

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

Title of paper	Name of the author/s	Department of the teacher	Name of journal	Link to the recognition in UGC enlistment of the	
				Link to website of the Journal	Is it listed in UGC Care list
Biochar derived from Caulerpa scalpelliformis for the removal of Reactive Yellow 81 in batch and packed bed column	D. Zunaihur Rahman	Civil	Biomass Conversion and Biorefinery	<a href="http://www.springer.com/journal/13399">http://www.springer.com/journal/13399</a>	Yes
Performance Evaluation of RC framed structures with and without shear wall using STAAD Pro	D. Zunaihur Rahman	Civil	European Journal of Molecular and Clinical Medicine	<a href="http://ejmcm.com/">http://ejmcm.com/</a>	Yes
Sequestration of Pb(II), Ni(II) and Zn(II) biosorption onto brown seaweed Sargassum wightii: Isotherm and kinetic modeling	D. Zunaihur Rahman	Civil	Journal of Indian Chemical Society	<a href="http://indianchemicalsociety.com/">http://indianchemicalsociety.com/</a>	Yes
Mixed pixel removal in north Tamil Nadu region for accurate area measurement	Dr N R Shanker	CSE	Computational Intelligence	<a href="http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-8640">http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1467-8640</a>	Yes
Multilayer Flexible Substrate Antenna sensor for PT Measurement from blood plasma to avoid Turbidity and Reagent Sensitivity Variations through Regression Modelling	Dr N R Shanker	CSE	IEEE Sensors Journal	<a href="http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=7361">http://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=7361</a>	Yes
Maximum Power Point Tracking During Partial Shading Effect in PV System Using Machine Learning Regression Controller	Dr N R Shanker	CSE	Journal of Electrical Engineering & Technology	<a href="https://link.springer.com/journal/42835">https://link.springer.com/journal/42835</a>	Yes
Aberrant Behavior Prediction and Severity Analysis for Autistic Child through Deep Transfer Learning to avoid Adverse Drug Effect	Dr N R Shanker	ECE	Biomedical Signal Processing and Control	<a href="http://www.journals.elsevier.com/biomedical-signal-processing-and-control">http://www.journals.elsevier.com/biomedical-signal-processing-and-control</a>	Yes
Searching time operation reduced IPV6 matching through dynamic DNA routing table for less memory and fast IP processing	Dr N R Shanker	ECE	Soft Computing	<a href="http://link.springer.com/journal/500">http://link.springer.com/journal/500</a>	Yes
Determination of Glycaemic Index (GI) through Detecting Insulin Secretion in Pancreas Using GMR Sensor	Dr N R Shanker	ECE	Journal of Sensors	<a href="http://www.hindawi.com/journals/js/">http://www.hindawi.com/journals/js/</a>	Yes
Improving Packet Delivery Performance in Water Column Variations through LOCAN in Underwater Acoustic Sensor Network	Dr N R Shanker	ECE	Journal of Sensors	<a href="http://www.hindawi.com/journals/js/">http://www.hindawi.com/journals/js/</a>	Yes
Efficient Routing In Uasn During The Thermohaline Environment Condition To Improve The Propagation Delay And Throughput	Dr N R Shanker	ECE	Soft Computing	<a href="http://link.springer.com/journal/500">http://link.springer.com/journal/500</a>	Yes
Modified Mackenzie Equation and CVOA Algorithm Reduces Delay in UASN	Dr N R Shanker	ECE	Computers, Materials & Continua	<a href="http://www.techscience.com/journal/cmcc">http://www.techscience.com/journal/cmcc</a>	Yes

BR22 TECHNIQUE USED TO SECURE THE DATA	Dr. M. Amanullah	IT	Journal of Huazhong University of Science and Technology	<a href="http://www.hust.edu.cn">http://www.hust.edu.cn</a>	Yes
Blockchain Technology Empirical Studies on the Demand of Distributed Network	Dr. M. Amanullah	IT	Journal of Physics: Conference Series	<a href="http://iopscience.iop.org/journal/1742-6596">http://iopscience.iop.org/journal/1742-6596</a>	Yes
A Study on Developing 3-Dimensional Architecture Array of Solar Park above Railways	P Muni Raja Chandra, Dr Mohd F Shabir, R Manikandan	IT	Materials Today Proceedings	<a href="http://www.journals.elsevier.com/materials-today-proceedings">http://www.journals.elsevier.com/materials-today-proceedings</a>	Yes
Effect of Various Phase Change Materials (Paraffin Wax /Hydrogenerated Vegetable Oil) Packed in a Fabricated Shell and Tube type Heat Exchanger	P Muni Raja Chandra, Dr Mohd F Shabir	MECH	Materials Today Proceedings	<a href="http://www.journals.elsevier.com/materials-today-proceedings">http://www.journals.elsevier.com/materials-today-proceedings</a>	Yes
Experimental Investigation of the Effect of Independent Parameters in the Face Milling of Aluminium 6082 Alloy	Dr S Ramkumar	MECH	Transactions of the Indian Institute of Metals	<a href="https://link.springer.com/article/10.1007/s12666-020-02161-x">https://link.springer.com/article/10.1007/s12666-020-02161-x</a>	Yes
Effect of Cascara/testa natural fiber reinforced (epoxy based) hybrid composites	R Manikandan	MECH	Journal of Physics: Conference Series	<a href="http://iopscience.iop.org/journal/1742-6596">http://iopscience.iop.org/journal/1742-6596</a>	Yes



  
**PRINCIPAL**  
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# Biochar derived from *Caulerpa scalpelliformis* for the removal of Reactive Yellow 81 in batch and packed bed column

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Received: 9 October 2020 / Revised: 5 November 2020 / Accepted: 13 November 2020  
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## Abstract

The present study investigated the potential of biochar synthesized from *Caulerpa scalpelliformis*, a marine seaweed in the decolorization of Reactive Yellow 81 (RY81). The decolorization study was conducted in batch experiments and also in a packed bed column for continuous study. Maximum uptake of 151.5 mg/g was reported in a batch study under optimum conditions. Biosorption isotherm studies were conducted to understand the biosorption mechanism. A correlation coefficient of 0.9998 was obtained for a four-parameter model Fritz-Schlunder – IV. The kinetic study concluded that pseudo-first-order kinetics predicted the experimental data with a correlation coefficient always greater than 0.984. Desorption studies were carried out to find the best elutant, solid to liquid ratio and regeneration cycles. The maximum uptake of 122.48 mg/g was reported in a column study at optimum conditions. Yoon Nelson model predicted the experimental uptake with a correlation coefficient always greater than 0.99 and the % error was always less than 0.11.

**Keywords** *Caulerpa scalpelliformis* biochar · Isotherm · Kinetics · Packed bed column · Reactive yellow 81

## 1 Introduction

Worldwide the usage of water for domestic and industrial purposes was increasing in recent years. The increase in population had a great impact on the industrial growth and consumption of

water. The population growth directly affected the ecosystem and increased water demand. Day by day the fresh water source was depleted due to the discharge of industrial wastewater into the water bodies. These had created a great impact on the environment and also affected the health of the human being [1]. Much

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# PERFORMANCE EVALUATION OF RC FRAMED STRUCTURES WITH AND WITHOUT SHEAR WALL USING STAAD PRO

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## Abstract

*Engineering structures are very difficult to analyze for their dynamic or vibration behavior since they are very complex. In the last couple of decades alone in India, with the incidental loss of life and property witnessed due to failure of structures caused by earthquakes, now attention is given to neglect the adequacy of strength in RC framed structures to resist strong ground motions. As we know that in the present scenario, buildings with shear walls are gaining more popularity than buildings without the shear wall in earthquake-prone areas mainly under zones III, IV and V due to their capability to the resistance during earthquake. In this paper, 7 storey's RCC framed structure is considered for the seismic analysis which is located in zone III is considered the analysis using equivalent static analysis method. Six models have considered for the analysis out of which one is bare frame model i.e without shear wall and remaining five models are structures with column support shear wall at various positions is considered. Initially, shear walls are used in reinforced concrete buildings to resist wind force. Since building with shear wall gives excellent performance even under seismic force, shear walls are extensively used for all earthquake resistance design. The shear wall imparts lateral stiffness to the system and also carries the gravity load. When design for wind loading, the location of shear wall in building plan does not play important role. In case of Seismic loading, location of shear walls plays a critical role. Under wind loading, a fully elastic response is expected, while during strong earthquake significant inelastic deformations are anticipated. Hence, in this paper, Column support shear walls are placed at different locations in RC frames of G+6 Storey building and analyzed for seismic action and also subjected to static pushover analysis. The modeling and analysis are done using Staad Pro. An attempt is made to study and compare the seismic parameters such as storey displacement, storey drift, storey shear and story stiffness by equivalent static analysis method. This paper aims to find the optimum location of shear walls which can be determined with the help of seismic performance parameters. The torsional effects in a building can be minimized by proper location of vertical resisting elements and mass distribution. Multi-storied RCC building with shear walls is now becoming popular as an alternative structural form for resisting the earthquake force.*

**Keywords:** Shear walls, Static pushover analysis, Storey displacement, Storey drift, Storey shear & storey stiffness



J. Indian Chem. Soc.,  
Vol. 97, No. 11a, November 2020, pp. 2224-2232

## Sequestration of Pb(II), Ni(II) and Zn(II) biosorption onto brown seaweed *Sargassum wightii*: Isotherm and kinetic modeling

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Manuscript received online 12 October 2020, revised and accepted 30 November 2020

This analysis is aimed at exploring the potential of brown seaweed *Sargassum wightii* for the sequestration of lead, nickel, and zinc metal ions from aqueous solutions. The biosorption process was identified by FTIR and SEM analytics on the contact between positive metal ions and negatively-charged functional groups on *S. wightii*'s surface. Biosorption isotherms obtained at pH 5, 4, and 8 for Pb(II), Ni(II), and Zn(II) indicate that the seaweed provides a greater intake of Pb (86.37 mg/g), with Zn (70.16 mg/g) and Ni (56.74 mg/g). The above-mentioned pH mechanism significantly affected the biosorption capacity of brown algae. Such varying affinity was measured by atomic weight, the radius of metal ions, and the negative charges of electrons of the biosorbent for the three metal ions. The Toth model improved projected experimental isotherm results with strong correlation coefficients ( $R^2$ ) from different isotherm models (Langmuir, Freundlich, Toth, and Sips). Kinetic tests found very strong metal removal efficiency by *S. wightii*, with 99% being completed in 90 min. Desorption tests with different elutant components (0.01 M NaOH, HCl, and EDTA) revealed that 0.01 M HCl could accomplish the highest desorption of all metal ions from metal-loaded *S. wightii*.

Keywords: Water treatment, biosorption, Pb, Ni and Zn, metal, *Sargassum wightii*, brown seaweed.


### Introduction

Rising point sources of emissions and the need to clean up toxic runoff are recognized by the government and industry in recent years. The prevalence of heavy metals in wastewater, which are non-biodegradable, cause severe health concerns<sup>1,2</sup>. Many factories, in particular those involved in plating, coating, leather, and mining, produce vast volumes of wastewater with heavy metal concentrations. The risk of such heavy metals ensures that all contaminated products should be treated before discharge<sup>3</sup>. The following constraints which include high cost, incomplete elimination, poor selectivity, high energy usage, and production of toxic slurries have already been established for the traditional processing methods or recovery of toxic wastewater pollutants through adsorption, exchange of ions, precipitation, electrosorption, and adding oxygen and reduction pro-

cesses<sup>4,5</sup>. Therefore, new inexpensive and effective solutions are desperately required to replace current methods in treating wastewater contaminated with heavy metals<sup>6,7</sup>.

Biosorption is an effective method for liquid treatment of heavy metals. The process consists of solid and liquid phases. The latter is drawn and attached to the sorbent by different paths due to the higher affinity of the sorbent for the sorbate. The cycle continues until an equilibrium between the quantity of firmly bonded sorbate species and its share is defined. Metal sorption through biosorbents is achieved by ion exchange and/or variations of such processes via complexation, synchronization and, chelation<sup>8,9</sup>. Various biosorbents, like inactive/dead microbes, fungi, algae, yeast, farm waste, and industrial waste have been widely used to extract heavy metal ions. The possibility of utilizing dead or inactive algae to function as possible heavy metal biosorbents was exten-

# Mixed pixel removal in north Tamil Nadu region for accurate area measurement

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## Abstract

In remote sensing, vegetation and water areas delineation from satellite image plays a vital role for urban and rural planning. Delineation of vegetation and water area is a challenging task due to mixed pixels and geometric distortion over the boundary region. Geometric distortion arises due to change in velocity and speed of satellite during image acquisition, and mixed pixels arises due to different surfaces in a particular area. Traditional methods apply classifier algorithms such as support vector machine, neural network, and fuzzy for vegetation and water area delineation. The traditional methods require more training dataset and consume more interpretation time for delineation. In this article, we propose transverse dyadic wavelet transform (TDyWT) to delineate vegetation and water area from Landsat 8 images. The TDyWT method enhances the boundary and curvature area of satellite image for accurate delineation. From the experimental results, the proposed TDyWT approach delineates the area of subclass for vegetation and water areas with 95% of accuracy with respect to the ground truth.

## KEYWORDS

geometric distortion, Landsat 8 image, mixed pixels, remote sensing, transverse dyadic wavelet transform

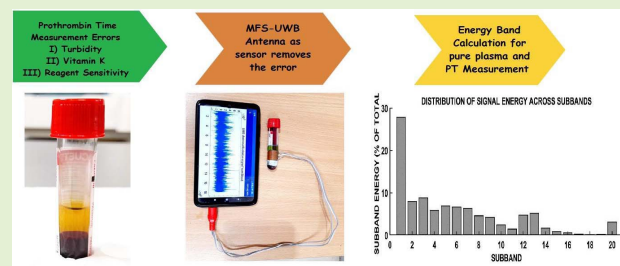


# Multilayer Flexible Substrate Antenna Sensor for PT Measurement From Blood Plasma to Avoid Turbidity and Reagent Sensitivity Variations Through Regression Modelling

R. Prasanna<sup>1</sup>, K. Annaram, *Senior Member, IEEE*, and N. R. Shanker

**Abstract**—Passive antenna is applied in medical applications such as sensor, radiometer, rectenna, and implantable device for accurate measurement and analysis. Moreover, passive antennas can replace the optical sensors in the pathological instruments to overcome the drawbacks such as optical interference, offset voltage, time consumption and dark current. Furthermore, prothrombin time (PT) measurement through optical and mechanical instruments requires repeated testing for accurate results due to turbidity (lipemia) in blood Plasma and reagent sensitivity during coagulation. Plasma samples in instruments with more K vitamin influences the accuracy of PT measurements. In this paper, we propose a method to measure the PT from blood plasma through passive Ultra-Wideband sensor and overcomes the above problem. The proposed multilayer flexible substrate ultra-wide band (MFS-UWB) passive antenna absorbs the electromagnetic radiations from the concentration of plasma during clotting. The Concentration of plasma is proportional to electromagnetic energy density during clotting. The clotting duration time is acquired based on voltage. During clotting, observed electromagnetic emitted voltage is converted into frequency for measuring the clot concentration and the observed radiation from human blood clotting frequency ranges from 2GHz to 3GHz and voltage from 0.55mV to 0.85mV. The acquired blood clotting concentration voltage measures the prothrombin time using regression modelling and validated through laboratory values.

**Index Terms**—Passive antenna sensors, prothrombin time, measurements, regression modelling, laboratory values.



## I. INTRODUCTION

THE Antenna is used as active and passive in the field of communication. The active antenna plays a vital role in data communication. The passive antenna is used as a sensor in various fields such as medical, environmental, textile and chemical. Furthermore, bandwidth of the antenna is an important parameter to radiate and receive energy. The

Manuscript received February 5, 2021; accepted February 21, 2021. Date of publication February 26, 2021; date of current version April 5, 2021. The associate editor coordinating the review of this article and approving it for publication was Dr. Cheng-Ta Chiang. (Corresponding author: R. Prasanna.)

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Digital Object Identifier 10.1109/JSEN.2021.3062415

UWB antenna has the bandwidth range from 3.1GHz to 10.6GHz according to the Federal Communications Commission (FCC) of the United States, which adopted the First Report and Order that permitted the commercial operation of ultra-wideband (UWB) technology (FCC, 2002) [1]. Active UWB antenna radiation can penetrate the human body and the interference is avoided due to the UWB properties such as very low transmit power and wide bandwidth. The Passive UWB antenna is used as sensors in biomedical applications. Dipole UWB antenna in capsule for Wireless endoscopy communication and applications is developed [2]. MIMO UWB antenna sensor applied in breast tumour detection [3]. Grounded low band UWB antenna as a sensor measures the human tissue conductivity(S/m), permittivity, Thickness (mm) and Density ( $\text{kg/m}^3$ ) [4]. Electromagnetic bandgap structured monopole antenna analyse the specific absorption rate for muscles (20mm), skin (2mm) and fat (6mm) [5]. UWB array antennas detect breast cancer through imaging [6]. A double layer bowtie antenna diagnoses the brain stroke, breast cancer and detects the water accumulation in the human body [7]. The



# Maximum Power Point Tracking During Partial Shading Effect in PV System Using Machine Learning Regression Controller

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Received: 18 January 2020 / Revised: 12 October 2020 / Accepted: 26 November 2020 / Published online: 7 January 2021  
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## Abstract

Maximum Power Point Tracking (MPPT) algorithm performs for maximizing the efficiency of solar Photo Voltaic (PV) system. The solar photovoltaic system efficiency reduces due to partial shading and ambient atmospheric condition, which varies with geographic locations. Traditional MPPT systems solve the above problem through different soft computing algorithms such as Perturb and observe (P&O), Flower pollination algorithm (FPA) and Particle swarm optimization (PSO). In P&O, FPA and PSO algorithms, duty cycle of boost converter varies to attain MPPT. The soft computing algorithms in MPPT perform less during the partial shading effect or rapid insolation, fluctuation condition of solar energy. The performance of MPPT with traditional algorithms is reduced due to slow convergence speed and oscillations in tracking by computing algorithms. In this paper, Regression controller based MPPT achieve maximum peak voltage during partial shading effect is developed. The regression controller predicts the duty cycle for boost converter based on stored dataset of PV system output voltage and load, during partial shading effect or rapid isolation for that particular geographic location. The regression based duty cycle prediction controller is programmed in MATLAB R2018a Simulink. Furthermore, Regression controller is implemented in PV system test bed. The simulation and hardware results of Regression controller based MPPT perform more of about 20%, 16.96% and 15% in efficiency respectively than PSO, FPA and P&O algorithms during partial shading condition in PV.

**Keywords** Energy harvesting · Machine learning algorithm · Maximum power point tracking · Microcontroller based system design · Regression controller

## 1 Introduction

Renewable energy source has gained more interest in recent decades because of global warming and demand for Energy. Renewable energy source includes of wind, solar and tidal. The solar energy source is preferred, when compared to other energy sources due abundant availability of sun radiation. The solar power generate through photovoltaic (PV) cells. PV cell generates the direct current with minimum hardware and less maintenance cost. In PV cell, photons from sunlight convert to electrical energy. The electrical energy produced through PV cell is directly proportional

to incident sunlight. The PV cell performance affect due to static and dynamic shadowing effect of sun radiation. The dynamic shadow arise during cloud movement or weather condition such as cloud shading, UV radiation and dust settling on solar panel, which is referred as partial shading effect. The static shading effect cause due to bird litter, and hard dust settled on the surface of solar panel. The PV cell efficiency reduces due to self-shading effect. The self-shading effect arises because of earth rotation, which occurs in specific time in a day. However, performance of PV cells improves with DC-DC converters and Maximum Power Point Tracking (MPPT) algorithm [1, 2].

The MPPT algorithm varies the duty cycle in DC-DC converter for maximum power extraction from PV array. Traditional MPPT algorithms such as perturb and observe (P&O) method [3–5], incremental conductance (InC) method [6], curve fitting method [7], fuzzy logic methods [8–11], and neural networks [13, 14] is applied for maximum power extraction from PV array. Similarly, Genetic

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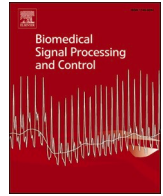




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## Aberrant behavior prediction and severity analysis for autistic child through deep transfer learning to avoid adverse drug effect

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### ARTICLE INFO

#### Keywords:

Deep transfer learning  
IP webcam  
Adverse drug effect  
Action recognition

### ABSTRACT

Autism Spectrum Disorder (ASD), in child is identified through various parameters such as social skills, repetitive behaviors, speech and nonverbal communication. Among the above parameters repetitive behavior plays a vital role for physician to prescribe dosage of drugs. The repetitive behavior and more aggressiveness in the autistic child is the symptom for growth of the disease. To control the repetitive behavior, the physician prescribe the dosage level of drug based on Aberrant Behavior Checklist (ABC). The ABC is measured only for few seconds by the physician and such measurement need continuous monitoring for proper prescription of drugs and also to avoid adverse drug effect. The above problem solve through IP Webcam app based ASD recognition for continuous monitoring and replaces the empirical method of ABC measurement. In this paper, the proposed method recognizes behavior and changes in autistic child through activity detection and repetitive behaviour, due to overdosage of drugs. In proposed method, hybrid framework incorporates training of deep CNN model for the monitoring of ASD children in natural environment through Autismdata.Net. Moreover, Transfer learning avoids the over-fitting problem in small size Autismdata.Net dataset through CNN in severity analysis of child. The behavior of ASD children is evaluated through Autismdata.Net dataset and validated through drug thermo regulation of autistic child. Action recognition accuracy of the proposed method is much better than the clinical literate/therapist analysis/observation. The proposed system helps physician for regulation of dosage level to ASD children.

### 1. Introduction

ASD patients find difficulty in day-to-day communication such as verbal, non-verbal, social interaction, and behavior [1]. ASD in child shows symptoms such as Rett's syndrome, autistic, pervasive development and Asperger's. ASD in child is about 1:59 ratio, according to the medical records of Centers for Disease Control and Prevention (CDC), U. S.A. [2] – 2018. The CDC record data shows ASD in boys and girls such as 1:37 (boys) and 1:151 (girls). CDC record proves that the boys are affected more than girls. ADHD (Attention Deficit Hyperactivity Disorder) [3] foundation record of Australia states that ASD is diagnosed only after 4 years of age and severity of the disorder increases up to the age of 20 years and decrease in severity is after 21 years of age. However, the medical record from the various foundation and hospital reveal that ASD symptom seen only below 2 years of age. The medical statistics show the

increase of ASD in children of about 10% to 17% for every year. Furthermore, Adverse Drug Reaction (ADR) effect in ASD children leads to kidney failure, cardiac arrest, irregular heartbeats, blood pressure, and coma. The drug dosage level for ASD person depends on the behavior and clinical trait. Clinical trait is a trial and error approach, followed by the physician for drug prescription with dosage level. The clinical trait identifies a new dosage level after several tests, and effect of dosage level is not monitored in the child through regular activity in day-to-day life, which leads to ADR. Furthermore, ASD children show different symptom in activity, which varies from child to child. The ASD symptom diagnose [4] through clinical traits only and never with medical reports or continuous monitoring. The clinical trait in ASD identification is done through vision, neurological disorder, genetic and weigh/pre-birth [5]. Furthermore, the prescription of drug and dosage levels for ASD patients depends on the clinical trait. In clinical traits,

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<https://doi.org/10.1016/j.bspc.2021.103038>

Received 12 May 2020; Received in revised form 17 March 2021; Accepted 19 March 2021

Available online 17 August 2021

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# Searching time operation reduced IPV6 matching through dynamic DNA routing table for less memory and fast IP processing

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## Abstract

The internet technology needs high-speed (Internet Protocol) IP addressing system and IP matching in router. The IP addressing speed depends on the size of address and destination. Until now, IPV4 address matching performs with various algorithms such as binary trie, LC trie, prefix tree, priority trie, DTBM, and multi-prefix tree. The above algorithms suit for IPV4 address matching and never suit for IPV6 address matching. The IPV6 consists of 128 bits with different header structures when compared to IPV4. The IPV6 address matching needs a robust algorithm with high processing speed IP matching and uses low memory and high accuracy in IP address matching with less operation time. In this paper, we propose DNA-based sequence matching lookup (DSML) algorithm for IPV6 address matching with reduced searching time. The DSML algorithm performs better than existing algorithms such as disjoint prefix tree and multi-index suffix trie because of direct computation of IPv6 matching through DNA folding sequence. The proposed DSML algorithm does the direct computation due to hit score method and never splits the prefix of IPV6. The splitting of prefix in the existing algorithm consumes more time and reduces the accuracy in IPv6 matching. From the experimentation, when compared to existing algorithms the proposed DSML algorithm provides 80% result in terms of speed and scalability.

**Keywords** Internet technology · Lookup speed · IPV6 matching · DSML algorithm · Speed and scalability

## 1 Introduction

An internet system consists of nodes and routers connected through transmission cable such as optical and coaxial. Node processes the data through router. Routers execute four tasks such as packet switching, packet filtering, internetworking and path selection. In packet switching, the data is broken into packets to improve network efficiency. Packet switching enables multiple users to share a single data path, and packet has sent through network based on their destination IP address (Bando and Jonathan Chao

2010). In addition, packet filtering monitors and restricts the packet entering and leaving the network based on the source and destination internet protocol (IP) address, port and protocol. Furthermore, internetworking acts as gateway to enable two or more networks in the internet. Internetworking provides a standard method of routing packet among the networks. The path selection in the router selects the best route/path among many routes (Berger 2003). In path selection, the router obtains the network topology along with reachability information. In reachability information, the packet distributes among the router based on IP address. The IP address prefix pattern matches with binary bits for packet distribution (Byun et al. 2019). The matching of binary bit has done in forwarding information base [FIB] algorithm. The FIB consists of lookup table, where the mirror image content of the IP routing table has stored dynamically. FIB algorithm holds the next-hop address referred for IP destination prefix-based switching decision (Chang et al. 2014). FIB of the router applies multiple matching IP address prefix of different lengths in destination IP address, where the longest prefix has determined for the next hop (Deng et al. 2017). The

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Communicated by V. Loia.

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## Research Article

# Determination of Glycaemic Index (GI) through Detecting Insulin Secretion in Pancreas Using GMR Sensor

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Received 16 April 2020; Revised 2 July 2020; Accepted 28 August 2020; Published 18 September 2020

Academic Editor: Gwanggil Jeon

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Diabetes is a metabolic disease that affects the ability of the body to process blood glucose, otherwise known as blood sugar. Diabetes occurs when the body produces minimal or no insulin. The diabetes patients check their glycaemic index after each meal and intake medicine to control glycaemic index. Traditionally, glycaemic index estimates the glucometer by acquiring blood sample. In this paper, we propose a noninvasive method to estimate glycaemic index from the pancreas. The magnetic signal from the pancreas acquires with Giant Magneto Resistance (GMR) sensor for glycaemic index estimation. The GMR acquired pancreatic magnetic signal process with Multi Synchro Squeezing Transform (MSST) for feature extraction. The MSST analysis shows significant changes in instantaneous frequency of the pancreas biomagnetic signal before and after meal consumption. The signal statistical parameters help to predict glycaemic index via regression modelling. The proposed method estimates glycaemic index with 88% accuracy.

## 1. Introduction

The autoimmune diseases are caused due to the effect of self-immune system detecting its own proteins as antigens and perform an attack over its own tissues. These are caused due to the genetic proneness over the stimulus of prior environmental disease commencement. Blood glucose is the main source of energy and comes from the food. Insulin, a hormone made by the pancreas, helps glucose from food get into the cells to be used for energy. All carbohydrate foods are broken down into glucose in the blood. Insulin helps glucose get into the cells. Hyperglycaemia is a condition, where the body cannot produce insulin or use it which effectively leads to raised glucose levels. High glucose levels over the long term will cause damage to the body and failure of various organs and tissues [1]. Diabetes is a chronic disease caused due to the swelling of T-cells, which causes autoimmune disorder that destroys the  $\beta$ -cells in the pancreas. These are the base cells for producing insulin for regulating the blood glucose level.

This develops the impairment in maintaining glucose level in the blood. The insulin helps the cells to consume glucose from the blood stream. Nearly 70 to 80% of  $\beta$ -cells are present in the islet of the pancreas and it covers 1 to 2% of the pancreas total size. The islet is covered by glucagon, somatostatin, and pancreatic polypeptide. These are responsible for generation of  $\alpha$ -cells,  $\delta$ -cells, and  $\epsilon$ -cells. The pancreas acts as a digestive organ that generates lytic enzymes for the catabolism of nutrients.

Type 1 diabetes can develop at any age, but occurs frequently in children and adolescents. People with type 1 diabetes need daily insulin injections to control their blood glucose levels. If people with type 1 diabetes do not have access to insulin, they will die. The risk factors for type 1 diabetes are still under research. A family member with type 1 diabetes slightly increases the risk of developing the disease. At present, type 1 diabetes cannot be prevented. The environmental triggers that are thought to generate the process that results in the destruction of the body's insulin-producing cells are still under investigation. The most common

## Research Article

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

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Received 1 November 2019; Accepted 21 January 2020; Published 20 February 2020

Academic Editor: Sabrina Gaito

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

## 1. Introduction

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

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

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



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

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## Abstract

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

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

## 1 Introduction

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

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

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

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Communicated by V. Loia.

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## Modified Mackenzie Equation and CVOA Algorithm Reduces Delay in UASN

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Received: 19 May 2021; Accepted: 06 July 2021

**Abstract:** In Underwater Acoustic Sensor Network (UASN), routing and propagation delay is affected in each node by various water column environmental factors such as temperature, salinity, depth, gases, divergent and rotational wind. High sound velocity increases the transmission rate of the packets and the high dissolved gases in the water increases the sound velocity. High dissolved gases and sound velocity environment in the water column provides high transmission rates among UASN nodes. In this paper, the Modified Mackenzie Sound equation calculates the sound velocity in each node for energy-efficient routing. Golden Ratio Optimization Method (GROM) and Gaussian Process Regression (GPR) predicts propagation delay of each node in UASN using temperature, salinity, depth, dissolved gases dataset. Dissolved gases, rotational and divergent winds, and stress plays a major problem in UASN, which increases propagation delay and energy consumption. Predicted values from GPR and GROM leads to node selection and Corona Virus Optimization Algorithm (CVOA) routing is performed on the selected nodes. The proposed GPR-CVOA and GROM-CVOA algorithm solves the problem of propagation delay and consumes less energy in nodes, based on appropriate tolerant delays in transmitting packets among nodes during high rotational and divergent winds. From simulation results, CVOA Algorithm performs better than traditional DF and LION algorithms.

**Keywords:** Gaussian process regression (GPR); golden ratio optimization method (GROM); corona virus optimization algorithm (CVOA); water column variation; dissolved gases; acoustic speed; divergent wind; rotational wind

### 1 Introduction

UASN plays a vital role in monitoring and surveillance of ocean areas in various depths. The monitoring and surveillance applications such as pollution monitoring, underwater exploration, seismic exploration, underwater navigation and tracking, hydrography, oceanography, Unmanned Underwater Vehicle (UUV), anti-submarine warfare needs efficient routing algorithms in different ocean environments and water column variations. The ocean environments are depth, salinity, temperature, and pressure. The water column variations are geometric and Doppler effects, rotational and divergent wind stress, dissolved



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# BR22 TECHNIQUE USED TO SECURE THE DATA

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**Abstract:** The current globe is data globe. This data produced using online media; this data is unhindered data; this data have not incredible security; hereafter to beat this issue we apply the Salsa technique. This technique successfully hack the data from the software engineers. BR22 strategy has 6 phases. 1. To find the mystery prime key S. 2. To find the  $X_1$  and  $X_2$  values from prime numbers. 3. To find the  $\bar{X}_1$  and  $\bar{X}_2$  values. 4. To find the standard deviation values with the help Step 2 and Step 3. 5. To trade a and b esteems from left in matrix. 6. To locate the T-test values and pair it that numbers from left to right. The BR22 strategy gives extraordinary security while appearing differently in relation to Salsa technique.

**Keywords:** BR22, Encryption, Decryption, Prime, T-test, Salsa

## 1. INTRODUCTION

The current globe is data globe. This data produced using online media; this data is unhindered data; this data have not incredible security; from now on to beat this issue we apply the Salsa technique. This procedure adequately hack the data from the software engineers. The extra revolutions XOR for ChaCha is deficiency assault [1]. This creator is utilized new hash idea for key speculating and ending condition [2]. Creator was presented thw bricklayer assault for investigation of ChaCha [3]. They basically focus the security for Double A [4]. They made new plan for secure quick and adaptable calculation [5]. SRB18 strategy used to give security to information [6]. SRB21 Phase 1 and SRB21 Phase 2 strategy used to give security to information [7][8]. CBB21, CBB22 and CBB20 techniques are used to give security to information [9][10][12]. Presented the novel strategy BR(Bagath Basha and Rajaprakash) 22.

**Table 1. Encryption Algorithm**

Steps	Encryption Algorithm
i	To find a prime numbers in given matrix IP.
ii	Equally separate the two parts of prime numbers and apply those values in equation (1), (2), and (3).
iii	T-Test Formula = $(\bar{X}_1 - \bar{X}_2) / \sqrt{((S_1^2 / N_1) + (S_2^2 / N_2))}$ <b>(1)</b>
iv	To find the values for equation (1) with the help of equation (2) and (3).
v	$\bar{X}_1 = \sum X_1 / N_1$ $\bar{X}_2 = \sum X_2 / N_2$ <b>(2)</b>
vi	$S_1 = \sqrt{\sum (X_1 - \bar{X}_1)^2 / (N_1 - 1)}$ $S_2 = \sqrt{\sum (X_2 - \bar{X}_2)^2 / (N_2 - 1)}$ <b>(3)</b>
vii	To pair the T-test value from left to right.

## Blockchain Technology Empirical Studies on the Demand of Distributed Network

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**Abstract.** Blockchain technology has become a new model for encryption, unsustainability and confidence in both consumers and suppliers (SPs) in order to increase the quality of services. A game theory framework is used to simulate a competitive market with the existing platform controlled by a centralizer as a confidant third party to provide an economic overview of such a Blockchain-based platform sector. The portals serve as a mediator in this industry and provide consumers with services delivered by SPs. The key reasons for blockchain based network market performance are (i) how engagement by SPs represents its service efficiency (QoS) and (ii) how SPs are empowered to contribute their services, such as the virtual environment. A non-cooperative two-stage competitive game is used in our game formulation, whereby the first stage model how to promote SPs on a blockchain basis and the second stage model eases rivalry between platforms to draw consumers. We therefore have an equilibrium analysis that offers a valuable description of the effect on competition among platforms and SPs' equilibrium reward policy of the service quality of the blockchain network. Our numerical analysis reveals that the incentive to balance is increasing proportionately to the Fault tolerance of a blockchain-based network when the incentive is unfavourable if the number of participating SPs has a non-increasing QoS.

**Keywords:** Block chain, QoS, Network, Bitcoin, Distributed Network

### 1. Introduction

We are now seeing a major advancement in blockchain technologies from Bitcoin's central architecture [1]. A variety of projects have been created that involve real-time collaboration between suspect contributors around the Internet, thanks to the widespread acceptance of blockchain technologies. The growth of blockchain technology involves horizontal expansion by start-ups predominantly using public blockchain such as Bitcoin [7], Ethereum [2], and the vertical advancement guided primarily by approved blockchain consortia and business alliances such as Hyper ledger [3] and Corda [4].

The technology from Blockchain has allowed building a new network system by means of which a community of collaborative and similarly privileged suppliers will decentralise, along with no unilateral centralization, a large amount of data storage and processing capacity. Samsung SDS [5]





Contents lists available at ScienceDirect

## Materials Today: Proceedings

journal homepage: [www.elsevier.com/locate/matpr](http://www.elsevier.com/locate/matpr)

## A study on developing 3-dimensional architecture array of solar park above railways

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### ARTICLE INFO

#### Article history:

Received 18 September 2020

Received in revised form 28 October 2020

Accepted 1 November 2020

Available online xxxxx

#### Keywords:

Energy generation

Solar industries

Civil works

Return of investment

Employment opportunities

CO<sub>2</sub> emission

### ABSTRACT

Energy generation through solar has become more tedious due to huge investment required over its equipment and land. Though the equipment cost factor can be managed by latest technologies, availability of land has become a major setback for the development of solar industries. To eliminate the land requirement for power generation using solar, a concept has been proposed to use the available railway lines for dual purpose. A deck can be formed above 10 m from the ground level to establish a solar park of capacity of 50,000 MW using 300 Wp monocrystalline PV module at a cost of 5 trillion rupees, which includes module, civil works, installation, commissioning, operation and maintenance cost for a period of 25 years with Return of Investment in 10 years. If the concept is implemented throughout India, it not only increases the power generation capacity through renewable energy but also has other various benefits including longer life of rail tracks & coaches, employment opportunities and reduce CO<sub>2</sub> emission in environments.

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research – 2019.

### 1. Introduction

Energy has become a powerful engine for economic and social development of a country. Various fossil fuel resources provide huge amount of energy, which is necessary for the modern industrial economy such as oil, coal and natural gas. However, with the rapid industrialization of world, the energy crisis may be presented in foresee future. This may lead to hike of fossil fuel price in future and also their existence may become a history. These things have made the world to move over renewable source of energy for power generation and other utilities [1,2]. Out of renewable source of energy, wind and solar sources are fast growing in global level. Solar photovoltaic (PV) is already a proven technology for energy generation [3,4]. Solar power is based on the conversion of sunlight into electricity, either directly using Photovoltaics (PV), or indirectly using concentrated solar power (CSP). Concentrated solar power systems use lenses or mirrors and tracking systems to focus a large area of sunlight into a small beam. Worldwide, the grid - connected solar PV continued to be the fastest growing power gen-

eration technology. In a similar way, the Indian solar energy sector has been growing rapidly for the past few years mainly due to the government's initiative such as tax exemptions and subsidies. It has been predicted that India will be one of the largest global solar markets by 2022 [5,6]. As of 31st December 2016, India has installed 9012.66 MW of solar power in the country. The Indian government has also planned to install 100 GW capacity of solar power by 2022 which is a five time increase from the previous target of 20 GW [7,8]. In the same guidelines, to achieve a partial portion of the target, government planned to install world's two largest solar farm with a capacity of 750 MW (under construction) in Rewa district of Madhya Pradesh and 648 MW (commissioned) in Ramanadhapuram district of Tamil Nadu involving huge amount of investment in land occupying around 5 ha per MW i.e. 3250 ha of land for 648 MW [9–11], which makes them to use the land only for solar power generation and not for any other human or industrial applications. As these large capacity solar power plant require large amount of area and due to difficulties and delay in land acquisition the project cost escalates to 8 Crores per MW. As per the study of cost economics of a solar photovoltaic power plant, the PV module cost is about 45% and that of other accessories like transformers, cables, inverters, civil works, etc. comes to about 55%

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<https://doi.org/10.1016/j.matpr.2020.11.018>

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research – 2019.





Contents lists available at ScienceDirect

## Materials Today: Proceedings

journal homepage: [www.elsevier.com/locate/matpr](http://www.elsevier.com/locate/matpr)

## Effect of various phase change materials (paraffin wax/hydrogenated vegetable oil) packed in a fabricated shell and tube type heat exchanger

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### ARTICLE INFO

#### Article history:

Received 27 May 2020  
Received in revised form 10 July 2020  
Accepted 12 July 2020  
Available online xxxx

#### Keywords:

Phase changing materials (PCM)  
Charging  
Storing  
Discharging  
Thermal energy storage (TES)

### ABSTRACT

Researchers are often trying to find out the various renewable energy sources to continuously feed the growing energy demands as well as storing the generated energy with appropriate known technology. In line of the above, in order to store the energy, phase changing material (PCM) playing the major role. The phase changing materials exhibit better efficiency due to its energy storage capacity, and keep supplies constant thermal energy when need arises. Normally the characteristics of the phase change materials are charging, storing and following this, final step is discharging the heat to the selected medium through the phase changing materials and the same could be used for many applications starts from domestic to industrial spectrum. In this present study, the paraffin wax and hydrogenated vegetable oil have been used as the phase changing materials. To experimentally analyze the coefficient of thermal expansion of the phase changing material, the tube and shell type heat exchanger have been used. Similarly the efficiencies of the thermal energy storage (TES) capacity of the subjected material have been verified, with the intention of employ the same system for the applications like cold storage plant, refrigeration, domestic heating and automobile sectors.

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research ? 2019.

### 1. Introduction

The sky rocketing fuel prices, depletion of fossil fuels and effect of the green house effect gases are the predominant factors which constantly forcing modern scientists to look after the various possible way of generating the renewable energy sources. Though the solar energy, wind energy, tide energy and geothermal energy are considered as the wide alternative source of conventional fossil fuels, still researchers are finding themselves difficult to completely covert the generated energy to keep supply the growing industrial sector. Because all the renewable energy sources are seasonal based and some of the times, it would not possible to completely tap and convert the available energy due to lack of technological advancement. Scientists from all over the world are persistently doing research in this particular area and from their outcome upraises that, indeed need of effective energy storage system to efficiently store the generated seasonal energy with minimum cost. The associated cost factor attributed to develop the

energy storage devices are became as the alarming factor to most of the investigators doing examination in this particular area [1–4].

Although the conventional energy sources like thermal, atomic power plant and so on are believed as the prominent energy generation technologies, still the capital cost coupled in developing the power plants are huge, and needs special attention to curb the cost associated in constructing the power plants. Moreover the waste disposal becomes the huge task to most of the conventional plants, especially thermal and atomic power generation units. The emission of green house effect gases like carbon monoxide and carbon dioxide abruptly affects the entire environment and often needs sophisticated technology to completely eliminate the green house effect. As per the international energy agency reports, the so called green house gases production possibly could be doubled in the year of 2050, also hinted out that the exhaustion of fossil fuels and issues related to their supplies and global energy security. Equally the unconventional power plants are also needs huge attention towards constructing the power plants and distribution of power from the generation grid to user end. Subsequently the unconventional power plants are not worthwhile due to non prolific approach in unseasonal environment. Hence explo-

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<https://doi.org/10.1016/j.matpr.2020.07.231>

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Selection and peer-review under responsibility of the scientific committee of the International Conference on Advances in Materials Research ? 2019.

# Experimental Investigation of the Effect of Independent Parameters in the Face Milling of Aluminum 6082 Alloy

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Received: 22 June 2020 / Accepted: 13 December 2020 / Published online: 2 February 2021  
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**Abstract** Face milling is the vital process, which takes away the material from the top surface. This work comprehends the selection of desirable milling parameters like spindle speed (SS), feed rate (FR) and depth of cut (DoC) over machining time, material removal rate and surface roughness. The complex technical reasons like shearing action, dribbling, furrowing, churning and piling were identified concerning the parameter considered. The SS is associated with shearing action or incising with plowing, FR causes furrowing and DoC concerns the piling action over the material, affecting the responses. The mathematical model was developed through response surface methodology (RSM). Later, an assessment was made between the predicted and experimental data so as to perceive the consistency of the developed model. The surface plot of RSM has greater concurrence with the white light interferometer images, which is evident for the technical reason. The maximized productivity and better part quality are decided based on the appropriate machining parameter selection. Therefore, optimization is carried out through the genetic algorithm to obtain the desired input parameters. The optimal values of SS, FR and DoC for minimizing the

responses are found to be 4978.51 rpm, 598.242 mm/min. and 1.499 mm, respectively.

**Keywords** Characterization · Material processing · Empirical modeling · Aluminum 6082 · Face milling · Machining time · Surface roughness · Material removal rate

## 1 Introduction

Components from manufacturing processes have different stages; these are preliminary production processes such as casting, rolling, forging, welding, etc. However, the manufactured components from preliminary operations are not suitable for working conditions, because they do not have any close tolerance values. A lot of secondary operations are available for making the components to close tolerances by using machining operations [1]. Studies in production processes and mechanisms are largely examining processes to enhance their quality and productivity. The quality of goods is characterized by how precisely the finished products complies with requirements, including measurements and consistency of the surface. Surface quality is described and established by parameters like surface texture, SR, surface finish, etc. [2]. Recent years have seen a large ascend in the usage of Aluminium (Al) alloys in the automotive sector due to the combination of superior strength and lightness [3]. Özel et al. [4] studied the micro-milling operation to enhance the productivity, reliability and quality in Al 2024-T6 and AISI 4340. Larger instability due to process dynamics and uninterrupted shift, among shearing dominated cutting and plowing was observed during micro-milling. The machine tool vibration and SR were studied in milling of Al 6082. The tangential,

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## Effect of cascara/testa natural fiber reinforced (epoxy based) hybrid composites

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**Abstract:** In this investigation, cascara/testa has been chosen as the particulate reinforcement agent along with the E-Glass fiber support, upon the epoxy matrix material. To carry out the experimental analysis, the standard ratio of cascara, testa and combinations of both have been selected as the particulate reinforcement, as 10% weight ratio of each respectively. Moreover to completely exploit mechanical behaviourism of the fabricated composite, physical analysis like tensile, flexural, impact and water absorption tests have been conducted as per the ASTM standards. In the pretext of the analysis, the strain rate of the tensile and flexural analysis has shown the increase of 3.5% and 2.75% respectively. In the same way, the impact analysis has also shown the hike in the absorption value as 1.25%, 1.12%. Furthermore the obtained results have shown that, the addition of cascara/testa have considerably increases the strain value and impact resistance of the fabricated specimens in sizeable manner by compromising the water uptake behaviour. Out of all standard tests, the hybrid composites (combination of cascara and testa) have shown the good conformity with all set of remaining specimens.

**Keywords:** cascara, testa, E-Glass, Epoxy, physical analysis, ASTM standards.

### 1. INTRODUCTION

The most promising and perspicacious material available in this century was identified to be composites. Currently, polymer composites with synthetic or natural material fibres are becoming highly prevalent as the demand for high strength to lightweight materials for unique applications is rising in the industry. In addition to the high strength to weight ratio, the composite fiber-reinforced polymer also shows outstanding properties such as durability, rigidity, damping resistance, flexural resistance, impact, corrosion, impact, wear and burn resistance [1-3]. These wide ranges of distinct requirements have made an advantage on composite materials to explore applications in mechanical, architectural, automotive, biomedical, marine, and various erstwhile manufacturing industries. Composite material recital depends greatly on its constituent elements and production methods, besides composite material performance depends primarily on its constituent elements and production techniques, so it is essential to learn the functional features of different fibres accessible worldwide as well as their classifications based on the manufacturing techniques which is used to produce the complex materials in order to determine the optimised characteristics of the material for the needed application [4-6].

A summary of broad series of fibres, their properties, classification and different fibre composite

