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40th World Conference on Applied Science, Engineering & Technology

30th & 31st December 2021

WCASET-2021

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Editorial

We cordially invite you to attend the **40th World Conference on Applied Science, Engineering and Technology (40th WCASET-2021)** which will be held in **Goa, India** on **30th & 31st December 2021**. The main objective of **40th WCASET-2021** is to provide a platform for Researchers, Students, Academicians as well as Industrial Professionals from all over the world to present their research results and development activities in relevant fields of Science, Engineering and Technology. This conference will provide opportunities for the delegates to exchange new ideas and experience face to face, to establish business or research relationship and to find global partners for future collaboration.

These proceedings collect the up-to-date, comprehensive and worldwide state-of-art knowledge on cutting edge development of academia as well as industries. All accepted papers were subjected to strict peer-reviewing by a panel of expert referees. The papers have been selected for these proceedings because of their quality and the relevance to the conference. We hope these proceedings will not only provide the readers a broad overview of the latest research results but also will provide the readers a valuable summary and reference in these fields.

The conference is supported by many universities, research institutes and colleges. Many professors played an important role in the successful holding of the conference, so we would like to take this opportunity to express our sincere gratitude and highest respects to them. They have worked very hard in reviewing papers and making valuable suggestions for the authors to improve their work. We also would like to express our gratitude to the external reviewers, for providing extra help in their view process, and to the authors for contributing their research result to the conference.

Since October 2021, the Organizing Committees have received more than 130 manuscript papers, and the papers cover all the aspects in Electronics, Computer Science, Information Technology, Science Engineering and Technology. Finally, after review, about 59 papers were included to the proceedings of **40th WCASET-2021**.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of **40th WCASET-2021**. We would like to thank the keynote and individual speakers and all participating authors for their hard work and time. We also sincerely appreciate the work by the technical program committee and all reviewers, whose contributions made this conference possible. We would like to extend our thanks to all the referees for their constructive comments on all papers; especially, we would like to thank to organizing committee for their hard work.

Acknowledgement

IFERP is hosting the **40th World Conference on Applied Science, Engineering and Technology** this year in month of **December**. The main objective of **40th WCASET-2021** is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points, and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts. Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader.

I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of Organizing Committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to make this conference successful.

Er. R. B. Satpathy
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ABSTRACTS

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Method for Improving the Accuracy of Autonomous Vehicle Control

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Bychkov Dmitriy, Engineer, Department "Transport Machines", Penza State University, Penza, Russia

Abstract

Every (namely, most) control system structurally contains inaccuracies in the transfer of the control action to the node implementing this control. So, the steering contains a number of links and the resulting behavior of the wheels, even with a non-linear gear function, has some lag (backlash). In a number of agricultural units that were not originally intended for accurate positioning, such a lag can reach tangible values and interfere with accurate positioning when equipping the unit with automatic control systems (piloting).

To solve the problem of increasing the control accuracy, it is proposed to add a direct propagation neural network with a small number of neurons (approximately 10-30 neurons) as an additional link between the control body and the control mechanism. Such a neural network, after a short training, will be able to predict the control lag and adjust the current control signal to the angle necessary for turning the agricultural unit to the angle closest to the expected one.

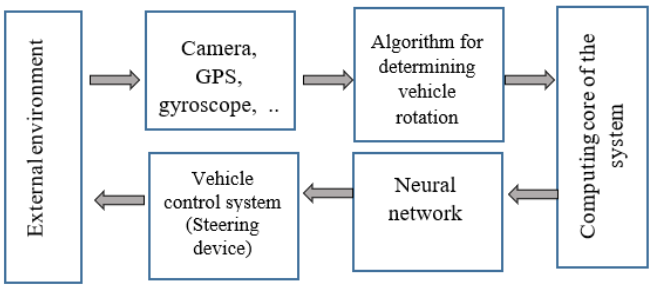
The network training should be carried out on the basis of data on the rotation of the c\x unit obtained in one way or another: through a satellite navigation system (preferably with a high position update frequency, not less than 10 Hz), through an algorithm for determining the rotation based on data from fixed cameras, based on data from a gyroscope\accelerometer\magnetometer.

The neural network training algorithm can be briefly described in the form of three main steps:

1) The autopilot (if available) or the pilot generates a control signal (turn left or right), the signal passes through the neural network and moves further to the controller of the thruster, and the tractor \ agricultural transport turns (or does not turn).

2) The algorithm for determining the rotation fixes the amount of rotation of the tractor at a particular angle based on the data received from the camera (either from the satellite navigation system, or from the accelerometer\gyroscope\magnetometer).

3) The expected rotation angle is compared, based on the control signal at step 1, with the angle determined at step 2. The difference between these angles is an error in the operation of the neural network. Using this error, you can adjust the weights of the neural network in any convenient way (by the method of back propagation of the error, by a genetic algorithm,...).



Using this algorithm, the neural network quickly learns to predict the lag in control and supplement the value of the control turn to the necessary, most appropriate to the expected result, which means an increase in control accuracy.

Effect of Seabuckthorn by Products on Biochemical Parameters of Poultry Birds

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Abstract

Seabuckthorn has recently gained interest for its nutritional and medicinal values. Fruits and leaves are considered to be good source of large number of bioactive substances such as vitamins, trace elements, amino acids, β-carotene, zeaxanthin, lycopene, flavonoids, folic acid, fatty acid, tannic acid etc. Chemoprofiling (Total phenols, total flavonoids, vitamin C, vitamin E, lycopene and β- carotene contents) of various seabuckthorn byproducts has been done and it was found that among all the seabuckthorn byproducts, leaf extract contained significantly highest amount of total phenols (332.49±7.45 mg/g), total flavonoids (271.56±5.41 mg/g), vitamin C (399.49±4.90 mg/100g) and lycopene content (8.50±2.92 mg/100g).

Seabuckthorn byproducts were screened for the presence of antioxidant potential for inhibiting the different *in vitro* free radicals. The IC_{50} values for different radicals were determined and from the IC_{50} values, it was observed that among the seabuckthorn byproducts, leaves had lowest IC_{50} value for all the free radicals and was better scavenger of these radicals. The leaves sample of seabuckthorn showed better reducing power ability as compared to other extracts.

The *in vivo* (antioxidant, biochemical and immunomodulatory) studies of seabuckthorn leaves showed significant effect on growth, antioxidant and microsomal enzymes in poultry birds. The cadmium treatment significantly ($P<0.05$) reduced weight gain, a significant ($P<0.05$) decrease in total serum proteins, globulins, total leucocyte count and haematological parameters (Hb, PCV, TEC) in birds and at the same time significantly increased ($P<0.05$) feed conversion ratio as compared to the control birds, whereas, seabuckthorn pomace supplementation at 10000 ppm level significantly ($P<0.05$) increased the body weight gain, GSH, number of NBT positive cells indicating increased phagocytic activity, haemagglutination titre, Hb, PCV and TEC and skin thickness in birds as compared to control birds. The malondialdehyde levels of liver and kidney were significantly ($P<0.05$) increased and the kidney GSH levels were significantly ($P<0.05$) decreased following cadmium administration. The seabuckthorn pomace supplementation at 10000 ppm significantly ($P<0.05$) decreased lipid peroxidation in liver and kidney, and serum albumin: globulins ratio.

In vivo studies of seabuckthorn leaves were carried out in broiler birds by evaluating various parameters. Aflatoxin (400 ppb) was administered continuously in feed and seabuckthorn leaves were mixed in poultry feed 10000ppm dose levels. Aflatoxin increased serum triglyceride, blood urea nitrogen and creatinine, lipid peroxidation, Aminopyrine demethylase and Aniline hydroxylase levels where as seabuckthorn leaves supplementation at 10000ppm significantly decreased triglyceride ($P<0.001$), blood urea nitrogen ($P<0.05$), Aniline hydroxylase and creatinine levels in birds. Toxin decreased liver, kidney and blood superoxide dismutase, catalase and glutathione, NADPH cytochrome P450 reductase activity, whereas, seabuckthorn leavesincreased the activity of these enzymes as compared to control group.

Keywords

Seabuckthorn, Aflatoxin toxicity, Immunomodulatory effect, BUN, antioxidant enzymes

The Impact on the Quality of Life of Employees of Private Professional Educational Institutions in India during Covid 19 Pandemic

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Abstract

As the coronavirus pandemic is rigorously spreading, the professoriate is overworked, stressed, and thoroughly drained out. As a result of the lockdown, all higher educational institutions had to make a swift move from the traditional face-to-face teaching method to virtual learning. Faculty members have been changing themselves, adjusting in the new environment, and working harder and more rigorously delivery quality output to student fraternity than ever before to keep up with the dynamic challenges. To come up to the growing literature on the effects of the COVID-19 pandemic on professionals in education sector, the current study emphasizes on the **quality of life of employees of Private Professional Educational Institutions,** more distinctively. Thus, we believe this study will add valuable information to help develop future interventions that help to understand the quality of life of professionals in education sector during the case of any pandemic.

Keywords

Pandemic, Online teaching, Quality of life, Teaching faculty

Design of Compressed Gas Driven Blast Tube

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Abstract

Blast waves are pressure waves expanding outward resulting from an explosion. An example of such explosion is the Beirut explosion which is a bear witness to the destructive power of the blast waves to life and property. Sudden raise and drop in pressure are the characteristics of blast waves which leads to long term damage to internal organs. Creating a blast wave using shock tube is the simplest and safest means to study its effects on the materials and structures. The present study explores the effectiveness of the shock tube to generate blast waves in a safe, consistent and inexpensive manner, which is detrimental for studying blast wave phenomena and developing blast mitigation strategies. The idea of modifying compressed gas driven shock tube to generate a blast signal is the main focus of the study. The blast tube relations yield the driven section length, peak over pressure and decay time which are then used along with Kingery-Bulmash equations to obtain the impulse, wave form factor, TNT equivalent and the stand-off distance. Friedlander wave profile is hence plotted analytically which is then compared with CFD data for both viscous and inviscid simulations.

Keywords

Blast Tube, Blast Wave, Friedlander's Curve, Kingery-Bulmash Equations

IoT based Inspection Model for Pipeline Defect Detection

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Abstract

The longest and the most prevalent ways to transport liquids like water and sewage, gas, oil is through pipelines. In India, the pipelines are located across the various places which help in reaching out the needs of people in urban and rural areas. Although there are a considerable number of pipelines available in India, ensuring the structural health of the pipelines is the key factor. These pipes are prone to certain defects like cracks, holes, corrosion, open joints and blocks which are caused due to the conditional changes with respect to the material of the pipe. Our country solely relies on the experts in for monitoring and maintenance of these pipes. There are existingworks which focuseson using machinelearning and image processing techniques to detect the defects. Yet the current system lacks a proper monitoring system that would move through the pipe and identify the defects if any. This paper explains about the developed robot model using the raspberry pi processor interfaced with the pi camera which tracks the surface inside the pipes, proposed methods to identify the blockage or cracks and store the images of defects in the local machine. The proposed model is validated by making it run through the Poly Vinyl Chloride (PVC) pipes of different diameter ranging between 8 and 10 inches. The defects like blocks/deposit and cracks were manually created inside the pipes and the robot has been tested in each environment. Further this paper emphasizes on working of the model from the results arrived from the robot in each criterion.

Impact Analysis of a Hexacopter UAV Landing Gear Configuration using Finite Element Analysis

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Abstract

The current work analyzes the impact performance of an Aluminum alloy hexacopter fixed landing gear configuration using Finite element analysis (FEA). CATIA V5 software is used to generate the model, which is solved for dynamic loading conditions using an FEA explicit solver. The results obtained from FEA are validated with those published in the literature. A parametric study is done for different drop altitudes and the results are obtained for different time steps (upon impact, at maximum stress and at complete propagation of energy). Regions of high stresses in the model are identified and a suitable design configuration for the landing gear is proposed.

Keywords

Hexacopter, Landing gear, Finite element analysis, impact, free-fall

Sentiment Analysis of Cryptocurrency Apps Textual Reviews using BERT Model

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Abstract

Nowadays, Online textual Reviews play an important role in the development of a product or service. An online platform like Amazon and Flipkart uses textual reviews of a consumer to better utilize the behavior of a consumer about a particular product. Sentiment analysis of textual reviews is crucial for a better enhancement of a product. There is a need for positive and negative reviews. In this proposed work, Sentiment analysis of the top best apps of India's cryptocurrencies is to be done on the basis of textual reviews. Demand for the crypto-currency is increasing day by day so it is better to analyses the reviews of the consumer. Textual Reviews Data collected through Google play store. In this research work, the BERT base cased model which is a powerful and robust deep learning model is used for Sentiment analysis. Further, compare the results with the other classification and found that the BERT model outperformed all the other models. The Bert model delivered an improved performance in terms of precision, recall, and F1 parameters.

Keywords

Sentiment analysis, textual reviews, Natural Language Processing, BERT, Machine Learning

Application of Continuous and Semi-Continuous Flow Methods in Synthesis of Fluconazole and Hydroxychloroquine

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Abstract

In recent decades, flow chemistry has emerged as a vital tool for the manufacture of key intermediate for active pharmaceutical ingredient (API) and molecules of therapeutic interest. Herein, we report a high-yielding, safe and efficient formation of aryl turbo Grignard intermediate and its selective addition to highly enolizable 1,3-dichloroacetone, resulting in the formation of key pharmaceutical intermediate for fluconazole.

Flow chemistry also provide the advantages of providing access to alternate reaction pathways and/or high energy intermediates, which are inaccessible in batch conditions. An excellent example is an efficient continuous synthesis of the antimalarial drug hydroxychloroquine (HCQ). Key improvements in our new process includes elimination of protecting groups with an overall yield improvement of 52% over current commercial process.

Phishing Attack Detection Using NLP and Machine Learning

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Abstract

It's observed that in recent years, cyber-attacks are becoming a regular threat. In conventional phishing attacks, targeted users are redirected to visit a fake or counterfeit website, for taking out personal information and credentials like banking information, credentials, and even UPI wallets. Usually, phishing attacks happens using email, text messages, voice calls by forwarding fake website URL. This attack is not only referring to users who have very little information about this fraud but also those who have good and sound knowledge of these types of attacks.
Detection of a Social engineering attack such as phishing is a challenging task due to its nature of affecting. In this research, System uses the approach of detecting this sophisticated attack using ML, NLP, WDM, MCAM which is the best suitable approach to identify the phishing attack. Machine Learning is the most advanced way of detecting targeted phishing attacks from URL, Email, or SMS. a Detection is done with NLP and Machine learning with attack vectors as a dataset with help of simulators performing data visualization work..

Keywords

NLP, ML, CNN, Phishing attack, WDM, MCAM

A Computational Study towards Noise Emission of A Modified Supersonic Nozzle

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Abstract

Acoustic emissions created by the flow through the nozzle acts as a very important factor while designing and construction of the aircraft as a whole. New innovative techniques are being studied for reduction of high noise emissions with the increased emphasis of the adverse effects on the ecosystem. Noise generated is generally a function of the pressure fluctuations in the surrounding medium. With the existing problems faced by different governments to certify the use of supersonic aircrafts because of high noise emission, such as the certification of Concorde aircraft by the US government to fly over cities, the analysis of the variation of these emitted noise levels play a vital role. The nozzle is a very important component of an aircraft engine because of its capability to convert thermal energy into kinetic energy, the analysis of the flow conditions in the nozzle and the variation of the emitted noise with respect to the different factors such geometric design and flow conditions is critical. The change in the design of the nozzle invokes the change in the position of the shock and the shock cell structure. Thus, the present work, studies the effect of geometric variations leading to changes in shock cell structure thereby changing the acoustic emissions. These emissions not only tend to have an adverse affect on the ecosystem but also on the structure of the aircraft. Thus, the reduction of these Noise Levels becomes a necessity.

Keywords

Computational Analysis, Noise Levels, Pressure fluctuations, Shock-Cell Structure

Machine Learning Approach for Early Prediction of Arrhythmia

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Abstract

Arrhythmia is a problem that occurs with the rhythm or beats of the heart. Heart starts to act abnormally which could cause serious problems such as heart failure. ECG (Electrocardiogram) plays a vital role in monitoring the heart conditions thus detecting such heart rhythm issues which could be prevented by early and proper diagnosis. We put forward a two-dimensional (1-D) convolutional neural network (CNN) and long short-term memory (LSTM) model for accurately classifying five classes of ECG signals consisting of one class of normal beat and four different kinds of abnormal beat thus further classifying arrhythmias types. ECG (Electrocardiogram) signals are chosen from MIT-BIH arrhythmia database. 95.49% was the accuracy achieved by the proposed strategy.

Keywords

Arrhythmia Detection, Electrocardiogram, Convolutional Neural Network

Robotics and Automation in Aerospace Industry and Applications: A Review

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Abstract

Main focus of this paper is to discuss growing uses of robots by the aerospace industry. In man applications, use of robotics and automation has increased in variety of applications. Robots have number of significant benefits including increased productivity, reduced costs, manpower and timescales, improved quality and novel manufacturing capabilities. There seems to be rapid growth in the market as new applications emerge. The aerospace industry faces unique challenges. In terms of robotic automation, one unique challenge is the fact that the aircrafts are used for years, but the technology which is used to manufacture them develops at a rapid pace. Increasing productivity and Smooth Running operations places more responsibility for robotics and automation.to gain the competitive advantage. This paper focuses on discussing Basic concepts, Need of automation, Benefits, Challenges and Applications of Automation in Aerospace Industry with related Case Studies in depth.

Keywords

Aerospace, Automation, Robotics, IIOT

A Review on the Main Levels of Ontology and a Proposed Lower Level for the Quranic Ontology

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Abstract

Ontology is a data model that describes the related meaning between concepts of knowledge. The knowledge fragments based on taxonomy are depicted by the levels of ontology, such as the upper, middle, lower, and lowest level, which differs in the reusability, depth, and breadth of knowledge. Previous literature focused on the ontology's upper level only, which disregarded the other levels. Two main levels, the upper and lower level, were compared where the lower level required less understanding to develop an ontology and retrieved higher results than the upper level, albeit the upper level could work in other domains because of its high reusability and flexible ontology. This paper reviewed the lower level of the Quranic ontologies, which described nouns or verbs of the part-of-speech (POS) of the various Quranic domains. Concerning other ontologies, one Quranic ontology got 196 and 180 Quran verses for two Arabic root words as sample query words, albeit this Quranic ontology could not retrieve the exact number of verses, which were collected by the research team of the Faculty of Quran and Sunnah Studies (FPQS), Universiti Sains Islam Malaysia (USIM). Therefore, this paper enhanced the Quranic ontology using several POS concepts and, synonym and antonym relations.

A Systematic Literature Review Identifying Dimensions of Creative Classroom Climate Fostering Student Creativity in Higher Education

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Abstract

The current circumstances of the 21st century are characterized by several complex challenges such as pervasive job uncertainty, rapid technological changes, and globally spreading public health concerns due to COVID-19 pandemic. To overcome these challenges effectively, developing creativity and innovation capabilities of young people is more important now than ever. Hence, there is an urgent need in higher education for fostering student creativity and innovation. A huge volume of research revealed that creativity is the crucial component of innovation process. Looking at the growing prominence of creativity and innovation in US higher education, it is imperative to study and understand how student creativity is/can be fostered in a college classroom. Prior research has shown that physical, social, and psychological environments impact creative performance of individuals. Although, some recent reviews have focused on identification of certain practices that are indicative of creative climate in the classroom at the K-12 schooling, there has been limited research available regarding the creativity-fostering learning environments in higher education. The present systematic review aimed to advance our understanding of creativity-fostering classroom climate in higher education by focusing on identifying dimensions used in the literature on the practices perceived to be supportive for creative performance of college students in different domains. A literature search of three databases resulted in 30 scholarly-reviewed articles with a variety of classroom practices and/or characteristics of creativity-fostering classroom climate that were finally classified into four dimensions: Interpersonal practices, instructional practices, self-regulatory support practices, and dynamic practices such as instructors enthusiasm for creativity that promote student creativity effectively. Limitations of the current review and the literature reviewed are discussed. Furthermore, implications for the practice and recommendations for the future research are described in detail.

Comparison of Aerospike Nozzle with Contoured CD Nozzle for a Nominal Mach Number

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Abstract

Aerospike nozzle, also known as a plug nozzle can be used instead of conventional Convergent-divergent nozzle (CD) in reusable launch vehicles. Aerospike nozzle is considered as a candidate for next generation propulsion systems for launch vehicles due to its altitude compensating features and shortened nozzle length when compared to a typical contoured CD nozzle. The specialty of Aerospike nozzle is that when the end of the spike is truncated, it entirely makes up for the thrust loss due to lesser nozzle area. With the aid of truncation, high thrust is developed due to the base pressure. Vehicles operating using Aerospike nozzle do not require gimbals for thrust vectoring unlike CD nozzle. Hence, reduction in the weight of the system significantly makes them apt for Single Stage To Orbit (SSTO) applications. An Aerospike and CD nozzle with the same exit Mach number are analyzed and simulated using an open source CFD solver. Plug nozzles have higher area ratios when compared to CD nozzle and hence the thrust. Studies show that Aerospike nozzles are more efficient when compared to a typical CD nozzle for varying altitudes. An Aerospike nozzle can be used with a solid fuel motor provided that there is an annular combustion chamber instead of a central conical combustion chamber. They have not been used due to their complicated manufacturing process and high cooling requirements.

Keywords

Area ratio, Aerospike, CFD, open source, SU2

Synthesis and Characterization of Lanthanum Nanoparticles by Anethum Graveolens (Dill) Leaf Extract

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Abstract

Anethum Graveolens is a herb used extensively as an additive in chicken feed to help in enhancing the performance, immune reaction and fitness of broiler chickens. The herb consists of various volatile secondary metabolites which are bioactive compounds which helps in their daily food regime. This present work is aimed at synthesizing and characterizing Lanthanum-nanoparticles (LaNps) by using Anethum Graveolens (dill) leaf. LaNps has been synthesized by various methods and characterized by using UV-Vis spectral analysis, Fourier infra-red , X-ray diffraction and SEM analysis.

Keywords

Lanthanum Nanoparticles, Synthesis, Anethum Graveolens,Characterization, X-ray diffraction and SEM analysis

"Voyadores" Dance Notation in the Promotion of Nagueño Culture

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Abstract

It is a qualitative study which analyzed dance performance aligned in the preservation of cultural context. Respondents were purposively selected from known choreographers of the "voyadores" street dance during the yearly celebration of the Bicolandia's patroness for two years. Delphi techniques like congregating questions among experts were used to gather data. Results revealed that dance performance has displayed distinct feature and movement characteristics that manifest regional beliefs, customs, and traditions through exquisite body language that displayed veneration, protection, and respect. It was further clarified that part of the dance creation process is the comprehensive planning with the school and LGU tourism as one of the In-charge of the event, distinct movements' organization like movements identification commonly expressed like walking in a procession, clapping, chaining arm among men, compressed formation, crawling on top of the shoulder and heads of "voyadores", storyline conceptualization, and capacitating dancers like enjoining them for creative concepts into dance pattern. Making "Voyadores" performance as a theme for literary and other performance art in school and LGU enhanced the promotion of Nagueño Culture. Dance notation intensifies the preservation of "voyadores" dance in the Region by replicating local performances utilizing notated manuscripts, with the developed software for movement recording.

Keywords

Creation, Ethnography, Dance performance, Movement recording

Mixing Enhancement using Supersonic Ejector

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Abstract

The world's power consumption has drastically increased over the past decades. Helping in the decrease of energy consumption, technologies and in greenhouse gas reduction are the main focus during the development of many engineering equipment, one such tools a supersonic ejector.

Supersonic ejectors are used as a compressor in a wide range of applications. The purpose of a supersonic ejector is to mix two flows with different stagnation pressures in order to obtain a fluid at an intermediate stagnation pressure at the discharge.

Ejectors find their application in several engineering sectors such as refrigeration, high-altitude testing facilities, to increase the mixing in engines which can increase the engine efficiency, desalinization plants, fluid mixing, material transportation and thrust augmentation. Depending on the application, these ejectors are designed either for vacuum creation or increasing the pressure recovery in the secondary flow.

The present study concentrates on improvement of performance of ejector by varying pressure values, entrainment ratio area, nozzle distance using computational method. The primary supersonic flow is used to mix the secondary flow at lower pressure to improves the discharge characteristic of the over-all ejector.

Keywords

CFD, entrainment ratio, supersonic flow, refrigeration

Bioconversion of Coal Waste to Natural Gas: Conversion of a Liability to an Asset

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Abstract

Almost 30% of coal mined is considered waste, typically in the form of fines/ultra-fines, necessitating development and maintenance of extensive facilities for its storage. This paper presents the results of a study aimed at exploring the feasibility of utilizing mine waste by converting it to natural gas using bioconversion. The technology also has tremendous application in abandoned mines, with a large amount of residual coal, depleted coal-gas operations and coals with low gas content.

The technical feasibility was investigated by first retrieving water from deep coal and identifying the microbial communities present and appropriate nutrients to stimulate their growth. The second component involved studying the changes in the microstructure of coal with continued bio-conversion, with emphasis on properties related to gas storage and flow. Coal samples were treated with nutrient amended microbial consortia for different periods and gas production monitored over thirty and sixty days after which, flow/storage experiments were repeated, thus establishing a trend over the sixty-day period.

The results indicated production of large amounts of gas, increase in the gas storage capacity of coal and enhanced transport properties with continued bioconversion. These findings clearly support the technology and extensive work is currently underway.

Simulation Analysis and Optimization Design of Front Suspension using ADAMS

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Abstract

A suspension system is responsible for the safety of vehicle during its movement. It is used for the dual purpose of providing stability to the vehicle whereas providing a comfortable ride quality to the occupants. In this paper multi-body dynamics model of vehicles front suspension is built in ADAMS/car and the location parameters of the front wheel are simulated. To improve the kinematics performance and steering stability of suspension system, the Double wishbone suspension system of a vehicle is taken as the research object and parallel wheel travel simulation is performed in ADAMS/car to analyse the variation in important parameters of suspension system like toe angle, camber angle, caster angle, kingpin inclination angle and scrub radius. After simulation in ADAMS/car the results show that scrub radius and camber angle are away from normal design range and require optimization. Wheel alignment parameters are determined by sensitivity analysis and optimized in ADAMS. Then simulation is carried out to analyse the performance of optimized suspension system. After optimization result shows that the suspension system satisfies the design requirements of vehicle stability and safety.

Keywords

Double wishbone suspension system, Multi-body Dynamics, Optimization Design

BHAS: A Blockchain-Based Healthcare Analytic System for Quality of Service Concerns in PHR

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Abstract

The main aim of the digitalized healthcare is to keep patient records with diagnostic details. Data leakage is a high risk if proper measures haven't been taken. Blockchain is a reliable technology that will assist in the creation of a secure yet tamper-resistant data management system.

The focus of this research is to provide smart contracts with a layer-based integration mechanism (IAIM), wherein the system migrates from a cloud system to a private blockchain infrastructure using encrypted and hashed nodes and vendor-neutral miners to participate in transactions, thus also improving the security and integrity of data transfer and storage. Said DApp makes use of Hyperledger Caliper, which allows authenticated users to track a blockchain PHR's performance and modify data using a set of predefined instructions.

Keywords

Blockchain, Blockchain-PHR, IAIM, Hyperledger Caliper, Tamper-Proof, Health Systems security

Characterization of Mechanical Behavior of ABS/Calcium Sulphate Particulate Composites

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Abstract

In this research paper, Acrylonitrile-butadiene-styrene (ABS) a matrix material, and calcium sulfate ($CaSO_4$) as a filler material to prepare composite. Composite specimens prepared with the utilization of an injection molding machine. Tensile and hardness tests led to explore the mechanical behavior of composites. The foremost contributions of this work are the decrease of ultimate strength with increasing content of calcium sulfate within the composites. Mixture mode of ductile-to-brittle fracture has been noticed within the ABS/ $CaSO_4$ polymer composites. It likewise shows the effect of other parameters to measure the improvement of the mechanical properties. Utilizing $CaSO_4$ as filler material to ABS, the properties improved, which brings a few more extensive applications.

Keywords

ABS, $CaSO_4$, Tensile strength, Hardness, SEM

Effect of Co and Mn on Corrosion Behavior of CoCrFeMnNi High Entropy Alloy

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Abstract

In recent time, High entropy alloys (HEAs) are getting attention due to their extraordinary properties such as yield strength, corrosion behavior, oxidation resistance, and wear resistance. Among the HEAs, an equiatomic CoCrFeMnNi alloy is the most studied systems. It has excellent corrosion resistance and ductility. However, it has been reported recently that non-equiatomic HEAs also show extraordinary properties. In this work, the effect of Co and Mn on the corrosion behavior in CoCrFeMnNi HEA is studied. Corrosion study was carried out in NaCl environment, and further evaluated with Tafel and Niquist plots with Cyclic polarization studies. It was found that, equiatomic CoCrFeMnNi alloy showed better corrosion resistance than the non-equiatomic CoCrFeMnNi HEAs. Decreasing Co, Mn content exhibits very poor corrosion resistance in polarization and EIS tests which shows that better protective passive layer formed at equi-molar concentrations.

Investigation of Machining Performance of IS 2062 Steel using Different PVD Coated Tools

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Abstract

IS 2062 steel is a low carbon steel, it meets all the requirements of high strength steel when it is hot rolled. Hence, it is one on the popular steel for structure and machining application in various industries worldwide. Despite its strong mechanical qualities, high-speed machining of IS 2062 remains a challenge for manufacturers that want to enhance material removal rate, tool life, and surface finish. In present study, high speed machining performance of IS 2062 steel have been investigated for different machining parameters using different PVD coated tools during milling. Spindle speed range was 400 rpm, feed 456 to 600 mm/min keeping depth cut constant as 1 mm. AlTiN and TiSiN PVD coating was deposited in the cemented carbide tool using PVD coating technique. It was observed that the performance AlTiN coating produced 15 component and outperformed compared to TiSiN tool. However, AlTiN has higher oxidation resistance as compared to TiSiN.

Keywords

AlTiN, CVD coated, Milling, PVD coated

Ocular Surface Disorders and Current Treatment Modalities Using Stem Cells

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Abstract

The ocular surface is the part of the human eye which is directly exposed to the external environment. It is therefore the most prone to injuries and ocular diseases. The ocular surface is vital component of vision. Any damage or dysfunction in ocular surface can be classified as an ocular surface disorder (OSD). In OSD, the epithelial layer is damaged, resulting in poor vision and ultimately can lead to permanent injury or blindness in severe cases. Numerous ocular surface disorders occur as a result of an imbalance in the immune system's regulation. Persistent inflammation caused by immune dysregulation impairs the ocular surface microenvironment's ability to regenerate. Immune cells infiltrate the eye and interfere with the normal function of resident cells and tissues, causing damage to the ocular surface. Because lymphocytes persist for an extended period of time, they replace resident cells and alter the microenvironment, resulting in a loss of regenerative capacity. Thus, local stem cells lose their ability to proliferate, migrate, and differentiate, which are required for ocular surface rehabilitation. The current line of therapy for OSDs is supportive and palliative, with the patient requiring lifelong and frequent lubrication and other medications. Globally, the prevalence of OSD ranges between 11% and 22%. It is more prevalent in India than it is globally, ranging between 18.4 percent and 24 percent. Recent advances have concentrated on regenerating the ocular surface microenvironment via cell-based therapies, including cells capable of supporting and modulating inflammation, such as mesenchymal stem cells (MSCs), and synthetic molecules capable of regenerating the microenvironment structure. MSCs are critical in a variety of cell-based therapies and have shown promising results. MSCs are the stem cells that reside in various areas of the ocular surface. The primary goal of this study is to define the molecular mechanisms underlying immune imbalance and ocular surface restoration using stem cells and tissue engineering techniques such as scaffolds and stem cells.

The Research and Development of Intelligent Detection System for Commercial Vehicle Intersection Violations

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Abstract

This research proposes a Smart Intersection Event Detection System (SIEDS), using the smart phone as a Vehicle-Tracking-System prototype for sensing the data of Longitude and Latitude, Video, Image, and Acceleration, to detect illegal left turns, illegal U-turns and illegal stays at intersection by YOLO algorithm of AI and image processing. SIEDS also provides geo-fencing, tracking replay, event management and real-time monitoring function. The Geo-fencing algorithm can detect vehicle entering limited area or leaving restricted area and then store event into database. Tracking Replay can draw the traveling paths for the durations assigned by users. Event Management can notify users by Google Firebase Cloud Messaging (FCM) or Email and create the event reports for the durations assigned by users. This project develops a system by Python and Django on Ubuntu server. It can help the enterprise to establish the market segmentation on fleet management service.

A Study in Planning, Seismic Analysis & Designing with Shear Wall & Mat Foundation of Seven Storey Building

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Abstract

The project report presents the details on planning, drafting, analyzing, seismic designing, of the Seven Storey RC seismic building with shear wall and MAT Foundation. The project is prepared with reference to standard codes (IS 456,2000, IS 875, IS 1893, IS 1026 & by employing various task specific software (autocad, Etabs, CSI SAFE, Microsoft excel, Microsoft word) keeping in mind the importance of safety, accuracy and reliability of design. It has been observed that each year a massive destruction occurs due to improper planning & designing of multistoried buildings. In order to avoid such hazards building should be designed seismically using robust software following standard code and procedure, which is well depicted in this project report. As standard codes & procedure is followed and robust task specific software are used in designing of the building which the project is entitled to, this report can be taken as a basic reference for the construction of other seismic multistoried buildings too. The past research depicts that the strength, stiffness & durability of buildings designed with the aid of seismic code and task specific software are much higher and better than preliminary buildings. The project starts with tabulation of preliminary requirements of the client. After preliminary survey of the site & soil test, a blueprint of the entire building has been prepared in autocad & soil test report has been collected in Microsoft word. After That, the entire building is analyzed and designed seismically in ETABS and CSI SAFE. The most economical and safest design is adopted and both architectural and structural /reinforcement detailing has been drawn in A3 sheets using Autocad. It is anticipated that the data presented in this report will have wide application and usage.

Keywords

Planning, analyzing, modelling, designing, strength, stiffness, durability, seismic building

Artificial Nano Preprocessed Triplet (ANPT)

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Abstract

Quantifying face detection as a cascade Demogpairs approach using Artificial Nano Preprocessed Triplet (ANPT) is the most reliable solution for law enforcement officers to quantify and detect the criminal faces from crowded and clear images, live video feeds from a variety of sources from Internet, CCTV or any other sources. This created solution is a very Extensive and easily adaptable wearable solution having a central Command Control Application.

This command-and-control application is the key application to analyze and determine the carry-out investigation using advanced Face detection and AI-controlled in-house developed 128p vector-based imaging scale to navigate and precisely predict the possible match of the criminal.

The advanced Artificial Nano Preprocessed Triplet (ANPT) method developed by SoftTech Data Securities enables complete face detection with the accuracy to detect suspected criminal face from the most crowdy environment with the accuracy of 90% in all odd conditions, 90% to 95% in Avg. to Good conditions. (These conditions are determining in case scenarios where most crowdy environment to less populated environment is considered as an ideal situations to test out with wrist wearable object designed and developed in SoftTech Data Securities RnD Unit)

Emergency Reporting System for Animals

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Abstract

Charitable resources are used to create a better life for the underprivileged, but any such endeavour requires a planned scheme to create and execute with the greatest reach without significant loss in the quality of the resource. It is common knowledge that helping children and old people is one of the most common charities. Animals just simply don't get much attention, the reason being their contribution back to society/nature either does not exist or seem less important compared to helping children. This doesn't mean help for animals doesn't exist.

This project aims to connect the missing links with a web-based solution where-in a person, can register their complaint describing the condition of the animal in concern. On registering the complaint via our app, each complaint will undergo categorization via NLP. Categorization happens based on the type of animal, the severity of the injury, degree of importance, and a few more important fields. All nearby NGOs, vets, animal hospitals, shelters will be alerted of this complaint. A temporary connection between both the parties will be made for updates and contacts. After the remediation of this complaint both parties will be rewarded with good karma points and ratings respectively and not to mention, feel good for doing justice and societal welfare.

Attribute Based Access Control in Infrastructure as A Service Case Study

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Abstract

Perhaps the main difficulties that have undermined cloud computing and caused its lethargic reception is security. Since clouds have assorted gatherings of clients with various arrangements of safety prerequisites, confining the clients' accesses and shielding data from unapproved accesses have become the most troublesome errands. To address these basic difficulties, in this paper initially formalize Attribute Based Access Control (ABAC) and propose another access control model, called Attribute- Rule ABAC (AR-ABAC), for cloud computing to meet basic access control necessities in clouds. Our model backings the attribute decides that arrangement with the relationship among clients and items, just as the capacity for accessing objects based on their affectability levels. The attributedecides to indicate an understanding that figures out what sort of attributes ought to be utilized and the quantity of attributes considered for settling on access choices.

Likewise, our model guarantees secure asset dividing between potential untrusted inhabitants and supports distinctive access consents to a similar client at a similar meeting.

Keywords

Cloud Computing, ABAC, Authorization, authentication

Analysis of Comparator using TFET Technology

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Abstract

The present technology is moving towards realization of smaller in size, higher in speed [1], low power consumption, and cost-effective computing systems, which is essential for the semiconductor industry. The constraint of ICs is the non-scalability of the subthreshold slope in Metal-oxide field effect transistors, which may affect the further scaling. Thus, several works are being carried out on subthreshold-slope devices to replace of the MOSFETs in future technology. Therefore, Tunnel Field Effect Transistor (TFET) is an efficient alternative to the MOSFET devices due to lower subthreshold swing and suitable for the low power devices. Two-bit comparator has been designed and characterized using TFET technologies Si-MOSFET with Synopsys HSPICE tool.

Keywords

Metal-oxide field effect transistors, tunnel field effect transistor, subthreshold voltage

Expediting Sustainable Implementation of Safety Measures and Risk Reduction Management

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Abstract

This study assessed the implementation of safety measures and risk reduction management in Consolatrix College of Toledo City, Inc., Cebu. This study determined the respondents' age, gender, highest educational attainment, length of years of involvement in CCTC, safety trainings attended. This study assessed the implementation of safety measures, provision of safety facilities and trainings. This study also analyzed the attitude of the respondents towards the school's implementation of safety management. The findings were taken from 75 respondents composed of 5 administrators, 10 teachers, employees, parents and 40 students. A descriptive research design was used. This study revealed that most of the respondents were adults, female, have at least baccalaureate degree, have been connected to CCTC for more than 5 years and have attended safety trainings. Safety measures were implemented. However, the giving of penalties for breaking safety rules was observed to have less extent. Safety facilities were available and safety trainings were also provided. Still, the provision of adequate budget for safety education was in less extent. The respondents have positive attitude towards the implementation of safety management systems. From these findings, the school is encouraged to maintain its good practices to safety. The school may also address the implementation of penalties for breaking a safety rule, allocate safety budget and giving of rewards for good practices on safety. Other researchers may continue this study with LGU's as the respondents. A proposed enhance safety measures and risk management plan was recommended to prevent accidents in the school.

Keywords

Administration and Supervision, Descriptive Research, Safety Management Systems, Safety First, Toledo City

Combustion, Performance and Emission Characteristics of Direct Injection Diesel Engine using Waste Plastic Oil

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Abstract

Plastics usage is increasing day by day even though it not environment friendly material but yet not found the suitable replacement for it. The disposal of after use plastic is a major challenge and best disposal is converting the same as fuel. The major of the advantage of conversion to fuel is not the only disposal but also enable energy to be derived from the disposal of after use plastics. The properties of plastic oil obtained from pyrolysis rejects its utilization as direct fuel but blend of conventional fuels and plastic oil can be used without affecting much on engine performance. Therefore blends of plastic oil are preferred for diesel engines. In this study catalytic pyrolysis of waste plastic oil is carried out with at temperature of 3800C having properties similar to petroleum fuels. Physical properties of plastic oil were analyzed. Four different proportions of 10, 20, 30 and 40% plastic oil with diesel in blend were utilized as fuel in diesel engine to determine the Combustion, Performance and Emission Characteristics. The plastic oil increases the brake thermal efficiency and reduces the specific fuel consumption. With incresence in blend ratio there is longer ignition delay, higher heat release rate. Oxides of nitrogen (NOx), carbon monoxide (CO), Hydrocarbon were increased compared to diesel. The result shows that the plastic pyrolysis oil is a possible alternative fuel for some engine with suitable operating conditions. The utilization of PO with diesel up to 30% in the blend can be used in diesel engines with a slight increase in emission at higher loads.

Temperature anisotropy Driven Weibel Instability in a Carbon Plasma with the Addition of Hydrogen Ions

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Abstract

In the present manuscript, the phenomena of temperature anisotropy driven Weibel instability is reported for two modes: in the presence of cold and warm carbon ion plasma, carbon plasma with the addition of hydrogen ions and hydrogen ions plasma respectively. Numerical calculations of the normalized growth rate and their expression for an electromagnetic wave having $\omega >> k_z v_{thz}$, i.e., the phase velocity of electromagnetic wave is greater than electron thermal velocity, and $\omega << k_z v_{thz}$, i.e., the phase velocity of electromagnetic wave less than thermal velocity of electrons for cold ion case is explained. Also in case of warm ions, for the electromagnetic wave having $v_{thz} > \frac{\omega}{k_z} > v_{thz\alpha}$ and $v_{thz} > v_{thz\alpha} \approx \frac{\omega}{k_z}$, the growth rate have been carried out for the typical existing plasma parameters. It is found that the normalized growth rate in the presence of cold carbon ion plasma scales one half power of the electron temperature anisotropy parameters $A = \frac{T^x}{T^z} - 1$. Also, the normalized growth rate $\Gamma_p = \Gamma / \omega_{pe}$ increases with increasing normalized wave number k_p and attains a maxima at small wavenumber and due to thermal effect the further increases in wave number decrease the growth rate. There is a significant effect of addition of hydrogen ions into carbon plasma. The addition of these hydrogen ions into carbon plasma increases the stability, so our growth rate decreases. Also, for the case of pure carbon ion plasma the instability increases, so our growth rate increases. While, the normalized growth rate value is largest for the case of pure carbon ion plasma or smallest for the case of pure hydrogen ion plasma and lies in between them for the case of carbon plasma with addition of hydrogen ions.

GRNIP: A Java Package for Inferring Gene Regulatory Networks from Gene Expression Profiles

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Abstract

Inferring Gene Regulatory Networks (GRNs) from gene expression profiles is an important task in systems biology research, having applications in identi-fication of regulators and transcription factors among a set of genes. Once the GRNs are known, one can ana-lyze these inferred networks and find key genes and the corresponding regulators responsible for various dis-ease including cancers, and GRNs can also be employed to design drugs for the identified drug targets. In this paper, we present a Java language based bioinformatics software package, GRNIP (GRN Inference Package) which implements 10 well-known statistical methods for inferring GRNs from gene expression profiles. The package is simple to use, does not require much pro-gramming skills, and is helpful for the biologists, bio-technologists and other scientists. The complete pack-age and its detailed documentation can be downloaded fromthe author's homepage: http://www.kraza.in/software/grnip/.

Keywords

Java Package, Gene Regulatory Networks, Gene Expression Profiles, GRN Inference

Interference Cancellation with Channel Coding of Spectrally Efficient FDM Systems for Cellular Networks

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Abstract

This work investigates innovative multicarrier signals and systems for 5G, such as spectrally efficient frequency division multiplexing (SEFDM), which achieves higher spectral efficiency (SE) than standard orthogonal frequency division multiplexing (OFDM) by breaching subcarrier orthogonality.

This paper introduces novel system and receiver models, then analyzes the use of various forward error correction (FEC) approaches and a new interference cancellation receiver design to improve overall system performance by reducing inter-carrier interference effects (ICI). The results demonstrate that using a coded SEFDM system can boost the SE by up to 71 percent compared to OFDM at a power penalty of less than 4dB.

A Study on Detection of Flaws in Concrete Elements by Contour Mapping Technique

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Abstract

Health assessment of any concrete structure is an essential task for engineers to maintain the condition of structure safe and for well performing. NDTs are more promising for doing this task. As they are quick, sound and doesn`t cause considerable damage to the elements of concrete structures. The application of NDT is an interesting approach to monitor/assess the internal concrete defects and flaws. This paper aimed at studying the conditional homogeneity of the concrete elements using Contour mapping technique by interpretation of Rebound Hammer data. For this study, we performed rebound hammer test on beam and column elements on small parking shed. The image contour map generated using rebound hammer test data exhibits the extent of homogeneity. The dissimilarities of colours in contour map significantly stipulates the presence of flaws/defects in the structural elements. This way of approach might be a suitable technique for the conditional assessment of Concrete Structural elements.

Keywords

Assessment of concrete structures, Rebound Hammer, Contour mapping technique

Ageing Treatment Enhances Mechanical Properties of β-Ti Alloy for Biomedical Applications

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Abstract

The α+β-Ti alloy exhibits high strength due to dual phases. It has used many engineering applications like structural materials, aerospace, and medical prostheses due to their specific strength and corrosion resistance. But β-Ti alloy has better biocompatibility because its elastic modulus is low. This alloy had been deliberately solution treated (quenching in CT, WQ) just below the β transus just avoid grain coarsening for single β region, also accomplish optimum properties. Notable changes had observed at cryogenic treatment (CT) after solution treatment (860oC-1h) encourages formation of α′-martensite has low elastic modulus used to orthopaedic implants for human bone. The examination of microstructures by SEM with EDAX analysis revealed after ageing treatment (500oC-5h) shows very fine α, β phases with needle shape α is decomposed from α′-martensite tends to accelerate by TiN, VN precipitates. The aged titanium alloy was examined through optical microscopy, SEM with EDAX, hardness, tensile properties and SEM with EDAX fractography analysis. Optimum tensile properties have obtained after solution treatment (WQ-water quenching) plus ageing treatment likely better hardness (376.16±8.3HV), UTS of 1234 MPa, YS of 647 MPa, and 5.63% El due to decomposition of martensite, nitrides and retained β-phases.

Keywords

β-Ti alloy, biocompatibility, CT, tensile and SEM fractography

A Novel Approach in Smart Waste Bin Management

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Abstract

In the present scenario, many people are suffering from an infectious diseases due to improper disposal of waste and it has become the most challenging task is to keep the surroundings to be clean. As the rate of population in our country is increasing rapidly, garbage may be huge which pollutes the environment. Waste Bin is a small plastic or metal container which is used to store garbage's or store items like wet and dry which may be either recyclable or non-recyclable. Unclosed Waste Bin may cause an air pollution which makes life harmful disease for human. Therefore, a Smart Waste Bin has been designed and developed this system for the society using the components like Arduino Uno, Ultrasonic Sensor and Servo Motor. This system is based on Internet of Things which brings a new and smart way of cleanliness. This Waste Bin automatically opens its lid when it detects the human hand and it will segregate whether the wastes are either biodegradable or non-biodegradable. This system may cause the surroundings to be clean and decreases the pollution which may not affect the humans' health.

Keywords

Waste Bin, Arduino Uno, Ultrasonic Sensor, Servo Moto, Biodegradable and non-Biodegradable

A Novel Approach in Secure Door Automation System

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Abstract

With the rapid growth of lifestyle and technology advancements, the consistent need for security prevails both in home and workplace. This venture is proposed to build an economic Secure Door Automation System. In pursuit of bringing a reformation in the door security, we are contributing a fraction of it through our project - IoT based Secure Door Automation System. Utilizing RFID together with keypad for passcodes could replace conventional keys and could give access control to the user. With extra efforts of providing ESP32 camera integration to facilitate a more secure environment to monitor the person on the other side of the door with him/her given a contactless doorbell mechanism using IR proximity sensor to ring. The predominant attribute of this project is the Arduino Uno board that facilitates the usage of this project. With this, it is ready to be set up anywhere and everywhere with utmost expedite efforts. This prevents security breaches and helps establish a secure environment in and around.

Keywords

Secure Door Automation, RFID, Arduino Uno, ESP32 Camera, IR Proximity sensor

Comparative Analysis of Memristor Devices as Neuron

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Abstract

Memristor, a two-terminal device whose unique ability to control its resistance by varying its input, is a promising technological device for intelligent systems. In humans, pattern recognition is associated with memory which helps in decision making for the behavioral and cognitive aspects. The storage of memory is crucial in decision making, and the adaptation between remembering and forgetting memory in time plays a pivotal role for pattern decision; this memory consolidation method is an extreme design challenge in the neuron, the detailed changes in the ion exchange and its timings is what responsible for memory consolidation. A memristor is recognized as a device able to mimic and function like a synapse. Recent advances in memristor have shown the working of a memristor as the different levels of memory, i.e. Long-term memory (LTM) and Short-term memory (STM), memristor devices perform memory potentiation and depression characteristics in them. However, to perform as a real neuron, a network of multiple memristors with careful design has to be followed. In this paper, the detailed mechanism of neuron morphology is explained to show how the many mechanisms inside the biological neuron become responsible for memory consolidation and compare how a memristor can function the neuron rules like plasticity and spike-threshold.

Keywords

Frequency-timing, LTP-LTD, Memory, Memristor

Labor Status in Japan and Analysis of WMN Model to Procure External Human Resource from Overseas

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Abstract

Deficiency of labor is one of prominent issue in Deficiency of labour is one of prominent issue in Japan from last several years. To handle the situation and provide the solution of this shortage of labour issue, Japanese government has set several facilities and services for employee and employer. Although there are several facilities that are helpful for people engaging in work activity in Japan, still the country faces some shorts of labour shortage.

This article focusses on study of economic growth in Japan during 20th century and early of 21st century and obtains the cause of this long term 'Labour shortage issue' by analyze the past economy of Japan. Later, we have also introduced a model called 'Watasi-Mo-Nihonjin model' abbreviation is WMN model, for filling the deficiency of the this labour shortage issue in future. The approach, presented in this model, is enforced by Japanese Government and Government would encourage semi-government and private bodies to join the implementation of the model for nullifying 'Labour shortage issue' throughout Japan.

Keywords

Labour shortage issue, Japanese economy, Japanese economy growth, WMN model, Labour status in Japan, External human resource

Automating Human Dialogue Lie Detection with Ensemble Machine Learning Algorithms

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Abstract

For as long as individuals have deluded each other, there have been attempts to develop new techniques for detecting deception and discovering the truth. Lie detectors or polygraph tests currently use pulse rate variations and EEG to “detect” the possibility of a lie. According to studies, it has been observed that the task of cheating such a lie detector is not difficult even though they provide an accuracy of approximately 75%. This paper aims towards building a non-invasive lie detector through the techniques of artificial intelligence and natural language processing and the creation of a dataset named "LARN Lie Detection" which involves 292 videos from 25 interviewees. The proposed architecture focuses on using facial micro-expressions, speech processing, head movement, eye blink rate and facial expressions to provide a decision on the credibility of the information obtained from the interviewee being questioned. We empirically show that, once the predictions obtained from the respective techniques are combined, the lie detector provides an accuracy score between 65-70%. Thus, making this approach non-invasive, sufficiently efficient and more feasible as compared traditional lie detectors.

Keywords

Blockchain, Digital Certificates, Security, Attacks, Smart Contract, Distributed ledger

Robotics and Automation in Aerospace Industry and Applications: A Review

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Abstract

Main focus of this paper is to discuss growing uses of robots by the aerospace industry. In man applications, use of robotics and automation has increased in variety of applications. Robots have number of significant benefits including increased productivity, reduced costs, manpower and timescales, improved quality and novel manufacturing capabilities. There seems to be rapid growth in the market as new applications emerge. The aerospace industry faces unique challenges. In terms of robotic automation, one unique challenge is the fact that the aircrafts are used for years, but the technology which is used to manufacture them develops at a rapid pace. Increasing productivity and Smooth Running operations places more responsibility for robotics and automation.to gain the competitive advantage. This paper focuses on discussing Basic concepts, Need of automation, Benefits, Challenges and Applications of Automation in Aerospace Industry with related Case Studies in depth.

Keywords

Aerospace, Automation, Robotics, IIOT

Fresnel-Spiral Based Acoustic Metamaterial for Simultaneous Sound Absorption and Air Circulation

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Abstract

With a steep rise in the urban population requiring an increased number of buildings, public and private transport systems, urban noise is posing a serious environmental problem affecting health. To attenuate the effect on the well-being of human health, a variety of conventional sound-absorbing materials suitable at mid and higher-frequency noise absorption are commonly being used but low and mid-frequency noise remains a challenge. These applications are further limited by the acoustic performance and ventilation efficiency in conventional noise barrier limits of their fields. Acoustic metamaterial presents a unique solution as an artificially designed material showing low-frequency noise mitigation. A novel subwavelength device with potential application in noise mitigation and air ventilation solution is presented herein. In this study, the design and fabrication of a small prototype based on a Fresnel-spiral shape composed of several arms are performed. Numerical and experimental investigations were carried out to determine the acoustical properties of the proposed ventilated metamaterial in terms of sound absorption and sound transmission loss. The experimental investigation shows significant acoustic properties leading to potential applications in urban noise control for low and mid-frequency ranges.

Carbon Monoxide Concentration Measurement in the Implementation of Level IV Restrictions on Community Activities during the Covid-19 Pandemic in Makassar City, Indonesia

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Abstract

The COVID-19 pandemic is mainly caused by a highly contagious corona virus. As an effort to prevent its spread, several steps have been taken such as a ban on gatherings, social distancing and even lockdown. In Indonesia, the policy taken by the government is known as the Enforcement of Community Activity Restrictions (PPKM) from Level 1-4. The determination of naming the level for one city depending much on the number of people exposed upon Covid-19. The existence of this PPKM causing community activities limited including the transportation sector which makes the streets quiet. This condition will certainly improve the air quality in the city including the city of Makassar. Therefore, the measurement of air quality especially the concentration of Carbon Monoxide during PPKM Level 4 in the city of Makassar which is valid until September 28, 2021 is carried out. Air sampling is on Andi Pangeran Pettarani and Sultan Alauddin street, with the consideration that these two roads were anticipated as traffic-heavy roads before the Covid 19 pandemic. Air samples were taken using a tedlar bag and a vacuum pump then the Carbon Monoxide sample was analyzed by using the Non-Dispersive Infrared (NDIR) method. The results show that the average CO concentration on Andi Pangeran Pettarani street for Morning, Midday and Afternoon is 826.63 μg/m^3, 685.65 μg/m^3, 861.6 μg/m^3 while on Sultan Alauddin street show different results in the morning, midday and afternoon is 875.46 μg/m^3, 741.80 μg/m^3, 833.04 μg/m^3 respectively. The average concentration of CO at the sampling site is still far below the Air Quality Standard set by the Governor of South Sulawesi which is 30,000 μg/m^3. The results obtained also indicate that the average concentration of CO from the measurement Photograph Organization Logo results during PPKM Level 4 is lower when compared to the period before PPKM was implemented in Makassar City.

Keywords

air pollution, PM_{10}, elemental pollution, PMF, Makassar

Issues and Challenges of Virtual Organisation Development

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Abstract

A decade ago, we are some extent aware of the globalization, but now, the whole world depends on globalization and boundary-less organizations. Virtual Organization is a group of geographically separated areas but is linked with electronic forms of communication and relies on lateral, dynamic relationships for coordination. There are some issues in implementing virtual organization. Here, we are trying to show the new way offers new means of effectively addressing complex decision processes and enabling solutions to business requirements associated with Virtual Organizations, organizing businesses are continuously evolving with the information and communication technology as an enabling factor along with increasing pace and globalization of the market. Intelligent agents can provide more flexible intelligence and help the smooth integration of a variety of system types.

Hierarchical Screening of Different Biomass - Based Adsorbents in the Heavy Metal Removal from Waste Water

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Abstract

Heavy metal contamination of water by the industries like metal plating, paper and pulp, metallurgy and mining, tanneries, energy and fuel production etc has become a serious issue worldwide. These heavy metals being toxic, non-degradable, mutagenic and carcinogenic need to be removed before discharge to the environmental. Adsorption using biomass-based materials derived from cheap feedstock has become a highly potential solution to tackle this issue. In our work, removal capacities of 42mg/g and 39mg/g of Ni and Cu ions respectively have been achieved at optimal process conditions of agitation speed, initial concentration, adsorbent dosage, P^H and contact time. Response surface methodology has been used for process optimization. From the results achieved, it is clearly evident that this biomass-based sorbents have a great promise and can be commercialized with appropriate scale up.

Keywords

biomass; adsorption; heavy metal removal; RSM; synthesis and modification

A Study on Onset and Prognosis of Alzheimer's Disease

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Abstract

Alzheimer's disease is a neurodegenerative disorder that affects the cognitive abilities such as memorizing, listening, capability of understanding, reasoning, learning capabilities and decision-making functions. In general Alzheimer's is a chronic disorder that progresses with time and age. This chronic disorder is most prevalent in the age group of above 65. With the prognosis of disease, the quality of life of the patient is affected severely. According to the World Health Organization, the existence of diseases such as Cardiovascular Diseases, Diabetes, Hypertension, Traumatic Head Injury are one of the few factors that may show significant impact on a patient's risk factor of Alzheimer disease. In this paper exploration is made on risk factors for Alzheimer disease, Available methods of Diagnosis, Methods existing on early detection of Alzheimer disease using various Algorithmic and Machine Learning Models.

Keywords

Alzheimer's Disease (AD), Dementia, Cognitive Assessments, Behavioural Analysis, Alzheimer's screening

Multilayered CNT Structures with Sandwiched Foam towards Effective Microwave Absorption

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Abstract

Lightweight polymeric foams were developed using simple salt leaching technique, and sandwiched between freestanding CNT papers. This arrangement resulted in an excellent absorption-based EMI shielding material. To give this structure some mechanical integrity, polycarbonate (PC) films were laminated. This laminated structure exhibited a shielding effectiveness (SET) of -49 dB (@ 26.5 GHz) with 92% absorption. The sandwich structures without foam and only CNT paper showed a maximum SET of -35 dB (@ 26.5 GHz) with 73% absorption. The porous foam worked in tandem with the CNT paper through impedance match, and multiple scattering.

Keywords

PU foam, CNT paper, multi-layered structure, single-layered structure

A Hybrid Approach on Smart Health Prediction Using Data Mining

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Abstract

The digital technology era demands the world to provide an excellent health system, in order to ensure the community to be alive and healthy. Objectives of this research paper is admin can login using his credentials, add new doctor details, add disease and its symptoms and manage data. Doctor can login with his credentials, and view appointment of patients. New user can sign up, they can login using user Id and password. Disease prediction is done when user enter symptoms. User can upload the reports. Chat instantly with doctor, they can book appointments and can give feedback about doctors. This study can be used for the data mining techniques such as medical field, research field, and educational field and various aspects. Due to the availability of computers and other regulations, huge amount of data is becoming available in medical and healthcare areas. As per the modern technology huge improvement has been made in computer field and therefore there is no need to deal with such a large amount of data at a same time. A major objective of this study is to evaluate data mining technologies in medical and healthcare applications to develop an accurate disease prediction. It is an amazing innovation which is of exorbitant interest in the current PC world. It is a sub area of PC sciences which utilizes previously existing information in different data sets to change it into new arrangement of results. It makes use of Deep learning, machine learning and database management techniques to extract new patterns from large data sets and the knowledge associated with these patterns. By using this technique data can be extracted automatically or semi automatically. The various parameters included in data mining are classifying, clustering and predictive analysis

Virtual Reality- Modern Technique for Education

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Abstract

COVID-19 pandemic made us aware of a totally new concept which is now widely acceptable throughout schools and colleges in India. Many colleges in India and abroad are transitioning from conventional face-to-face classes to completely immersive, web-based courses. Online education, also known as distance education or web-based education, is the most recent and widely used form of distance education. Many academic programmes have recently included it as a requirement. But every new technique comes with its own challenges. The aim of this paper is to provide a brief overview of the modern techniques such as Virtual Reality (VR) that can be applied in online teaching and learning. This will also pave a way for the different techniques applied to solve the various challenge. We present new opportunities in VR and recent virtual reality tools and applications used in education..

Keywords

Innovative Teaching Learning, ICT, VR, Unity 3D

Damage Detection strategy by Integrating Mobile Sensor Concept and Fractal Dimensioning Techniques on Bridges

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Abstract

Mobile Sensor Technology has become a viable, low-cost, effective, and rapid bridge condition screening and inspection alternative to (SHM) approaches with static high-fidelity sensing. This paper focusses on the development of a direct structural health monitoring technique using re-deployable mobile sensors mounted on bridges subjected to random excitation and passing traffic. At first for the direct SHM technique, the modal parameters (i.e., natural frequencies and mode shapes) are estimated using two sensing-based re-deployable mobile sensing concepts. Traditionally, mode shape estimation requires high fidelity dense sensor networks (several accelerometers – remain fixed at certain locations) which can be resource-intensive and high expenditure. In this paper, it is attempted to propose a bespoke decentralized modal analysis approach where only two sensors are moved along the monitored bridge and are progressively re-deployed for various segments (by changing the location of the sensors on the bridge with time and independent of traffic movement) to obtain continuous or a global mode shape data. Each local mode shape at every stage is combined to form a global mode shape. Damage is then identified using the mode shape data. The proposed work uses the traditional mode shape difference-based index integrated with Katz Fractal Dimension (KFD) as a damage localization index to find the geometric location of damage present anywhere in the structure. A numerical investigation was carried out using MATLAB to prove the proposed methodology. By these procedures we can reduce no. of sensors that are involved in computation and also obtain a detailed knowledge on damage location and can be extended to quantification of the damage.

Keywords

Mobile-sensor concept, Fractal dimensioning techniques, Structural Health monitoring

Optimal Design of Grading Ring of HV Surge Arrester by using FEM Method

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Abstract

It has been observed that the electric field & distribution of voltage and along an arrester is non-uniform which leads to the reduction in service life and low safe reliability, so grading ring is applied on HV surge arrester in order to uniform the electric field distribution. In this paper the optimal design of grading ring of a metal oxide surge arrester is presented in order to uniform the electric field distribution, inside and outside of arrester, using intelligent algorithms and numerical analysis, i.e. Finite Element Method (FEM).The introduced method can be used in order to determine the optimal dimension of grading rings so that the electric field distribution is minimized and the lifetime of highly stressed ZnO blocks in vicinity HV electrode is increased.

Prediction of Rainfall Data of Beaver Spring Weather Station, Arizona using Artificial Neural Networks

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Abstract

Rainfall prediction is one the most important tasks for meteorological analysis. Artificial Neural Networks is one of the most powerful way to predict. We have used Tensorflow to model the neural network with back propagation support to relearn from the historical data and relate them to the current data. We have chosen the Beaver Spring weather Station of Arizona data to see the results.

Keywords

ANN, Precipitation, rainfall, AI, ML

Study Comparative Techno-Economic of SRU Technology Forming Sulfur and Sulfuric Acid in Refining Unit

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Abstract

In the oil and gas processing industry, acid gas removal processes such as H_2S are required to meet the sales gas specifications for LPG Recovery. Several natural gas processing units in Indonesia have a concentration of H_2S in gas asam, namely> 50-% mol. This gas asam is then treated in an gas asam conversion unit called the Sulfur Recovery Unit. There have been several SRU technologies developed by both industry in the world and in Indonesia, but what has been proven to be commercially applied is Claus technology and WSA technology (Wet Sulfuric Acid). Aspen HYSYS V.11 software is used to simulate the two technologies. The simulation results with acid gas feed capacity of 250-500 kgmole/hr with composition of H_2S> 50%-mol obtained results for the Claus Selectox technology in flow rate of sulfur products = 96-115.5 ton/day; composition of exhaust gas product SO_2 = 1396-1862 mg/Nm^3; the total conversion of the reactor 75%; the thermal efficiency of the boiler is 46.2-50.8%; electricity utilization from steam produced is 26,064-29,664 MW while the WSA technology produces sulfuric acid product flow rate = 123.9-133.6 ton/day; SO_2 exhaust gas products = 1369-1396 mg/Nm^3; total conversion of the reaktor 82%; the thermal efficiency of the boiler is 78-83%; electricity utilization from steam produced is 3,973-4,068 MW. Economic analysis obtained from Claus Selectox Technology IRR = 5.5%; NPV = 12,802 USD million; POT = 9 years, while WSA Technology IRR = 13.7%; NPV = 31,029 USD million; POT = 8 years. The result of technical analysis with simulation and economic analysis, the WSA technology was chosen as a better technology for the sulfur recovery process at the LPG plant.

Keyword

Claus Technology, Economics of SRU Technology, Sulfur Recovery Unit, Wet Sulfuric Acid Technology

Comparative Disease Prediction Performance Analysis for Indian Brinjal Plant

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Abstract

As per NCRB Government of India's report on farmers, around 35 famers die every day. There are many reasons for this. Some of the major causes are low crop production after many efforts, increased cost of cultivation and management, debt on farmer, low crop prices and many other environment issues. Brinjal is one of most cultivated crop in major part of India. One of the major reasons of above issues is improper disease prediction and management on the crop. This paper presents comparative analysis of disease prediction on Indian Brinjal plant using various deep learning techniques. Deep learning has performed outstandingly in image classification problems. Various deep convolutional neural network (DCNN) models include VGG16, VGG-19, ResNet50, ResNet101, InceptionV3 and Dense Net 121 are implemented to predict the disease on Brinjal plant. The high-quality preprocessed dataset collected from real field with data augmentation of 40,336 images is used to conduct this research work. These implemented models are achieved the training accuracy of 90.92%, 90.69%, 45.80%, 52.21%, 89.17% and 92.35% respectively whereas validation accuracy of 97.01%, 99.66%, 45.92%, 55.86%, 95.10% and 97.89% respectively. These accuracy results showed that the DenseNet121, VGG19, VGG16 and InceptionV3 deep convolutional neural network models are promising way for effective implementation of such disease prediction systems in real time agricultural field.

E-Gatepass System

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Abstract

"Time is of the essence" – today this phrase is applicable to every sector and is one of the crucial factors in determining productivity. This project aims to streamline the process of gate pass management system for vendors at India's major supplier of steel- Bhilai Steel Plant. It is accomplished through reducing the processing time of manual entry and verification of vendors at the entry point and enhancing transparency by automating the logistics process. The project simplified the process through generation of an e-gatepass by vendors themselves through a cross-platform mobile app, thus removing the requirement of data entry at checkpoint. Vendors can also check their shipment status through the app there by creating a more transparent relation between vendor and supplier. For the development of the app Software Development Life Cycle(SDLC) is used. The project is built on Flutter SDK which is Google's UI software development kit for cross-platform development of mobile apps with exquisite UI templates and faster user experience. For database and backend implementation, PHP, MySQL and WAMP server were used.

Index Terms

App development, Bhilai Steel Plant, Database, Flutter, PHP, SQL, WAMP

Identification of the Epileptic Seizure Detection Using the Machine Learning, Fuzzy Classification

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Abstract

The main aim and Challenges are used to the Classification By the electroencephalography of the seizure and Nonseizure and also used Classify the ictal and the interictal of the Classification It is very difficult to Identify the seizure even the signal is the Biomedical signal It is very difficult Task to Identify the seizure and the Nonseizure of the epilepsy of the Classification State. The previous study Focused on several machine learning technique methodologies for the investigation in the Scientific interpreting the EEG data to get the accuracy of the result. To overcome address the issues, the study is used to focus on the extraction of the most discriminating and also used to distinguish the aspects of the seizure EEG recordings that are used to build a technique for epileptic seizure identification both the fuzzy-based and also the traditional machine learning algorithms. Along with comparing with the two data sets Bonn and Children's Hospital of Boston Massachusetts Institute of Technology (CHB-MIT) datasets that are used to validate to build the model.

Index Terms

Epilepsy, EEG, Machine learning, and Fuzzy

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