely local, regional, national and global scales.

Land management and land planning needs the current status of the landscape. Understanding current land cover status, it's uses, and monitoring the timely changes is responsible for land management. Also, the reason for the changes in the land condition can be found easily through land cover mapping. Keeping in mind these applications, the classification of RS images has to be done efficiently. The neural networks are employed for obtaining the features from the RS images which in turn is used for classifying each and every pixel of the image.

The remaining chapters are organised as follows: The chapter II discusses about some of the neural networks used for extracting the features from the RS image. The chapter III discusses about the neural networks which are trained layer wise. Chapter IV provides the conclusion of the study.

## II. DEEP NEURAL NETWORK ARCHITECTURE

### A. Deep Belief Network

A deep belief network (DBN) is a class of deep neural network introduced by Geoff Hinton [3][4] and his students in 2006. DBN composed of multiple layers of latent variables ("hidden units"). The network has connections between the layers and there is no connection between units within each layer. When trained on a set of examples without supervision, a DBN can learn to probabilistically reconstruct its inputs. The layers then act as feature detectors. After this learning step, a DBN can be further trained with supervision to perform classification.

DBNs can be viewed as a composition of simple, unsupervised networks such as restricted Boltzmann machines (RBMs) or autoencoders, where each sub-network's hidden layer serves as the visible layer for the next. This stack of RBMs might end with a Softmax layer to create a classifier, or it may simply help cluster unlabelled data in an unsupervised learning scenario. DBN's hidden layer serves as both input and output to the layers before and after it respectively.



# Corrosion Inhibition of Mild Steel by using Banana Peel Extract

C. Bala Manikandan, S.Balamurugan, P.Balamurugan, S.Lionel Beneston

**Abstract**— Corrosion is the deterioration of metal by chemical attack or reaction with its environment. It is a continuous problem, difficult to eliminate completely. The cost of metallic corrosion to the total economy is in billions of rupees per year. The inhibiting action of the banana peel extract as a corrosion inhibitor in controlling corrosion of mild steel in 0.1M HCl solution was studied. Corrosion inhibition was identified by employing weight loss measurements and electrochemical techniques. Five samples of mild steel specimen were taken and they are subjected to varying concentration of banana peel extract solution for analyzing the inhibitory properties. The protective film has been analyzed using FTIR spectroscopic techniques. The results indicated that the corrosion rate is decreasing as the concentration of banana peel increases and simultaneously it enhances the inhibition efficiency of the mild steel.

**Key words:** Mild steel, Banana peel extract, Corrosion inhibition, Corrosion rate, Weight loss measurements, Electrochemical techniques.

## 1. INTRODUCTION

Mild steel finds its applications in the field of construction in wide range of industries due to its high strength and availability at low cost. The main setback for mild steel is its tendency to corrode easily in an acidic environment. Inorganic acids like HCl and H<sub>2</sub>SO<sub>4</sub> are used for drilling, fracturing and acid stimulations at various stages in oil exploration, production and/or descaling operations, which leads to a significant amount of corrosion. Several protective measures are to be taken. One of them is being the use of corrosion inhibitors. Corrosion inhibitors are surface active compounds that are added in small quantities to stop metal dissolution by a corrosive environment. Corrosion inhibitions by organic compounds are widely used in industries. Most organic inhibitors control corrosion by adsorption of inhibitor molecules on the metal surface forming thin films. The use of inhibitors is one the most practical methods for the protection of metals in acidic media. However, most of organic inhibitors are harmful and toxic to the environment. This has led to the need for natural products which are eco-friendly and harmless. Several investigators have reported the use of natural inhibitors, which were extracted from plant leaves or seeds. [1]. Taleb H. Ibrahim et al. investigated about the corrosion of mild steel using Potato Peel Extract in 2M HCl by weight loss and electrochemical techniques. It was observed that the increase

in the inhibition efficiency with increasing potato peels extract concentration. A reasonable corrosion inhibition level was obtained at a concentration of 50 ppm at higher temperatures (>70% inhibition efficiency) [2]. S.A.Umoren et al. found that corrosion of mild steel using leaf and stem extracts in 1 M H<sub>2</sub>SO<sub>4</sub>, there is a significant corrosion inhibition and the inhibition increases with increase in concentration of leaf and stem extracts [3]. Deepa Rani.P et al. identified corrosion inhibitor and reported its inhibiting properties by weight loss measurements at various times and temperature. The inhibition efficiency is markedly higher in a Natural sea water environment with the addition of Emblica officinalis leaves extract compared with those in the inhibitor free solution. The inhibition efficiency increased with increase of inhibitor concentration [4]. M.S.Al-Otaibi et al. tested the Corrosion inhibitory action of some plant extracts on the corrosion of mild steel in acidic media. Using polarization studies, it was found that the extracts of A. Sieberi, T. Auriculatum, C. Tinctorius, L. Shawii and O. Baccatus plants serves as an effective green corrosion inhibitors for mild steel in 0.5M HCl media [5]. A. Anejar et al. found the Inhibition of carbon steel corrosion in 1M HCl medium by potassium thiocyanate. The inhibition efficiency of potassium thiocyanate (KSCN) depends on temperature and increases with increasing of the KSCN concentration [6]. Aprael S. Yaro et al. demonstrated the Apricot juice as green corrosion inhibitor of mild steel in phosphoric acid. The maximum corrosion inhibition efficiency of apricot juice on mild steel is 75% at 30°C. From Statistical analysis, it was identified that the corrosion rate depends on temperature, inhibitor concentration and the combined effect of these two parameters [7]. DeepaPrabhu et al. studied about the Corrosion behavior of 6063 Aluminium alloy in acidic and in alkaline media. The corrosion rate was increased by the following factors: Increase in the temperature, Increase in concentration of sodium hydroxide medium and phosphoric medium. Sodium hydroxide medium induces more corrosion on 6063 Aluminium alloy than the phosphoric acid medium [8]. Mahmoud N. EL-Haddad et al. tested the use of Hydroxyethylcellulose as an eco-friendly inhibitor for 1018 c-steel corrosion in 3.5% NaCl solution. Corrosion inhibition decreases when the temperature increases for 1018 c-steel in 3.5% sodium chloride solution by hydroxyethylcellulose [9]. E.Uwahl et al. found out the Inhibitive action of ethanol extracts from Nauclealatifolia on the corrosion of mild steel in H<sub>2</sub>SO<sub>4</sub> solutions and their adsorption characteristics. The inhibition efficiency was directly proportional to the concentration and inversely proportional to the temperature [10]. K. K.

Revised Version Manuscript Received on 30 May, 2018.

C. Bala Manikandan, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

S. Balamurugan, Department of Mechanical Engineering, AAA College of Engineering & Technology, Sivakasi, Tamil Nadu, India.

P. Balamurugan, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

S. Lionel Beneston, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

# Braking Force & Braking Time Reduction by using Four Shoe Brake System

C. Bala Manikandan, P. Balamurugan, S. Lionel Beneston, S. Balamurugan

**Abstract**— Brake is a mechanical device used in automobiles, trains, machineries etc., to slow down or stop the vehicle in shortest possible time at the time of need and to control the speed of vehicle at turns and also at the time of driving down on a hill slope. Frictional brakes, commonly referred as drum brake are used for the purpose. In traditional method, two shoes are used to stop the vehicle by making them press against the rotating drum, in which area of contact of brake lining with brake drum is less. Arc angle of each of the shoes in contact with the brake drum is high and it leads to only 50% of the brake lining to be in contact with brake drum while applying brake. Increase in the area of contact between brake lining and brake drum, was achieved by splitting the traditional two brake shoes into four brake shoes, thereby reducing the arc angle of each shoe. Therefore area of contact was increased, which leads to the braking time reduced by 25% and correspondingly braking distance also reduced.

**Keywords** — Brake Drum, Area of Contact, Four Shoe Brake, Braking Time, Braking Distance.

## I. INTRODUCTION

Brakes inhibit slowing or stopping a moving object or preventing its motion, by the action of friction between the sliding contact surfaces. While braking, the entire kinetic energy of the moving vehicle is converted into heat. Brakes are generally applied to rotating axles or wheels. While braking a vehicle moving at a velocity of 10m/s, kinetic energy increases quadratically with velocity, having 100 times as much energy as one of the same vehicle moving at 1 m/s. Simultaneously the braking distance also 100 times long at the traction limit. Friction (pad/shoe) brakes are often rotating devices with a stationary pad and a rotating wear surface. Pads that pinch a rotating disc, refers to a disc brake. Brake characteristics includes: Peak force, continuous power dissipation, fade, smoothness, power, pedal feel, drag, weight, noise & durability. A significant amount of energy is always lost while braking, even with regenerative braking system. Energy applied for braking, may be mistakenly utilized for unavoidable friction, leads to deceleration of the vehicle. Brakes usage have to be minimized for the efficient usage of fuel. The specific contact surfaces that form during the use render the pads very good friction and wear characteristics [1]. The pad area is divided into numerous contact plateaus (occupying some 20% of the area) surrounded by lowlands. The lowlands are constantly out of

sliding contact. The area of real contact is concentrated to small spots confined within the plateaus. The plateaus have a relatively long life while the areas of real contact are constantly shifting due to wear and deformation and surface roughness on the disc surface. The size of the nominal contact area has very little influence on the friction level as long as it is very much larger than the real contact area. The only effect of decreasing the nominal contact area will be to bring the areas of real contact correspondingly closer, and in the particular case of brake linings probably collected within fewer contact plateaus. Pin on disc tests conclude Fragments tend either to leave the tribological system or are trapped with debris from the disc in between the mating surfaces and are compacted to form the secondary plateaus. [2] In general, the composition of the friction layers observed at different temperatures and their stability are paramount to infer the composition of the particles and fragments emitted by this sort of tribological systems. [3] The increasing coverage of the disc surface with wear debris is in agreement with the slight reduction in the wear coefficient. Increase in friction surface has an impact on friction coefficient, thereby affects brake pressure, leads to the reduction of friction at the interface. Further it has been found that disc brakes exhibit gradual decrease of friction coefficient due to the equitable distribution of braking effort while drum brake presents sudden variations in friction coefficient. [4] The highest friction can be accompanied with the lowest detected wear and vice versa. This is related to specific character of the friction layer, which can protect surface against wear and will have larger adhesive capacity. [5] Friction surface can be divided into several plateaus (red areas), which are elevated above numerous valleys. The effects of using a fixed caliper, different friction coefficients and different speeds of the disc on the stress concentration, structural deformation and contact pressure of brake disc and pads, respectively. [6] The temperature distributions in the pin and the disc were modeled using a finite element analysis by considering perfect contact between the surfaces. The results were then discussed by considering the damaging phenomena occurring at the sliding contact. The approach based on the perfect contact with thermal continuity at the interface was found to better fit the experimental temperature records and to be in substantial agreement with the observed wear phenomena occurring at the pin-disc interface. [7]

## 2. TRADITIONAL METHOD

Most used wheel brakes are internal expanding brakes, which have the compactible construction and economic too.

**Revised Version Manuscript Received on April 07, 2019.**

**C. Bala Manikandan**, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

**P. Balamurugan**, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

**S. Lionel Beneston**, Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India.

**S. Balamurugan**, Department of Mechanical Engineering, AAA College of Engineering & Technology, Sivakasi, Tamil Nadu, India.





# Mutually Authenticated Control Scheme Using Enhanced ECC In Wireless Sensor Network

R.Ranjitha<sup>1</sup>, k. Indumathi<sup>2</sup>

UG Student <sup>1</sup>, Assistant Professor, Department of Computer Science and Engineering <sup>2</sup>

AAA College of Engineering and Technology, Sivakasi, India

<sup>1</sup>ranjitharce@yahoo.com, <sup>2</sup>kindumathicse@gmail.com

**Abstract**— Wireless sensor networks (WSN), sometimes called Wireless Sensor-Actuator Networks (WSAN), are spatially distributed autonomous sensors to monitor physical or environmental conditions and to cooperatively pass through the network to the main location. These nodes in the network are restricted to memory and energy issues. Data encryption is an important issue and widely used in recent times to protect the data over internet and ensures security. One of the mostly used public key cryptography technique is the Elliptic Curve Cryptography. ECC is more efficient with the key size. It is less vulnerable to security threat attacks. A Modified effective implementing enhanced ECC with features like Elliptic Curve Digital Signature Algorithm (ECDSA) is to add more secure and effective data transfer along with key cipher of the text information. The enhanced scheme used in this ECC is Modified ElGamal Scheme over elliptic curves.

## I. INTRODUCTION

Wireless sensor networks (WSN), sometimes called Wireless Sensor-Actuator Networks (WSAN), are spatially distributed autonomous sensors to monitor physical or environmental conditions and to cooperatively pass through the network to the main location. A usual WSN systems formed by combining these autonomous devices, or nodes with routers and a gateway.

The dispersed measurement nodes communicate wirelessly to a central gateway, which provides connection to the wired world where the user can collect, process, analyse and present your measurement data. Routers to gain an additional communication link between the end nodes and the gateway for extend distance and reliability in a wireless sensor network.

The Wireless sensor is networked and scalable, require very little power. It is also smart and software programmable, and also able to fast data acquisition, reliable and accurate over the long term, but costs little to purchase and install, and requires nearly zero maintenance. Collect, record and analyze data. In healthcare, able to collect patient.

The major issues that affect the design and performance of a wireless sensor network are as follows:

Security is quite challenging issue as WSN is not only being deployed in battlefield applications but also for surveillance, building monitoring, burglar alarms and in critical systems such as airports and hospitals. Confidentiality is required in sensor networks to protect information traveling

between the sensor nodes of the network or between the sensors and the base station; otherwise it may result in eavesdropping on the communication. In sensor networks, it is essential for each sensor node and the base station to have the ability to verify that the data received was really sent by a trusted sender and not by an adversary that tricked legitimate nodes into accepting false data. A false data can change the way a network could be predicted.

Quality of service is the level of service provided by the sensor networks to its users. WSN are being used in various real time and critical applications, so it is mandatory for the network to provide good QoS. Though, it is difficult because the network topology may change constantly and the available state information for routing is inherently imprecise. Sensor networks need to be supplied with the required amount of bandwidth so that it is able to achieve a minimal required QoS. Traffic is unbalanced in sensor network since the data is aggregated from many nodes to a sink node. QoS mechanisms should be designed for an unbalanced QoS constrained traffic. Many a time routing in sensor networks need to sacrifice energy efficiency to meet delivery requirements. Even though multihops reduce the amount of energy consumed for data collection the overhead associated with it may slow down the packet delivery. QoS designed for WSN should be able to support scalability. Adding or removing of the nodes should not affect the QoS of the WSN.

Wireless sensor networks once deployed should be able to work without any human intervention. It should be able to

---

## A comparative study of universal fuzzy logic and PI speed controllers for four switch BLDC motor drive

---

K.S. Krishna Veni and N. Senthil Kumar\*

Department of Electrical and Electronics Engineering,  
Mepco Schlenk Engineering College,  
Sivakasi, Tamilnadu, India  
Email: krishnaveni.ks@mepcoeng.ac.in  
Email: nsk\_vnr@mepcoeng.ac.in  
\*Corresponding author

C. Senthil Kumar

Department of Electrical and Electronics Engineering,  
AAA College of Engineering and Technology,  
Sivakasi, Tamilnadu, India  
Email: csenthilsaro@gmail.com

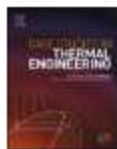
**Abstract:** This paper presents a comparison of PI controller and fuzzy controller for speed control of a low cost brushless DC (BLDC) motor drive used in variable speed drive applications. The cost reduction in BLDC drive system is achieved by the reduction of power semiconductor switches. A PI controller and universal fuzzy controller are designed for the speed control and tested by simulation for various conditions. The simulation is performed by using MATLAB Simulink toolbox and the results show the effective response of the fuzzy controller. The rise time and steady state error of fuzzy controller is improved on an average of about 26% and 55% respectively compared to the conventional PI controller.

**Keywords:** four switch drive; BLDC motor; switching sequence; PI controller; fuzzy controller.

**Reference** to this paper should be made as follows: Krishna Veni, K.S., Senthil Kumar, N. and Senthil Kumar, C. (2019) 'A comparative study of universal fuzzy logic and PI speed controllers for four switch BLDC motor drive', *Int. J. Power Electronics*, Vol. 10, Nos. 1/2, pp.18–32.

**Biographical notes:** K.S. Krishna Veni is working as an Assistant Professor in the Electrical and Electronics Engineering Department of Mepco Schlenk Engineering College, Sivakasi. She received her BE in Electrical and Electronics Engineering and ME in Power Electronics and Drives in 2011 and 2013 respectively from Anna University, Chennai. Her fields of interest include power converters, BLDC motor and machine fault diagnosis.

N. Senthil Kumar is working as a Professor and the Head in the Electrical and Electronics Engineering Department of Mepco Schlenk Engineering College, Sivakasi. He received his BE in Electronics and Communication Engineering and ME in Electronics Engineering in 1988 and 1991 from the Madurai Kamaraj University and Anna University, Chennai respectively. He completed



## U-drill embedded with phase change heat transfer device for machining applications



I. Kantharaj<sup>a</sup>, M. Sekar<sup>b,\*</sup>, A. Brusly Solomon<sup>a</sup>, Nallapaneni Manoj Kumar<sup>c</sup>, Kalakanda Alfred Sunny<sup>a</sup>

<sup>a</sup> Department of Mechanical Engineering, Kuvempu Institute of Technology and Science, Coimbatore, 641114, Tamil Nadu, India

<sup>b</sup> Department of Mechanical Engineering, AAA College of Engineering and Technology, Srirangapatna, 626005, Tamil Nadu, India

<sup>c</sup> School of Energy and Environment, City University of Hong Kong, Kowloon, Hong Kong

### HIGHLIGHTS

- A novel method of removing heat from the tool-work interface.
- A custom built U-drill is designed with a heat pipe placed axially.
- Experiments were conducted to measure the performance of the U-drill.
- Heat pipe embedded U-Drill bit is able to remove heat and operates at a lower temperature at the tool-chip interface.

### ARTICLE INFO

#### Keywords:

Heat pipe  
U-drill  
Cutting temperature  
Surface finish  
Metal machining

### ABSTRACT

Metal machining is always associated with the generation of heat. Though heat generated in metal cutting is carried away by the chips, continuous engagement of tool with the workpiece increase the temperature at the tool-work interface and spreads to its neighborhood. In this article, a novel method of removing heat from the tool-work interface is implemented with the use of phase change heat transfer device (heat pipes) and applied for drilling operation carried out by U-drills. A custom built U-drill is designed with a heat pipe placed axially. The temperature of the tool-work interface is estimated analytically using the experimental values of cutting force components. Experiments were conducted at various speeds and feed to measure the performance of the U-drill. It is found that the proposed method of heat pipe (HP) embedded drill bit is able to remove heat and operates at a lower temperature at the tool-chip interface. Results show that a considerable reduction in the cutting force generated at various machining conditions. The heat pipe embedded U-drill will be useful in drilling components made of composite materials where coolants are not widely employed. It was evident from the experimental works that the inclusion of heat pipe in U-drill has brought forth a reduction of cutting temperature of about 30%. This also brought forth a better cutting parameter, and a significant reduction in tool wear increased the tool life which invariably decreases the production cost and time.

### 1. Introduction

In metal cutting industries, machining plays a substantial role. Machining industry has incorporated continuous changes in

\* Corresponding author.

E-mail address: [mailbsekar@gmail.com](mailto:mailbsekar@gmail.com) (M. Sekar).

<https://doi.org/10.1016/j.csite.2019.100533>

Received 5 May 2019; Received in revised form 15 July 2019; Accepted 11 September 2019

Available online 11 September 2019

2214-157X/© 2019 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

<https://creativecommons.org/licenses/by-nc-nd/4.0/>

# Power Law Enhancement Based Fuzzy C-Means Retinal Blood Vessel Segmentation

Sekar Mohan, Vijayarajan R

**Abstract:** The detection and analysis of retinal blood vessels is vital for the diagnosis and treatment of retinal diseases. Characteristics such as vessel lengths, diameters, bifurcations, tortuosity and reflectivity are the key to analyze retinal blood vessels for hypertension, diabetic retinopathy and macular degeneration. This manuscript proposes a power law enhanced Fuzzy C-Means method for retinal blood vessel segmentation. Morphological operations are also used to get proper vessel structure and to eliminate unwanted regions. The proposed methodology is experimented for various values of gamma and the appropriate value is suggested for power law enhancement of retinal images. For performance evaluation, normal retinal images from STARE database are tested and the results are compared with other methods experimented on the same database. It is observed from the metrics that the proposed methodology is able to achieve average accuracy of 98.45%.

**Index Terms:** Fuzzy C-Means, Morphological operations, Power Law Enhancement, Retinal vessel segmentation, Retinopathy.

## I. INTRODUCTION

Diabetes related health issues are the major cause of concern among the elderly people all over the world. This increases year by year and hence medical experts and researchers look for feasible solutions to curtail the complications caused by the diabetes. The detection and analysis of retinal blood vessels is vital for the diagnosis of retinal diseases caused by diabetic's mellitus complications [1,2]. Characteristics such as vessel length, diameter, bifurcation, tortuosity and reflectivity are the key to analyze retinal blood vessels for hypertension, diabetic retinopathy and macular degeneration. Diabetic retinopathy can be classified into proliferative and non-proliferative [3]. In proliferative retinopathy, abnormal new vessels start to grow in the retina. Non-proliferative is the early stage of diabetic retinopathy in which accumulation of proteins and lipids causes bleeding in capillaries [4]. Early detection of this complications helps in the prevention of vision loss among the diabetic patients. Retinal blood vessel analysis also contributes to the diagnosis of glaucoma, hypertension and obesity [5].

Manual segmentation of blood vessels is a laborious task that needs a lot of skills, training and time. This can be automated in the form of computer aided diagnosis tool that can segment retinal blood vessels for further analysis of vessel diameter, thickness and so on. This manuscript analyses the performance of Fuzzy C-Means blood vessel

segmentation method for power law enhanced retinal images (PLFCM). Retinal images are subjected to power law enhancement to give emphasis to the gray values of blood vessels. Once the blood vessels are segmented by Fuzzy C-Means method, morphological operations applied to eliminate small and unwanted regions in the retinal image. Metrics such as sensitivity (SE), specificity (SP) and Accuracy (AC) are evaluated with the help of ground truth images. For the experiments, normal retinal images from the STARE dataset are tested and compared with other algorithms.

## II. POWER LAE ENHANCED FUZZY C-MEANS SEGMENTATION

Various enhancement techniques have been used as pre-processing step in combination with different segmentation algorithms. Vermeer et al [6] used Laplacian filter and thresholding for enhancement and blood vessel segmentation respectively. Ocbagabir et al. [4] suggested adaptive histogram equalization and morphological operations for enhancement. For blood vessel segmentation star networked pixel algorithm is suggested. This manuscript uses power law enhancement to give emphasis to the gray values of blood vessels.

### A. Power Law Enhancement

This is the enhancement algorithm which gives emphasis to certain range of gray values with the appropriate selection of ' $\gamma$ '. If ' $I_i(x,y)$ ' is the input image, then the power law transformed image is given by

$$I_o(x,y) = C * [I_i(x,y)]^\gamma \quad (1)$$

### B. Fuzzy C-Means Clustering

FCM algorithm is a clustering algorithm used to classify blood vessel pixels from other pixels in the retinal images [7]. FCM assigns membership values which demonstrate the belongingness of all pixels to all the clusters. FCM algorithm updates the cluster centers and membership values for each pixel in the retinal images. The membership matrix  $U_{ij}$  is randomly initialized to start the iteration process. The cluster centers and membership matrix are updated based on objective function, defined by

$$J(U,C) = \sum_{i=1}^C \sum_{j=1}^n U_{ij}^m d_{ij}^2 \quad (2)$$

$U_{ij}$  takes the values between 0 and 1. ' $C$ ' denotes the number of clusters. ' $d_{ij}$ ' denotes the Euclidian distance between cluster center of  $i^{\text{th}}$  cluster and  $j^{\text{th}}$  pixel of a retinal image. ' $j$ ' changes from 1 to  $n$  where ' $n$ ' is the number of pixels in the retinal image. ' $m$ ' is a weighting factor that takes the value between 1 and infinity.

Revised Manuscript Received on December 22, 2018.

Sekar Mohan, Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakani (Tamil Nadu), India

Vijayarajan R, Department of Electronics & Communication Engineering, RGM College of Engineering & Technology, Nandyal (Andhra Pradesh), INDIA.



## Dry Sliding Wear Performance of Thermoplastic Copolyester Elastomer Composites

Hemanth R.<sup>1,a\*</sup>, Suresha B.<sup>2,b</sup> and Sekar M.<sup>3,c</sup>

<sup>1</sup>Department of Mechanical Engineering, NIE Institute of Technology, Mysuru – 570 018, India

<sup>2</sup>Department of Mechanical Engineering, The National Institute of Engineering, Mysuru – 570 008, India

<sup>3</sup>Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakasi – 626 123, India

<sup>a</sup>hemanth@nieit.ac.in, <sup>b</sup>sureshab@gmail.com

**Keywords:** TCE hybrid composites, Specific wear rate, Friction coefficient.

**Abstract.** This research work uncovers the wear performance of short glass fiber (SGF) fortified thermoplastic copolyester elastomer (TCE) hybrid composites loaded up with both micro (short carbon fibers, PTFE, SiC, Al<sub>2</sub>O<sub>3</sub> and MoS<sub>2</sub>) and nano (Al<sub>2</sub>O<sub>3</sub> and PFPE) sized particulate fillers. The readied hybrid composites are tested for tribological performance using pin-on-disc test rig. Test outcomes uncovered that TCE hybrid composite strengthened with SGF and loaded up with PTFE, SiC, Al<sub>2</sub>O<sub>3</sub> and MoS<sub>2</sub> displayed better wear resistance, however TCE hybrid composite loaded up with nano lubricating filler i.e. PFPE displayed slightest friction coefficient ( $\mu$ ) in the investigation. This study additionally archives the impact of tribological control factors such as sliding distance, sliding speed and filler content on tribological conduct of TCE composites in terms of specific wear rate ( $K_s$ ) and  $\mu$ .

### Introduction

The enthusiasm for fiber and particulate fortified thermoplastic composites is developing quickly in industrial as well as research fronts. Their accessibility, light weight, manufacturability, low cost and sensible mechanical properties make these composites a practical interchange for customary materials. Subsequently, fiber fortified polymer composites (FRPCs) have turned into a prevalent group of materials and generally utilized in an expansive range of domains extending from domestic to space applications.

In polymer matrix composites (PMCs), distinctive polymers for example, thermoplastics, thermosets, elastomers and additionally thermoplastic elastomers (TPE) can be utilized as matrix materials. TPE show attributes of both rigid plastics and in addition elastomers. Salman and Muhammad [1] reported that thermoplastic elastomers have been the subject of investigation by specialists everywhere throughout the world amid recent decades and are being utilized in a wide scope of uses. In the present context, the polyester based TPE is utilized as potential matrix material, which has been once in a while investigated.

Among various kinds of filaments as support in PMCs, strands made of glass, carbon, aramid and so forth are broadly utilized. They are grouped by their aspect ratio. Polymers are additionally strengthened with different fillers that are accessible normally or synthesized in the form of flakes, platelets, particles and so on to upgrade their processability, mechanical behaviour, and in addition to lessen material cost. Table 1 exhibits the literature review of the works done by conspicuous research troops in the field of PMCs.

Notwithstanding, the impact of strands and fillers on dry sliding wear conduct of TCE composites has not been investigated till date. Henceforth, in the present work, tests were carried out with a specific end goal to evaluate the impact of filaments and fillers on dry sliding wear conduct of TCE based multi-phase composites.

## Design of E-shaped Microstrip Patch antenna for S band Applications

Mr.P.Sivakumar<sup>1</sup>, Ms.P.Arunadevi<sup>2</sup>, Ms.T.Revathi<sup>2</sup>, Mr.L.K.Balaji Vignesh<sup>1</sup>,  
Mr.C.Shanmugaraja<sup>1</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>UG Scholar, Department of E&T, AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, India

Email: arunapothi@gmail.com

DOI: <http://doi.org/10.5281/zenodo.3333579>

### Abstract

Micro strip antennas are widely used in many applications due to their low profile, low cost and ease of fabrication which is required in various applications like mobile & satellite communication, Global positioning system and wireless application etc. In this paper, different E-shaped micro strip patch antennas are designed and the results are compared. The antenna design is an improvement from previous research and it is simulated using ADS (Advanced Design System) software. The design has been made on low cost material of FR4 substrate having dielectric constant of 4.2 with thickness of 1.6 mm. The proposed scheme is used by the probe feeding technique in order to operate under the frequency range of 3.45 GHz. The main objective of this paper is to design E-shaped microstrip antenna under various conditions by adjusting the dimensions of the antenna. After comparing different antenna's parameter values, the better antenna will give good enhancement in the return loss, bandwidth, gain and directivity.

**Keywords:** Microstrip patch antenna, Co-Axial probe feed, return loss, bandwidth, gain, directivity

### INTRODUCTION

A Microstrip patch antenna is types of antennas that offers a low profile, i.e., thin and easily manufacture ability, which provides great advantage over traditional antennas [1]. An E-shaped patch antenna is easily formed by chop two slots from a rectangular shape. By chop a two slots from a patch, gain, directivity, bandwidth of Microstrip antenna can be improved [2]. And return loss of Microstrip patch can be reduced. The design adopts contemporary techniques; coaxial probe feeding, E-shape patch structure. The antenna operating the band of 2-4GHz [3]. Narrow bandwidth is the serious limitation of these Microstrip patch antenna. Different techniques are used to overcome this narrowband limitation. These techniques include changing the width of the E-shape patch antenna [4]. This paper, introduces design of E-shaped Microstrip patch antenna with slots for mobile communication.

### ANTENNA DESIGN & STRUCTURE

In this paper, the E-shape Microstrip patch antenna has been designed with overall dimensions W(26.95mm) x L(20.66mm). The designing of E-shaped Microstrip patch antenna, the resonant frequency  $f_r = 3.45$  GHz and the dielectric substrate FR4 epoxy is used for fabrication [5].

The dielectric constant of the substrate  $\epsilon_r = 4.2$  and thickness of the substrate  $h=1.6$ mm have been used to design the E-shaped Microstrip patch antenna. The width and length of the Microstrip patch antenna are determine as follows [6].

Calculation of width (W): Width of the Microstrip patch antenna is given by equation

$$W = \frac{c}{2f_r \sqrt{\frac{\epsilon_r + 1}{2}}}$$



# IMPLEMENTATION OF HEALTH MONITORING AND MOVEMENT OF HANDICAP VEHICL USING PIC MICROCONTROLLER

Ms. Chandralekha. R<sup>1</sup>, Mr. Balaji Vignesh. L.K<sup>2</sup>

<sup>1</sup>Dept. of Electronics and Communication Engineering, AAA College of Engineering and Technology, TN, India.

<sup>2</sup>Assistant Professor, Dept. of Electronics and Communication Engineering, AAA College of Engineering and Technology, TN, India.

**Abstract** - Here is implemented a home navigation system, which comprises of a wheelchair which works on the inputs such as gesture and voice commands via an android phone and navigates according to command. It can be used by an elderly or physically challenged person to move inside the home without any difficulty. It's common that the elders and the physically challenged people find it hard to move the wheelchair without external aid. By making use of HNS, elderly and the physically challenged can move to different locations in the particular house just by pronouncing the direction name or by making the movement of the android phone they will be provided with. It is also equipped with obstacle avoidance technique, where the person may not be able to provide proper command at the right time. A security threat message can be sent through the mobile phone to predefined number, if the user feels to be found in danger.

**Key Words:** Wheel chair, Sensors, Android phone, Health Monitoring.

## 1. INTRODUCTION

The most common image of disability is the people in wheelchairs. Wheelchairs are used by people who find themselves unequipped to move without external aid. The special needs of the elderly may differ from that of a physically challenged person or a large individual but they all have "special needs" and often require some assistance to perform their daily routine. The physically challenged people, who use a normal wheelchair for navigation, usually require an external person to move around. In this busy world, the elderly people may be left alone at home and also may not find an apt person for external help. Here comes the need of an automated home navigation system, which consists of a wheelchair which can be used by the elderly and the physically challenged people without the help of an external person. The proposed HNS can be operated using voices and the gestures of the provided android mobile phone. An important feature is that the personal security of the person who is using the wheelchair is also taken care. If the person feels uncomfortable or insecure, he can send a message to a predefined number using the speech to text (STT) function in the mobile phone.

## 1.1 EXISTING SYSTEM

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you.

### I. BLOCK DIAGRAM



### II. WORKING

In this system there are two input devices, speech recognition system and touch screen. In order to select a specific input device we are using a switch that is when the switch=1 voice recognition system is considered and when switch=0 touch screen is considered. The output of the touch screen is analog in nature, to digitize these signals we are using in-built six channel ADC of ATMEGA8 micro controller. On receiving the Signal the microcontroller directs the motors through the control circuit. In this, two DC brushless motors are used for controlling the two wheels of the chair independently. The different directions of motions possible are:

- ☐ Forward: Both the motors in the forward direction.
  - ☐ Backward: Both the motors in the reverse direction.
  - ☐ Left: Left motor stopped/Right motor in the forward direction.
  - ☐ Right: Right motor stopped/Left motor in the forward direction.
- The code is written in arduino such that the speed of the motors is controlled by using PWM output pins of

# Design Of Standalone Pv System

Dheeban S S, Muthu Selvan N B, Senthil Kumar C

**Abstract:** The usage of conventional energy sources is being replaced by renewable energy sources. The solar energy is the most widely used renewable energy source. The solar energy can be harnessed from the sun with the help of photovoltaic panels. The photovoltaic panels can be configured to function as a standalone system or a grid-connected system. The standalone system is more reliable and easy for installation. The standalone system plays a major part in the rural electrification. This paper involves the mathematical modeling of the solar panels and analysis of the standalone system with a battery backup.

**Index Terms:** PV- photovoltaic, MPPT- Maximum Power Point Tracking, SOC- State of Charge, OCV- Open Circuit Voltage

## 1. INTRODUCTION

Electrical energy has become a basic need in our day to day life. As the population of the country increases steadily, it becomes difficult for governments to provide people with basic electricity. In India, the government aims to provide all the villages with electricity. This vision of rural electrification can be achieved with the help of renewable energy resources like solar energy and wind energy. The solar energy installation cost is lower compared to that of wind energy. The grid integrated solar panel system has complexity in installation as the parameters of the grid and the PV system must be matching perfectly [11]. The main problem in a grid-connected PV system is the controllability of the system. The standalone PV system is easy to setup. The standalone system can be made to work efficiently with the help of a battery backup system.

## 2 SYSTEM LAYOUT

The standalone PV system consists of an array of PV panels, power electronics converter, MPPT charge controller and a battery backup system [8]. The array of PV panels is used to harness the energy from the sun and it generates electric current [9]. The PV panels are arranged to generate the desired power. The output of the PV panel is fed to the converters. The power electronic converter used is of different topologies. The most commonly used topologies include boost converters, buck-boost converters [12]. These converters increase the reliability of the standalone PV system. The output of the converter is given directly to the load. The excess power can be stored using the battery backup system. The energy from the battery backup system can be used for future purpose. An MPPT charge controller is embedded along with the converter to track the maximum power point [9]. The overall layout of the standalone PV system is given in the below figure.

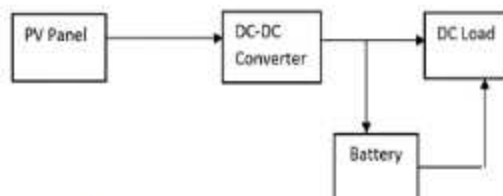


Fig. 1: System Layout of Standalone PV system

## 3 PV PANELS

The photovoltaic panels are the main components in harnessing the energy from the sun. A single PV cell is fabricated to harness a small amount of solar energy. These PV cells can be clubbed together as a module or an array. The PV panels can be arranged in arrays to give the desired output power [2]. The equivalent circuit of the PV panels is given in the below diagram.

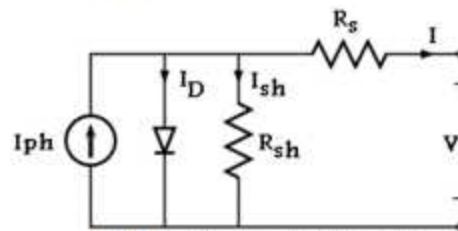


Fig. 2: Equivalent circuit of Photovoltaic cell

The PV panels can be mathematically modeled with the help of equations [1]. The following are the equations for modeling of the PV panels. The module photocurrent depends upon the irradiation of the solar energy over the panels and the operating temperature. These two characteristics determine the output of the solar photovoltaic module [1], [2]. The module photocurrent is given by the following equation.

$$I_{ph} = I_s + K_1 (T - 298) \times A / 1000 \quad (1)$$

where  $I_s$  is the current through the series resistance in ampere,

$K_1$  is a constant,

• Dheeban S S., M.E., is currently working as an Assistant Professor in Department of Electrical and Electronics Engineering in AAA College of Engineering and Technology Sivakasi, India, E-mail: dheebanss@ieee.org.

• Dr. N. B. Muthu Selvan., Ph.D., is currently working as an Associate Professor in the Department of Electrical and Electronics Engineering at SSN College of Engineering Chennai, India, E-mail: muthuselvanb@ssn.edu.in

• Dr. C. Senthil Kumar., Ph.D., is currently working as the Head of the Department in the Department of Electrical and Electronics Engineering in AAA College of Engineering Technology Sivakasi, India, E-mail: senthilkumar\_c@aaacet.ac.in.

# Influence of Frequency Ratio on the Hydroelastic Response of a Cylinder with Degrees of Freedom under Vortex Induced Vibration

Vidya Chandran, M Sekar, Sheeja Janardhanan

**Abstract:** Vortex induced vibration of cylindrical structures is an extensively researched topic. Most of the studies have concentrated on the response of the cylinder in the cross flow (CF) direction. In a realistic ocean environment, structures such as drilling and marine risers are more or less free to vibrate both in CF and in line (IL) directions. It has also been observed that the IL vibrations have significant influence on the CF response. Interaction between the responses in inline and cross flow directions has still been not fully understood. This paper addresses the same through a simplified numerical method for understanding the interaction between these two responses using two dimensional computational fluid dynamics (CFD) simulations. Here analyzes two cases have been considered; where in the cylinder is modeled with two different values of ratio of natural frequency of the cylinder in the IL direction to that in the CF direction. The trends of variation of hydrodynamic and structural parameters have been analyzed to comprehend the effect of directional natural frequency ratio on the cylinder response and hydrodynamic force coefficients. The shedding pattern has also been studied in this paper. An increase by 18% in the value of the lift coefficient and 38 % of that in the drag coefficient has been observed when the frequency ratio is increased from 1 to 2. The results show that the cylinder with frequency ratio 2 is more prone to lock in vibration. This phenomenon may be related to the shifting of shedding pattern from 2S to P+S mode when the frequency ratio is 2.

**Index Terms:** CFD, cross flow vibration, hydroelastic response, inline vibration, vortex induced vibration.

## I. INTRODUCTION

Vortex induced vibration (VIV) of marine risers has ever been quite an enticing topic for researchers. However most of the studies have concentrated on understanding the wake characteristics and estimating the hydrodynamic loading and the subsequent response of either stationary cylinder or cylinder with single degree of freedom (SDOF) [1]. The results on the study of hydrodynamic response of cylinder with TDOF in both in-line (IL) and cross-flow (CF) directions are scanty. IL vibration has significant impact on the shedding pattern and also on the amplitude of CF vibrations [2]. The first of its kind discussions were reported in the case of flow around cylinder with TDOF [3]. Establishing the effect of reduced velocity ( $U_r$ ) on forced and

free TDOF cylinder response [3]. The effect of IL response on CF response depends on the ratio of natural frequencies in both the directions ( $\eta_b = \frac{f_{n,IL}}{f_{n,CF}}$ ), where  $f_{n,CF}$  is the natural frequency of the cylinder in the CF direction and  $f_{n,IL}$  is the same in the IL direction. During lock in, if the natural frequency in the IL direction is twice that in the CF direction, resonance occurs in both directions leading to premature failure of the riser [4]. This aspect of VIV needs a detailed study to understand the influence of natural frequency ratio on the shedding pattern and hydrodynamic force coefficients. Also it has been observed that IL response amplitude is a function of the reduced velocity,  $U_r$  and stability parameters, whereas CF response amplitude is a function of  $U_r$  and flow velocity [5]. Wake characteristics, hydrodynamic force coefficients as well as the structural response vary significantly with frequency ratio. Hence there is a need to develop a simplified method for the prediction of response that holds good for different values of  $\eta_b$ .

## II. PROBLEM DESCRIPTION

In the present paper a riser model with outer diameter 0.076 m has been numerically analyzed using two dimensional (2D) Reynolds average Navier-Stokes (RANS) based computational fluid dynamics (CFD) approach. Specifications of the riser and the flow conditions are listed in Table 1. **Table 1 Riser model specifications and flow characteristics**

Properties	Values	Units
Diameter of the Cylinder ( $D$ )	0.076	m
Aspect ratio of Cylinder ( $L/D$ )	13.12	-
Inlet Velocity ( $V$ )	0.5	m/s
Flow Reynolds Number ( $Re$ )	$3.8 \times 10^4$	-
Mass ratio of the Cylinder ( $m^*$ )	0.66	-

The incoming flow velocity is taken as 0.5 m/s to maintain the flow regime uniform at  $Re = 3.8 \times 10^4$  which corresponds to the average current velocity in the ocean flow condition frequently encountered by a real marine riser used for petroleum extraction in offshore industries [6]. In this paper an effort has been made to study the influence of ratio of natural frequencies in the CF and IL directions on the wake dynamics.

Revised Manuscript Received on July 22, 2019.

Vidya Chandran, Department of Mechanical Engineering, Karunya Institute of Technology and sciences, Coimbatore, India

M Sekar, Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakani, India.

Sheeja Janardhanan, Department of Mechanical Engineering, SCMS School of Engineering and Technology, Ernakulam, India.



# Document details

1 of 1

[Text export](#) [Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Save to list](#) [More...](#)

[Periodico Tche Quimica](#) [Open Access](#)  
 Volume 16, Issue 33, 2019, Pages 841-853

## Towards reducing computational effort in vortex induced vibration predictions of a cylindrical riser (Article)

Vidya, C.<sup>a</sup>, Sheeja, J.<sup>b</sup>, Sekar, M.<sup>c</sup>  

 Save all to author list

<sup>a</sup>Department of Mechanical Engineering, Karunya Institute of Technology and Sciences, Tamil Nadu, India  
<sup>b</sup>Department of Mechanical Engineering, SCMS School of Engineering and Technology, Kerala, India  
<sup>c</sup>Department of Mechanical Engineering, AAA College of Engineering and Technology, Tamil Nadu, India

### Abstract

[View references \(25\)](#)

Vibrations induced by flow, generally referred to as vortex induced vibrations, are of great importance in the design of marine risers. These flexible cylindrical risers undergo vibrations of very high amplitude when the vortex shedding frequency matches the natural frequency of the riser. Such vibrations are capable of putting the safety of crew working on offshore platforms in question. Hence the prediction of response of such structures is considered very important. Although a lot of numerical work has been done in this field treating the problem as a two-way fluid structure interaction, the fact that these works demand very high computational efforts has not made it pertinent where high end computing resources are not readily available. A quick prediction of the structural response of such slender structures needs to be handy to the engineers at times of need. This paper addresses a solution technique for such a problem through an economical method for quick and reliable prediction of riser response under vortex induced vibration utilizing minimum computational effort for moderate Reynolds number ( $Re < 3 \times 10^5$ ). Two dimensional flow simulations are carried out using RANSE based CFD followed by the uniform mapping of hydrodynamic forces on to the three dimensional riser. The grid used for the numerical simulation has been well validated against wind-tunnel experimental results for  $Re = 5.3 \times 10^4$ . Hydrodynamic forces corresponding to the first three harmonics of natural frequency of the riser have been used as input in the structural solver to analyse the response using finite element method. Trajectories of the cylinder in the first three modes of vibration have been obtained, a typical eight figure pattern which is characteristic for lock-in vibration. It is found that the method is quite effective in the quick computation of flow induced vibration problems for low and moderate Reynolds numbers. © 2019 Tche Quimica Group. All rights reserved.

### Author keywords

[CFD](#) [Flow past cylinders](#) [Lock-in](#) [Structural response](#) [Vortex-induced-vibrations](#)

ISSN: 18060374  
 Source Type: Journal  
 Original language: English

Document Type: Article  
 Publisher: Tche Quimica Group

[References \(25\)](#)

[View in search results format](#)

[Metrics](#)  [View all metrics](#)



PlumX Metrics 

Usage, Captures, Mentions, Social Media and Citations beyond Scopus.

[Cited by 0 documents](#)

Inform me when this document is cited in Scopus:

[Set citation alert](#)

[Set citation feed](#)

### Related documents

Experimental study on vortex induced vibration responses of a flexible cylinder in sheared flow current

Gao, Y., Fu, S., Xiong, Y. (2016) *Zhendong yu Chongji/Journal of Vibration and Shock*

Experimental investigation on the suppression device of VIV of a flexible riser

Gao, Y., Song, L., Li, R. (2014) *Proceedings of the International Conference on Offshore Mechanics and Arctic Engineering - OMAE*

Vortex and structural dynamics of a flexible cylinder in cross-flow

Shang, J.K., Stone, H.A., Smits, A.J. (2014) *Physics of Fluids*

[View all related documents based on references](#)

Find more related documents in Scopus based on:

[Authors](#) [Keywords](#)

# Effect of Substrate Temperature on Physical Properties of Nebulized Spray Deposited SnS Thin Films

P. S. Satheeshkumar<sup>1</sup>, J. Raj Mohamed<sup>2</sup>, S. Palanichamy<sup>3</sup>, L. Amalraj<sup>4</sup>

<sup>1,3,4</sup>PG & Research Department of Physics, V.H.N.S.N. College, Virudhunagar 626001, Tamilnadu, India

<sup>2</sup>PG & Research Department of Physics, H.H. The Rajah's College, Pudukkottai 622001, Tamilnadu, India

<sup>1</sup>[pssatheesh@yahoo.com](mailto:pssatheesh@yahoo.com)

<sup>2</sup>[raj.shafraz@gmail.com](mailto:raj.shafraz@gmail.com)

<sup>3</sup>[nanopalani@gmail.com](mailto:nanopalani@gmail.com)

<sup>4</sup>[amalraj.raj1973@gmail.com](mailto:amalraj.raj1973@gmail.com)

**Abstract-**Thin films of SnS were fabricated using nebulized spray pyrolysis technique on microscopy glass slides with different substrate temperature between 250 °C and 325 °C under vacuum. The films have been characterized to evaluate the structure, morphology, optical and electrical properties. The morphological and compositional properties of the films have been investigated using scanning electron microscopy (SEM) and energy dispersive X-ray (EDX) spectroscopy. XRD patterns indicated that the films exhibited an orthorhombic crystal structure with a strong (111) preferred orientation. The crystallite size varied between 13.5-25.2 nm where the film at 300 °C has maximum size (25.2 nm) formation of the SnS phase. The broad absorption of the films over visible region leads to industrial applications such as solar cell absorber layer. The higher energy gap of SnS films at lower (250 °C, 2.31 eV) and higher (325 °C, 2.20 eV) substrate temperature than orthorhombic structure SnS (1.4 eV) is due to quantum confinement effect and the existence of SnO<sub>2</sub> phase. The photoluminescence spectra exhibited the luminescent peaks in the visible region, which shows its potential application in photovoltaic devices.

**Keywords-** SnS thin films, X-ray diffraction, band gap, Photoluminescence, SEM, Nebulized spray pyrolysis technique

## I. INTRODUCTION

SnS compounds are potential candidates for the production of low cost solar energy conversion materials and optical devices [1–3]. SnS is a p-type semiconductor compound with an indirect band gap between of 1.0 and 1.5 eV [1, 4–7], and direct band gap between 1.39 eV [8] and 2.33 eV [9] depending on the method of preparation and heat treatment temperature. It is basically the combination of tin, an element from group IV and S the member of group VI. SnS has some unique characteristics like band gap lies in between that of Si and GaAs, high absorption coefficient, non-toxic nature and both the constituent materials tin and sulfur are abundant and cheap. This semiconductor material is attractive especially in thin film solar cell application, because of its high optical absorption coefficient and versatile optical and electrical properties.

SnS exists in various crystallized states like orthorhombic [10], tetrahedral (Zinc blende like) [11] or a highly distorted rock-salt (NaCl) structure [12]. However, due to the nature of the tin and sulphur bonding, it forms two-dimensional sheets [13], giving rise to a layered structure with strong intraplanar forces and weak van der Waal forces between the adjacent planes [14]. In layered type chalcogenides, within each layer, the atoms are predominantly bound together by covalent forces. SnS has layered lattices with cleavage planes perpendicular to the c axis that their properties are strongly anisotropic. Work by Ghosh et al. [7] found that the Sn-to-S ratio leads to change in energy band structure of SnS. Therefore, there are many properties of SnS films that are not clear and not characterised in depth [4]. Nair and Nair [15] have reported the chemical bath deposition of Cu<sub>x</sub>S and

# Effects of Precursor Concentration on the Structural, Optical and Electrical Properties of Nebulized Spray Pyrolysis SnS Thin Films

P. S. Satheeshkumar<sup>1</sup>, J. Raj Mohamed<sup>2</sup>, S. Palanichamy<sup>3</sup>, L. Amalraj<sup>4</sup>

<sup>1,3,4</sup>PG & Research Department of Physics, V.H.N.S.N. College,  
Virudhunagar 626001, Tamilnadu, India

<sup>2</sup>PG & Research Department of Physics, H.H. The Rajah's College,  
Pudukkottai 622001, Tamilnadu, India

<sup>1</sup>pssatheesh@yahoo.com, <sup>2</sup>raj.shafraz@gmail.com, <sup>3</sup>nanopalani@gmail.com,  
<sup>4</sup>amalraj.raj1973@gmail.com

**Abstract** - At the substrate temperature of 300 °C thin films of tin sulphide (SnS) with different precursor concentrations have been prepared by the nebulized spray pyrolysis technique. The physical properties of the films were studied as a function of increase precursor concentration (up to 0.150 M). The films were characterized by different techniques to study their structural, optical and electrical properties. The X-ray diffraction analysis revealed that the films were polycrystalline in nature and having orthorhombic crystal structure with a preferred orientation in (111) direction. The crystalline quality and the preferential orientation of SnS films were improved at 0.125 M of concentration due to increase in precursor concentration. Optical measurements showed that the band gap values decreased from 2.24 eV to 1.81 eV with increase precursor concentration from 0.050 to 0.125 M. The better conductivity and mobility are noticed at  $m_c=0.125$  M is explained by carrier concentration and crystallite. Better optical and electrical conductivity behaviour of SnS thin film sample suggests for solar cell applications.

**Keywords** - SnS, Nebulized spray pyrolysis, Precursor concentration, Band gap, resistivity, activation energy.

## I. INTRODUCTION

Investigations on tin mono sulphide (SnS) semiconductor demonstrated that it has an optical energy band gap of  $\sim 1.3$  eV [1] and exhibits high absorption coefficient ( $\sim 10^5$  cm<sup>-1</sup>), which is greater than that of presently existing materials such as GaAs, CdTe [2]. This band gap is nearer to the optimum value of 1.4 eV for efficient absorption of electromagnetic radiation above the visible radiation. Its constituent elements such as 'Sn' and 'S' are abundant in nature, less toxic and available at low cost. In addition, it has shown high theoretical solar conversion efficiency ( $>24\%$  [3]). These properties made SnS as one of the candidates for the fabrication of hetero-junction solar cells.

A thin film deposition technique that can be easily handled at low cost is needed for large-scale production of solar cells. The SnS thin films were prepared with different techniques such as vacuum evaporation [4], RF-sputtering [5], cathodic electrode position [6], electrochemical deposition [7], chemical vapour deposition [8] and spray pyrolysis [9-12].

# Studies On Synthesis And Characterization Of $Cd_{3x}In_{2-2x}S_3$ Alloy Thin Films By Nebulized Spray Pyrolysis Technique

J. Raj Mohamed<sup>1</sup>, P. S. Satheeskumar<sup>2</sup>, L. Amalraj<sup>3</sup>

<sup>1</sup>PG & Research Department of Physics, H.H. The Rajah's College, Pudukkottai 622001, Tamilnadu, India

<sup>2,3</sup>PG & Research Department of Physics, V.H.N.S.N. College, Virudhunagar 626001, Tamilnadu, India

<sup>1</sup>raj.shafraz@gmail.com, <sup>2</sup>psatheesh@yahoo.com, <sup>3</sup>amalraj.raj1973@gmail.com

**Abstract** - Nanostructured  $Cd_{3x}In_{2-2x}S_3$  thin films with different concentration of ( $0 \leq x \leq 1$ ) deposited at 300 °C using the NSP technique. The films were characterized by structural, surface, optical and electrical properties, respectively. X-ray diffraction analysis shows that the  $Cd_{3x}In_{2-2x}S_3$  films have cubic structure with preferential orientation along (111) plane. The estimated values compare well with the standard values. Micro structural properties of  $Cd_{3x}In_{2-2x}S_3$  thin films such as crystallite size, dislocation density, micro strain, number of crystallites and texture coefficient were calculated. The optical band gap value was calculated from transmittance and absorption data. The electrical properties of  $Cd_{3x}In_{2-2x}S_3$  thin films are studied and the results are discussed in detail.

**Keywords** -  $Cd_{3x}In_{2-2x}S_3$  thin films, Nebulized spray pyrolysis, Xrd, SEM, Hall effect, Urbach energy, Skin depth

## I. INTRODUCTION

Group II –VI semiconductor thin films belonging to the cadmium chalcogenide family are reckoned to be very significant materials for a broad spectrum of optoelectronic applications [1-3] and photovoltaic applications [4] as having precise physical properties such as high coefficient of absorption, direct band gap and good electrical properties. CdS and  $In_2S_3$  are better known wide and direct band gap II-VI and III-VI semiconductors with a band gap,  $E_g$  of 2.37-2.44 eV and 2.2-2.68 eV respectively [5,6]. The CdS window layer absorbs the blue band of the solar spectrum due to its low band gap which efforts a fall in the solar cell efficiency [7,8]. The alloy of Cd-In-S should be more applications because its band gap can be tuned by changing the composition of the elements. In general, thin films have been notably photogenic owing to their potential applications in optoelectronic devices, photovoltaic and solar cell converters. The n-type  $CdIn_2S_4$  thin films have recently concentrated considerable attention owing to their exciting physical properties. It has wide applications in optoelectronic devices, photoconductors, solar cells and light emitting diodes (LED) [9-12].

$CdIn_2S_4$  thin films have been grown by various techniques such as vacuum evaporation [13], successive ionic layer absorption and reaction (SILAR) [14], pulse electro deposition [15], electro deposition [16], hot wall epitaxy method [17,18], hydrothermal [19], and spray pyrolysis [20, 21] technique. The physical deposition techniques are comparably very expensive and high energy consuming even though it provided quality and uniform films. Nebulized spray pyrolysis technique (NSP) is a simple, cost effective by which an efficient way of growing thin films is possible. In spite of the fact that, a variety of research is being considered for  $CdIn_2S_4$  thin films, studies on  $Cd_{3x}In_{2-2x}S_3$  ( $0 \leq x \leq 1$ ) thin films are not previously studied. In this work, we report the structural, morphological, optical, elemental and electrical conductivity properties of nebulized spray deposited  $Cd_{3x}In_{2-2x}S_3$  ( $0 \leq x \leq 1$ ) thin films.



# Physical properties of nebulized spray pyrolysed SnO<sub>2</sub> thin films at different substrate temperature

S. Palanichamy<sup>1</sup> · J. Raj Mohamed<sup>2</sup> · P. S. Sathesh Kumar<sup>1</sup> · S. Pandiarajan<sup>3</sup> · L. Amalraj<sup>1</sup>

Received: 15 April 2018 / Accepted: 22 August 2018  
© Springer-Verlag GmbH Germany, part of Springer Nature 2018

## Abstract

Using nebulized spray pyrolysis technique, we investigate tin oxide (SnO<sub>2</sub>) thin films had been coated with different substrate temperature (300–500 °C) onto microscopic glass substrate. All the prepared films have tetragonal crystalline structure with preferential orientation (110) observed by X-ray diffraction analysis. The reduced strain due to the increase of substrate temperature from 300 to 450 °C increased the average crystalline size from 27.40 to 42.99 nm and then decreased further. All the films display high transmittance in the visible and also in IR region. As the substrate temperature had increased from 300 to 500 °C, the average transmittance of SnO<sub>2</sub> thin films varied between 79 and 90%. The energy band gap values had diminished from 3.91 to 3.75 eV by increasing the substrate temperature. The refractive index (*n*) of these films had increased from 2.11 to 2.32 with increase in substrate temperature from 300 to 450 °C and then decreased further. The optical static and high frequency dielectric constants ( $\epsilon_r$  and  $\epsilon_{\infty}$ ) have been determined as a role of substrate temperature. The surface morphology of these thin films exhibited polyhedron-shaped grains obtained by scanning electron microscope. Energy dispersive X-ray analysis proved the presence of Sn and O elements in the as-prepared SnO<sub>2</sub> films. Hall effect measurements shows that the film had deposited at 450 °C exhibited lowest resistivity  $6.53 \times 10^{-3} \Omega \text{ cm}$  and highest figure of merit  $9.14 \times 10^{-7} (\Omega/\text{sq})^{-1}$  among all the samples. Activation energy varied between 0.14 and 0.20 eV with the increase of substrate temperature from 300 to 500 °C.

## 1 Introduction

Transparent conducting oxide (TCO) thin films such as zinc oxide (ZnO), tin oxide (SnO<sub>2</sub>), indium oxide (In<sub>2</sub>O<sub>3</sub>), cadmium oxide (CdO), titanium oxide (TiO<sub>2</sub>) have been attracted substantial attention owing to their low resistivity and high transparency in the visible part of spectrum [1]. Among various transparent conducting oxides, SnO<sub>2</sub> is a most significant material since it is inexpensive, mechanically hard and thermally stable in oxidizing environments at high temperature, and splendid chemical stability [2]. Especially, SnO<sub>2</sub> films are excellent adherence to numerous substrates, resistant to mechanical corrosion, and unchangeable

at high temperature. At room temperature, it has fantabulous resistance to strengthen acids and bases [3]. SnO<sub>2</sub> thin film has a tetragonal structure with a large band gap ( $E_g > 3.6 \text{ eV}$ ) n type semiconductor [4], which used in numerous applications like flat panel displays [5], super capacitor [6], organic light emitting diodes [7], heat mirror coatings [8] and solar cells [9]. Due to their remarkable chemical and physical characteristics, the preparation of ultra-fine SnO<sub>2</sub> particles is of magnificent technological and scientific passion and their use as optoelectronic devices, catalysts for the oxidation of organic compounds in gas sensors and rechargeable Li-batteries [10], etc.

Various types of techniques have been used to deposit SnO<sub>2</sub> thin films such as chemical vapour deposition [11], sol-gel technique [12], metal organic chemical vapour deposition (MOCVD) [13], photochemical method [14], pulse laser deposition [15], plasma-enhanced atomic layer deposition (PEALD) [16], Electron beam evaporation [17], magnetron sputtering [18] and spray pyrolysis [19], etc. Among these methods, the physical techniques are capable of depositing high quality and uniform thin films; they are comparably overpriced and tremendously energy

✉ L. Amalraj  
amalraj57@yahoo.co.in

<sup>1</sup> Research Department of Physics, V.H.N.S.N. College, Virudhunagar, Tamilnadu 626001, India

<sup>2</sup> P.G. and Research Department of Physics, H.H. The Rajah's College, Pudukkottai, Tamilnadu 622001, India

<sup>3</sup> Department of Physics, Devanga Arts College, Aruppakkattai, Tamilnadu 626101, India





## Volume of precursor solution effect on the properties of SnO<sub>2</sub> thin films prepared by nebulized spray pyrolysis technique

S. Palanichamy<sup>1</sup> · J. Raj Mohamed<sup>2</sup> · P. S. Satheesh Kumar<sup>1</sup> · S. Pandiarajan<sup>3</sup> · L. Amalraj<sup>1</sup>

Received: 29 May 2018 / Accepted: 27 August 2018  
© Springer Science+Business Media, LLC, part of Springer Nature 2018

### Abstract

Undoped SnO<sub>2</sub> thin films have been deposited on amorphous glass substrates with different precursor solution volume (10, 15, 20 and 25 ml) using simple and cost-effective nebulized spray pyrolysis technique. The influence of precursor solution on structural, optical, photoluminescence and electrical properties had been studied. The X-ray diffraction spectra prove the polycrystalline nature of SnO<sub>2</sub> with tetragonal structure. All the films show a preferred growth orientation along (110) diffraction plane. The average transmittance of SnO<sub>2</sub> thin films varied between 82 and 75% in the visible as well as IR region. The band gap energy decreases from 3.74 to 3.64 eV corresponding to direct transitions with the precursor solution volume had increased from 10 to 20 ml and then increased as 3.72 eV for 25 ml. SEM pictures demonstrated polyhedrons like grains. EDX confirmed the existence of Sn and O elements in all the prepared SnO<sub>2</sub> thin films. Photoluminescence spectra at room temperature revealed that the four emission bands in all the samples such as sharp dominant peak at 361 nm with shoulder peak at 377 nm (UV region), a broad and low intensity peak at 492 nm (blue region) and 519 nm (green region). The electrical parameters were examined by Hall effect measurements, which demonstrated that the film prepared at 20 ml precursor solution volume possess minimum resistivity  $2.76 \times 10^{-3} \Omega\text{-cm}$  with activation energy 0.10 eV and maximum figure of merit  $1.54 \times 10^{-2} (\Omega/\text{sq})^{-1}$ .

**Keywords** Nebulized spray pyrolysis · Tin oxide · Band gap · Activation energy · Crystallite size

✉ L. Amalraj  
amalrajpalani57@gmail.com

<sup>1</sup> Research Department of Physics, V.H.N.S.N. College, Virudhunagar, Tamilnadu 626001, India

<sup>2</sup> Research Department of Physics, H.H. The Rajah's College, Pudukkottai, Tamilnadu 622001, India

<sup>3</sup> Department of Physics, Devanga Arts College, Aruppukottai, Tamilnadu 626101, India

# Experimental and artificial neural network based prediction of performance and emission characteristics of DI diesel engine using *Calophyllum inophyllum* methyl ester at different nozzle opening pressure

G. Vairamuthu<sup>1</sup> · B. Thangagiri<sup>2</sup> · S. Sundarapandian<sup>3</sup>

Received: 4 April 2017 / Accepted: 11 July 2017  
© Springer-Verlag GmbH Germany 2017

**Abstract** The present work investigates the effect of varying Nozzle Opening Pressures (NOP) from 220 bar to 250 bar on performance, emissions and combustion characteristics of *Calophyllum inophyllum* Methyl Ester (CIME) in a constant speed, Direct Injection (DI) diesel engine using Artificial Neural Network (ANN) approach. An ANN model has been developed to predict a correlation between specific fuel consumption (SFC), brake thermal efficiency (BTE), exhaust gas temperature (EGT), Unburnt hydrocarbon (UBHC), CO, CO<sub>2</sub>, NO<sub>x</sub> and smoke density using load, blend (B0 and B100) and NOP as input data. A standard Back-Propagation Algorithm (BPA) for the engine is used in this model. A Multi Layer Perceptron network (MLP) is used for nonlinear mapping between the input and the output parameters. An ANN model can predict the performance of diesel engine and the exhaust emissions with correlation coefficient ( $R^2$ ) in the range of

0.98–1. Mean Relative Errors (MRE) values are in the range of 0.46–5.8%, while the Mean Square Errors (MSE) are found to be very low. It is evident that the ANN models are reliable tools for the prediction of DI diesel engine performance and emissions. The test results show that the optimum NOP is 250 bar with B100.

**Keywords** *Calophyllum inophyllum* Methyl ester · Diesel engine · Nozzle opening pressure · Performance · Emissions · Artificial neural network

## Highlights

- Modification the Nozzle Opening Pressure (NOP) of the diesel engine for CIME fuel.
- Effects of NOP on the engine performance are investigated.
- An ANN model is developed for rapid prediction of engine performance and emissions.
- Prediction results of the ANN model are compared with the experimental results.
- NOP 250 bar gives optimum performance and low NO<sub>x</sub> emissions.

✉ G. Vairamuthu  
vairamuthu\_guru@yahoo.com

<sup>1</sup> Department of Mechanical Engineering, AAA College of Engineering & Technology, Sivakasi, Tamil Nadu 626 123, India

<sup>2</sup> Department of Chemistry, Mepco Schlenk Engineering College (Autonomous), Sivakasi, Tamil Nadu 626 005, India

<sup>3</sup> Department of Automobile Engineering, Sri Shakthi Institute of Engineering and Technology, Coimbatore, Tamil Nadu 641062, India

## 1 Introduction

Rising fuel costs and future emission regulations have sharpened the automotive industry's focus on efficiency. Moreover, the rapid depletion of fossil fuels due to extensive use has been forced to investigate the renewable fuel with low emission. In the search for alternative fuels, the good option is found to be renewable fuels like vegetable oils, alcohols, etc. Biodiesel is derived from vegetable oils such as jatropha, karanja, *Madhuca indica*, sunflower, cotton seed, neem, corn, and *calophyllum inophyllum* (punnai seed oil) by a process called transesterification [1, 2]. Out of these edible and non-edible vegetable oils are preferred for engine applications in India. This study focuses on *Calophyllum inophyllum* biodiesel. Some researchers [3, 4] investigated the testing of alternative diesel fuel from *Calophyllum inophyllum* biodiesel in a DI diesel engine. Engine performance, exhaust emissions and combustion analysis of each fuel blend are monitored and compared with those of diesel fuel.

Fuel injection pressure is one of the most important operating parameters affecting the performance and emissions in diesel engine. Some researchers [5–10] have found that viscosity is the main dominating effect, whereas density is the



Reference No : OUCIP286



# Certificate of Publication

*This is to certify that*

R.Prabhu

Department of Computer Science & Engineering , AAA College of Engineering and Technology,  
Sivakasi , India

*Published a paper in*

IJRECE Vol. 6, Issue 3, ( July - September 2018) ISSN: 2393-9028 (Print) | ISSN: 2348-2281 (Online)

*Titled as*

"Symmetric Searchable Encryption and Data Retrieval In Cloud Computing"



UGC Approved Journal



Dr K. Agarwal  
Editor, Academic Science

## DESIGN AND IMPLEMENTATION OF SUFFOCATING PREVENTION SYSTEM

Shenbagarajan.A<sup>1</sup>, M.A.Kumaran<sup>2</sup>, B.Ramachandramoorthy<sup>3</sup>

Department of Computer Science and Engineering  
AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, India.

**Abstract:** Accidents are caused due to getting locked inside the cars without sufficient air. There are many incidents in which children got locked inside the car and were dead due to suffocation. This can be prevented by implementing our project in automobiles. In our project we are going to sense the presence of human inside a locked car and alert the driver and the owner through SMS to open the car. If there is no response or the car is parked in a remote area, after a few waiting period the air vent present in the car is opened automatically, which prevents the suffocating child from death.

**Key-words:** Security, Suffocation Prevention, Automated System, SMS Alert, Human Detection

### I. INTRODUCTION

Life casualty caused by suffocating inside a closed parked car has become a worldwide tragedy. Statistic has shown the occurrence of death inside a non-moving vehicle involving children is the largest, followed by handicapped and elderly person. Cases involving adults usually happens while the victims are taking a nap inside the car. This is due to dehydration, reduced amount of oxygen and heat exhaustion from the car's interior. When it became hard to breathe, it is usually too late to react as the body already too weak to do anything. Cited from an article about child's injury and death caused by suffocation inside a closed parked car, 54% of these cases are due to parent's carelessness by leaving the child intentionally while doing some chores and 42% of the cases are the opposites as the parents forgets or did not realize that their child is inside the car when they parked it. Usually the biggest factor of this fatality is caused by hyperthermia as the temperature inside the car will drastically increase when the engine has been turned off. As a solution, sense the presence of human inside a locked car and alert the driver and the owner through SMS to open the car. If there is no response or the car is parked in a remote area, after a few waiting period the air vent present in the car is opened automatically. This system will prevent any parents from intentionally leaving their child inside the car while doing chores. Hence, this will reduce the number of life casualty especially the fatality among children inside the car.

### II. PROPOSED SYSTEM

The presence of human inside a locked car is detected and alerts the driver and the owner through SMS to open the car. If there is no response or the car is parked in a remote area, after a few waiting period the air vent present in the car is opened automatically. This system will prevent any parents from intentionally leaving their child inside the car while

doing chores. Hence, this will reduce the number of life casualty especially the fatality among children inside the car.

2.1Block Diagram:-It consists of a processor (Arduino which is used here).

The connections are made according to the block diagram shown in fig 2.1.The timer used here is inbuilt timer. User mobile is the driver's and owner's mobile.



Fig 2.1:-BLOCK DIAGRAM

2.2Module Explanation:-A module is a software component or part of a program that contains one or more routines. One or more independently developed modules make up a program. An enterprise-level software application may contain several different modules, and each module serves unique and separate operations.Modules make a programmer's job easy by allowing the programmer to focus on only one area of the functionality of the software application. Modules are typically incorporated into the program (software) through interfaces. There are several modules and their explanations are given below.

2.2.1User Module:-The user module supports user roles, which can be set up with fine-grained permissions allowing each role to do only what the administrator permits. Each user is assigned one or more roles. Here the user module consists of the user mobile where the messages can be received.

2.2.2Processor (Arduino Board):-A processor is the logic circuitry that responds to and processes the basic instructions that drive a computer. The four primary functions of a processor are fetch, decode, execute and writeback. The processor used here is Arduino.Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed(referred as a microcontroller) and a ready-made software called Arduino IDE(Integrated Development Environment), which is used to write and upload the computer code to the physical board. Arduino

## Object-Based Convolutional Neural Network for Remote Sensed Imagery Classification

K.Pallavi Priya<sup>\*</sup>, S.Rajesh<sup>\*\*</sup>, T.Gladima Nisia<sup>\*\*\*</sup>

*\*( PG Scholar, Department of IT, Mepco Schlenk Engineering College, Sivakasi, India*

*E-mail: [pallavipriyaguru@gmail.com](mailto:pallavipriyaguru@gmail.com)*

*\*\* (Associate Professor, Department of IT, Mepco Schlenk Engineering College, Sivakasi, India*

*E-mail: [srajesh@mepcoeng.ac.in](mailto:srajesh@mepcoeng.ac.in)*

*\*\*\* (Assistant Professor, Department of CSE, AAA College of Engg & Tech., Sivakasi, India*

*E-mail: [gladimab@gmail.com](mailto:gladimab@gmail.com)*

### Abstract:

In high-resolution images, it is very important to classify the satellite images accurately. However, it is not easy to identify complex patterns in remotely sensed images. To overcome this difficulty, deep learning method is used to improve the accuracy of the satellite images; object-based method is used. Thus, we are combining deep learning with object-based method for classifying high resolution remotely sensed images. Deep features are extracted from convolutional neural network and it could be carried for different layers. In order to improve the classification accuracy, the object based classification method is integrated with deep feature learning. The main motive of deep learning is to construct a manual feature extraction automatically. In object based classification, boundary based information are to be added to improve the performance of the system. Experimental results are carried out for the object based deep learning method.

**Keywords** — Convolutional neural network (CNN), deep learning, high-resolution image, image classification.

### 1. INTRODUCTION

Remote sensing imagery means to map urban land cover and provide a real-time data with more complex pattern. However, the complexity of the high resolution remotely imagery increases widely. Several methods are introduced to improve the accuracy of the complex pattern urban imagery.

When we manually extracted features, it is hard to improve the classification accuracy.

This paper aims to work for improvement of classification accuracy through deep learning. However, in deep feature learning it is hard to



# A study on magnetic field assisted laser percussion drilling and its effect on surface integrity

S. Balamurugan <sup>a</sup>, C. Bala Manikandan <sup>b,\*</sup>, P. Balamurugan <sup>b</sup>

<sup>a</sup> AAA College of Engineering & Technology, Sivakasi, India

<sup>b</sup> Mepco Schenk Engineering College, Sivakasi, India

\* Corresponding e-mail address: balamani1991@gmail.com

## ABSTRACT

**Purpose:** of this paper is to reduce the taper angle and surface roughness of the laser drilled hole on Aluminium alloy with the assistance of magnetic field. At lower laser powers, able to achieve higher material removal rate in drilling with reduced taper angle and roughness.

**Design/methodology/approach:** Aluminium alloy is a highly reflective material, while laser drilling it ejects plumes, which makes the drilling unreliable. The plume generated due to this action causes deteriorating effects over the work piece as such affecting surface textures. Removal of plume is the major consideration in laser machining process, especially in laser assisted drilling. The plume is a form of cluster of ions having charges in it. Due to the magnetic field input, the ions line the path along the lines of force of magnets. Thus, the ion cloud can be cleared at the localized plane, where the subsequent laser drilling going to be happens, leads to reduced plume thereby reduces the taper angle and surface roughness.

**Findings:** The defect of percussion laser drilling that is barrelling effect in the drilled hole was reduced with the assistance of magnetic field setup. For the laser energy of 90 mJ, the magnetic assisted laser drilling shows better improvement in the material removal rate of 64.5%, the profile error (spatter height) was reduced to 45% and the taper angle of the drilled hole also reduced by 16.3%. The results confirmed the fact that, the Lorentz force confined the plume particle to be raised upwards and circulated outwards to the sidewall from the centre of the laser beam. This expansion of laser induced plasma plume, improved the material removal rate of the hole.

**Research limitations/implications:** Laser drilling was carried out by a constant magnetic field and the parameters like material removal rate, taper angle, profile error, surface roughness were studied. In the future work, these parameters were studied with the application of varying magnetic field.

**Practical implications:** As a result of the work, laser drilling was carried out on turbine blades or complex shapes for retention properties, with reduced taper hole and surface roughness, thereby improving the efficiency of the systems.

**Originality/value:** The novelty of the work is providing magnetic flux for the laser drilling process, which improves the process parameters. The incorporation of magnetic field to the laser drill needs a cost less setup, which can ensure reliable improvement in the material removal rate, reduction in taper angle and profile error.

**Keywords:** Laser drilling, Magnetic flux, Plumes, Taper angle, Surface roughness

## Weight reduction of motorcycle frame by topology optimization

C. Bala Manikandan <sup>a,\*</sup>, S. Balamurugan <sup>b</sup>, P. Balamurugan <sup>a</sup>,  
S. Lionel Beneston <sup>a</sup>

<sup>a</sup> Assistant Professor, Department of Mechanical Engineering,  
Mepco Schlenk Engineering College, Sivakasi, India

<sup>b</sup> Assistant Professor, Department of Mechanical Engineering,  
AAA College of Engineering & Technology, Sivakasi, India

\* Corresponding e-mail address: balamani1991@gmail.com

### ABSTRACT

**Purpose:** of this paper is to improve the fuel efficiency of electrical motorcycle by reducing the weight of its frame without affecting the basic functionalities, dimensions and performance.

**Design/methodology/approach:** Weight reduction of the frame was achieved by topology optimization technique. Initially the load and stresses acting on the frame was studied. Material of the frame was chosen as Aluminium and the frame was geometrically modelled using Autodesk Fusion 360. With the help of ANSYS AIM 18.2, weight of the frame was optimized by the design modifications suggested by the concept of topology optimization, for the corresponding loads and stresses induced on it. It was observed that the stress induced on the modified design was lesser than that of respective permissible yield stress of the frame material. After optimization, the weight of the frame was reduced from 3.0695 kg to 2.215 kg with the weight reduction of 27.84%. The weight reduction shows that the topology optimization is an effective technique, without compensate the performance of the frame. Approach used in the paper for the weight reduction of the frame is the topology optimization. The modelled frame was topology optimized by using ANSYS 18.2. After the topology optimization, the regions where the metal removal is possible, for weight reduction was identified.

**Findings:** In this paper, the motor cycle frame was optimized and weight of the frame was reduced from 3.065 kg to 2.215 kg. Weight reduction of 27.84% was achieved without compensating the performance.

**Research limitations/implications:** All the components of the automobile may be topology optimized for the weight reduction, thereby improving the fuel efficiency. Innovative design/Improvement in design also possible.

**Practical implications:** By reducing the weight of the frame, weight of the automobile also reduces. Reduction in weight of the automobile leads to improved fuel efficiency.

**Originality/value:** Weight of the motorcycle frame reduced by topology optimization. The regions of material removal at the frame, without compensating the performance was identified.

**Keywords:** Motorcycle frame, Aluminium, Weight reduction, ANSYS, Topology optimization

## MOBILE APP FOR SMART VEHICLE PARKING SYSTEM

K.Indumathi<sup>1</sup>, G.Mathi Bala<sup>2</sup>, R.Megala<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2,3</sup>UG Scholar Department of Computer Science and Engineering  
AAA College of Engineering & Technology, Sivakasi, Tamilnadu

**ABSTRACT:** This paper aims to provide a user friendly, reliable and automated car parking system. A major problem in day to day life is parking of vehicles especially the car parking at an appropriate place. And the issue indirectly leads to traffic congestion. This paper presents the basic concept of using server or cloud based smart parking services in smart cities as an important application of the Internet Of Things (IOT) paradigm. This system will be accessible through a mobile app or through the webpage provided and can be used to monitor or find the empty slot. The Ultrasonic Range Detection Sensor is utilized with Arduino to indicate the empty slot. By measuring the distance using ultrasonic sensor drivers are able to find the empty slot in parking to park the car and help the driver to find the slot easily and reduce the searching time. As the parking place is found to be empty it is detected using ultrasonic sensors which report it further.

### I. INTRODUCTION

In the current era, we are facing a new problem of parking of vehicles in urban cities. By using our automated parking system, a user can save much time for searching free parking space. The user can book in advance the parking slot and update the information to the server. Every user has a unique id and password. Too many cars, too much traffic and there is no enough parking area. This is the situation which is seen in most of the metropolitan cities today. People keep on roaming on roads searching for a parking space to park their vehicles especially at peak hours of time. Our proposed system presents a smart parking system that regulates a number of vehicles to the nearest parking space at any given time based on the parking space availability. "Intelligent Parking System (IPS)" is implemented using the Operating System Android. The user requests the Parking Control Unit to check the status of available parking slots. As soon as the user request, all the available free slots are displayed to the user. If the availability of parking space is confirmed, the user can book the parking slot and proceed to pay. The vehicle follows its path towards the starting of the parking area. The user fixes his slots by showing his confirmation details to the concerned person at Parking area. After communicating, the vehicle will further follow its path to the allocated parking slot. After successful parking the slot details are updated simultaneously in the Administrators database. Finally the time to find for an empty parking slot is minimized. The main responsibility of the Intelligent Parking System (IPS) is to help the user to find an area where parking is available and total number of slots free in that area. Thus our proposed methodology reduces the user's effort and time of searching a parking slot.

### II. RELATED WORK

1.D.J.Bonde "Automated car parking system commanded by android application" in Proc. IEEE Conf.03-05, Jan 2012. The aim of this project is to automate the car and car parking as well. A miniature model of an automated car parking system that can regulate and manage number of cars that can be parked in given space at any given time based on the availability of parking slot. Automated parking is a method of parking and existing cars using sensing device. The entering and leaving to the lot is commanded by an android application.

2.M.M.Rashid, A. Musa, M. AtaurRahman, and N.Farahana; A. Farhana "Automatic Parking Management System and Parking Fee Collection Based on Number Plate Recognition International Journal of Machine Learning and Computing, 93-98, 2012.

This paper discussed on automatic parking system and electronic parking fee collection based on vehicle number plate recognition. The aim of this research is to develop and implement an automatic parking system that will increase convenience and security of the public parking lot as well as collecting parking fee without hassles of using magnetic card. The auto parking system will be able to have less interaction of humans and use no magnetic card and its devices. In additions to that, it has parking guidance system that can show and guide user towards a parking space. The system used image processing of recognizing number plates for operation of parking and billing system. Overall, the systems run with pre-programmed controller to make minimum human involvement in parking system and ensure access control in restricted places.

3.R. Yusnita, FarizaNorbaya, and Norazwinawati Basharuddin " Intelligent Parking Space Detection System Based on Image Processing", Internation Journal of Innovation, Management and Technology, 232-253, 2012.

This paper aims to present an intelligent system for parking space detection based on image processing technique that capture and process the brown rounded image drawn at parking lot and produce the information of the empty car parking spaces. It will be display at the display unit that consists of seven segments in real time. The seven segments display shows the number of current available parking lots in the parking area. This proposed system, has been developed in software and hardware platform.

### III. SYSTEM DESIGN

Our system utilizes Arduino Uno, the open source and user friendly hardware, with Wifi connectivity. Uses Ultra Sound sensor for identification of the parking slot status. The status



# Comparative Study of Cutting Fluid Application Methods to Improve Machining Conditions During Surface Grinding on AISI 1040 Steel



I. Kantharaj, M. Sekar, X. Ajay Vasanth and S. Mohanasundaram

**Abstract** Finishing operations play a very important role in machining as they help to achieve the desired high-quality surface. Surface grinding, a widely employed finishing process uses wheels made of abrasive grains mixed with a bonding material. At the initial stages of the grinding process, the structure of the grain in the wheel will be in upright condition as the abrasive grains are sharp. As the process proceeds, abrasive grains become blunt due to the cutting force and the heat generated at the interface, thereby reducing the surface quality of the workpiece. Application of the coolant at the primary cutting zone reduces the temperature and also improves the grinding but at the cost of the environmental and health hazards which is prominent in the grinding process. In this research article, comparative experimental investigations between the different methods of application of coolant namely flood and minimal quantity lubricant (MQL) with the dry grinding process are carried out. It is the MQL method of coolant application that offers a desirable grinding operation, with reduced environmental impact and health hazards.

**Keywords** Surface grinding · Minimum quantity lubrication (MQL)  
Dry grinding · Surface roughness

---

I. Kantharaj · X. A. Vasanth · S. Mohanasundaram  
Department of Mechanical Engineering, Karunya Institute of Technology and Science,  
Coimbatore, India  
e-mail: kantharaj@karunya.edu

X. A. Vasanth  
e-mail: vasantajay@gmail.com

S. Mohanasundaram  
e-mail: johnmohana@yahoo.com

M. Sekar (✉)  
Department of Mechanical Engineering, AAA College of Engineering and Technology,  
Sivakasi 626005, Tamil Nadu, India  
e-mail: sekar.m@gmit.edu.in

## HEAT-TRANSFER ENHANCEMENT OF NANOFLUIDS IN A CAR RADIATOR

### IZBOLJŠANJE PRENOSA TOPLOTE NANOTEKOČIN V AVTOMOBILSKEM RADIATORJU

Thangasamy Ganesan<sup>1</sup>, Pauldurai Seeni Kannan<sup>2</sup>

<sup>1</sup>Department of Mechanical Engineering, AR College of Engineering & Technology, Kadayam, Tamilnadu 627 423, India.  
<sup>2</sup>Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakasi, Tamilnadu 626 123, India  
ganesanjoshi2012@gmail.com

Prejem rokopisa – received: 2017-10-07; sprejem za objavo – accepted for publication: 2018-02-22

doi:10.17222/mit.2017.171

In recent times, enhancing the efficiency of automobiles has become very important. As part of this effort, increasing the efficiency of the heat transfer in the radiator of an automobile is also crucial. The present approach involves an addition of nanoparticles to the cooling liquid. Most of the current results were obtained using a few types of nanoparticles. Only a limited amount of work involved hybrid nanofluids including several types of nanoparticles. Multi-walled carbon nanotubes (MWCNT) were used along with aluminium-oxide nanoparticles to form a nanofluid with the base fluid (ethylene glycol (EG) + distilled water (DW) – 1:1 ratio) having volume concentrations of (0.03, 0.06, 0.09 and 0.12) %. The characterization of the nanoparticles was carried out. The experiments were carried out at inlet temperatures of 40–75 °C, with increments of 5 °C. The volume flow rate was varied from 0.6 m<sup>3</sup>/h to 0.96 m<sup>3</sup>/h, with increments of 0.12 m<sup>3</sup>/h. An increase in the heat transfer of 35 % was achieved.

Keywords: computational fluid dynamics, nanofluids, alumina, multi-walled carbon nanotubes

V zadnjem času je postalo zelo pomembno povečanje zmogljivosti avtomobilov, hkrati s tem pa tudi povečanje učinkovitosti prenosa toplote v avtomobilskih radiatorjih. V prispevku so avtorji dodali nanodelce v hladilno sredstvo (kapljevino). Večina podanih rezultatov se nanaša na uporabo nekaj različnih vrst nanodelcev. Delno pa so avtorji raziskovali tudi hibridna hladilna sredstva uzitoma vpliv istočasnega dodatka več različnih vrst nanodelcev. Uporabili so dodatke večstenskih ogljikovih nanocevk (MWCNT; angl.: Multi Walled Carbon Nano Tubes) v kombinaciji z nanodelci Al oksida k osnovnemu hladilnemu sredstvu (Etilen Glikol (EG) + destilirana voda (DW) – v razmerju 1:1) v volumskih koncentracijah (0,03, 0,06, 0,09 and 0,12) %. Izvedli so karakterizacijo nanodelcev. Preizkuse so izvajali pri vstopnih temperaturah hladilnega sredstva od 40 °C do 75 °C v korakih po 5 °C. Hitrost volumskega pretoka je varirala od 0,6 m<sup>3</sup>/h do 0,96 m<sup>3</sup>/h v korakih po 0,12 m<sup>3</sup>/h. Dosegli so povečanje prenosa toplote do 35 %.

Ključne besede: računalniška dinamika tekočin (kapljevin in plinov), nanotekočine, aluminijev oksid, večstenske ogljikove nanocevke

## 1 INTRODUCTION

Only a part of the heat energy produced with combustion is converted to the mechanical energy to power the automobiles while the remaining energy is rejected and unutilized. A part of the energy is removed by the cooling water surrounding the engine and then taken to the radiator while the heat is released into the atmosphere. If effective cooling is not done, the efficiency of the engine can be reduced and, in extreme cases, engine may be damaged by overheating. The cooling system normally consists of a cooling medium surrounding the engine cylinder, a pump allowing the circulation of the cooling medium, a radiator with a cooling fan and a thermostat. In the present work, an attempt to improve the effectiveness of the heat transfer in the radiator was made. With the advances made in the field of nanotechnology, we now have nanoparticles, which can be mixed with the fluid to form a homogeneous mixture. These mixtures are called nanofluids and they have better thermal properties. They enhance the heat transfer even

with a low concentration of nanoparticles. The papers published so far indicate improvement in the heat transfer due to single nanoparticles. Further research can be done using hybrid nanofluids, which are mixtures of more than one type of nanoparticles. It is expected that hybrid nanofluids will improve the heat transfer.

## 2 LITERATURE SURVEY

A brief survey of the work done so far is presented below.

K. S Sughanthi et al.<sup>1</sup> prepared a nanofluid using a spherical ZnO by mixing it with water and propylene glycol (PG). The heat-absorption capacity of their nanofluid was compared with that of the solution of just water and PG. The nanofluid showed a higher heat absorption capacity than the solution of water and PG. The nanofluid showed an increase of 16 % in the case of heat transfer under indicator conditions with 2 % volume of ZnO of 70 nm. B. Ilhan et al.<sup>2</sup> used hexagonal boron nitride (HBN) to make a nanofluid using a volume con-



# A new energy based power aware routing method for MANETs

J. Deepa<sup>1</sup> · J. Sutha<sup>2</sup>

Received: 23 November 2017 / Revised: 13 January 2018 / Accepted: 15 January 2018  
© Springer Science+Business Media, LLC, part of Springer Nature 2018

## Abstract

A mobile ad-hoc network (MANET) is a self-configuring and self-directed functioning system that operates without infrastructure and rapidly deploys in a network. The MANET does not need centralized administration. It contains a mobile node for wireless transmission and MANETs that can be established anywhere. In addition, any instance of the ad-hoc network is effective since it is capable of eliminating the complexity of central admission and infrastructure. The MANET is widely in use in many fields such as military applications, mobile communication, and emergency situations. Energy consumption is an important issue in MANET because the mobile nodes are battery powered. In this paper, a dynamic energy ad-hoc on-demand distance vector routing protocol (DE-AODV) is proposed to minimize the packet delay, maximize the network lifetime, and reduce the energy consumption. The increase in node energy and dynamic supply of external energy is through a battery. The energy mechanisms consider whether the mobile nodes are in sleep, active, or transmit mode. The DE-AODV protocol is used to find out the selection of nodes which are energy-efficient and trustworthy to select the shortest route path from source to destination. The routing protocols use the external battery when there is a chance of link failure during packet transmission time. The proposed DE-AODV routing protocol provides efficient output when compared with other existing techniques. Simulation results show that the proposed system achieves better performance when compared with previous protocols in terms of packet delivery ratio, network stability rate, end-to-end delay of packets, end-to-end transmission, and throughput.

**Keywords** DE-AODV · AODV · Energy consumption · Route discovery · Route maintenance

## 1 Introduction

Mobile ad-hoc networks (MANETs) are self-directed systems that contain the collection of mobile nodes used for wireless broadcast in communication. They are self-configured, self-organized, and self-controlled infrastructure networks [1]. Nodes in MANETs can act as routers that are capable of sending and receiving the data or multimedia packets. In MANETs, the mobile nodes are open to move in any direction and frequently change the node links. The mobile nodes forward the packets from the intermediate node. If two nodes are within the transmission range, they communicate directly. Otherwise, additional nodes are required to forward the packets. The nodes are dynamically operated through a battery. As a result, application recharging and replacing of the battery is a complicated task [2]. The most important issue

in MANET is energy consumption because the mobile nodes are usually operated with battery power [3]. The power failure of mobile nodes affects the network functionality and reduces the overall network lifetime. The efficient node-energy utilization plays an essential role in MANETs. A death of node energy exhausted in MANETs leads to the partitioning of the network, which in turn causes a communication link failure on the network.

The ad-hoc on-demand distance vector routing protocol (AODV) protocol only uses residual energy, and the node with a large distance will consume more energy to transfer the packets [4]. In addition, if the packets collide during their transmission, more energy is consumed. To address these issues, this paper proposes dynamic energy AODV (DE-AODV) protocol which provides dynamic energy to the nodes to reduce the overall energy consumption and maximize the network lifetime. DE-AODV routing protocol finds the optimal routing path in the network with maximum energy based on transmitting the packets from the source to the destination. During the route discovery process, the route path based on the node energy efficiency

✉ J. Deepa  
deeparavindhran@gmail.com

<sup>1</sup> Panimalar Institute of Technology, Chennai, India

<sup>2</sup> AAA College of Engineering and Technology, Sivakasi, India

**PERFORMANCE ANALYSIS OF TWO-OPTIMAL METHOD FOR SHORTEST PATH  
COST ANALYSIS AND ROUTE AGGREGATION FOR OBJECT TRACKING  
APPLICATIONS IN WSN**

**<sup>1</sup>Mrs.P.Krishnaveni, <sup>2</sup>Dr.J.Sutha**

<sup>1</sup>Assistant Professor (Sr.Grade), Department of Computer Science and Engineering, Sethu Institute of Technology, Pulloor,  
Kariapatti – 626115, Mail id: venigovind@gmail.com

<sup>2</sup>Professor & Head, Department of Computer Science and Engineering, AAA college of Engineering and Technology, Kamarajar  
Educational Road, Amathur (V), Sivakasi – Virudhunagar Main Road, Mail id: sutha\_skad@yahoo.co.in

**Abstract**

In day to day life there are number of applications based on Wireless Sensor Networks (WSN). A particular application of WSN is Object Tracking, which is used to track and locate a specific object. One of the main challenges is to identify and track objects in remote areas with energy efficiency. The main objective of this paper is to design an optimal path routing for object tracking application in WSN, called as a Two Optimal Methods (TOM). TOM implements Bellman Ford (BF) algorithm, Floyd-Warshall's (FW) Algorithm and Modified Floyd-Warshall's (MFW) algorithm and compares their performance. The MFW is designed by incorporating the main features of BF into FW algorithm to enhance the efficiency of TOM regarding time, cost and energy. All the three algorithms are simulated, experimented and their results are verified. The performance of MFW algorithm is evaluated by comparing its results with the other algorithms. From the comparison, it is noticed that MFW is better than BF and FW algorithms regarding energy consumption, throughput, Packet Delivery Ratio, and packet loss.

**Keywords:** Wireless Sensor Network, Remote Application, Object Tracking, Optimization, Bellman Ford Algorithm, Floyd Warshall's Algorithm.

**Introduction**



## An Efficient Encoder Architecture Design for Cognitive Radio Networks

D. Abitha Kumari<sup>1</sup> · J. Sutha<sup>2</sup>

Published online: 29 September 2018  
© Springer Science+Business Media, LLC, part of Springer Nature 2018

### Abstract

Interference formation between received symbols in Cognitive Radio (CR) network system is the main problem which reduces the performance of the CR networks. In this paper, efficient encoder architecture for interference suppression is designed for low power applications in CR networks. The proposed architecture is imposed into various spartan processors to analyze the power consumption and current consumption. The proposed system architecture is analyzed in terms of power and current consumptions using Xilinx Project Navigator.

**Keywords** CR network · Interference · Low power · Performance · Architecture

### 1 Introduction

Utilization of higher end mobile phones and personal computers leads to avail large amount of data utilization due to the transmission of multimedia data throughout the entire network environment. Hence, there is a new requirement of bandwidth for this large amount of data to be transmission and reception over long distance in both open and closed environment. This will lead to allocate the new spectrum for new data transmission and reception over the large medium. This spectrum is allotted for the new users by Federal Communications Commission (FCC). This newly allotted spectrum is shared by each transmission and reception devices in the network. The system is divided into primary and secondary where as primary system avails the entire bandwidth between transmitter and receiver. The secondary system requires high bandwidth which avails the bandwidth from primary system. This is called as Cognitive Radio (CR). The interference is occurred in CR networks during the availability of primary spectrum

✉ D. Abitha Kumari  
abithajustin2005@gmail.com

J. Sutha  
sutha\_skad@yahoo.co.in

<sup>1</sup> Faculty of Computer Science and Engineering, Sethu Institute of Technology, Virudhunagar, Tamilnadu, India

<sup>2</sup> Faculty of Computer Science and Engineering, AAA College of Engineering and Technology, Sivakasi, Tamilnadu, India

## Research Article

# Design and Implementation of Maximum Point Power Tracking controller for Grid-connected Photovoltaic System and Analyzing its Performances

**C. Karuppasamy<sup>1</sup>, V. M. Ravi Kumar<sup>2</sup>, S. Venkatanarayanan<sup>3</sup>**<sup>1</sup>Department of EEE, AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, India,<sup>2</sup>Department of EEE, St. Michael College of engineering, Sivagangai, Tamil Nadu, India,<sup>3</sup>Department of EEE, K.L.N. College of Engineering, Pottapalayam, Tamil Nadu, India**ABSTRACT**

The world is running fast and very competitive; in this world, the electricity plays a major role. To generate electricity, we have renewable and non-renewable resources. If we use non-renewable resources, it produces pollution and running cost of the plant is high when compared to renewable sources. In renewable resources, solar energy has great importance because it is easily available in worldwide for energy generation. However, only one drawback is efficiency and to increase its efficiency of maximum point power tracking (MPPT) techniques is used. Then, the solar has low efficiency. For improving efficiency and to make constant energy power generation, we are using MPPT techniques. The MPPT techniques used to track maximum point to produce constant power. Then, we are using converters to make the voltage level high. The converters are controlled by MPPT. According to the MPPT signal, the output of converter decides. Then, it is converted into ac using inverters to supply to the grid. In this paper, we are proposing incremental conductance MPPT algorithm for obtaining constant power and higher efficiency.

**Address for****correspondence:**

C. Karuppasamy, Department of EEE, AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, India

**Keywords:**

maximum power point(mpp), Hill climbing method, Photovoltaic array, Switched mode power supply

Received: 03<sup>rd</sup> February 2018Accepted: 20<sup>th</sup> September 2018Published: 13<sup>th</sup> October 2018**INTRODUCTION****The need for renewable energy**

Renewable energy is the energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat. These resources are renewable and can be naturally replenished. Therefore, for all practical purposes, these resources can be considered to be inexhaustible, unlike dwindling conventional fossil fuels. The global energy crunch has provided a renewed impetus to the growth and development of clean and renewable energy sources. Clean development mechanisms are being adopted by organizations all across the globe. Apart from the rapidly decreasing reserves of fossil fuels in the world, another major factor working against fossil fuels is the pollution associated with their combustion. Contrastingly, renewable energy sources are known to be much cleaner and produce energy without the harmful effects of pollution unlike their conventional counterparts.

**Renewable energy trends across the globe**

The current trend across developed economies tips the scale in favor of renewable energy. For the last 3 years, the continents of

North America and Europe have embraced more renewable power capacity as compared to conventional power capacity. Renewables accounted for 60% of the newly installed power capacity in Europe in 2009 and nearly 20% of the annual power production.

As can be seen from Figure 1, wind and biomass occupy a major share of the current renewable energy consumption. Recent advancements in solar photovoltaic (PV) technology and constant incubation of projects in countries such as Germany and Spain have brought around tremendous growth in the solar PV.

Market as well, which is projected to surpass other renewable energy sources in the coming years. By 2009, more than 85 countries had some policy target to achieve a predetermined share of their power capacity through renewables. This was an increase from around 45 countries in 2005. Most of the targets are also very ambitious, landing in the range of 30–90% share of national production through renewable. Noteworthy policies are the European Union's target of achieving 20% of total energy through renewable by 2020 and India's Jawaharlal Nehru Solar Mission, through which India plans to produce 20 GW solar energy by the year 2022.

Nowadays, the electricity is essential for the entire one. We have more demand in it; we need more power to run in this



# Plan and Execution of Solar Charge Controller with MPPT Algorithm Utilizing Arduino

R. Ganesan, C. Karuppasamy, S. Saravanan

Assistant Professor/EEE, AAA College of Engineering and Technology, Sivakasi, Tamil Nadu, India

**Abstract:** In an increasing energy demand, it is need to come up with innovative solutions to reduce and conserve energy use. The light and temperature are not steady for a PV board, along these lines the power ages of the PV board isn't steady. So the most Maximum power point Tracking (MPPT) systems are utilized to give the most noteworthy capacity to the heaps or batteries. The MPPT procedure with Perturb and Observe technique is performed with a power electronic circuit and it beats the issue of voltage confuses between the PV boards and the batteries/loads. In this an Arduino UNO (microcontroller) is employed to develop battery charge control system for PV panels. The proposed system is composed of an Arduino UNO, sensors, synchronous buck converter, PV panel and battery. MPPT is a strategy for extracting greatest power from PV module and furthermore to shield the battery from cheating. MPPT charge controller serves two main purpose battery protection and energy metering. This paper provides details of maximum power point tracking solar charge controller device and de energy-meter.

**Keywords:** Solar Charge control, MPPT Algorithm, Perturb and Observe, Arduino, Charge control, Automatic charge controller, Solar Energy

## I. INTRODUCTION

We have just a single planet that we can call home. However, we are gradually annihilating this home with each liter of non-renewable energy source that we consume each day. No alternative, you say? Obviously there's a choice. The Sun. India is one of the sunniest nations on the planet, with 250 – 300 bright days consistently. What's more, we let this awesome abundance of nature go to squander. Because of late improvements in photovoltaic innovation, one can undoubtedly change over sunlight based vitality to electrical power and store it for utilize at whatever point we require it. Sunlight based vitality is free, for all intents and purposes endless and does not contaminate the planet. Shockingly, it is additionally extremely sparing over the long haul. As individuals are tremendously worried about the petroleum derivative fatigue and the natural issues caused by the regular power age, sustainable power sources and among them photovoltaic boards and wind-generators are broadly utilized at this point. The productivity of a PV plant is influenced principally by three components:

- the proficiency of the PV board (in business PV boards it is between 8-15% )
- the proficiency of the inverter (95-98 % )

- the proficiency of the MPPT calculation (which is more than 98% )

Enhancing the proficiency of the PV board and the inverter isn't simple as it relies upon the innovation accessible, it might require better segments, which can increment radically the expense of the establishment. Rather, enhancing the following of the MaximumPower Point (MPP) with new control calculations is less demanding, not costly and should be possible even in plants which are now being used by refreshing their control calculations, which would prompt a quick increment in PV control age and subsequently a decrease in its cost. MPPT calculations are fundamental in light of the fact that PV exhibits have a nonlinear voltagecurrent trademark with an extraordinary point where the power created is most extreme. This point depends upon the temperature of the sheets and on the irradiance conditions. The two conditions change amid the day and are additionally extraordinary relying upon the period of the year. Besides, illumination can change quickly because of changing barometrical conditions, for example, mists. It is vital to track the MPP precisely under every conceivable condition with the goal that the most extreme accessible power is constantly acquired. In this venture, Perturb and Observe (P&O) and Incremental Conductance (InCond) calculations are dissected inside and out and tried by the standard conditions said above. From that point forward, upgrades to the P&O and the InCond calculations are recommended to prevail in the MPP following under states of evolving irradiance. To test the MPPT calculations as indicated by the illumination profiles proposed in the standard, a rearranged display was created, in light of the fact that the reproduction time required in a portion of the cases can't be come to with the point by point exchanging model of a power converter in an ordinary work station. The purpose behind that will be that the PC comes up short on memory in the wake of mimicking just a couple of moments with the total model. At last, every technique is assessed and their qualities and shortcomings are distinguished.

## II. ARDUINO

The Arduino microcontroller is a simple to utilize yet ground-breaking single board PC that has increased impressive footing in the pastime and expert market. The Arduino is open-source, which implies equipment is sensibly estimated and advancement programming is free. This guide is for understudies in ME 2011, or understudies anyplace who are going up against the Arduino out of the blue. For cutting

# Fuzzy logic controlled Doubly Fed Induction Generator for Wind Energy Conversion System

<sup>1</sup>Dhceban S S, <sup>2</sup> Saravanan S, <sup>3</sup>Ganesan R

<sup>1</sup> Assistant Professor, <sup>2</sup> Assistant Professor, <sup>3</sup> Assistant Professor

<sup>1</sup> Department of EEE,

<sup>1</sup> AAA College of Engineering and Technology Sivakasi, India

**Abstract :** The conventional energy resources are being replaced by the renewable energy resources. Among them solar and wind are the two most widely used resources. The energy from these two resources are the basis for domestic usage. The wind energy is harnessed by the wind mills wherein they use doubly fed induction generators. The control method of Doubly fed Induction motor is carried out by the controllers like PI controllers. The maximum power point tracking is done with the help of fuzzy logic controller. The DG system characteristics like the total harmonic distortions, voltage and the current variations and power quality variations at different environmental conditions are observed using MATLAB. The DFIG system is made to use for the smart grid applications as it is more reliable.

**IndexTerms** - DFIG – Doubly Fed Induction Generator for Wind Energy Conversion System, DBR – Diode Bridge Rectifier

## I. INTRODUCTION

The usage of the power electronic devices are increasing due to the wide use of computers in the day to day life. This induces the harmonic components into the grid. The power quality at the grid side gets affected drastically which may lead to additional power loss. The manufacturer of the wind turbine and the power electronic devices certifies them according to the national and international guidelines.

Wind energy is most widely harnessed in the tropical regions. The large wind turbines make use of the doubly-fed induction generators. In the doubly-fed induction generator only a fraction of the system power is handled by the power electronic equipment. The losses can be reduced when compared to the system in which the power electronic equipment handling the total system power. The cost of the system is also minimized due to the usage of smaller converter.

The power quality is a measure of the system in which the characteristics of the voltage and the frequency are defined. The power and the voltage quality of the grid gets affected by the grid interference. It is a difficult process to compensate the voltage fluctuations with a simple compensator. The conventional reactive power compensators are being replaced by the fast controlled power electronic compensators. The maximum power must be extracted from the wind energy for this we are making use of the maximum power point tracking technique. The total harmonic distortion of the Wind energy system can be reduced by the use of soft computing techniques like the fuzzy logic controller.

## II.WIND TURBINE MATHEMATICAL MODELLING

The kinetic energy of the wind gets converted into the mechanical energy with the help of a rotating machine. This rotating machine is a wind turbine and the mechanical energy from the wind turbine gets converted into the electrical energy with the help of a wind generator. The rotor shaft of the wind turbine make use of the mechanical torque. The wind power can be calculated as follows

$$P_r = 1/2 \rho C_p A V^3 \quad (2.1)$$

$P_r$  is the rotor mechanical power (W)

$V$  the wind speed (m/s)

$A = \pi R^2$  the rotor surface (m<sup>2</sup>)

$R$  is the rotor radius (m)

$\rho$  the air density (kg/m<sup>3</sup>)

$C_p$  is the power coefficient.

The rotor aerodynamic power coefficient,  $C_p$ , is the function of blade pitch angle ( $\beta$ ) and tip speed ratio ( $\lambda$ )

$$\begin{aligned} \lambda &= \text{Tip speed/Wind speed} \\ \lambda &= \omega_s R / V \end{aligned} \quad (2.2)$$

Sub eqn (2.2) in (2.1) we get



## A Survey on Fractal Antenna Design

L.K.Balaji Vignesh<sup>1</sup>, Dr.K.Kavitha<sup>2</sup>,

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor,

<sup>1</sup>AAA College of Engineering and Technology,  
Amathur, Sivakasi-626005.

<sup>2</sup>Mepco Schlenk Engineering College  
(Autonomous),Sivakasi-626005.

<sup>1</sup>balagkannan@gmail.com

<sup>2</sup>kkavitha@mepcoeng.ac.in

August 4, 2018

### Abstract

Fractal structure is implemented in such a way to maximize the effective length of material that can receive or transmit electromagnetic radiation within a given total surface area or volume. Fractals have unique property by making the copies of itself at different scales. Fractals found its applications in two fields: 1. For the analysis and design of fractal antenna elements and 2. To the design of antenna arrays. Self similarity and Space filling are the key properties of fractal geometries which are used for the design of fractal antennas and arrays. This paper presents the survey on the existing categories of Fractal Antennas and their applications. Types of Fractal Geometries are listed in this survey. A brief summary of works incorporated and the advantages of those proposed methods and the findings and shortfalls have been discussed.

**Keywords:**Fractal, Sierpinski Gasket, Sierpinski Carpet, Koch curves, Minkowski Geometry, Hilbert.

## Design of Microstrip Hybrid Patch Antenna for Tri-slotted wideband Applications

<sup>1</sup>L.K.Balaji Vignesh, <sup>2</sup>M.Kartheeswari, <sup>3</sup>G.Uthrananthini  
<sup>1</sup>Assistant Professor, <sup>2,3</sup>UG Scholar,

AAA college of Engineering and Technology, Virudhunagar District, Sivakasi-626005  
E-mail ID: balagkannan@gmail.com, centhoormurugan96@gmail.com, uthrananthini18@gmail.com

### Abstract

*In this paper, a compact size microstrip hybrid Patch Antenna is designed and analyzed. The bandwidth enhancement of microstrip patch [MSP] is done by rectangular slotted technique. The designed antenna may be used to reduce return loss and increase the bandwidth. The gain has been improved up to 8.729dBi, directivity 11.47dBi and efficiency 99.54%. The proposed rectangular slotted MSP antenna is used for L-band and S-band operations. Study of literature of past few year shows that, the leading work on MSP is focused on designing compact sized broadband microstrip antenna. But inherently MSP have narrow bandwidth so to enhance bandwidth various techniques are engaged. The proposed antenna is simulated using ADS 2009 simulation software based on Momentum and EMDS. The antenna is fed by 50Ω microstrip line feed.*

**Index Terms:** Ground plane, Microstrip patch [MSP], Enhance bandwidth, ADS 2009 Simulator, Microstrip line feed.

### INTRODUCTION

Microstrip antenna [1] consists of a radiating patch on one side of a dielectric substrate and a ground plane on the other side. The major disadvantages of Microstrip antennas are lower gain and very narrow bandwidth [2,3]. It consists of dielectric substrate, with ground plane on the other side.

In this paper, the purpose of a new designed antenna presents to enhance the bandwidth of microstrip hybrid multiband antenna for many broadband applications [4], [7]. The major drawbacks of MSP antennas are narrow bandwidth and low gain. They may use many techniques to enhance bandwidth and gain of MSP antennas. By using thick substrate with low dielectric constant and slotted patch can enhance the bandwidth and gain of antennas up to greater extent [5].

The MSP antenna have some good features such as low cost, low profile, light weight, high efficiency, easy to implement with circuits[2],[5],[6]. The design structure components of antenna become

small in size and have low processing cost [3].

In this letter, transmission line method is used to analysis the Hybrid Multiband Patch antenna. The design resonant frequency of proposed antenna is 2.2 GHz with 50Ω microstrip line feed. The proposed antenna is characterized by using thickness (h), dielectric constant ( $\epsilon_r$ ) and length(b, d), width(a, c) of ground plane and patch. The performance of designed antenna such as radiation pattern, return loss, directivity, VSWR and gain are simulated by using ADS 2009 Software.

### PROPOSED SUBSTRATE DESIGN

#### A. Antenna Dimensions

The mathematical formula is used to calculate the dimensions of ground plane and microstrip patch in the form of length and width. Here we use the slotted technique for improve the bandwidth and reduce the return loss of the microstrip patch antenna. By using multidielctric substrate the return loss are minimized while compare to the MSP antenna. The

## Design of H-Shaped Microstrip Hybrid Patch Antenna for C-Band Applications

Balaji Vignesh.L.K<sup>1</sup>, Dr.K.Kavitha<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of ECE, AAA College of Engineering and Technology, Sivakasi.

<sup>2</sup>Associate Professor, Department of ECE, Mepco Schlenk Engineering College (Autonomous), Sivakasi.

<sup>1</sup>[balajikannan@gmail.com](mailto:balajikannan@gmail.com), <sup>2</sup>[kavitha@mepcoeng.ac.in](mailto:kavitha@mepcoeng.ac.in)

**Abstract**—In this paper, a compact size microstrip hybrid Patch Antenna is designed and analyzed. The bandwidth enhancement of microstrip patch [MSP] is done by rectangular slotted technique. The designed antenna may be used to reduce return loss and increase the bandwidth. The gain has been improved up to 8.72897 dBi, directivity 11.4703 dBi. The proposed rectangular slotted MSP antenna is used for C-band operations. Study of literature of past few year shows that, the leading work on MSP is focused on designing compact sized broadband microstrip antenna. But inherently MSP have narrow bandwidth so to enhance bandwidth various techniques are engaged. The proposed antenna is simulated using ADS 2009 simulation software based on Momentum and EMDS. The antenna is fed by 50Ω microstrip line feed.

**Keywords**—Ground plane, Microstrip patch [MSP], Enhance bandwidth, ADS 2009 Simulator, Microstrip line feed.

### I. INTRODUCTION

Microstrip antenna [1] consists of a radiating patch on one side of a dielectric substrate and a ground plane on the other side. The major disadvantages of Microstrip antennas are lower gain and very narrow bandwidth [2, 3]. It consists of dielectric substrate, with ground plane on the other side.

In this paper, the purpose of a new designed antenna present to enhance the bandwidth of microstrip hybrid patch antenna for many wideband applications [4], [7]. The major drawbacks of MSP antennas are narrow bandwidth and low gain. They may use many techniques to enhance bandwidth and gain of MSP antennas. By using thick substrate with low dielectric constant and slotted patch can enhance the bandwidth and gain of antennas up to greater extent [5].

The MSP antenna has good features such as low cost, low profile, light weight, high efficiency, easy to implement with circuits [2], [5], [6]. The design structure components of antenna will become small in size and have low processing cost [3].

In this letter, transmission line method is used to analysis the Hybrid Multiband Patch antenna. The design resonated frequency of proposed MSHP antenna is 5 GHz (C-band) with 50Ω microstrip line feed. The proposed MSHP antenna is characterized by using thickness (h), dielectric constant ( $\epsilon_r$ ).The designed MSHP antenna can be simulated by ADS 2009 Simulation Software. The performance of the designed MSHP antenna can be analyzed by radiation pattern, return loss, directivity, VSWR and gain.

### II. PROPOSED SUBSTRATE DESIGN

#### A. Antenna Dimensions

The mathematical formula is used to calculate the dimensions of ground plane and microstrip patch in the form of length and width. Here, we use the rectangular tri-slotted technique for improve the bandwidth and reduce the return loss of the MSP antenna. Using the new concept of multidielctric substrate, the return losses are minimized while comparing with the ordinary MSP antenna. The proposed antenna is fed by 50Ω microstrip line feed.

# Numerical Study on the Influence of Mass and Stiffness Ratios on the Vortex Induced Motion of an Elastically Mounted Cylinder for Harnessing Power

Vidya Chandran <sup>1</sup>, Sekar M. <sup>2</sup>, Sheeja Janardhanan <sup>3,\*</sup> and Varun Menon <sup>4</sup> 

<sup>1</sup> Department of Mechanical Engineering, Karunya Institute of Technology and Sciences, Coimbatore, Tamil Nadu 600018, India; vidya.rudn@gmail.com

<sup>2</sup> Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakasi, Tamil Nadu 600018, India; mailtosekar@gmail.com

<sup>3</sup> Department of Mechanical Engineering, SCMS School of Engineering and Technology, Ernakulam, Kerala 673307, India

<sup>4</sup> Department of Computer Science and Engineering, SCMS School of Engineering and Technology, Ernakulam, Kerala 673307, India; varunmenon46@gmail.com

\* Correspondence: sheejajanardhanan@scmsgroup.org; Tel.: +91-828-194-3531

Received: 10 September 2018; Accepted: 25 September 2018; Published: 27 September 2018



**Abstract:** Harnessing the power of vortices shed in the wake of bluff bodies is indeed a boon to society in the face of fuel crisis. This fact serves as an impetus to develop a device called a hydro vortex power generator (HVPG), comprised of an elastically mounted cylinder that is free to oscillate in the cross-flow (CF) direction even in a low velocity flow field. The oscillatory motions in turn can be converted to useful power. This paper addresses the influence of system characteristics viz. stiffness ratio ( $k^*$ ) and mass ratio ( $m^*$ ) on the maximum response amplitude of the elastically mounted cylinder. Computational fluid dynamics (CFD) simulations have been used here to solve a two way fluid–structure interaction (FSI) problem for predicting the trend of variation of the non-dimensional amplitude  $Y/D$  with reduced velocity  $U_r$  through a series of simulations. Maximum amplitude motions have been attributed to the lowest value of  $m^*$  with  $U_r = 8$ . However, the maximum lift forces correspond to  $U_r = 4$ , providing strong design inputs as well as indicating the best operating conditions. The numerical results have been compared with those of field tests in an irrigation canal and have shown reasonable agreement.

**Keywords:** computational fluid dynamics (CFD); flow around cylinder; fluid structure interaction (FSI); hydrodynamic response; numerical methods; simulation and modeling; vortex induced vibration (VIV) ratio

## 1. Introduction

As the sources of fossil fuels are depleting at a faster pace, energy scientists all over the world are keen on the search for new technologies that can provide renewable and clean energy. Hydroelectric power generation is of course a clean source of energy, but considering the capital investment and the effects of dams on natural ecosystems, the need for a much cleaner energy source becomes more important. This paper discusses the design and manufacture of the hydro vortex power generator (HVPG) model, which when scaled up can be viewed as one such cleaner source of electricity. Also, the paper discusses a numerical method to optimize the design parameters of HVPG model. The principle behind the working of HVPG is vortex shedding in the wake of bluff bodies in fluid flow. The phenomenon of vortex shedding behind bluff bodies has been an extensively researched topic [1,2]. The presence of such vortex shedding has been considered undesirable and researchers had been in

## Prediction of Hydro-dynamic Force Coefficients and Shedding Frequency during Vortex Shedding Behind a Stationary Cylinder

Vidya Chandran<sup>1\*</sup>, Sheeja Janardhanan<sup>2</sup>, Sekar M.<sup>3</sup>

<sup>1</sup>Department of Mechanical Sciences, Karunya University, Coimbatore, Tamil Nadu, India

<sup>2</sup>Department of Mechanical Engineering, SCMS School of Engineering and Technology, Karukutty, Kerala, India

<sup>3</sup>Department of Mechanical Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh, India

### ABSTRACT

*Vibration of slender cylinders caused by the shedding of vortices at the wake, known as vortex induced vibrations (VIV) is a topic of great research interest, since the phenomenon can reduce the fatigue life of marine risers, which are subjected to complex flow conditions in ocean environment. This paper studies in detail the accuracy with which hydrodynamic forces are predicted by different turbulence models such as k-ε and k-ω-shear stress transport (SST) turbulence models. Numerical simulations have been carried out in commercial solver ANSYS FLUENT. Present study compares the results of numerical simulations of flow around a stationary cylinder at Re= 1000. It has been evidently proved from this study, mesh size and skewness not only of the near body elements, but also of those in the far flow field influences the shedding phenomenon, especially the shedding frequency.*

**Keywords:** Vortex induced vibrations (VIV), shear stress transport (SST), ANSYS fluent.

### \*Correspondence Author

E-mail: vidyachandran@scmsgroup.org

### INTRODUCTION

With the ever-rising demand for petroleum products, development of offshore oilfields has been growing fast over the past century. The drilling facilities are designed in such a way that it enables a prolonged offshore operation for a large period of time starting from a few months to several decades. Numerous studies are being carried out in this field for proper designing of the slender marine risers in ocean. If the bluff structure is not mounted rigidly and the frequency of vortex shedding matches the natural frequency of the structure, the structure begins to resonate, vibrating with harmonic oscillations of large amplitude. This phenomenon is known as "lock-in". During lock-in, vortex shedding frequency shifts to the natural frequency of the structure leading to large amplitude vibrations.

The vortex shedding occurs at a discrete frequency and is a function of the Reynolds number (Re), defined by Eq. (1).

$$Re = \rho V D / \mu \quad (1)$$

The dimensionless frequency of the vortex shedding, the shedding Strouhal number (St),  $St = f \cdot D / V$ , is approximately equal to 0.2 when the Reynolds number is greater than 1,000. When vortices are shed from the cylinder, uneven pressure distribution develops around the upper and lower surfaces of the cylinder, generating an oscillatory hydrodynamic loading (lift) on the cylinder. This unsteady force is given by Eq. (2) that can induce significant cross flow vibrations on a structure, especially if the "resonance" condition is met.

$$F_L = C_L \frac{1}{2} \rho A V^2 \quad (2)$$

## WATER QUALITY MONITORING SYSTEM USING IoT

P. Elamparithi<sup>1</sup>, S.Adhlin Esther<sup>2</sup>, A.Jeya Gowri<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2,3</sup>Student

Department of Computer Science & Engineering, AAA College of Engineering & Technology, Sivakasi.

**ABSTRACT:** In the modern world, Internet of Things (IoT) and Remote Sensing (RS) techniques are being used in diverse areas of research for monitoring, collecting and probing data from isolated locations. Drinking water is a very valuable Commodity for all human beings. Drinking water utilities face a lot of new challenges in real-time operation. The existing system consists of several sensors which are used for measuring physical and chemical parameters of water. The parameters such as temperature, pH, turbidity, conductivity, dissolved oxygen of the water can be measured. Our proposed system consists of Turbidity and pH sensor of water evaluation testing, single board computer module/mobile module, internet and other accessories. Our proposed work describes the wireless water quality monitoring system through which the quality of the water can be monitored and sends the alarm signal when the eminence of water is not on the anticipated value. A user can check the status of pH on the mobile through Wi-Fi. The undesired pH value shows that the stored water is contaminated and not useful to consume, hence one should clean their water tank or change the water as early as possible.

**Keywords:** Water Quality; pHsensor; Turbidity Sensor; Raspberry Pi3 model B

### I. INTRODUCTION

Ensuring the safety of water is a challenge due to the unnecessary sources of pollutants, most of which are man-made. The foremost causes for water quality problems are over exploitation of natural resources. The hurried pace of industrialization and greater prominence on agricultural growth combined with latest advancements, agricultural fertilizers and non-enforcement of laws have led to water pollution to a large scope. The crisis is sometimes annoyed due to the non-uniform distribution of rainfall. Individual practices also play a significant role in determining the quality of water (Central Ground Water Board, 2017). Water quality is exaggerated by both point and non-point sources of pollution, which comprise sewage discharge, expulsion from industries, run-off from agricultural fields and urban run-off. Other sources of water pollution include floods and droughts and due to lack of responsiveness and education among users. The need for user contribution in maintaining water quality and looking at other aspects like hygiene, environment cleanliness, storage and disposal are critical elements to preserve the quality of water resources. Poor water quality spreads disease, causes death and hampers socio-economic progress. More than 5 million people die due to waterborne diseases around the world (Water Resource Information System of India, 2017). Fertilizers and pesticides used by farmers can be washed through the soil by rain, to

end up in rivers. Industrial waste goods are also joined into rivers and lakes. Such contaminations enter the food chain and accumulate until they reach toxic levels, eventually killing birds, fish and mammals. Chemical factories also dispose wastes in the water. Factories use water from rivers to power equipment or to cool down machinery. For proper water supply, water administration is required for the wise use of water assets. The major problems are: poor water allocation, degraded water health or quality and lack of tolerable water management system. The above problems are the key enthusiasm of this research and the ultimate purpose is to monitor the water health. Due to leakage of pipes where water distribution networks are implemented, the water can be polluted and the quality of water degrades. Hence it is suitable to continuously monitor the water health. The earlier methods required a person to take samples of water and then testing was done manually which consume a lot of time and was lengthy.

### II. RELATED WORKS

Numerous systems have already been developed based on the topics of remote monitoring. Various researches have been performed to monitor the quality of water:

Autonomous water quality monitoring system using GSM [4]. This system was developed jointly as an element of the Autonomous Live Animal Response Monitor (ALARM) toxicity biosensor, designed to be deployed in-stream for continuous surveillance. The objective of their work is to create a low cost, wireless water quality monitoring system that aids in continuous menstruation of water conditions. Their involvement during this is that the system-level integration of biosensors, sensing element signal processing and sensing element information management. Their system was designed to measure a suite of biologically relevant physiochemical parameters in fresh water. They measured temperature, intensity level, pH, electrical conduction, total dissolved solids, salinity, dissolved oxygen and red sox potential. These parameters provide insights into the current status of changing water conditions and assist in identifying pollution sources.

Design of Smart Sensors for Real-Time Water Quality Monitoring using ZigBee[5].

The system is able to calculate physiochemical parameters of water quality, such as flow, temperature, pH, conduction and also the redox potential. These physiochemical parameters are used to detect water contaminants. The sensors which are designed from first principles and implemented with signal conditioning circuits are connected to a microcontroller-based measuring node, which processes and analyses the data. In this design, ZigBee receiver and transmitter modules are used for communication between the measuring and



# Max-Weighted Routing and Wavelength Assignment Algorithm in Optical Networks

Jeno Jasmine J

Department of Computer and Engineering  
S. Veerasamy Chettiar College of Engineering  
Taminadu, India  
jenojasmime@gmail.com

Sutha J

Department of Computer Science and Engineering  
AAA College of Engineering and Technology  
Taminadu, India  
sutha\_skad@yahoo.co.in

**Abstract**—Wavelength routed network is capable of carrying the traffic grooming situations. The assigning of wavelength to routed path is one of the major facts that affect the blocking probability. This paper proposes a novel idea for assigning of wavelength called Max-Weighted Routing and Wavelength assignment algorithm for reducing the blocking probability and better performance. This algorithm focuses on weight factor which is calculated from number of total available wavelength, free wavelength and hop count along with load balancing factor. The results are compared with first fit, random, least used wavelength assignment with fixed, fixed alternate, adaptive routing, adaptive alternate routing.

**Keywords**—Routing, Wavelength, WDM, Weight Factor

## I. INTRODUCTION

### A. Wavelength Division Multiplexing (WDM)

In optical networks, Wavelength division multiplexing (WDM) is emerging technology for next generation. In WDM, many optical light signals share the single fiber using many wavelengths [1] [2]. The utilization of fiber link can be increased with wavelength routed channel operating at high speed. The lightpath is established, when connection request arise between source(s) and destination (d), s-d pair. Lightpath is the set of links between the internet nodes from s to d, where the each links are assigned to wavelength. This is how the wavelength routed optical network (WRON) is linked with nodes. For every connection request, a wavelength is determined and assigned to a physical links for creating the lightpaths. This issue is called as routing and wavelength assignment problem [3] [4].

### B. Routing and Wavelength Assignment (RWA) Algorithm

RWA problem is divided into two sessions. First is assigning routes and second is assigning wavelength to links between s to d nodes.

### a) Routing Algorithms:

Fixed routing, fixed alternative routing for static lightpath establishment (SLE) and adaptive routing adaptive alternate routing for dynamic lightpath establishment (DLE) are some the routing algorithms used in optical WDM network. In fixed routing, s to d path is fixed previously and assigned to the physical links [5]. In fixed alternate routing [6], s and d have more than one alternate path which is predicted and fixed in advance. An alternate route is chosen, if there is any failure in the previous assigned links.

In Adaptive Routing, the link state information is taken from routing table for assigning routes from s to d in dynamic manner [7]. The routes are chosen on basis of hop-by-hop instead of end-to-end. Information of every node is taken on routing table which is classified in local information, global information and neighborhood information [8] [9]. Adaptive alternate routing (AAR) is for circuit switched network which is dynamic alternate routing [10] base. AAR is to distribute the traffic among two pre-predicted links, where links are chosen with the amount of traffic load on path. The alternate path is finding by rrankback mechanism to check the given network periodically for available bandwidth in the network link.

### b) Wavelength Assignment Problem:

Wavelength Assignment problem is further subdivided in to search and selection method. Search method used to assign the available wavelength; soon the routes are identified like first-fit and random wavelength assignment. In selection method, the wavelength is chosen with some criteria and the assigned to the set of routes like least used and most used wavelength assignment.

In First-fit (FF) wavelength assignment method, all the available wavelengths are arranged in increasing order. Then from lowest position, the wavelength is selected for assigning the route. This method doesn't need global information and very less computation cost. In random wavelength (RW) assignment, the wavelength is selected randomly from the set of available wavelengths [11-13]. This method doesn't have communication overhead but high cost compare to first-fit wavelength method. Least used and most used wavelengths are identified and then assigned to a chosen route for load balancing in least used (LU) and most used (MU) wavelength



---

## Design of fault tolerance environment in optical networks

---

Jeno Jasmine J.\* and J. Sutha

Department of Computer Science and Engineering,  
SVC College of Engineering,  
Tamilnadu, India  
Email: jenojasmine@gmail.com  
Email: sutha\_skadi@yahoo.co.in  
\*Corresponding author

**Abstract:** In optical networks, transfer of data happens at long haul in form of light. While transmitting data at long distance make sure that the delivery of data and quality of service must guarantee. To ensure the QoS, delivery of data, the network environment must be a fault tolerance. In this paper a novel algorithm, Fault Alarm and Location Algorithm is launched for detecting and locating the fault occurrence in network to create fault tolerance environment.

**Keywords:** long-haul, fault tolerance, QoS, delivery of data, fault alarm, locating.

Reference to this paper should be made as follows: Jasmine J. J. and Sutha, J. (2017) Design of fault tolerance environment in optical networks, *Int. J. Biomedical Engineering and Technology*, Vol. 25, Nos. 2/3/4, pp.326–335.

**Biographical notes:** Jeno Jasmine J. graduated in Information Technology with first class in 2006 from Anna University, obtained master degree in Network Engineering with first class in 2008 from same university. She is Assistant Professor at SVC Engineering College, Tiruvelveli. She has published two papers in international journals.

J. Sutha graduated in Computer Science and Engineering with first class in 1991 from Madurai Kamaraj University, obtained master degree in Computer Science Engineering with first class with distinction in 2000 from same university and completed PhD program in Anna University, Chennai in 2008. She is Professor and Head of the Department of Computer Science and Engineering of AAA College of Engineering and Technology, Sivakasi. She has written three books, namely, *Computer Programming, Programming with C, Fundamentals of Computing and Programming* and published 28 papers in international journals, eight papers in international conferences and 12 papers in national conferences.

---

### 1 Introduction

Optical networking is capable of achieving extremely high bandwidth using fibre optic cables. Fibre uses signals encoded into lights to transmit information over national, international and transoceanic distance. The network failure may occur due to the failure of ports, link, node, and segment.

---

## Optimisation of cutting parameters in CNC turning of EN-19 using tungsten carbide

---

M. Suresh, R. Meby Selvaraj, K. Rajkumar  
and V.M. Saravanan\*

Department of Mechanical Engineering,  
P.S.R. Engineering College,  
Sivakasi-626140, Tamil Nadu, India  
Email: mesuresh\_theni@rediffmail.com  
Email: mebyselvaraj@gmail.com  
Email: rajkumark180@gmail.com  
Email: rvmsaravanan@gmail.com  
\*Corresponding author

**Abstract:** Efficient turning of high performance EN series material can be achieved through proper selection of turning process parameters to minimise surface roughness and maximise the material removal rate. This present paper outlines an experimental study to optimise and study the effects of process parameters in CNC turning on surface roughness of EN19/AISI4140 (medium carbon steel) work material in dry environment conditions. The orthogonal array, signal to noise ratio and regression technique were employed to study the performance characteristics in CNC turning operation. Four machining parameters were chosen as process parameters. They are cutting speed, feed rate, tool nose radius and depth of cut. The experimentation plan was designed using Taguchi's L9 orthogonal array (OA) and Minitab-16 statistical software. Optimal values of process parameters for desired performance characteristics were obtained by Taguchi design of experiment. Moreover prediction models had been developed with the help of regression analysis to find the effect of cutting parameters.

**Keywords:** Taguchi method; surface roughness; EN19; feed rate; depth of cut; material removal rate.

**Reference** to this paper should be made as follows: Suresh, M., Meby Selvaraj, R., Rajkumar, K. and Saravanan, V.M. (2017) 'Optimisation of cutting parameters in CNC turning of EN-19 using tungsten carbide', *Int. J. Computer Aided Engineering and Technology*, Vol. 9, No. 2, pp.218-228.

**Biographical notes:** M. Suresh obtained his BE from ACCET, Karaikudi, Tamil Nadu in 2000. He obtained his ME from GCE, Periyar University, Tamil Nadu. His research interests are composite materials and machine design. He is currently working as an Assistant Professor in the Department of Mechanical Engineering of P.S.R. Engineering College, Sivakasi.-626140, Tamil Nadu, India.

R. Meby Selvaraj obtained his BE from Karunaya University, Tamil Nadu in 2011. He obtained his ME from Anna University, Chennai in 2013. His research interests are nanocomposite materials and machine design. He is currently working as an Assistant Professor in the Department of Mechanical Engineering of P.S.R. Engineering College, Sivakasi.-626140, Tamil Nadu, India.

---

## Optimisation of swept angles for airfoil NACA 6-series

---

R. Meby Selvaraj\*, P. Ebenezer Sathish Paul,  
G. Uthaya Kumar and M. Ramesh

Department of Mechanical Engineering,  
P.S.R. Engineering College,  
Sivakasi, Tamil Nadu, India  
Email: mebysevaraj@gmail.com  
Email: ebyapaul007@gmail.com  
Email: uthayg@yahoo.co.in  
Email: rameshthermal79@gmail.com

\*Corresponding author

**Abstract:** A NACA 6-series is one of the most commonly used commercial passenger aircraft, which is of subsonic and transonic type. This series, a laminar flow type is taken for our study. In this paper the straight wing and the swept back wings are designed using a suitable tool and it is simulated by using CFD software. FLUENT software is used to analyse the different swept angles of 0°, 25°, 30°, 35°, 40° and 45° for different mach numbers ranging from 0.6 to 1.2. Based on these results the drag coefficient ( $C_D$ ) and lift coefficient ( $C_L$ ) are plotted. The values for the straight and swept wings indicate that there is a reduction in drag coefficient. Then thus by means of optimisation factor the swept angle is optimised for the NACA 6-series air foil. By the help of the optimising factor we have found that 35° will be more efficient and it is the best choice for a high speed aircraft, because this wing minimises fuel consumption and thereby by remarkably reducing wave drag during flight thus reducing the cost of flight and increase the range of aircraft and at the same time it ensures a safe take-off and a smooth landing.

**Keywords:** NACA 6-series; CFD; swept angles; drag coefficient; lift coefficient.

**Reference** to this paper should be made as follows: Selvaraj, R.M., Paul, P.E.S., Kumar, G.U. and Ramesh, M. (2017) 'Optimisation of swept angles for airfoil NACA 6-series', *Int. J. Computer Aided Engineering and Technology*, Vol. 9, No. 2, pp.229–240.

**Biographical notes:** R. Meby Selvaraj obtained his post graduate in CAD/CAM (2013) at Mepco Schlenk Engineering College Sivakasi and obtained his under graduate in Mechanical Engineering (2011) at Karunya University, Coimbatore. His research interest is in computational fluid dynamics. Currently, he is working as an Assistant Professor in P.S.R. Engineering College, Sivakasi 626140.

P. Ebenezer Sathish Paul obtained his post graduate in CAD/CAM (2008) at Mepco Schlenk Engineering College Sivakasi and obtained his under graduate in Mechanical Engineering (2006) at Karunya Institute of Technology, Coimbatore. His research interest is in fracture mechanics. Currently, he is working as an Assistant Professor in P.S.R. Engineering College, Sivakasi 626140.

# An effective genetic algorithm for flow shop scheduling problems to minimize makespan

R.B. Jeen Robert\*, R. Rajkumar\*\*

\*Department of Mechanical Engineering, AAA College of Engineering and Technology, Sivakasi- 626005, India, E-mail: jeenrb\_robert@yahoo.com

\*\*Department of Mechanical Engineering, Mepco Schlenk Engineering College, Sivakasi-626005, India

 <http://dx.doi.org/10.5755/j01.mech.23.4.1.5053>

## 1. Introduction

In past 5 decades flow shop scheduling may be a challenging area for researchers. Its main aim is to work out the job sequence of processing jobs on a given set of machines. In manufacturing environment flow shop scheduling is taken into account as most category of problem. A general flow shop scheduling during which  $n$  jobs are to be processed through  $m$  machines is to be considered. Fixed and non-negative processing times are thought of here: the foremost important assumptions created are that every job will be processed on only one machine at a time, the operations don't seem to be preventive, the jobs are out there for processing at time zero and set-up times are sequence independent. Here we have a tendency to think about the permutation flow shop problem, identical job sequence is taken into account on each machine for manufacturing. In flow shop scheduling minimizing makespan and total flow time may be a difficult task for several of the researchers. Therefore we thought of minimizing makespan as objective for my present work using meta-heuristic approach by improvising the Genetic algorithmic program. During this effective genetic algorithm (EGA), worst solutions are aloof from that algorithm by adding robust factor concept.

The first research involved to the flow shop scheduling problem was planned by Johnson [1]. Johnson represented a certain algorithm to reduce makespan for the  $n$ -jobs and 2-machines flow shop scheduling problem. Once the flow shop scheduling problem enlarges as well as additional jobs and machines, it becomes a combinatorial optimization problem. It's clear that combinatorial optimization problems are in NP-hard problem class, and close to optimum solution techniques are most popular for such problems. In recent years, metaheuristic approaches like Tabu Search, Genetic algorithms, simulated annealing, differential evolution, and artificial immune systems are very fascinating to solve combinatorial optimization problems relating to their computational performance. The recent studies for the flow shop scheduling problem with makespan criteria, it's obvious that the solution methods supported metaheuristic approaches are often planned. Mainstream of studies for the flow shop scheduling problem focuses to reduce makespan. For instance, the flow time, the machine idle times are main measures in minimizing total scheduling cost. Whereas makespan decrease results in total production run utilization, flow time decrease results in stable consumption of resources, fast turn-around of jobs and work-in-process inventory minimization. So as to reduce the production cost, it's desired to attain each these two objectives at the same time. Rajendran [2, 3] given one branch-and-bound algorithm and

two heuristic algorithms aimed at two machine flow shop scheduling problem through makespan because the primary criterion and total flow time. Neppalli, Chen, and Gupta [4] planned two genetic algorithms for this problem. T'kindt, Gupta, and Billaut [5] presented mathematical programming designs, a branch-and-bound process, and a heuristic algorithm. Later, Jeen Robert et al. [6] have given a hybrid algorithm for Minimizing Makespan in the flow shop Environment. Yeh [7] created a memetic algorithm to solve this problem.

Recently, ant colony optimization (ACO) approach has become additional preferred to solve combinatorial optimization problems. This heuristic algorithm combines simulated annealing search and a local search algorithm. This study is that the initial application of ACO metaheuristic to multiobjective  $m$ -machine flow shop scheduling problem with esteem to the both objectives of makespan and total flow time. The performance of planned algorithm was related with two heuristic algorithms developed by Rajendran [8] and Ravindran [9] for these category problems and Genetic algorithm. Computational studies were showed on the yardstick problems from Taillard [10] because the test problem so as to verify the algorithm's performance. During this literature survey we tend to found several algorithm are accustomed solve flow shop scheduling problem in manufacturing field by many of the researchers, however we might found that genetic algorithm is very old algorithm however very powerful algorithm to solve flowshop scheduling problem. At the same time Muthiah [18] was described an opposite genetic algorithm and it was applied in Job shop scheduling problem. Thus we used genetic algorithm to solve flowshop scheduling however it's in effective approach by modifying its method routes strategies. Here we tend to addressed effective genetic algorithm (EGA) to solve flowshop benchmark problem, and also the results obtained by EGA are compared with earlier reportable results by using ant colony algorithm ACO by Betul Yagmahan [11] and Andrea Rossi [12].

## 2. Problem description and notations

Consider an  $m$ -machine flow shop problem where there are  $n$  jobs to be processed on the  $m$  machines among an equivalent order. We've got a tendency to completely take under attention of the permutation schedules, i.e., the same job order on each machine. The objective of this paper is to improve a developed Real Coded Genetic Algorithm and Efficient Genetic Algorithm to hunt out the most effective or near best sequence in flowshop environment by minimizing makespan. Meanwhile, the sequence among which

## PATTERN GROWTH ALGORITHM FOR MINING HIGH UTILITY ITEMSETS

T.Gladima Nisia<sup>1</sup>, K.Banu Priya<sup>2</sup>,V.Gayathri<sup>3</sup>

<sup>1</sup>Assistant Professor, AAA College of Engineering and Technology, Sivakasi

<sup>2,3</sup>UG Student, AAA College of Engineering and Technology, Sivakasi

*Corresponding author E-Mail-ID: gladimab@gmail.com*

### ABSTRACT

---

Mining high utility itemsets from a transactional database refers to the discovery of itemsets with high utility like profits. Although a number of relevant algorithms have been proposed in recent years, they incur the problem of producing a large number of candidate itemsets for high utility itemsets. In this paper, we propose an algorithm namely Pattern Growth Algorithm (P\_Growth Algorithm) for mining high utility itemsets from frequent itemsets with a set of effective strategies for pruning candidate itemsets. The information of high utility item sets is maintained in a Graph based data structure named Pattern Graph (P\_Graph) such that candidate item sets can be generated efficiently. Algorithm named Pattern Growth Algorithm and a compact data structure, called Pattern Graph for discovering high utility item sets and maintaining important information related to utility patterns within databases are proposed. The Classification based on Multiple Association Rule (CMAR) is utilized in order to generate frequent itemsets. Several strategies are proposed for facilitating the mining processes of P-Growth Algorithm by maintaining only essential information in P\_Graph. The Pattern Graph is generated for finding High Profit with Support Count.

**Keywords:** *P-Growth Algorithm, Itemsets, P\_Graph, Multiple Association Rule, Support Count.*

---

### 1. INTRODUCTION

Data Mining is the process of revealing nontrivial, previously unknown and potentially useful information from large databases. Discovering useful patterns hidden in a database plays an essential role in several data mining tasks, such as frequent pattern, weighted frequent pattern mining, and high utility pattern mining. Among them, frequent pattern mining is a fundamental research topic that has been applied to different kinds of databases, such as transactional databases [1],[14],[17], streaming databases [18],[3], and time series databases [9],[12], and various application domains, such as bioinformatics [8],[11],[2], Web click-stream analysis [7], mobile environments [15],[14].

Algorithm, named pattern growth (P\_Growth) and a compact data structure, called Pattern Graph (P\_Graph), for discovering high utility item sets and maintaining important information related to utility patterns within databases are proposed.

High-Utility item sets can be generated from P\_Graph efficiently with only two scans of original databases. Several strategies are proposed for facilitating the mining process of P\_Growth Algorithm by maintaining only essential information in P\_Graph. By these Strategies, overestimated utilities of candidates can be well reduced by discarding utilities of the items that cannot be high utility or are not involved in search space.

## Optimization of transesterification of biodiesel using green catalyst derived from albizia lebback pods by mixture design

N. Subramonia Pillai<sup>a\*</sup>P. Seeni Kannan<sup>b</sup>S. C. Vettivel<sup>c</sup>S. Suresh<sup>d</sup>

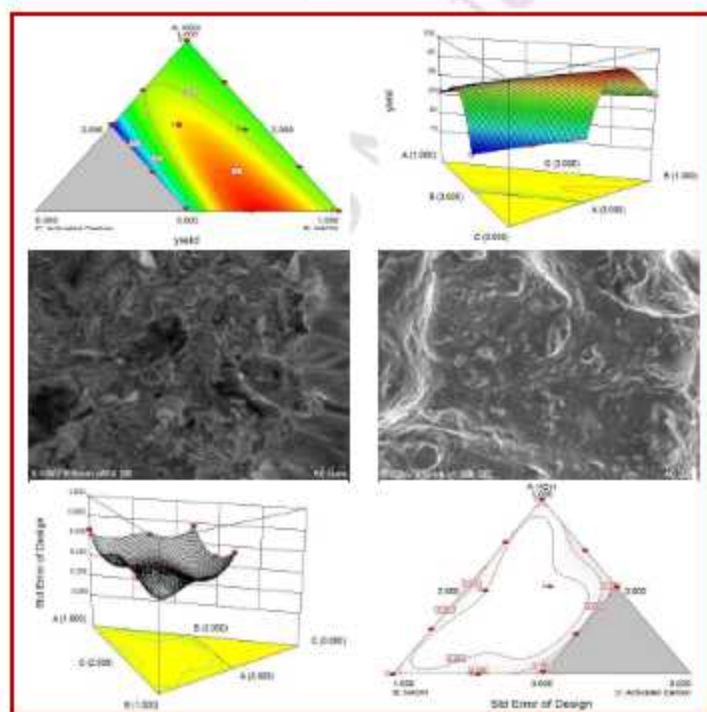
<sup>a</sup>\*Corresponding Author, Department of Mechanical Engineering, Rohini College of Engineering and Technology, Kanyakumari, Tamilnadu, India, Pin: 629 401, E mail: shiva.ice@gmail.com, Tel.: +91-9843743431.

<sup>b</sup>Department of Mechanical Engineering, Sethu Institute of Technology, Pulloor, Karaiapatti, Tamilnadu, India, – 626115 E mail: seenipkannan@yahoo.co.in, Tel.: +91-9486140536.

<sup>c</sup>Department of Mechanical Engineering, Chandigarh College of Engineering and Technology, Chandigarh, India. E mail: scvettivel@ccet.ac.in, Phone: +91-9865822376.

<sup>d</sup>Department of Mechanical Engineering, University College of Engineering, Nagercoil, Tamilnadu, India, Pin: 629 004. E-mail: ssuresh2009@gmail.com, Tel.: +91- 9443494576.

### Graphical Abstract



## Structural and Optical Properties of SnO<sub>2</sub> Thin Film by Nebulizer Spray Pyrolysis Technique

S.Palanichamy<sup>1</sup>, L.Amalraj<sup>1</sup>, J.Raj Mohamed<sup>2</sup> and P.S.Satheesh Kumar<sup>3</sup>

<sup>1</sup>P.G. and Research Department of Physics, Virudhunagar -626001, Virudhunagar, Tamilnadu, India

<sup>2</sup>P.G. and Research Department of Physics, H.H.The Rajah's College, Pudukkottai -622001, Tamilnadu, India

<sup>3</sup>Department of Physics, NPR College of Engineering & Technology, Natham, Dindigul-624 401, Tamilnadu, India

\*Corresponding Author: S.Palanichamy<sup>1</sup>, L.Amalraj<sup>1</sup>

E-mail: (e-mail: nanopalani@gmail.com)

Received: 07/11/2015, Revised: 13/01/2016 and Accepted: 05/03/2016

---

### Abstract

Nano crystalline tin oxide (SnO<sub>2</sub>) thin film was prepared at optimized substrate temperature 300 °C with 0.05M concentration using a simple and easy nebulizer spray pyrolysis technique. The film was characterized by X-ray diffraction analysis(XRD), optical transmittance study (UV-Vis-NIR double beam Spectrophotometer), scanning electron microscopy (SEM) and photoluminescence analysis(PL). The film was shiny, uniform and good adherent with polycrystalline nature. The X-ray diffraction pattern shows the tetragonal structured SnO<sub>2</sub> film with (110) preferred orientation. The average crystalline size was found to be 53.17 nm. SEM image exhibits that the film has no voids and cracks. The higher transmittance (91%) of photon energy was observed by transmittance spectra. The band gap energy of the as prepared SnO<sub>2</sub> thin film was obtained to be 3.78 eV.

**Key words:** *absorption, band gap, Nebulizer spray pyrolysis, thin film*

*\*Reviewed by ICETSET'16 organizing committee*

---

### 1. Introduction

In recent years, the nano-structured metal oxides have been most widely studied materials owing to their many applications. Tin oxide (SnO<sub>2</sub>) is the most important transparent conducting oxide (TCO) material among various TCO materials such as ZnO, CdO, In<sub>2</sub>O<sub>3</sub> etc., due to their high transmittance, high reflectance, chemically inert, mechanically hard, not affected by atmospheric conditions. The SnO<sub>2</sub> film were used in various applications such as window materials in solar cell [1], gas sensors [2], transistor [3], optoelectronic devices [4], lithium batteries [5], flat panel display etc., Its splendid physical and chemical properties makes it one of the top-quality material used for detection of distinct types of gases.

Different types of techniques have been used to prepare SnO<sub>2</sub> thin film such as electron beam evaporation

## Use of calophyllum inophyllum biofuel blended with diesel in DI diesel engine modified with nozzle holes and its size

G. Vairamuthu<sup>1</sup> · S. Sundarapandian<sup>2</sup> · B. Thangagiri<sup>3</sup>

Received: 9 December 2014 / Accepted: 30 June 2015  
© Springer-Verlag Berlin Heidelberg 2015

**Abstract** Improved thermal efficiency, reduction in fuel consumption and pollutant emissions from biodiesel fueled diesel engines are important issues in engine research. To achieve these, fast and perfect air–biodiesel mixing are the most important requirements. The mixing quality of biodiesel spray with air can be improved by better design of the injection system. The diesel engine tests were conducted on a 4-stroke tangentially vertical single cylinder (TV1) kirloskar 1500 rpm water cooled direct injection diesel engine with eddy current dynamometer. In this work, by varying different nozzles having spray holes of 3 (base,  $\text{Ø} = 0.280$  mm), 4 (modified,  $\text{Ø} = 0.220$  mm) and 5 (modified,  $\text{Ø} = 0.240$  mm) holes, with standard static injection timing of 23° bTDC and nozzle opening pressure (NOP) of 250 bar maintained as constant throughout the experiment under steady state at full load condition of the engine. The effect of varying different nozzle configuration (number of holes), on the combustion, performance and exhaust emissions, using a blend of calophyllum inophyllum methyl ester by volume in diesel were evaluated. The test results showed that improvement in terms of brake

thermal efficiency and specific fuel consumption for 4 holes and 5 holes nozzle operated at NOP 250 bar. Substantial improvements in the reduction of emissions levels were also observed for 5 holes nozzle operated at NOP 250 bar.

### Abbreviations

CIME	Calophyllum inophyllum methyl ester
ULSD	Ultra low sulfur diesel
NOP	Nozzle opening pressure
B0	ULSD
B25	Blend of 25 % CIME with ULSD
B50	Blend of 50 % CIME with ULSD
B75	Blend of 75 % CIME with ULSD
B100	100 % CIME
NH	Nozzle hole
CI	Compression ignition
DI	Direct injection
BSFC	Brake specific fuel consumption
BTE	Brake thermal efficiency
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
NOx	Oxides of nitrogen
HSU	Hartridge smoke unit
SD	Smoke density
HC	Hydrocarbon
ppm	Parts per million
HRR	Heat release rate
P	Pressure (bar)
°CA	Degree crank angle
TDC	Top dead center
bTDC	Before top dead center
kW	KiloWatt
kJ	KiloJoules
kg	Kilogram

✉ G. Vairamuthu  
vairamuthu\_guru@yahoo.com

<sup>1</sup> Department of Mechanical Engineering, Sethu Institute of Technology (Autonomous), Virudhunagar, Tamil Nadu 626115, India

<sup>2</sup> Department of Automobile Engineering, Dr. Mahalingam College of Engineering and Technology (Autonomous), Pollachi, Tamil Nadu 642 003, India

<sup>3</sup> Department of Chemistry, Mepco Schlenk Engineering College (Autonomous), Sivakasi, Tamil Nadu 626 005, India



# Accepted Manuscript

Experimental investigation on the effects of Cerium oxide nanoparticle on Calophyllum inophyllum (PUNNAI) biodiesel blended with diesel fuel in DI diesel engine modified by nozzle geometry

G. Vairamuthu, S. Sundarapandian, C. Kailasanathan, B. Thangagiri



PII: S1743-9671(14)20392-8

DOI: [10.1016/j.joei.2015.05.005](https://doi.org/10.1016/j.joei.2015.05.005)

Reference: JOEI 158

To appear in: *Journal of the Energy Institute*

Received Date: 9 November 2014

Revised Date: 10 May 2015

Accepted Date: 19 May 2015

Please cite this article as: G. Vairamuthu, S. Sundarapandian, C. Kailasanathan, B. Thangagiri, Experimental investigation on the effects of Cerium oxide nanoparticle on Calophyllum inophyllum (PUNNAI) biodiesel blended with diesel fuel in DI diesel engine modified by nozzle geometry, *Journal of the Energy Institute* (2015), doi: [10.1016/j.joei.2015.05.005](https://doi.org/10.1016/j.joei.2015.05.005).

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**MRI brain image analysis for tumour diagnosis using hybrid MB-MLM pattern classification technique.**Shenbagarajan A<sup>1\*</sup>, Ramalingam V<sup>1</sup>, Balasubramanian C<sup>2</sup>, Palanivel S<sup>1</sup><sup>1</sup>Department of Computer Science and Engineering, Annamalai University, Chidambaram, India<sup>2</sup>Department of Computer Science and Engineering PSR Rengasamy College of Engineering for Women, Sivakasi, India**Abstract**

Brain tumours are rooted by atypical and abandoned enlargement of brain cells, which are the subsequent source of death associated to cancer in less than 30 years age of people in recent years. Early stage diagnosing of these brain tumours will reduce the unconditional deaths of young people. For that the most suggested one of the finest expertises is Magnetic Resonance Imaging (MRI). In this work, proposed a brain MRI image based medical image analysis process, which consists of Modified Bat Algorithm with Modified Levenberg Marquardt (MB-MLM) classification with Active Contour Method (ACM) segmentation method to identify or classify tumor or non-tumor at earlier stage. For optimal results, this work also proposes the methods like advanced median filter pre-processing method for enhance the input image, parallelized clustering method for surface feature extraction and Intensity in Homogeneity (IHH) for high segmentation accuracy, hybrid wavelet and Sobel and Canny feature extraction method and Fast Independent Component Analysis (Fast ICA) feature selection method for dimensionality reduction, these proposed methods are increase the efficiency of the proposed MRI brain image based tumor diagnosis process. The performance of this proposed work is measured by standard parameters such as sensitivity, specificity and accuracy.

**Keywords:** Brain tumours, Magnetic resonance imaging (MRI), Modified levenberg marquardt (MB-MLM), Active contour method (ACM), Hybrid wavelet and sobel and canny feature extraction, Fast independent component analysis (Fast ICA).

*Accepted on August 31, 2016***Introduction**

Recent years medical imaging is extensively utilized for examination and analysis of image based applications. The improvement on the medical imaging systems at reduced cost can solve many current problems in medical field such as image-guided surgery, therapy evaluation and diagnostic tools [1]. Thus, Magnetic Resonance Imaging (MRI) has been widely used due to its excellent spatial resolution, tissue contrast and non-invasive character [2,3]. Typically MRI supported imaging equipment utilized in brain images grounded by diagnosis procedure, since it is distinguished that the brain has a problematical structure; thus, truthful examination of brain is highly significant for identifying tumors founded on MRI method, in sort to offer appropriate treatment [4]. A method to categorize tissues into these grouping is an essential stride in quantitative morphology of brain since the largest part of brain organizations is distinct by restrictions of these tissue modules [5]. Contrasting additional diagnostic processes, MRI schemes generate recurrent images, where varied essential factors of interior anatomical organization in the identical body segment are tinted by every

image with numerous contrasts. In the largest part of the MRI supported medical imaging investigations, primarily spotlights on pre-processing method. The main popular pre-processing approach is noise correcting or suppression for non-uniformities. There are numerous algorithms anticipated for this duty that adjacent to their profits, they may have off-putting effects on auxiliary processing phase [6]. Previous to several examinations on an exact objective in the image, it is essential to section or categorize that from further divisions in the image.

In general segmentation in medical images is dividing the pixels to distinguish and divide the intended area generally a tissue or an injury from the surroundings and strong tissues. In some study meadows, segmentation of a definite tumor or tissue is the major principle. In other words, segmentation is an intermediary stage for auxiliary investigation such as categorization or added measurements. In case of brain tumors, it is a tricky task concerning to the distinctiveness of the tumour in the MRI brain descriptions [7]. Image segmentation procedures make use of region, edge, or intensity possessions of the goal tissue in the image to divide them from the

# Tumor Diagnosis in MRI Brain Image using ACM Segmentation and ANN-LM Classification Techniques

A. Shembagarajan<sup>1\*</sup>, V. Ramalingam<sup>1</sup>, C. Balasubramanian<sup>2</sup> and S. Palanivel<sup>1</sup>

<sup>1</sup>Department of Computer Science and Engineering, Annamalai University, Chidambaram - 608002, Tamil Nadu, India; asrme2008@gmail.com, aucsevr@gmail.com, spal\_yughu@yahoo.com

<sup>2</sup>Department of Computer Science and Engineering, P. S. R. Rengasamy College of Engineering for Women, Sivakasi - 626140, Tamil Nadu, India; rc.balasubramanian@gmail.com

## Abstract

**Background:** Magnetic Resonance Images (MRI) is an important medical diagnosis tool for the detection of tumours in brain as it provides the detailed information associated to the anatomical structures of the brain. MRI images help the radiologist to find the presence of abnormal cell growths or tumours. MRI image analysis plays a vital role in diagnosis of brain tumours in the earlier stages and treatment of diseases. **Methods:** Therefore, this paper introduces an efficient MRI brain image analysis method, where, the MRI brain images are classified into normal, non cancerous (benign) brain tumour and cancerous (malignant) brain tumour. This proposed method follows four steps, 1. Pre-processing, 2. Segmentation, 3. Textural and shape feature extraction and 4. Classification. In this proposed MRI image analysis using the region based Active Contour Method (ACM) used for segmentation and Artificial Neural Network (ANN) based Levenberg-Marquardt (LM) algorithm used for classification process, which used to efficiently classify the MRI image as normal and Tumourous. **Findings:** The results revealed that the proposed MRI brain image tumour diagnosis process is accurate, fast and robust. The classifier based MRI brain image processing approach produced the best MRI brain image classification with use of feature extraction and segmentation results, in terms of accuracy. Best overall classification accuracy results were obtained using the given DioCom Images; The performance results proven that there is not sufficient result given to the classification process when it perform separately. With the use of ACM segmentation and feature extraction approaches, the proposed LM classification approach provides better classification accuracy than the existing approach. **Application:** The proposed MRI image based brain tumour analysis would efficiently deal with segmentation and classification process for brain tumour analysis with use of feature extraction methods, so this method can yield the better result of brain tumour diagnosis in advance where this method using in medical fields.

**Keywords:** Active Contour Method (ACM), Artificial Neural Network (ANN) based Levenberg-Marquardt (LM) Algorithm, Magnetic Resonance Images (MRI)

## 1. Introduction

Magnetic Resonance Imaging (MRI) is a kind of medical image processing approach<sup>1</sup>. It is mainly used by the radiologist for the purpose of visualization of the inner composition of the human body. It gives valuable details regarding human soft tissues anatomy. It effectively assists in the process of diagnosis of the brain tumour. Images

captured with MRI are employed for analyzing and investigating the behaviour of the brain. MRI of the brain is often used to monitor tumour response to treatment process.

The segmentation and classification of the brain tumour from the MRI is extremely vital in the field of medical diagnosis, since it gives details related with the anatomical compositions in addition to the potential

\*Author for correspondence

## Hybrid Swarm Intelligence Based FA with Modified Levenberg Marquardt Classifier for Detection of Brain Tumors Through Brain MRI Images

<sup>1</sup>A. Shenbagarajan, <sup>1</sup>V. Ramalingam, <sup>2</sup>C. Balasubramanian and <sup>3</sup>S. Palarivel

<sup>1</sup>Department of Computer Science and Engineering, Annamalai University, Chidambaram

<sup>2</sup>Department of Computer Science and Engineering,

PSR Rengasamy College of Engineering for Women, Sivakasi, Tamil Nadu, India

**Abstract:** Most commonly occurring causable disease among human beings is the Brain Tumor, subsequently early discover of brain tumor is important. In order to get over discover an issues of tumor from brain employing MRI images, an efficient classification method for classifying the brain MRI as Tumourous and non-Tumourous classes by making use of hybrid classifier is proposed. There are three critical early stages of brain MRI image analysis prior to the classification process. In the first step is the preprocessing stage which uses the Adaptive Median Filtering (AMF) method for noise elimination from brain MRI, then follows the segmentation process on these enhanced images on the basis of the regions of the images making use of Active contour Model (ACM) with extracted surface feature. The surface feature extraction is done by employing Kernelised Fuzzy-C-Means (KFCM), later from these segmented images, two most vital features are extracted based on the image edges, which are texture and shape. Texture features and shape features are extracted by utilizing hybrid wavelet transform and Sobel, Canny methods. Then, the most significant feature for classification process is chosen using Principal Component Analysis (PCA), finally, hybrid Firefly Algorithm-Modified Levenberg Marquardt (FAMLM) classifier used for classification. The experimental results of this proposed technique demonstrates that the efficiency of the hybrid classifier outperforms than that of the existing classifier.

**Key words:** Magnetic Resonance Imaging (MRI), hybrid classifier, Adaptive Median Filtering Method (AMF), Active Contour Model (ACM), Kernelised Fuzzy-C-Means (KFCM), Firefly Algorithm-Modified Levenberg Marquardt (FAMLM) classifier

### INTRODUCTION

The human brain tumor diagnosis and treatment is currently dependent on clinical symptoms and the radiological appearance through Magnetic Resonance Imaging (MRI). Nonetheless, treatment response of brain tumor varies according to the tumor stages. Modern day technologies may greatly enhance earlier tumor diagnosis and may permit individuals to make the most efficient usage of treatments in brain tumors. Magnetic resonance imaging is a technique that reveals information about the human body, particularly the most important human organ which is the brain. This MR imaging technique has been shown to considerably improve the accuracy of tumour diagnosis. But, MR imaging processes are sophisticated and expertise is necessary for its understanding. Here, this researcher is focused on the segmentation, feature extraction techniques which is used for making the analysis easier and hence, allows a faster classification of MRI data.

In the recent times, several classification techniques have been evolved for brain MRI image analysis for the cause of tumor diagnosis. Here, this proposed research describes the most efficient techniques along with classification process for tumor diagnosis obtained from the brain MRI images.

Removal of noises from the image is an early stage in the image processing which improves the images for further proceedings, since noises in images results in the errors such as blurring effects. Different filtering algorithms have been introduced in the literatures (Alajlan and Jernigan, 2004) for elimination of noises. Adaptive Median Filter (AMF) is exploited extensively in order to eliminate noise in practice. For improvement over the blurring effects, this proposed researcher makes use of the AMF for the purpose of achieving a balance between straightforward averaging and all-pass filtering. The proposed AMF outperforms rather than the other filters, and usually eliminates noises whilst preserving the edges of the images used in MRI image processing.

## An Innovative approach of EM Algorithm for Restoration of Noisy Video Frame Images in a Video Sequence

A. Shenbagarajan<sup>1</sup>, P. Elamparithi<sup>2</sup>, and C. Karuppasamy<sup>2</sup>

<sup>1</sup>Department of CSE, AAA College of Engineering & Technology, Sivakasi, Tamilnadu India

<sup>2</sup>Department of EEE, AAA College of Engineering & Technology, Sivakasi, Tamilnadu India

Copyright © 2016 ISSR Journals. This is an open access article distributed under the *Creative Commons Attribution License*, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**ABSTRACT:** In this paper, the method was proposed a solution for the problem of an image inpainting method for missing parts or corrupted by noise of a video sequence recorded by a moving or stationary camera. The region to be inpainted may be still or moving, in the background or in the foreground, it may occlude one object or may be occluded by some other objects. This method was approached by a simple preprocessing stage and two steps of video inpainting. In the preprocessing stage, the corrupted video sequence images is extracted into multiple frames, then roughly segment each frame into foreground and background using Expectation Maximization algorithm. In segmentation, it builds three image mosaics that help to produce time consistent results and also improve the performance of the algorithm by reducing the search space. In the first video inpainting step, it reconstructs the corrupted video images of the moving objects in the foreground that are occluded. At the end of this first video inpainting, fill the gap as much as possible by copying information from the moving foreground in other frames, using a priority-based scheme. In the second step, the remaining regions are inpainted with the background. To accomplish this, first align the frames and directly copy when possible. The remaining pixels are filled in by extending spatial texture synthesis techniques to the spatiotemporal domain. This proposed framework has several advantages such as, it is simple to implement, fast and does not require statistical models of background or foreground. Works well in the presence of rich and cluttered backgrounds.

**KEYWORDS:** Camera motion, Expectation-Maximization (EM), optical flow, texture synthesis, video inpainting, digital image, Partial Differential Equations (PDEs), video sequence, blurring operator, space variant.

### 1 INTRODUCTION

Image Restoration is the process of obtaining the original image from the degraded image given the knowledge of the degrading factors. There are a variety of reasons that could cause degradation of an image and image restoration is one of the key fields in today's digital image processing due to wide area of application. Commonly occurring degradations include blurring, motion and noise. [1]The general model for image degradation phenomenon is given as  $y = Hf + n$ , where  $y$  is the observed blurred and noisy image,  $f$  is the original image,  $n$  is additive random noise and  $H$  is the blurring operator. The main objective is to estimate the original image from the observed degraded image. Whatever the degraded process, image distortions can fall into two categories, namely, spatially invariant or space invariant and spatially variant or space variant. [3]In a space invariant distortion all pixels have suffered the same form of distortion. This is generally caused by problems with the imaging system such as distortions in optical system, global lack of focus, or camera motion. In a space variant distortion, the degradation suffered by a pixel in the image depends upon its location in the image. This can be caused by internal factors, such as distortions in the optical system, or by external factors, such as object motion.

The problem of automatic video restoration in general and automatic object removal and modification in particular, is beginning to attract the attention of many researchers. This proposed method is able to inpaint objects that move in any fashion but do not change size. A number of algorithms for automatic still image completion have been proposed to restore



## ORIGINAL ARTICLE

# Numerical study on energy absorbing characteristics of thin-walled tube under axial and oblique impact



V. Santhosh kumar<sup>\*</sup>, G. Manikandaraja

Department of Mechanical Engineering, Sri Venkateswara College of Engineering, Sriperumbudur, India

Received 20 April 2015; revised 17 November 2015; accepted 5 December 2015

Available online 4 January 2016

## KEYWORDS

EAC;  
Oblique;  
Crashworthiness;  
Regression

**Abstract** Energy absorbing characteristics (EAC) of thin wall tube during the impact are important in the automobile and aerospace industries. In this paper, energy absorbing characteristics such as mean force, peak force, energy absorption and crash force efficiency (CFE) of three different cross-sections (square, rectangular and circular) at three different thicknesses (2 mm, 2.5 mm and 4 mm) were analyzed. The analysis was accomplished using ABAQUS/EXPLICIT, and aluminum alloy (AA6063) was used as a shell material. The result of impact (or) crash-worthiness against axial load indicates that the circular cross section of 2.5 mm thickness is optimum. During the oblique (15°, 30°, 45°) impact, increasing the angle leads to less energy absorption. Also, Multilinear regression analysis was carried out to predict the energy absorption characteristics at 90°.

© 2015 Faculty of Engineering, Alexandria University. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Energy absorption is the ability of a material or section that absorbs energy or force during various mechanical loading conditions. Energy absorbing technique is the methodology to evaluate or identify the EAC such as crash force efficiency, specific energy absorption, peak force and mean force. This EAC of various cross-sections and materials are very much important in several applications especially in high speed automobiles that cause severe impact to the passengers and non-recyclable damage to the vehicles [1]. Furthermore, global increase in the usage of fossil fuels downs the overall weight

of the car, thus increase the fatalities and collisions vice versa. Energy absorption technique predominantly covers applications such as automobile, aerospace, blast industries and recently overwhelming speed of automobiles and their light weight increases concern over the roadside poles and their relative structures [2–13]. Thiyahuddin et al. studied the impact and energy absorption of portable water-filled road safety barrier system fitted with foam. To prevent the vehicle collision on the temporary construction zone, they developed the portable barrier to prevent the accident. This numerical model consisted of a steel frame, water, plastic shell and foam which was developed and validated against the experimental test. The result indicated reduction in initial impact because the foam absorbed high energy. In addition to that using different foam materials such as polymeric foams, Aluminum foam, polyurethane foam and XPS foam revealed different energy absorption characteristics [14].

<sup>\*</sup> Corresponding author.

E-mail address: [santhos284@gmail.com](mailto:santhos284@gmail.com) (V. Santhosh kumar).

Peer review under responsibility of Faculty of Engineering, Alexandria University.



## A Hybrid Algorithm for Minimizing Makespan in the Permutation Flow Shop Scheduling Environment

R. B. Jeen Robert\*; R. Raj Kumar\*\*

\*Department of Mechanical Engineering,  
AAA College of Engineering & Technology,  
Sivakani, India.

\*\*Department of Mechanical Engineering,  
Mepco Schlenk Engineering College,  
Sivakani, India.

### Abstract

Hybrid Genetic Algorithm – Simulated Annealing algorithm (HGASA) is proposed for explaining the permutation flow shop scheduling issue (PFSP) with minimizing makespan foundation. We have displayed a hybrid algorithm (HGASA) consolidates the great component of both the Genetic Algorithm and the simulated annealing algorithm. The HGASA is tried with outsized flow shop scheduling bench mark problems from OR Library and the test results are compared with earlier reported results of particle swarm optimization (PSO) algorithm, and a well-known bacterial foraging optimization algorithm (BFO). Almost, 45 famous benchmark problems were utilized to check the execution of proposed HGASA. The test comes about demonstrate that HGASA performs well with the other algorithm for all cases from the literature. The complexity of the proposed HGASA is found to be better than that of PSO and BFO. The obtained results demonstrates the viability of proposed HGASA.

**Keywords:** Permutation Flow Shop Scheduling Problem (PFSP), Genetic Algorithm, Simulated Annealing Algorithm (HGASA), Benchmark Problem.

### 1. Introduction

The permutation flow shop scheduling issue is a class of NP-difficult issue of wide engineering in manufacturing and fabrication industries. Therefore obtaining an optimal solution for Permutation Flow shop Scheduling Problem (PFSP) is essential for these production and manufacturing firms,

# Optimum Simultaneous Allocation of Renewable Energy DG and Capacitor Banks in Radial Distribution Network

Sivasangari Rajeswaran<sup>1</sup>, Kamaraj Nagappan<sup>2</sup>

<sup>1</sup>AAA College of Engineering and Technology, Sivakasi, India

<sup>2</sup>Thiagarajar College of Engineering, Madurai, India

Email: sivasangarianand@yahoo.co.in

**How to cite this paper:** Rajeswaran, S. and Nagappan, K. (2016) Optimum Simultaneous Allocation of Renewable Energy DG and Capacitor Banks in Radial Distribution Network. *Circuits and Systems*, 7, 3556-3564.

<http://dx.doi.org/10.4236/cs.2016.711302>

**Received:** April 23, 2016

**Accepted:** May 20, 2016

**Published:** September 8, 2016

Copyright © 2016 by authors and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

Nowadays the optimal allocation of distributed generation (DG) in the distribution network becomes the popular research area in restructuring of power system. The capacitor banks introduced in the distribution networks for reactive power compensation also have the capacity to minimize the real and reactive power losses occurred in the system. Hence, this research integrates the allocation of renewable energy DG and capacitor banks in the radial distribution network to minimize the real power loss occurred in the system. A two-stage methodology is used for simultaneous allocation of renewable DG and capacitor banks. The optimum location of renewable energy DG and capacitor banks is determined using the distributed generation sitting index (DGSI) ranking method and the optimum sizing of DG and capacitor banks is found out for simultaneous placement using weight improved particle swarm optimization algorithm (WIPSO) and self adaptive differential evolution algorithm (SADE). This two-stage methodology reduces the burden of SADE and WIPSO algorithm, by using the DGSI index in determining the optimal location. Hence the computational time gets reduced which makes them suitable for online applications. By using the above methodology, a comprehensive performance analysis is done on IEEE 33 bus and 69 bus RDNs and the results are discussed in detail.

## Keywords

Distributed Generation, Capacitor Banks, Real Power Loss, Radial Distribution Network, Distributed Generation Sitting Index, WIPSO, SADE

## 1. Introduction

There is an increase in world economy with the increase in load demand which de-





# Economic Analysis for different Types of DG Placement in Radial Distribution Network

R. Sivasangari\*; Dr. N. Kamaraj\*\*

\*Associate Professor,

Department of EEE,

AAA College of Engineering and Technology,

India.

\*\*Professor and Head,

Department of EEE,

Thiyagarajar College of Engineering,

Madurai, India

## Abstract

The installation of distributed generation (DG) in the distribution network produces the benefits such as the reinforcement of grid, power quality improvement, voltage regulation, line loss reductions, enhanced utility structure reliability, congestion management, reduction in fuel costs and reserve requirements. To achieve these benefits, the DG should be properly sized and placed in the distribution networks. In this work the performance of various types of DG systems in the radial distribution network (RDN) for loss reduction and voltage profile improvement is compared by inserting them at the optimal location. In the restructured power system environment, the choice about the type of DG for connection is taken by their investors or GENCOS depending on the location, availability of main fuel, transport facilities and climatic situation. In developing countries the investors are more concern about the investment cost and profit obtained. Hence in this paper the cost profit factor analysis for the optimal placement of various types of DG is projected. Here, a new Distributed Generation Sitting Index (DGSI) ranking method is projected to find the optimum DG Size and location for real power loss minimization in radial distribution network. The proposed DGSI method is compared with the existing loss minimization method and Bus Voltage Sensitivity Index (BVS<sub>I</sub>) ranking method based on real power loss minimization, voltage profile improvement and cost profit factor analysis. To validate the effectiveness of the proposed DGSI ranking method it is tested on 15 bus RDN and IEEE 33 bus RDN. The results show the efficacy of the proposed method.



*Impact Factor (SJIF): 5.301*

**International Journal of Advance Research in Engineering, Science  
& Technology**

*e-ISSN: 2393-9877, p-ISSN: 2394-2444*

*Volume 5, Issue 4, April-2018*

**IOT based automated home security system for elderly people using old  
mobile phone**

Dr.R.Sivasangari<sup>1</sup>, R.Muthumariappan<sup>2</sup>, S.Anbarasan<sup>2</sup>, R.Balamurugan<sup>2</sup>

1.Associate professor/EEE,AAA College of Engineering and Technology, Sivakasi

2.UG student/Bachelors of Engineering, AAA College of Engineering and Technology, Sivakasi

**Abstract:**

This paper aims to provide the complete home security system for elderly people who are forced to live in this modern era. The inkling behind this work is to provide its user a simple, cheap, fast and reliable way of getting help during their emergency conditions. To create an inexpensive security system for home the Internet On Things(IOT) concept is applied. The security system consists of Arduino Uno microcontroller to interface between sensors to monitor the status, a buzzer for alarming, a Wi-Fi module ESP8266 and associated components to connect and communicate using the Internet. The system also consists of old mobile phone converted into web camera for recording the movement of unknown persons and to send the picture and video of them to the house owner and police person. The main advantage of this system is a provision of complete security system for the users at low cost and low maintenance.

**Key words:**

Home security system, IOT, web camera, Arduino Uno controller, mobile phone

**1. Introduction:**

Automated home security system using IOT is an inventive application of internet of things developed to control the security devices used remotely over the cloud. This can be achieved by the incorporation of various subsystems into the security system with a single control unit such as surveillance, intruder control, access control, fire detection, etc [1]. The Smart Home security system based on GSM technology was conversed by Govinda et al.

## An Innovative approach of EM Algorithm for Restoration of Noisy Video Frame Images in a Video Sequence

A. Shenbagarajan<sup>1</sup>, P. Elamparithi<sup>2</sup>, and C. Karuppasamy<sup>2</sup>

<sup>1</sup>Department of CSE, AAA College of Engineering & Technology, Sivakasi, Tamilnadu India

<sup>2</sup>Department of EEE, AAA College of Engineering & Technology, Sivakasi, Tamilnadu India

Copyright © 2016 ISSR Journals. This is an open access article distributed under the *Creative Commons Attribution License*, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**ABSTRACT:** In this paper, the method was proposed a solution for the problem of an image inpainting method for missing parts or corrupted by noise of a video sequence recorded by a moving or stationary camera. The region to be inpainted may be still or moving, in the background or in the foreground, it may occlude one object or may be occluded by some other objects. This method was approached by a simple preprocessing stage and two steps of video inpainting. In the preprocessing stage, the corrupted video sequence images is extracted into multiple frames, then roughly segment each frame into foreground and background using Expectation Maximization algorithm. In segmentation, it builds three image mosaics that help to produce time consistent results and also improve the performance of the algorithm by reducing the search space. In the first video inpainting step, it reconstructs the corrupted video images of the moving objects in the foreground that are occluded. At the end of this first video inpainting, fill the gap as much as possible by copying information from the moving foreground in other frames, using a priority-based scheme. In the second step, the remaining regions are inpainted with the background. To accomplish this, first align the frames and directly copy when possible. The remaining pixels are filled in by extending spatial texture synthesis techniques to the spatiotemporal domain. This proposed framework has several advantages such as, it is simple to implement, fast and does not require statistical models of background or foreground. Works well in the presence of rich and cluttered backgrounds.

**KEYWORDS:** Camera motion, Expectation-Maximization (EM), optical flow, texture synthesis, video inpainting, digital image, Partial Differential Equations (PDEs), video sequence, blurring operator, space variant.

### 1 INTRODUCTION

Image Restoration is the process of obtaining the original image from the degraded image given the knowledge of the degrading factors. There are a variety of reasons that could cause degradation of an image and image restoration is one of the key fields in today's digital image processing due to wide area of application. Commonly occurring degradations include blurring, motion and noise. [1]The general model for image degradation phenomenon is given as  $y = Hf + n$ , where  $y$  is the observed blurred and noisy image,  $f$  is the original image,  $n$  is additive random noise and  $H$  is the blurring operator. The main objective is to estimate the original image from the observed degraded image. Whatever the degraded process, image distortions can fall into two categories, namely, spatially invariant or space invariant and spatially variant or space variant. [3]In a space invariant distortion all pixels have suffered the same form of distortion. This is generally caused by problems with the imaging system such as distortions in optical system, global lack of focus, or camera motion. In a space variant distortion, the degradation suffered by a pixel in the image depends upon its location in the image. This can be caused by internal factors, such as distortions in the optical system, or by external factors, such as object motion.

The problem of automatic video restoration in general and automatic object removal and modification in particular, is beginning to attract the attention of many researchers. This proposed method is able to inpaint objects that move in any fashion but do not change size. A number of algorithms for automatic still image completion have been proposed to restore

# A Survey on Black Hole Attacks in Mobile Ad hoc Networks

P. Elamparithi and Dr.K. Ruba Soundar

**Abstract**— MANET is a wireless Connectivity. It does not have centralized network. MANET is an infrastructure less, dynamic in nature. Any node can join the network and leave the network without any information. Due to its simplicity and flexibility, it is widely used in military communication and emergency situation like earth quake, flooding etc. In MANET there is no infrastructure hence each node acts as a host and server. A serious threat to mobile ad hoc network is the black hole attack. The Black hole generally advertises itself as a shortest path to the destination node in that way source node assumes this node as a shortest path to the destination node and sends all its packets through that node. By the way of disturbing its routing technique it easily hacks the information and also the performance of the network and it will be highly exaggerated. This paper discusses some of the methodologies put forwarded by researches to reveal and avert the Black hole attack in MANET using AODV protocol. Based on their flaws new tactics also have been proposed.

**Keywords**— MANET (Mobile ad hoc Network), Black Hole Attack, RREQ, RREP.

## I. INTRODUCTION

MANET is a collection of mobile nodes connected with a wireless links in which each and every node acts as both a host and a router. MANET does not have any fixed infrastructure. Based on their connectivity in the network, MANET can change their topology arbitrarily. MANET has a dynamic topology in nature therefore node can easily joiner leave the network without any intimation and time. MANET has an ability of self-configuration. Fig 1 illustrates the Mobile ad hoc Network.



Figure 1: Mobile ad hoc Network

---

P. Elamparithi, Research Scholar, Anna University, Chennai. E-mail:parithico@gmail.com  
Dr. K. Ruba Soundar, Professor, Department of Computer Science and Engineering, P.S.R. Engineering College, Srivasi. E-mail: rubasoundar@yahoo.com

## Survey on Selection of Features for Content Based Image Retrieval in Image Mining

*T. Gladima Nisia, S. Rajesh*

Department of CSE, AAA College of Engg. & Tech., Sivakasi, India

**E-mail:** gladimab@gmail.com, srajesh@mepcoeng.ac.in

### *Abstract*

*Image mining is the process of searching and discovering valuable information and knowledge in large volumes of data. It is a challenging field which extends traditional data mining from structured data to unstructured data such as image data. Image Mining is focused on extracting patterns, implicit knowledge, image data relationship or patterns which are not explicitly found in the images from databases or collections of images. The actual data analysis techniques suffer from the huge amount of complex data to process. So, in order to process this huge amount of data, efficient extraction of features is much more important. This paper presents a survey on various feature extraction techniques for image mining that were proposed earlier in literature. Also, this paper provides a marginal overview for future research and improvements.*

**Keywords:** *Image mining, data, research, analysing*

### **INTRODUCTION**

Due to the large analysis and development of the recent years, there is an enormous volume of information out there for individuals. Therefore, sorting the information and getting specific information from databases has become of nice significance. Analysing image information forms a keystone of the many analysis areas [1, 2]. Looking out info at intervals pictures represents a special entity of information process. Pictures as a novel class of information disagree from text data in many aspects as in terms of

their nature thus in terms of storing and retrieving. Pictures have visual character, they will be pictured in numerical kind, but great amount of numbers is to be evaluated so as to go looking image databases. Finding, extracting and classifying objects from pictures are the fundamental needs of process a picture with success. Figure 1 shows the schematic illustration of image mining method.



# MATHEMATICAL INVESTIGATION AND COMPUTATIONAL FLUID DYNAMIC MODEL OF RECIPROCATING AIR COMPRESSOR TO OBTAIN PRESSURE CRANK ANGLE

P.Zbenezar Sathish Paul, G.Uthaya Kumar, R.Meby Selvaraj

Assistant Professor, Department of Mechanical Engineering,  
P.S.R. Engineering College, Sivakasi, Tamil Nadu, India

e-mail: zbenzarsathishpaul@gmail.com, uthayg@aloo.co.in, mebyselvaraj@gmail.com

**Abstract** — Investigating the processes of reciprocating compressors using mathematical models is an effective tool by high development of computing techniques, which enables complicated problems to be solved with a minimal number of simplifying assumptions. In this paper, a model has been developed for obtaining cylinder pressure at different crank angles of the compressor. The effect of various physical parameters like clearance volume, cylinder diameter, connecting rod length, crank radius, valve lift and other dimensions etc., have been considered for mathematical analysis. Theoretical values are found by using appropriate thermodynamic equations. The numerical simulation has been carried out in commercial CFD code FLUENT. Dynamic mesh capabilities are explored in handling the piston movement. Eddy dissipation model is used to represent the turbulence. The pressure difference between the suction/discharge chamber and the cylinder, established by the piston motion, is responsible for the valve opening. The methodology developed herein applies K- $\epsilon$  model, to account for the compressible turbulent flow through the discharge valve. Validation should be done in FLUENT software by including parameters and also the valve opening and closing data to get the Pressure Crank angle diagram. Convergence history of static pressure can also get from the FLUENT software. Theoretical and Numerical values have been compared and found to be nearer. This is a great advantage to the manufacturers for effective design.

**Keywords:** Reciprocating air compressor, CFD, FLUENT, K- $\epsilon$  model

## 1. INTRODUCTION

Building a mathematical model for any project may be a challenging, yet interesting, task. A thorough understanding of the underlying scientific concepts is necessary and a mentor with expertise in the project is invaluable. Although problems may require very different methods of solution, the following steps outline a general approach to the mathematical modeling process:

- Identifying the problem, defining the terms in the problem and drawing diagrams where appropriate.
- Beginning with a simple model, stating the assumptions.

- Identifying the important variables and constants and determining how they relate to each other.
- Developing the equations that express the relationships between the variables and constants.

Once the model has been developed and applied to the problem, the resulting model solution must be analyzed and checked for accuracy. It may require modifying the model for obtaining reasonable outcome. This refining process should continue until obtaining a model that agrees as closely as possible with the real world observations.

## II. LITERATURE SURVEY

Mathematical modeling of reciprocating compressor is designed by integral formulations, differential formulations and also computer simulation is needed for validating every result computational fluid dynamic has been used as research and design tool in the modeling of reciprocating air compressor. A search on the different compressor simulation models from literature are given as follows.

Si-Ying Sun et al.[1] have predicted a model of reciprocating compressor. The model evaluates thermodynamically the behavior of reciprocating compressors at periodic conditions. Various factors taken into account are heat transfer, leakage, gas pulsation and valve motion. Basic equations for theoretical analysis such as energy equation, gas state equation, continuity equation, valve plate motion equation, heat exchange equation have been used. A fourth order Runge-kutta method has been used and a Pressure-Crank angle diagram and has been obtained. They have suggested doing the experimental work and simulation through software to give better results.

Rio de Janeiro et al.[2] have built a model of reciprocating compressor by using the application of Large Eddy Simulation (LES) combined with Smagorinsky Sub grid model to account for the compressible Turbulent flow through the discharge valve. They have studied about the valve dynamics and

# International Conference on Recent Advancements in Materials (ICRAM) 2015

Journal of Chemical and Pharmaceutical Sciences

ISSN: 0974-2115

## Growth and optoelectronic properties of SnS thin film prepared by nebulized spray pyrolysis technique

P.S. Satheeshkumar<sup>1\*</sup>, L.Amalraj<sup>2</sup>

<sup>1</sup>Department of Physics, NPR College of Engineering&Technology, Natham,Dindigul, Tamilnadu, India

<sup>2</sup>PG & Research Department of Physics, V.H.N.S.N College, Viruthunagar 626001, India

\*Corresponding author: Email: pssatheesh@yahoo.com, Mobile:+91 9566700896

### ABSTRACT

Tin mono sulfide (SnS) thin film is deposited onto micro glass substrates using Nebulized spray pyrolysis technique at a substrate temperature of 275°C. The structural, electrical and optical properties of the film are determined using X-ray diffraction (XRD), four probe method and Luminescence spectrometer. The XRD results revealed that the SnS thin film was polycrystalline in nature with an orthorhombic structure. The crystalline size, lattice parameters and dislocation density of the film are also calculated. The resistivity of the as prepared film was calculated to be 31.5Ωcm. The activation energy was calculated to be 0.04eV. Optical band gap of the film was found to be 2.08eV. The results show that nebulized spray pyrolysis technique can produce SnS thin film with optical and electrical properties that may be suitable for solar cell applications.

**KEY WORDS:** SnS, resistivity, Photoluminescence, nebulized spray pyrolysis.

### 1. INTRODUCTION

Tin mono sulfide is a IV-VI compound semiconductor with layered orthorhombic structure. It is a promising material for low-cost photovoltaic conversion of solar energy because it usually exhibits P-type conductivity and room temperature band gap reported to be 1.30 eV. Both Sn and S are cheap, abundant and nontoxic in nature. Thus it has potential use in the fabrication of various devices such as holographic recording systems, solar collectors and solar photovoltaic cells. There are many methods for preparing SnS film, such as vacuum evaporation, chemical deposition, spray pyrolysis, and molecular beam epitaxy. Amongst these deposition methods the nebulized spray pyrolysis technique is very easy, low cost, safe and cheap. The advantage of nebulized spray pyrolysis over conventional pneumatic spraying is its low material consumption with better gas flow, which allows the deposition of very thin layers of uniform thickness.

In the present study, the structure, electrical and optical properties of SnS thin film prepared by Nebulized spray pyrolysis technique was investigated.

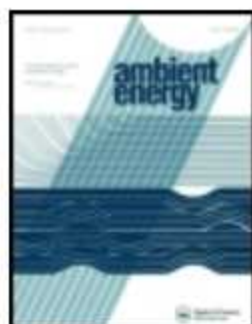
### 2. MATERIALS AND METHODS

Nebulized spray pyrolysis setup consists of a nebulized unit, temperature control unit and a compressor unit. A nebulizer unit, which is actually utilized to spray the medicine through mouth to provide comfort to the asthma patients, was used in the present study to spray mist like particles of precursor solution to the preheated substrates. The temperature of the glass substrate was maintained at  $T_s=275^\circ\text{C}$ . The size of the micro glass substrate used was  $2.5 \times 2.5 \text{ cm}^2$ . Compressed air (oxygen) was taken as a carrier gas. The amount of solution taken was 10 ml per sample. The precursor solution ( $\text{SnCl}_4$  &  $\text{SC}(\text{NH}_2)_2$ ) containing Sn and S sources was coated on the substrate with 1:1 molar ratio. When the compressed air was passed through the nebulized unit, the precursor solution travelled through a tube in order to spray fine particles on the glass substrate. The structural properties were analyzed by XPERT-PRO x-ray diffractometer ( $\text{CuK}\alpha - \lambda = 1.5405 \text{ \AA}$ ) in which x-ray diffraction patterns were scanned and recorded in  $2\theta$  interval from 10 to  $70^\circ$  with the step of  $0.05^\circ$  at room temperature. Luminescence spectrometer LS45 Perkin Elmer make was used to observe the emission spectra of the films measured in the wavelength range 400 nm to 800 nm. The electrical properties were analyzed by four probe method.

### 3. RESULTS AND DISCUSSION

The x-ray diffraction profile of SnS thin film by nebulized spray pyrolysis technique is shown in Fig.1. The diffraction of the film found at  $2\theta = 26.7, 34.02$  and  $51.8$  degrees respectively corresponding to the reflection from (210), (211) and (610) planes conforming that the polycrystalline nature of the film. All the diffraction peaks were in good agreement with original JCPDS data. The compared result of d-spacing values with the JCPDS data was tabulated in Table-1. (210) plane was identified as preferential orientation. N. Kotesswara Reddy et al also had obtained the same orthorhombic structured SnS thin film using spray pyrolysis technique. E. Guneri et al had reported the same preferred orientation (210) peak as in the present study. The d-spacing corresponding to all the peaks are determined and tabulated.





## International Journal of Ambient Energy

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/taen20>

### Experimental investigations on the influence of properties of Calophyllum inophyllum biodiesel on performance, combustion, and emission characteristics of a DI diesel engine

G. Vairamuthu<sup>a</sup>, S. Sundarapandian<sup>b</sup> & B. Thangagiri<sup>c</sup>

<sup>a</sup> Department of Mechanical Engineering, Sethu Institute of Technology (Autonomous), Virudhunagar 626115, Tamil Nadu, India

<sup>b</sup> Department of Mechanical Engineering, SBM College of Engineering and Technology, Dindigul 624005, Tamil Nadu, India

<sup>c</sup> Department of Chemistry, Mepco Schlenk Engineering College (Autonomous), Sivakasi 626005, Tamil Nadu, India

Accepted author version posted online: 26 Feb 2015. Published online: 01 Apr 2015.



CrossMark

[Click for updates](#)

**To cite this article:** G. Vairamuthu, S. Sundarapandian & B. Thangagiri (2015): Experimental investigations on the influence of properties of Calophyllum inophyllum biodiesel on performance, combustion, and emission characteristics of a DI diesel engine, International Journal of Ambient Energy, DOI: [10.1080/01430750.2015.1023838](https://doi.org/10.1080/01430750.2015.1023838)

**To link to this article:** <http://dx.doi.org/10.1080/01430750.2015.1023838>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

## INVESTIGATION ON THE EFFECTS OF NANOCERIUM OXIDE ON THE PERFORMANCE OF CALOPHYLLUM INOPHYLLUM (PUNNAI) BIODIESEL IN A DI DIESEL ENGINE

G. Vairamuthu\*<sup>a</sup>, S. Sundarapandian<sup>b</sup>, C. Kailasanathan<sup>c</sup> and B. Thangagir<sup>d</sup>

<sup>a</sup>Department of Mechanical Engineering, Sethu Institute of Technology, Virudhunagar - 626115, Tamilnadu, India

<sup>b</sup>Department of Mechanical Engineering, Dr.Mahalingam College of Engineering & Technology, Pollachi-642 003, Tamil Nadu, India

<sup>c</sup>Department of Chemistry, Mepco Schlenk Engineering College, Sivakasi - 626 005, Tamil Nadu India.

\*Corresponding author: [vairamuthu\\_guru@yahoo.com](mailto:vairamuthu_guru@yahoo.com)

### ABSTRACT

An experimental investigation is carried out to establish the performance, combustion and emission characteristics of Calophyllum Inophyllum (Punnai Seed oil) biodiesel and its doped with cerium oxide (CeO<sub>2</sub>) Nanoparticles blends are presented. The physicochemical properties of the base fuel and the modified fuel formed by dispersing the catalyst nanoparticles by ultrasonic agitation are measured using ASTM standard test methods. The cerium oxide Nanoparticles act as an oxygen donating catalyst which provides oxygen for the oxidation of carbon monoxide and absorbs oxygen for the reduction of nitrogen oxides. Comparisons of the performance of the fuel with and without the CERIA are also presented. The effect of CeO<sub>2</sub> nanoparticles additives in the B100+20ppm CERIA contributes for the green combustion and significantly reduces the harmful exhaust gas emissions. Based on the study, modified fuel perform well closer to conventional diesel on the source of experimental work.

### INTRODUCTION

Depletion of petroleum reserves, rising vehicle population, increasing fuel prices, and uncertainties concerning petroleum availability, stringent emission standards, and global warming due to carbon dioxide emissions, have forced the development of alternate energy sources, which are becoming increasingly important. As discussed elsewhere in Prabhakar et al., 2011; Vegetable oils have comparable energy density and cetane number as that of mineral diesel. The Fuel Additives are mainly metal-organic compounds which get dispersed completely in the diesel fuel. Metal additive is added to biodiesel: (i) to shorten the ignition delay, (ii) as stabilizer and anti-oxidant, and (iii) as surfactant. The effect of cerium on the size distribution and composition of diesel particulate matter has been studied by Skillas et al., 2000; indicating a reduction in the accumulation mode, but an increase in ultrafines. Lahaye et al., 1996; studied the effect of cerium oxide on soot formation and postoxidation and observed that the soot yield is not affected significantly by the presence of cerium oxide in the fuel for given oxygen content. The experimental investigations were carried out by adding the dosing levels of CERIA 20ppm with Calophyllum Inophyllum (Punnai Seed oil) biodiesel. The study of the stability of the nanofluid also has been carried out, with the addition of CERIA in the bio diesel, in the present work.

### MATERIALS AND METHODS

#### Biodiesel properties

The properties of the Calophyllum Inophyllum (Punnai Seed oil) biodiesel were experimentally evaluated. Most of the properties of bio-fuels like calorific value, viscosity, density, cetane number are compared as shown in table 1.

Table 1. Properties of diesel and Calophyllum Inophyllum (Punnai) biodiesel doped with CERIA

S.No	Name of the Properties	B100	B 100 + 20ppm	Diesel	ASTM Code
1	Kinematic Viscosity @ 40 °C in cSt	5.8	4.2	2.83	D2217
2	Gross Calorific Value in kJ/kg	38401	40627	42250	D4809
3	Specific Gravity @ 15 °C	0.8794	0.8539	0.8298	D445
4	Cetane Number	52	52.5	46	-

## A Survey of MR Image Brain Tumour Segmentation Using Different Classification Techniques

**Shenbagarajan.A\***,  
\*Research Scholar,  
Department of Computer  
Science and Engineering,  
  
Annamalai University,  
  
Chidambaram  
asrphdsc@gmail.com

**V.Ramalingam\*\***,  
\*\*Professor,  
Department of  
Computer Science  
and Engineering,  
  
Annamalai  
University,  
Chidambaram  
aucsevr@gmail.com

**C.Balasubramanian\*\*\***,  
\*\*\*Professor,  
Department of Computer  
Science and Engineering,  
  
P.S.R.Rengasamy College of  
Engineering for Women,  
Sivakasi  
rc.balasubramanian@gmail.com

**S.Palanivel\*\*\*\***  
\*\*\*\*Professor,  
Department of  
Computer Science and  
Engineering,  
Annamalai University,  
  
Chidambaram  
spal\_yugbu@yahoo.com

**Abstract.** Brain tumour is a common dangerous diseases affecting human beings. The Magnetic Resonance Imaging (MRI) segmentation is one among the most important techniques for detecting the tumour from the brain MRI. The chances of survival are great when the tumour detection is done correct at its early stage. In brain MRI analysis, image segmentation is generally used for the measurement and visualization of the brain's anatomical structures, for the analysis of brain changes, for the delineation of regions of pathology, and for planning for surgery and image-guided treatments. In the last few years, different segmentation techniques with various degrees of accuracy and degree of complexity have been formulated and studied in the literature. This paper gives an overview of Brain MRI analysis techniques that can be helpful for the MRI brain tumour segmentation and classification. The characteristics of many methodologies are discussed, which may be useful in the selection of the most suitable one for solving a problem in hand. This survey detail several MRI Brain Tumour analysis procedures such as inclusion of pre-processing methods, segmentation methods, feature extraction methods and classification methods of MRI images.

**Keywords**—Brain Tumour, Magnetic Resonance Imaging (MRI), pre-processing methods, MRI image segmentation, Feature Extraction, Classification methods.

### 1. INTRODUCTION

In the recent few years, the huge growth in non-invasive brain imaging technologies has paved the way for the analysis and study of the brain anatomy and function. Tremendous improvement in locating brain injury and studying the brain anatomy has been attained with the use of Magnetic Resonance Imaging (MRI) [1]. Also the

The major problems [3] in segmentation of brain MRI are Noise, Intensity in homogeneity, Shading artifact, Partial volume. Still there are some issues like accurate and reproducible segmentation and characterization of

progresses made in brain MR imaging have also helped in gaining large amount of data with an ever-growing high level of quality. The inspection of these huge and complicated MRI datasets has turned out to be a time-taking and complicated job for clinicians, who have to perform the extraction of important information without any automation. This manual analysis consumes a lot of time frequently and is prone to errors due to different inter- or intra operator variability studies. These hurdles in brain MRI data analysis needed inventions in computerized techniques for the improvement of disease diagnosis and testing. In the recent times, computerized methods for MR image tumour analysis process based on the segmentation with classification techniques have been widely used for assisting doctors in qualitative diagnosis. Chiefly the Brain MRI segmentation is an important task in many clinical applications because it impacts the result of the entire analysis. This is because various processing steps depend on segmentation of anatomic regions with accuracy. For instance, MRI segmentation is generally used for the measurement and visualization of different brain structures, for delineation of lesions, for the brain development analysis, and for image-guided interventions and planning of surgery. These diverse image processing applications has given rise to the development of multiple segmentation techniques with various degrees of accuracy and degree of complexity. Fundamental components of structural brain MRI analysis comprise of classifying the MRI data into particular tissue types and identifying and describing certain anatomical structures [2]. Classification refers to the association of each element in the image with a tissue class, the classes being specified earlier. The issues of segmentation and classification are closely related, segmentation means classification, while classifier inherently segments an Image.

abnormalities using intelligent algorithms because of the variety of shapes, locations and image intensities of different brain tumours. This paper provides a review of the methods and techniques utilized in MRI brain tumour segmentation

## PERFORMANCE ASSESSMENT OF DISTRIBUTED GENERATION TECHNOLOGIES IN RADIAL DISTRIBUTION SYSTEM

R.Sivasangari<sup>1</sup>, Dr.N.Kamaraj<sup>2</sup>

<sup>1</sup>AAA College of Engineering and Technology, Tamilnadu, Sivakasi, India

<sup>2</sup>Thiagarajar College of Engineering, Tamilnadu, Madurai, India.

Corresponding author: sivasangarianand@gmail.com

**Abstract** The optimal placement, size and type of distributed generation (DG) contribute an essential function in restructured power system environment due to the rising concerns over increase in load demand, green impacts coming up with the expansion of the distribution system, and rebate policies given to the Distribution Network Operators (DNO). This paper shows the performance of various types of DG technologies and their combinations in radial distribution network for loss reduction by inserting them at the optimal location. In deregulated environment the decision about the type of DG for installation is taken by their investors or GENCOS depending on the location, availability of main fuel, transport facilities and climatic situation. In developing nations like India, the investors are more concerned about the installment cost of DGs and the rural distribution feeders are too long so that the voltages at the remote end of a few such feeders are greatly low with decreased voltage regulation. Therefore in addition to the power system loss reduction, the voltage sensitivity of the node is also considered for the DG placement to produce the optimum result with reduced DG size and increased voltage profile. If the sizes of DGs at the optimum locations are large then huge investment is required for installation of DGs. Hence the sizing of DGs should be best possible minimum value such that it reduces the system loss effectively. A simple technique supported new index known as Distributed Generation Siting Index (DGSi) is projected to get the optimal size and site of assorted DG technologies at the radial distribution networks for the reduced system loss. In order to validate this method, it is experimented on the Radial Distribution Systems (RDS) of 33 bus and 69 bus networks. The outcome reaches with this technique for single and multiple DG placements prove its efficacy. The performances of four types of DGs and their combinations are compared by installing single and multiple DGs of optimum size at optimum locations. The results ensure the significance of installing appropriate types of DGs of optimum size at optimum location.

**Key words:** *Distributed generation, Radial distribution system, Distributed generation siting index, loss reduction, optimum size and site*

### 1. INTRODUCTION

The electrical power resources connected directly to the customer end of power system i.e. at the distribution side are called distributed generation (Elnashar.M.M. et al., 2010). The penetration of DG in the power system produces both positive and negative impacts for the utility and customers (Firuzabad .M. F. et al., 2005). The installation of DG at unsuitable location beyond certain capacity increases the active and reactive power losses of the network (Acharya .N. et al., 2006). In recent years, there were more number of approaches conferred for the placing DG units at the best location with optimum size. In most of these literatures (Chandrasekhar Yammani et al., 2011, Chiradeja.P. et al., 2004, Keane.A. et al., 2005, Khalesi.N. et al., 2011, Manafi.H. et al., 2013, Mithulanathan.N. et al., 2006, Murthy.V.S.V.N. et al., 2013, Niknam .T. et al., 2011, Padmalalitha.M. et al., 2010 and Singh.D. et al., 2009) the DG was assumed as the real power source by neglecting its reactive power. The following literatures considered both real and reactive power of DGs to be inserted. MohitMittal et al., 2012 proposed an algorithm based on network performance index for multiple DG allocation and analyzed a radial distribution network with multiple DGs for minimizing the losses occurred. The analytical approach for combined setting of DG units and capacitor was presented in a previous study (SampathKumar Bodapatla et al., 2011) for reduction of active power loss and improvement of voltage profile. The optimum site and the optimum power factor for the placement of multiple DGs by improved analytical method to achieve power loss reduction presented in ref (Hung D.Q. et al., 2013). The imperialist competitive algorithm to find the optimum site and capacity of multiple DGs of type solar, synchronous compensators and wind farm was proposed in the ref (Rostamzadeh .M. et al., 2012). The analytical approach supported with new index known as distributed generation siting index for the placement of single and multiple DGs are proposed in this paper. The performance of four types of DG technologies and their combinations in loss reduction with synchronized improvement of voltage profile are evaluated by applying this method to the IEEE 33 bus and 69 bus systems.

### 2. TYPES OF DG TECHNOLOGIES

There are various types of DGs. The main categorization of DG is according to the nature of fuel used. The DGs are broadly classified as renewable energy DGs and non-renewable energy DGs. The renewable energy DGs include

# Dual Active Clamped DC-DC Converter for Low Voltage Photovoltaic Sources

C. Karuppasamy<sup>1</sup> Arul Kumar. A<sup>2</sup>

<sup>1,2</sup>Assistant Professor

<sup>1,2</sup>Department of Electrical Engineering

<sup>1</sup>AAA College of Engineering and Technology Sivakasi, Tamil Nadu, India <sup>2</sup>Kamaraj College of Engineering and Technology Virudhunagar, Tamil Nadu, India

**Abstract**— The photovoltaic (PV) module-integrated converter (MIC) system is the key technology for the future distributed production of electricity using solar energy. The PV MIC system offers “plug and play” concept, greatly optimizing the energy yield from the PV module [1-3]. Each PV module has its own power conversion system, generating the maximum power from the PV module. To make the PV MIC system commercially viable, a low-cost and high-efficiency power conversion scheme should be developed. This project proposes a Dual active clamped dc-dc converter with fast dynamic response for low-voltage PV sources. An improved active-clamped dc-dc converter is presented by using a dual active-clamping circuit. The voltage tension at power switches can be reduced at low-voltage side. Also, a modified proportional integral (PI) controller is suggested for fast output voltage control. The performance of the proposed converter is verified using simulation using PSIM software for the output power of 200 watts.

**Key words:** Zero Voltage Switching, Zero Current Switching, PI controller, Photo Voltaic Cell, DC-DC converter

## I. INTRODUCTION

The sun is almost an inexhaustible source of energy capable of supplying large amounts of energy. The total amount of solar energy absorbed by the desert area in six hours is comparable to the total global energy consumption in an entire year. This large amount of solar energy incident on the earth remains unharnessed. Photovoltaic (PV) technology converts solar energy into electrical energy. The basic element of PV technology is the solar cell. A solar cell consists of a p-n junction fabricated in a thin wafer of layer of semiconductor similar to a diode. When exposed to light, photons energy is greater than depletion layer energy of the semiconductor. It will create an electron-hole-pair generation. So the current will flow in the circuit is proportional to the incident radiation. Workable voltage and reasonable power is obtained by inter connecting appropriate number of cells. This assembly is known as solar module, a basic building block of a PV system.

The PV module voltage has a low-voltage characteristic [5]. In order to deliver electric power into the grid, the low PV module voltage should be converted into a high dc voltage [6]. Thus, a dc-dc converter with a high-voltage gain is needed. The active-bridge dc-dc converter has been used for low-voltage PV sources [7], [8]. The power switches at low-voltage side are turned ON at zero voltage. However, the output diode at high-voltage side has high switching power losses due to its reverse-recovery current [9]. The half-bridge dc-dc converter has been presented to reduce switching power losses at high voltage

side [10]. The output diodes are turned OFF at zero current by using the voltage doubler rectifier. However, an additional uncontrolled rectifier is needed, which increases switching power losses. Alternatively, the active-clamped dc-dc converter has been used for low-voltage PV sources [11], [12]. It uses the active-clamping circuit and the resonant voltage doubler rectifier. However, the active-clamping circuit increases the voltage stress of power switches at low-voltage side, causing high switching power losses.

Considering the dynamic response of the converter, bandwidth limitations of conventional controllers have forced power electronics engineers to increase switching frequency or increase output capacitor [13]. This paper proposes a Dual active clamped dc-dc converter for low-voltage PV sources. The voltage stress of power switches can be reduced at low-voltage side. Also, a modified proportional and integral (PI) controller is suggested for fast output voltage control. The transient performance of the proposed converter is improved. The proposed converter is realized with minimal hardware with a low cost. The performance of the proposed converter is verified using a 200-W experimental prototype.

## II. CONVERTER OPERATION

Fig. 1 shows the circuit diagram of the proposed dc-dc converter. The converter consists of main switches ( $S_1, S_4$ ), the dual active-clamping circuit ( $S_2, S_3, C_c$ ), the transformer T, and the resonant voltage doubler rectifier ( $L_R, C_r, D_{R1}, D_{R2}$ ). The main switches ( $S_1, S_4$ ) and auxiliary switches ( $S_2, S_3$ ) operate complementarily with a short dead time. All switches are the metal-oxide-semiconductor field-effect transistors.  $C_i$  is the input capacitor.  $C_c$  is the clamping capacitor.  $C_o$  is the output capacitor. The capacitors  $C_r, C_c$ , and  $C_o$  are large enough so that their voltages  $V_c, V_{cc}$ , and  $V_o$  are considered constant, respectively. The transformer T has the magnetizing inductor  $L_m$  and leakage inductor  $L_k$  with the turns ratio of 1:N, where  $N=N_1/N_2$ .  $L_k$  is assumed to be much smaller than  $L_m$ .

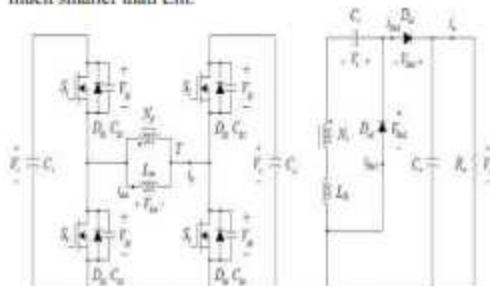


Fig. 1: Circuit diagram of the proposed converter

# Computational Fluid Dynamic Analysis of Airfoil NACA 6 – Series

R.Moby Selvaraj<sup>\*</sup>, P.Ebenezer Satish Paul<sup>\*</sup>, M.Ramar<sup>\*</sup>

<sup>\*</sup> Assistant Professor, Department of Mechanical Engineering, P.S.R. Engineering college,  
mobysevaraj@gmail.com

**Abstract**— A NACA 6-series Laminar flow airfoil, which at present is the most widely preferred choice on all modern high subsonic and transonic commercial passenger aircrafts has been taken for our study. The flow of air over the straight wing and swept back wings designed using the chosen airfoil cross section is simulated computationally with the CFD tool FLUENT. The wing, initially kept at zero sweep back angle, is analyzed at different Mach numbers ranging from 0.6 to 1.2 and the values of  $C_L$  and  $C_D$  are calculated. The same wing is then analyzed at five different sweep back angles via, 25°, 30°, 35°, 40°, 45° at various Mach numbers ranging from 0.6 to 1.2, and the values of  $C_L$  and  $C_D$  are calculated. The comparison made between the straight and swept back wings clearly depicts that there is a remarkable reduction of drag coefficient.

**Keywords**—NACA-6 series; CFD; Sweep back angles; drag coefficient; lift coefficient.

## I. INTRODUCTION

Computational Fluid Dynamics (CFD) is a computer-based tool for simulating the behavior of systems involving fluid flow, heat transfer, and other related physical processes. It works by solving the equations of fluid flow (in a special form) over a region of interest, with specified (known) conditions on the boundary of that region. Generally CFD has three main stages as follows: preprocessing, solving, post processing.

### A. Gambit Model

The Airfoil model was created by using coordinates of NACA-6 series. Then this model is fulfilled by making it solid surfaces. Then the boundary conditions and mesh conditions were given. Finally the meshed GAMBIT Airfoil model was generated as shown in the following Figures.

Fig 1 Gambit Model of Air Foil Structure

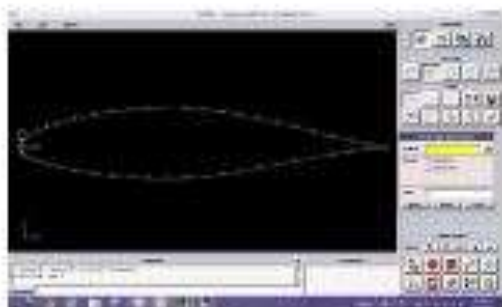
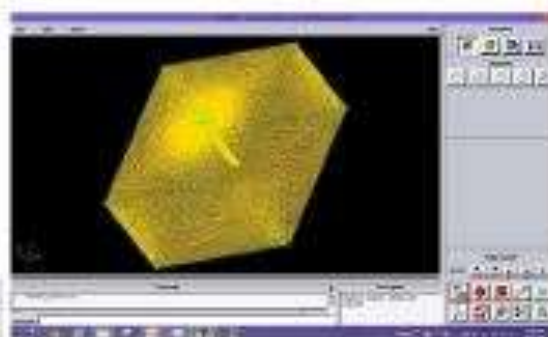


Fig 2 Gambit Model with Meshed Condition For Air Foil Wing Structure



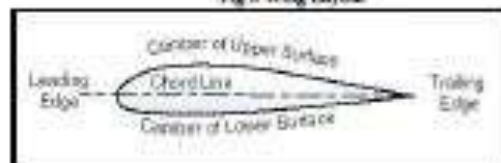
## II. AIRFOIL SELECTION

The airfoil selected for the paper is NACA 653218. All this NACA six series airfoils show the qualitative information. Wind tunnel and flight test of the section showed that the extensive laminar boundary layers could be maintained at comparatively large values of the Reynolds number if the wing surfaces were sufficiently fair and smooth. These tests also provided qualitative information on the effects of the magnitude of the favorable pressure gradient, leading edge radius, and other shape variables. The data also showed that separation of the turbulent boundary layer over of the section, especially with rough surfaces, limited the extent laminar layer for which wings should be designed the wing sections of these early families generally showed relatively low maximum lift coefficient and in many cases, where designed for a greater extent of laminar flow than is practical.

### A. Wing Specification

- The root chord of the wing = 121mm
- The span of the wing = 1320mm
- Semi span = 660mm
- Area of the wing semi span = 79860mm<sup>2</sup>
- Aspect ratio = 5.45

Fig 3 Wing Layout



# Feature Extraction of Brain Tumor Using MRI

SivaSankari.S<sup>1</sup>, Sindhu.M<sup>2</sup>, Sangeetha.R<sup>3</sup>, ShenbagaRajan.A<sup>4</sup>

U.G. Student, Department of Computer Engineering, PSRR Engineering College, Sivakasi, Tamilnadu, India<sup>1</sup>

Associate Professor, Department of Computer Engineering, PSRR Engineering College, Sivakasi, Tamilnadu, India<sup>2</sup>

**Abstract:** Magnetic resonance imaging (MRI) is a medical imaging technique used in radiology to visualize internal structures of the body in detail. MRI provides good contrast between the different soft tissues of the body, which makes it especially useful in imaging the brain, muscles, the heart, and cancers compared with other medical imaging techniques such as (CT) or X-rays. By using this MRI we are going to extract the optimal features of brain tumor by utilizing GLCM, Gabor feature extraction algorithm with help of k-means Clustering Segmentation. The brain tumor characterize by uncontrolled growth of tissue. It can be easily cured if it is found at early stage.

**Keywords:** MRI, Brain Tumour, segmentation, k-means Clustering, Feature extraction, GLCM, Gabor.

## I. INTRODUCTION

This paper deals with the concept for brain tumour segmentation and feature extraction. Normally the anatomy of the Brain can be viewed by the MRI scan or CT scan. In this paper,

The MRI scanned image is taken for the entire process. The MRI scan is more comfortable than CT scan for diagnosis. It is not affect the human body. Because it doesn't use any radiation. But they may have some drawback in segmentation. In this paper, k-means algorithm is used for segmentation. So it gives the accurate result for tumor segmentation. Tumour is due to the uncontrolled growth of the tissues in any part of the body [1][8].

## II. RELATED WORKS

The existing method is based on the thresholding and region growing. The thresholding method was ignored the spatial characteristics [4][5][8]. Normally spatial characteristics are important for the malignant tumour detection. In the thresholding based segmentation the image is considered as having only two values either black or white. But the bit map image contains 0 to 255 gray scale values. So sometimes it ignores the tumour cells also. In case of the region growing based segmentation it needs more user interaction for the selection of the seed [7][6]. Seed is nothing but the centre of the tumour cells; it may cause intensity in homogeneity problem. And also it will not provide the acceptable result in our feature extraction for all the images. So we are avoiding thresholding and region growing method it is not suitable for feature extraction technique.[1]

The proposed system has mainly three modules: pre-processing, segmentation and Feature extraction. Pre processing is done by median filtering. Segmentation is carried out by K-means clustering algorithms. Feature extraction is an, approximate reasoning method to recognize the tumour shape and position in MRI image using edge detection method. In the existing method many algorithms were developed for segmentation. But they are not good for all types of the MRI images.[1][3][7][8].

## III. METHODS USED IN PROPOSED SYSTEM

### A. IMAGE PREPROCESSING

According to the need of the first level the pre processing step convert the image. It performs filtering of noise in the image. RGB to grey conversion and Reshaping also takes place here. It includes median filter for noise removal. The possibilities of arrival of noise in modern MRI scan are very less. It may arrive due to the thermal effect. The main aim of this paper is to extract optimal features provide efficient result in feature extraction

# C.A.D.S., for Classification of MRI Brain Tumour Using Decision Tree

VijayaRekha.R<sup>1</sup>, Sudha.S<sup>2</sup>, Sangeetha.J<sup>3</sup>, Shenbagarajan Anantharajan<sup>4</sup>

<sup>1,2,3</sup>UG Student, Department of Computer science Engineering, PSRRCEW, Sivakasi, Tamilnadu, India

<sup>4</sup>Assistant Professor, Department of Computer science Engineering, PSRRCEW, Sivakasi, Tamilnadu, India

**Abstract:** This project aims at detection of Tumor blocks and classifying the type of tumor using Decision Tree in MR images of the tumor affected patients with Astrocytoma type of Brain Tumor. The proposed technique consists of different stages namely, Preprocessing, Adaptive Thresholding Segmentation, GLCM Feature Extraction and Decision Tree Classification. The Image Processing techniques such as Median filtering, Sobel gradient edge detection, Adaptive Thresholding and feature extraction have been developed for detection of Brain Tumor in the MR images of cancer affected patients. The developed system classifies the images into a Grade of tumor belongs to Astrocytoma type of Brain Cancer. The system is found efficient in classification of these samples and responds on any abnormality noticed and added to it, the system eliminates the need for Biopsy for classifying the tumor grades efficiently.

**Keywords:** Adaptive Thresholding, Decision Tree, Gray Level Co-occurrence Matrix, Magnetic Resonance Images, Median filter, Sobel gradient edge detection.

## I. INTRODUCTION

The Cancer is the next stage or effect of tumorous cells. It is dangerous and tedious to recover, sometimes it may lead to loss of life. Tumor is medically defined as an abnormal growth of cells. The tumor occurred within the brain or inside the skull then it is coined as Brain tumor. Brain tumors are great mimics of other neurological disorders. It may be of Least Aggressive or benign (non-cancerous) and Most Aggressive or Malignant (cancerous). They have been detected using either Computed Tomography(CT) or Magnetic Resonance Images(MRI)[4]. It is hard to conclude grade of tumor just by discussing the results of CT or MRI. A Biopsy is a surgical procedure in which a sample of tissue is taken from the tumor site and examined under a scientific microscope. The biopsy discovers the type and grade of a tumor. Hence C.A.D.S., eliminates the need for biopsy.

## II. LITERATURE SURVEY

- In [3] Hybrid Medical Image Classification Using Association Rule Mining With Decision Tree Algorithm.
  - ▶ The main focus is concerned with the classification of brain tumor in the CT scan brain images not in MRI.
  - ▶ In this paper the classification of brain images into normal, benign and malignant but not in grades.
- In [4] Classification Of Brain Tumors In MR Images
  - ▶ Feature extraction along with selection results in removal of redundant features.
  - ▶ It classifies the results either Benign or Malignant.

But now-a-days there is a need for fine tuned classification.



# Classification of Brain Tumor Grades using Neural Network

B.Sudha, P.Gopikannan, A.Shenbagarajan, C.Balasubramanian

**Abstract-** In this paper, the automated classification of brain tumor grades using FFNN, MLP and BPN are performed. The features of the brain tumor grades are extracted using GLCM and GLRM. The optimal features are selected using fuzzy entropy measure. Based on the features that are extracted from the various grades of brain tumor MRIs, the classifiers are trained and tested. The performances of the classifiers are evaluated in both the testing and training phases with various parameters. These classifiers are tested using a dataset of 50 MR brain images. From the accuracy in classifying the tumor grades, it is found that BPN outperforms other classifiers with the classification accuracy of 96.7% and this will be the fruitful automated tool for the classification of brain tumors according to their grades.

**Keywords-** Classifier, Feature Extraction, Feature Selection, Neural Network, Statistical Features

## I. INTRODUCTION

Now-a-days the major reason for death among the people is brain tumors. The automated system to identify brain tumors will help the patients in their early diagnosis. Depending on the grades of the tumor, treatment will vary. Hence the automatic classification of brain tumor grades by the system from the brain MRI is essentially a need for the patients for their survival. The proposed system is designed in order to classify the type of tumor based on its features that are extracted from the segmented tumor region of brain image.

Deepa and Aruna Devi (2012) compared the performance of BPN and RBFN classifier for the classification of MR brain images. They simply found whether the brain image is normal or abnormal and they have not found out its grades if it is tumorous. They concluded that RBFN classifier is best suited for the classification of brain tumors.

Sandeep et al. (2006) developed the neural network and support vector machine classifiers for the classification of brain images. Features extracted using wavelets are fed as inputs to the neural network classifier. Discrete Wavelet Transform uses the discrete set of wavelets to implement the wavelet transform[15]. SVM is the binary classification method that takes input from two classes and produces the output as the model file for the classification of data into the corresponding classes. Neural network is the non-linear computational unit through which large class of patterns can be recognized. The performances of both these classifiers are evaluated and based on this neural network is found to be the efficient classifier.

Arthi et al.(2009) [1], proposed the hybrid of neural network and fuzzy technique for the diagnosis of hyperactive disorder. A combination of self organizing maps which is unsupervised technique and radial basis function which is supervised algorithm. In Self Organizing Map, learning process is carried out and learning parameter rate starts to decrease during the convergence phase. Radial Basis Function neural network is a supervised technique for the non-linear data and in this no hidden layer units are present. Based on the degree of sensitivity to inputs, the hidden units in neural network are assigned with equal weights. They concluded that hybridization of these methods involves complexity and relaxation of training dataset is not possible in such scenarios.

Mohanaiah et al (2013) extracted the texture features such as energy, homogeneity, correlation, entropy using the GLCM. They have extracted the texture features for the images of varying sizes 64×64, 128×128, 256×256. They concluded that when the image size increases, the feature values are also increasing. Hence the optimum size of 128×128 is best suited for feature extraction and this will result in minimum loss of information.

Dong-Hui Xu et al proposed the run length metric for the extraction of features from images. The run length matrix is used to extract the features from 3D liver image. The features such as SRE, LRE, LGRE, SGRE and many others are extracted. They found out the features from CT liver image which is in 3D form. The run length matrices are calculated in various directions. They concluded that the results obtained from 2D data and those obtained from volumetric data have some similarities as well as differences.

The organization of the paper is as follows. After the introduction, we present the proposed system for the classification of brain tumor grades in Section II. Then the experimental result of the system is discussed in Section III. The comparison is also carried out in the same section. Section IV has the conclusion part based on the results obtained using the proposed system.

Manuscript received 7 April, 2014.

B.Sudha is the PG Scholar in PSR Rengasamy College of Engineering for Women, Sivakasi, Tamilnadu, India (email:sudhabalasubramanian.mepco@gmail.com)

P.Gopikannan is the Assistant Professor in PSR Rengasamy College of Engineering for women, Tamilnadu, India (email: gopikannan@psrr.edu.in)

A.Shenbagarajan is the Assistant Professor in PSR Rengasamy College of Engineering for women, Sivakasi, India (email: shenbagarajan@psrr.edu.in)

C.Balasubramanian is the Professor in PSR Rengasamy College of Engineering for women,Sivakasi, Tamilnadu, India (email: bala@psrr.edu.in)