



1st International Conference on Advances in Science, Engineering & Technology

27th & 28th October 2023
Hochi Minh City, Vietnam



Organized by
Institute For Engineering Research and
Publication (IFERP)

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Preface

We cordially invite you to attend the 1st International Conference on Advances in Science, Engineering & Technology (ICASET) on 27th–28th October 2023. The main objective of ICASET-23 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 & 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 August 2023, the Organizing Committees have received more than 110 manuscript papers, and the papers cover all the aspects in Science, Engineering & Technology. Finally, after review, about 75+ papers were included to the proceedings of ICASET-23.

We would like to extend our appreciation to all participants in the conference for their great contribution to the success of ICASET-23. 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.

MD's Message, IFERP



Mr. A. Siddh Kumar Chhajer

Managing Director & Founder
Institute For Engineering Research and Publication (IFERP)



On behalf of IFERP & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the ICASET is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries in various fields of academics. This conference creates solutions in different ways and to share innovative ideas in the field of Advances in Science, Engineering & Technology. ICASET provides a world class stage to the Researchers, Professionals, Scientists, Academicians, and students to engage in very challenging conversations, assess the current body of research and determine knowledge and capability gaps.

ICASET will explore the new horizons of innovations from distinguished researchers, scientists and eminent authors in academia and industry working for the advancements in Science, Engineering & Technology from all over the world. ICASET hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in various fields of Academics.

CEO's Message, IFERP



Mr. Rudra Bhanu Satpathy

Founder & Chief Executive Officer
Institute For Engineering Research and Publication (IFERP)

IFERP is hosting the 1st International Conference on Advances in Science, Engineering & Technology (ICASET-2023) this year in month of October. The main objective of ICASET-23 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.

Exclusive Event Speaker's Message



Dr. Wan Izhan Nawawi B Wan Ismail

Coordinator (Research Management Unit)
Universiti Teknologi MARA Cawangan Perlis

It is my great pleasure to welcome all distinguished speaker and presenters to this conference. I hope this conference will be a great event to exchange research ideas and to establish collaboration with colleagues from various countries. I strongly believe that participants will shine brighter in future with experience gathered here, throughout the conference programmed. Last but not least, we look forward to meet our in upcoming events organized by IFERP. I wish all you a productive day and enjoyable networking experience in these conference. Thank you.

Keynote Speaker's Message



Mr. Luke Ngo

Business Development Manager, British Council
Ho Chi Minh City, Vietnam.

Ladies and Gentlemen, Honourable Delegates, Esteemed Faculty, Respected Scholars, and Students,

I am profoundly honoured to stand before you today as a keynote speaker for the prestigious International Conference on Advanced Science, Engineering, and Technology – ICASET 2023. The conference's theme, "Growth Challenges in Science, Engineering and Technology for Global Scenario," is not only timely but also of paramount importance in our ever-evolving, inter-connected, and technologically driven world.

The objective of ICASET-2023, as we know, is to present the latest research and results from multiple disciplines. The focus on Electronics & Communication Engineering, Electrical Engineering, Computer Science & Engineering, Information Science & Engineering, Biotechnology, Mechanical Engineering, Civil Engineering, Basic Science Engineering, and Master of Business Administration (MBA) illustrates the comprehensive and interdisciplinary nature of this conference.

We are at a pivotal moment in history, where the outcomes of interdisciplinary research are not just profoundly influencing our lives but also shaping our future. These influences are pervasive, from the smart devices we use, the sustainable green technologies we advocate, the advanced software that powers businesses, to the innovative biotechnologies that enhance our health and well-being. This conference is a testament to the fact that the academic community, the industry, the governments, and research agencies are all working together to navigate the challenges and opportunities presented by these rapid advancements.

Our intention for this conference is to provide a platform for thought leaders from academia, industry, and government to share their achievements, deliberate on future approaches, and discuss the major bottlenecks. Not only will the discussions encompass all avenues of the scientific and engineering fields but also spotlight the impact of modern technologies on society. In the era of big data, high-performance computing, IoT, e-governance, and other emerging technologies, it is crucial to understand our societal responsibilities and the ethical implications of our work.

This conference aims to foster a vibrant research culture and facilitate the exchange of ideas, helping us understand the transcendental growth, recent trends, innovations, and security issues in our domains.

Through a series of brainstorming sessions, we hope to make the outcomes more realistic, particularly for young researchers and those carrying out their research work in the aforementioned domains.

The expected outcomes of this conference are manifold. We hope to raise and disseminate awareness about upcoming research areas, issues, and success stories. We aim to positively impact the teaching-learning process by acquainting the academic community with recent trends. We aspire to share the visionary strategies and modus operandi of developed nations, fostering a culture of innovative research.

The benefits to delegates attending this conference are immense. From learning new ideas and approaches, meeting experts and influencers, networking, exploring new ways of working, breaking out of comfort zones, gaining greater focus, to attending pre-conference workshops, this conference provides a unique convergence of networking, learning, and fun into a single package.

In conclusion, I am confident that ICASET-2023 will serve as a beacon of knowledge, inspiration, and collaboration. I hope that the discussions, deliberations, and insights gained from this conference will guide us in forging a path towards a sustainable, inclusive, and technologically advanced future.

Thank you, and I wish you all a fruitful and inspiring conference.

Keynote Speaker's Biography



Dr. Salmiah Ahmad

Associate Professor, Department of Mechanical and Aerospace Engineering, International Islamic University Malaysia & Currently Seconded at The University of Doha for Science and Technology, Qatar



Salmiah Ahmad currently works as an associate professor at the Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur. She is a Professional Engineer (P.Eng) and also a Chartered Engineer (C.Eng.) Salmiah does research in Control Systems Engineering, Engineering Education, signal processing and Instrumentation Engineering. Their current project is on modeling the correct makhrāj and sifaat of the Quranic alphabet.

Session Speaker's Message



Assoc. Prof. Dr. Chonlatee Photong

Deputy Dean for Administration, Graduate School,
Mahasarakham University, Thailand

It is my great honour to have a chance to attend the **1st International Conference on Advances in Science, Engineering & Technology (ICASET-23)** which is organized by Institute For Engineering Research and Publication (IFERP).

Efficient energy utilization and management for buildings would be one of the most attractive aspects of these recent years. This would not only reduce the relevant costs for the building owners, but also promote less use of natural energy resources and environment. In this talk, I would like to introduce some advanced technologies related to solar windows and their effectiveness when implementing energy conservation buildings. The case study of skyscrapers in a big city such as the buildings in Nanning, China, had been used for the exploration and analysis, which could be an alternative guidance for researchers for the further research studies in the future.

I would like to sincerely thank the organizers for inviting me to join and share some of my research knowledge and experiences at this conference.

Session Speaker's Biography



Assoc Prof. Dr. Hidayat bin Zainuddin

Dean, Faculty of Electrical Engineering,
Universiti Teknikal Malaysia Melaka, Malaysia



Assoc. Prof. Dr. Hidayat bin Zainuddin completed his M.Sc. in Electrical Power Engineering with Business from University of Strathclyde and his Ph.D. in Electronic and Electrical Engineering (High Voltage) from University of Southampton, UK. Assoc. Prof. Dr. Hidayat bin Zainuddin is currently the Dean of Faculty of Electrical Engineering, Universiti Teknikal Malaysia . Assoc. Prof. Dr. Hidayat bin Zainuddin has delivered many keynote address and has received many awards and recognitions to his name including UTeM Invention, Innovation and Technology Expo 2015 (UTeMEX 2015)–2 Gold and 1 Silve Medals, Seoul International Invention Fair 2010 (SIIF 2010)–1 Gold Medal and Malaysia Technology Expo 2010 (MTE 2010)–1 Silver Medal. His area of research interest is Condition monitoring of high voltage equipment, testing and failure/degradation analysis of insulation/dielectric materials and finite element analysis modelling. Assoc. Prof. Dr. Hidayat bin Zainuddin has published many research papers in various international reputed journals and has more then 50 + registrations to his name.

Session Speaker's Biography



Mr. R. S. Ajin

Research Fellow,
Resilience Development Initiative (RDI), Indonesia

R. S. Ajin is currently an research fellow at Resilience Development Initiative (RDI) Indonesia, Previously he worked as a Hazard Analyst (Geology) with the Kerala State Disaster Management Authority (KSDMA), Thiruvananthapuram, India. He has an M.Sc. degree with First rank in Applied Geology from the University of Madras (Chennai, India) in addition to have completed more than 120 online short term courses and attended more than 30 training courses. With six years of research experience, he has presented and published more than 20 research papers and edited/reviewed more than 500 manuscripts for various national and international conferences and journals. An Editorial board member for seven international journals and associated with more than 60 international conferences as a member of Scientific Committee, Technical Program Committee, and Reviewer Committee. He is a member of the Council of Asian Science Editors (CASE) and a life member of more than 10 professional societies which include Indian Society of Remote Sensing (ISRS), Indian Institute of Geomorphologists (IGI), Indian Association of Hydrologists (IAH), Association of Geoscientists for International Development (AGID), among others. The Government of Kerala awarded him 'Good Service Entry' for his meritorious service during the 2018 Kerala Floods, and he received a 'Letter of Appreciation' from the District Collector & Chairman, District Disaster Management Authority (DDMA), Idukki for his meritorious service during the 2018 Kerala Floods. He is a Certified Publons Academy peer reviewer and mentor. He received the Publons Peer Review Awards 2018 for being in the top 1% of reviewers in the 'Assorted' category. His research interests are Disaster risk reduction (mainly flood, landslide, and wildfire risk zone mapping and management), Remote sensing & GIS (Applications in Earth and Environmental Sciences), Hydrogeology, Geomorphology, and Environmental geology.

Session Speaker's Biography



Dr. Anchit Bijalwan

School of Computing and Innovative Technologies,
British University, Vietnam



Dr. Anchit Bijalwan is an academician, researcher, consultant, and mentor with 18 years of teaching experience for graduate, and postgraduate students, and Ph.D. He successfully completed many projects and guided Masters and Ph.D. students. Currently, he is working with the School of Computing and Innovative Technologies, at British University Vietnam and working as an Adjunct Assoc Professor with Arba Minch University, Ethiopia. He worked as an Associate Professor at the Faculty of Electrical and Computer Engineering at Arba Minch University, Ethiopia, and at Uttaranchal University, India as a Head of the Department.

Dr. Anchit has authored two books "Advanced Java Programming" and "Network Forensics: Privacy and Security". He has also published more than fifty research papers in reputable international journals and conferences and has also been involved in many funded projects. His specialization is in Privacy & Security. He has chaired the technical sessions for IEEE, ACM and Springer conferences, and he is also a committee member for umpteen conferences.

He was a keynote speaker and special guest at IEEE conference in El Salvador, and a keynote in the UK, Ethiopia, India, and Vietnam etc. He is a reviewer of Inderscience, IGI Global, IEEE Internet of Things Magazine, Willey and many other publishers. He has a professional membership of the Association for Computing Machinery (ACM) and IEEE (Vietnam Section). In 2018, he was awarded an International Research Award from the International Research Association, London, UK.

Session Speaker's Message



Prof. Dr. Ipseeta Nanda

Professor, School of Computer Science and Engineering,
IILM University, Greater Noida, India

Ladies and Gentlemen, Honorable Delegates, Esteemed Faculty, Respected Scholars, and Students,

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Thank you, and I wish you all a fruitful and inspiring conference.

Session Speaker's Biography



Dr. Loc Nguyen

Founder,
Loc Nguyen's Academic Network, Vietnam

Dr. Loc Nguyen is an independent scholar from 2017. He holds Master degree in Computer Science from University of Science, Vietnam in 2005. He holds PhD degree in Computer Science and Education at Ho Chi Minh University of Science in 2009. His PhD dissertation was honored by World Engineering Education Forum (WEEF) and awarded by Standard Scientific Research and Essays as excellent PhD dissertation in 2014. He holds Postdoctoral degree in Computer Science from 2013, certified by Institute for Systems and Technologies of Information, Control and Communication (INSTICC) by 2015. Now he is interested in poetry, computer science, statistics, mathematics, education, and medicine. He serves as reviewer, editor, and speaker in a wide range of international journals and conferences from 2014. He is volunteer of Statistics Without Borders from 2015. He was granted as Mathematician by London Mathematical Society for Postdoctoral research in Mathematics from 2016. He is awarded as Professor by Scientific Advances and Science Publishing Group from 2016. He was awarded Doctorate of Statistical Medicine by Ho Chi Minh City Society for Reproductive Medicine (HOSREM) from 2016. He was awarded and glorified as contributive scientist by International Cross-cultural Exchange and Professional Development-Thailand (ICEPD-Thailand) from 2021 and by Eudoxia Research University USA (ERU) and Eudoxia Research Centre India (ERC) from 2022. He has published 91 papers and preprints in journals, books and conference proceedings. He is author of 5 scientific books. He is author and creator of 9 scientific and technological products. Moreover, he is a Vietnamese-language poet who has created 1 verse narrative and 8 collections of 374 poems from 1993.

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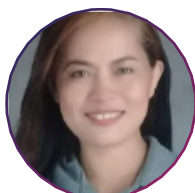
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A Few-shot custom CNN Model for Retinal Nerve Fibre Layer Thickness Measurement in OCT Images of Epilepsy

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Abstract

This work aims to determine the effectiveness of deep learning models to measure retinal nerve fiber layer (RNFL) thickness from optical coherence tomography (OCT) scans of patients with epilepsy. Traditional methods for OCT scan segmentation exploit a supervised learning paradigm, so they (a) require large volumes of data for their training, and (b) assume fixed (static) network weights once the training procedure has been completed. Recently, to overcome these difficulties, few-shot learning (FSL) has been introduced as a general concept of network model training using a very small amount of samples. In this paper, we explore the efficacy of few-shot learning in CNN architectures, allowing for a dynamic fine-tuning of the network weights as new few samples are being fed into the CNN. Experimental results indicate improvement in the segmentation accuracy. The training/validation dataset included 550 RNFL OCT B-scans from 200 eyes (60 eyes of epileptic patients, and 140 control eyes). 50 RNFL OCT scans. Performance of our algorithm was evaluated on 194 OCT B-scans from 70 healthy eyes, 82 scans from 28 epileptic eyes. Results were compared to manual segmentation as a ground truth and to RNFL calculations from the built-in instrument software. The mean average RNFL thickness using our custom CNN was not different from the manually segmented best estimate and OCT machine data in control and epileptic eyes. In epileptic eyes, while the mean average RNFL thickness using our custom CNN algorithm was not different from the manual segmented value, the OCT machine data were different from the manual segmented values. The proposed Few shot custom CNN achieved an accuracy of 91% followed by Custom CNN which achieved an accuracy of 86%. Therefore, the few-shot Custom CNN model improved the segmentation performance over the OCT scans.

Keywords

Deep learning; few-shot learning; segmentation; OCT images; Epilepsy.

Optimizing Red Reactive 4 (RR4) Dye Degradation: A Comparative Study of Ag-Decorated Photocatalysts with Various g-C₃N₄ / TiO₂ Preparations

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Faculty of Applied Sciences, Universiti Teknologi MARA (UiTM), Perlis, Malaysia

Abstract

This study presents a comprehensive evaluation of the photocatalytic performance of silver-decorated graphitic carbon nitride/titanium dioxide (AgTC) nanocomposites, synthesised using three different semiconductor composite preparation methods: dry-solid state (D), wet-solid state (W), and in-situ solvothermal synthesis (S), followed by photodeposition of Ag nanoparticles. The photocatalytic capabilities of the nanocomposites were evaluated under photodegradation of Reactive Red 4 (RR4) dye. Among the three synthesis routes, wet solid-state synthesised TC (WTC) exhibited the highest photocatalytic efficiency, as evidenced by a notably high photodegradation rate of 0.0881 min⁻¹. Moreover, A3WTC with an optimum Ag loading of 300 ppm showed exceptional photocatalytic performance compared to its counterparts prepared via dry-solid state and in-situ solvothermal synthesis with photodegradation rate of 0.1052 min⁻¹. The synergistic benefits of the coupling semiconductors were boosted by Ag's ability to create an effective Z-scheme heterojunction along with the Schottky barrier and surface plasmon resonance effects. The presence of Ag was confirmed through XRD and FESEM-EDX analyses. The photocatalytic enhancement was further proven through several advanced characterisation techniques, including UV-Vis DRS. This research provides insights into different TCN synthesis methods and their positive impact on Ag doping, advancing sustainable photocatalytic materials for treating dye-contaminated wastewater.

Keywords

Ag:g-C₃N₄/TiO₂, dry solid-state, wet solid-state, in-situ solvothermal, RR4 dye.

The Effect of Boric Acid Composition as Additional Crosslinking Agent in SA-PVA Matrix for Immobilization of *Pseudomonas aeruginosa* in Methylene Blue Biodecolorization

Silvia Abdi Pratama

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Abstract

Methylene blue (MB) dye is commonly used in the textile industry because it is relatively cheap and easy to obtain. Nevertheless, the disposal of MB wastewater can cause environmental pollution and disrupt the ecosystem life. To overcome this problem, biodecolorization by using microorganism such as bacteria is one of the best methods for dye removal. *Pseudomonas aeruginosa* bacteria can be immobilized on sodium alginate-polyvinyl alcohol (SA-PVA) matrix to enhance its capability to decolorize dye. Moreover, SA and PVA are well known as good matrix for bioimmobilization. The beads of SA-PVA-*P. aeruginosa* used in this study were prepared through a crosslinking process with boric acid as the additional crosslinking agent and CaCl₂. The peaks of many constituents of beads existing in FTIR spectra showed that the crosslinking process in the SA-PVA-*P. aeruginosa* beads fabrication was successfully done. The result showed that the most optimum percentage of MB decolorization was 87.496% which obtained with CaCl₂ and boric acid composition of 4:5 (%w/v), followed by the CaCl₂ and boric acid composition of 4:7 (83.619%), 4:3 (81.022%), 4:1 (79.212%), and 4:0 (77.140%). In addition, the temperature and time incubation study obtained that the most optimum decolorization percentage was reached in 40°C and 24 hours incubation time.

Keywords

Biodecolorization, boric acid, methylene blue, *Pseudomonas aeruginosa*.

Preliminary Study of Electrochemical Sensor Based on WO_x Modified Electrode for Nitrite Determination

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Abstract

This study introduces an electrochemical sensor design for detecting nitrite ions utilizing WO_x modified Au electrode. The sensor performance was conducted using cyclic voltammetry with a potential range of -0.2 to 1.1 V at a scan rate of 100 mV/s in PBS containing nitrite standard solution. The WO_x-modified Au electrode exhibited a well-resolved oxidation peak of 40 mg/L nitrite at 0.83 V, whereas no obvious peak current appeared at the bare Au electrode. The voltammogram curve acquired for different nitrite concentrations of 0, 5,40,200 in PBS pH 7 displayed that there is no peak observed in the absence of nitrite. Meanwhile, the anodic peak increased with a higher concentration of nitrite, indicating that the observed peak is indeed the anodic peak of nitrite. Ascorbic acid, the major interference component in food additives, did not show any redox peaks in the potential range of nitrite oxidation, indicating a good electrode selectivity toward nitrite. The experimental results show the applicability of the fabricated sensor for nitrite determination.

Keywords

Tungsten trioxide, Modified electrode, Electrochemical sensor, Nitrite.

Extreme Anthropogenic Activities Put Drastic Effects on River and its Fish Biodiversity: A Survey of River Gandak, Bihar (India)

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Abstract

Bihar is the land of rivers. Whole state is divided into north and south Bihar. North Bihar comprises of numerous rivers and aquatic diversities as compared to the south Bihar. In this 21st century, everything is running around the modernization. For all the self-comforts people harm the nature by various anthropogenic ways. River is also affected by these. The present study was undertaken to represent the types of anthropogenic activities that are directly associated with the decline of river water quality and the fish biodiversity of the river Gandak at Hajipur, Bihar. It flows between Vaishali and Saran district and a huge population resides at the bank of the river. The survey was conducted from July 2022 to June 2023 and data were collected from primary and secondary sources. The Survey concentrates on the availability of present fish biodiversity as well as conservative status globally. A total of 39 individual fish species were identified that belonged to 18 family, 29 genus and 39 species. Cyprinidae family (61.11%) was dominating followed by Bagridae family (27.78%). 79.4% are LC, 10.25% are VU, 5.12% are NT and 5.12% are EN. Physicochemical parameters of different seasons were analysed that showed variations in river water quality and fish availability. All these data will be helpful in development, preservation, conservation for the fish biodiversity of river Gandak.

Keywords

Gandak river, fish biodiversity, physicochemical parameters, anthropogenic activity.

Surface Energy Balance Closure Characterization using High Response Eddy Covariance Measurements Over Two Contrasting Agro-Ecosystems Over India

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Abstract

India is primarily an agricultural nation; food production and economic activity are heavily reliant on the Indian summer monsoon. In recent years, there has been a lot of focus on the influence of land-atmosphere interactions on climatic variability. Surface energy fluxes are critical for a wide range of applications at various geographical and temporal dimensions. The unbalance is caused by incorrect assumptions either or measurement mistakes. As a result, understanding the quality of observed fluxes and surface energy balance is critical before employing them in land-atmosphere models. Therefore, to understand these process, ISRO 10-m Agro-Meteorological Stations (AMS) have been upgraded with eddy covariance (EC) systems in Indo-UK INCOMPASS project on a range of surface types such as rice-wheat semi-arid agro-ecosystem in Nawagam, Gujarat (22.790N,72.570E) and arid grassland system in Jaisalmer, Rajasthan (26.990N,71.310N). The present study has brought out the results of analysis of high-frequency 20 Hz measured data on sensible (H) and latent heat fluxes (LE) from EC systems, net radiation (Rn) data and modelled soil heat flux (G) data for the period of June 2016 to March 2020. The Energy Balance Closure (EBC), computed as percent of ratio between difference of net available energy (Rn-G) and sum of H and LE, found to be in range of 9%, 28% and 19% during pre-monsoon, monsoon and post monsoon respectively at Nawagam. In contrast non-closure was found to be in range of 12%, 20% and 11% during pre-monsoon, monsoon and post monsoon respectively at Jaisalmer. The energy balance partitioning dominated in LE component (39-56%) at Nawagam, in contrast to 5-15% contribution in LE component at Jaisalmer. This could be due to having low vegetation growth, as exemplified through seasonal dynamics of LAI, vegetation index, Net Ecosystem Exchange (NEE) of CO₂. The major portioning in Jaisalmer was found in H component (50-60%). These data will be used to quantify the impacts of the atmosphere on the land surface, and vice versa, and to study errors in general circulation models in the coupling of land and atmosphere.

Keywords

INCOMPASS; Energy Balance Closure; Eddy covariance; Land-atmosphere coupling.

Adsorption Mechanism of Linear Alkane Liquid in Contact with Face Centered Cubic Lattice

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Abstract

Adsorption mechanisms is related to wear rates and scar. The main contributor of these problems is adsorption of liquid on solid surfaces. However, these problems have yet to be explained in the aspect of liquid orientation. Thus, this study investigates the adsorption mechanisms of butane and pentane in contact with face- centered cubic (FCC) lattice of (110), (100) and (111) surfaces, using molecular dynamics simulations. A constant temperature system will be applied to the system and the adsorption mechanism is explained using structural quantities. The results shows similar trends where a large adsorption of liquid appears on the solid surfaces and the liquid orientation is in parallel with the solid surfaces. However, the differences appear in the peak height of the adsorption of liquid for the systems. It is found that, (111) exhibits the highest adsorption of liquid near the solid liquid interfaces. Whereas, in terms of elongation of liquid alkanes (110) surface shows large elongation value in the x-directions. From these findings, it suggests that the alkane liquid is adsorbed on the solid surfaces that decreases with the increase in liquid molecule length. Furthermore, the surface structure of the solid influences the orientation of liquid on the solid surface.

Keywords

Liquid adsorption, molecular dynamics simulation, solid-liquid interfaces.

Novel $\text{TiO}_2/\text{Pt}/\text{g-C}_3\text{N}_4$ Photocatalyst: Advancing Photocatalytic Efficiency in RR4 Dye Degradation

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Abstract

Utilizing semiconductors for photocatalysis shows the potential for degradation of environmental pollutants. However, widely employed photocatalysts like titanium dioxide (TiO_2) remain ineffective in visible light conditions. This study focuses on synthesized a remarkably effective heterojunction catalyst that responds well to visible light based on graphitic carbon nitride ($\text{g-C}_3\text{N}_4$), platinum (Pt), and titanium dioxide (TiO_2). In this work, the $\text{TiO}_2/\text{g-C}_3\text{N}_4/\text{Pt}$ heterojunction photocatalyst was designed through the hydrothermal method followed by calcination using urea, chloroplatinic acid, and titania as precursors. The prepared samples were characterized by XRD, FTIR, FESEM, and UV-Vis DRS techniques. The photocatalytic efficiency of heterojunction photocatalyst was investigated through the discoloration of reactive red 4 (RR4) dye under visible light irradiation. The $\text{TiO}_2/\text{g-C}_3\text{N}_4/\text{Pt}$ heterojunction exhibited higher photocatalytic performance of decomposition RR4 dye than pure $\text{g-C}_3\text{N}_4$ and TiO_2 about 98.26%, 72.68%, and 88.51% in 20 min respectively. The pseudo-first rate constants for RR4 degradation on heterojunction $\text{TiO}_2/\text{g-C}_3\text{N}_4/\text{Pt}$ photocatalyst were 0.1929 min^{-1} which is 4.18 and 3.07 times of bare $\text{g-C}_3\text{N}_4$ and TiO_2 . The photoluminescence study, amount of generated hydroxyl free radicals and electrochemical confirmed the improvement in electron-hole pair separation and the formation of the Z-scheme heterojunction configuration. These discoveries might contribute to the development of active substances for water treatment in organic solutions.

Keywords

$\text{TiO}_2/\text{g-C}_3\text{N}_4/\text{Pt}$, RR4 dye, Z-scheme heterojunction, hydrothermal, water treatment.

A Review of High-Rise Buildings with Transfer Floor System

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Abstract

In high-rise buildings, variable configurations in the vertical structural elements may arise according to the functional requirements. To compensate for such discontinuities, a transfer floor is provided. A transfer floor is used to convey vertical and lateral loads between upper and lower storeys. A major drawback in the system is the change in the lateral stiffness of the building at the transfer floor level. This may lead to the formation of soft storey under moderate to severe earthquakes. There are two different transfer floor systems namely transfer girders and transfer slabs. Transfer girders system has proved to be more flexible than slab system. But transfer slab needs to be adopted in certain cases according to the configuration and many other factors. This paper is an attempt to compile the works carried out on high rise buildings with transfer floor system.

Keywords

Transfer Floor, Transfer Slab, Transfer Girder, High-rise buildings.

The Second Revolution of Relativity

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Abstract

Energy, this vital entity that we need, and that everyone consumes and releases, in different forms, has been since the dawn of time the greatest concern of the human being. Over the centuries, energy has transformed lifestyles in all societies around the world, contributing to the emergence of new and cosmopolitan cities. Scientific research has largely contributed to this extraordinary advance of energy in the conquest of the world, thanks to the many works and discoveries of scientists from the golden age of Islamic civilization to the renaissance in Europe, the great technological revolution that has emerged in the North and the South. The continuous need for energy has always been the main driver of various discoveries, whether related to energetic matter or energy reactions. Between pure matter and active reaction, energy has become the center of several hybrid studies, manipulating energy as a source on the one hand, and as a finished product on the other.

Most of the work done on electric current, in the early years of the seventeenth century, showed the precariousness of materials as to their conductivity, the arrival on the scientific scene of new chemical elements, discovered around the 18th century, have strengthened the quality of work and consequently the improvement of electrical productivity in the world. Nuclear energy will suffer the same fate of development as that of electrical energy, going through critical periods, especially those related to the discovery of high-activity materials. Nevertheless, the arrival at the beginning of the 19th of Albert Einstein's famous formula on relativity, ($E = mc^2$), put an end to the major concerns of scientists on energy, to know finally, the nature and value of the energy compensation of the material during its activity.

We consider that Albert Einstein's formula is not entirely sufficient to decipher the true energetic reality of matter. Our work is a remodelling of the relativistic formula, not only from the physical point of view, but also from the mathematical point of view. Therefore, our contribution to this restoration pleads for a new apprehension of the atom as an «original copy of the universe» which has an infinity of nanoscopic particles, which are chemically active and physically metastable. This extrapolation of the relativistic formula will recognize energy as the other side of its independence from matter.

Keywords

Relativity, Thermodynamics, nanotechnology, energy, nano black holes.

Utilizing J48 Algorithm in Predicting Students' Dropout in Higher Education Institution

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Abstract

Dropout refers to students who voluntarily withdraw from a course or program prior to completion. University dropouts continue to be a major concern for educators and represent a substantial loss of human resources for society. At Cebu Technological University, it is always a challenge of the Department Chairperson the declining student population, which results in the reduction of sections and under loading of faculty.

This study centers on the creation of a student-dropout model that predicts a student's behavior toward his studies. This model utilized the J48 decision tree algorithm, which extract data from the Student Information System (SIS) portal of the existing institution. Nine hundred sixty-one (961) demographic and academic datasets from students enrolled in the two programs under the College of Computer, Information, and Communications Technology (CCICT) of Cebu Technological University (CTU) with nineteen (19) attributes. During the testing procedure, 10-fold cross-validation was utilized. The J48 pruned tree utilized an average of 3 foliage with 4 as the measure of the tree. The Kappa statistic yields a value of 0.8617 and its Correctly Classified Instances rate of 93.7%. This algorithm helps a lot to the institution in reducing the escalation of the attrition rate and providing proactive measures to address the issue.

Keywords

Academic performance, data mining, J48 algorithm, student dropout, higher education institution.

An IoT Enabled Framework for Smart Supply Chain Management

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Abstract

Supply Chain Management (SCM) controls the course of goods and services between the origin and consumers through an interconnected network of organisations and activities. The inception of the Internet of Things (IoT) paved the way for smart technology and led to an expansive development in modern technology. Integration of IoT enabling technologies with SCM facilitates a higher performance for smart tracking and controlling of the flow in the network of supply chain. This paper introduces a framework for the supply chain designed the real-time intelligent tracking of goods. The ultimate goal of achieving the desired framework can be done by addressing the significant features of the supply chain in a real-time environment using IoT technology along with workflow modeling. The proposed methodology has been termed as Smart Supply Chain Management (SSCM), which is an automated event-driven system that operates in real-time, tracks a set of predefined supply chain operation, and reliable decision-making in real-time. The SSCM method to manage multitude of instances throughout the supply chain and transform these instances into useful data is done by conceptualization of Complex Event Processing (CEP). The adopted method sets a standard for necessary maximisation of supply chain value by reducing the wastages.

Keywords

Decision-making, Internet of Things, SCOR model, smart tracking, Supply Chain.

Detecting Partial Human Faces Using a Hybrid Model with Deep Learning Techniques

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Abstract

Facial recognition systems have gained significant attention in recent years due to their wide range of security, surveillance, and human-computer interaction applications. However, these systems often struggle to detect and recognize partially occluded faces accurately. This research presents a hybrid model that combines traditional computer vision techniques with state-of-the-art deep learning methods to develop an accurate and robust algorithm for handling variations in facial occlusions. Experimental results demonstrate the effectiveness of the proposed approach in partial face detection.

Keywords

Image Processing, Deep Learning, ANN, Hybrid Model.

Assessing Proline Accumulation as a Marker of Salinity Stress Tolerance in *Centella asiatica*

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Abstract

Salinity is considered one of the major constraints that limit the productivity of various significant crops globally. This leads to a great economic loss throughout the world. In the current era, there is a need to improve our knowledge about new mechanisms by which plants respond to salinity stress conditions and impart new platforms for the sustainable growth and cultivation of significant crops. In the current study, the medicinally and commercially significant plant *Centella asiatica* was selected and subjected to salinity stress by irrigating with increased concentrations of NaCl. The leaf samples were collected from the control (non-salt treated) and test plants (treated with increased concentrations of NaCl) at the time intervals of 7 days, 14 days, and 21 days after the salinity treatment. The leaf extract was prepared from each collected plant sample. The leaf extract was further analyzed spectroscopically to report the proline content in each sample. The recorded proline content indicated that *Centella asiatica* increased its intracellular proline content at the higher ranges of salinity stress. The results suggested that the accumulation of proline in the *Centella asiatica* mediated the salinity alleviation mechanism and contributed to the enhanced productivity of the test plant under the salinity stress.

Keywords

Centella asiatica, Proline, Salinity stress, Salt tolerance mechanisms, Spectroscopic analysis.

Interactive Education with Exploration Virtual Reality Technology

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Abstract

Nowadays, technology plays a fundamental role in the development of daily life activities. In this regard, there is an increase in disciplines that have used technologies, with educational fields standing out above all. Within education, there are a series of emerging technologies that are increasingly implemented in the classroom. The use of virtual reality in education is a good way to attract them in learning. Using virtual reality in learning give positive impact to the trend of increasing motivation, more attracting and fast learning. This is to design the 3-dimensional environment for education. The usefulness of this research is Interactive Virtual reality game is new technology in education, inspire players to focus, feel interesting, and enjoy playing the game. Helpful in motivating students due to having an interactive, interesting, fantasy-occupied and challenging game. The students could improve their learning as they are well immersed in the game. Using 3-dimensional virtual reality game acts as a new way to improve a student's skill in learning. The virtual reality environment will give the students a new environment that they can feel real while wearing the Oculus and doing exercises. The virtual reality game design will be used at home.

Keywords

Digital Technology, Higher Education Learning, Virtual reality.

Design and Analysis for Millimeter Wave Networks using Antenna Arrays

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Abstract

Millimeter wave (mmWave) communications is considered a promising technology for 5G networks. Exploiting beam forming gains with large-scale antenna arrays to combat the increased path loss at mm Wave bands is one of its defining features. However, previous works on mm Wave network analysis usually adopted oversimplified antenna patterns for tractability, which can lead to significant deviation from the actual performance. In this paper, using tools from stochastic geometry, we carry out a comprehensive investigation on the impact of directional antenna arrays in mm Wave networks. We first present a general and tractable framework for coverage analysis with arbitrary distributions for interference power and arbitrary antenna patterns. It is then applied to mm Wave ad hoc and cellular networks, where two sophisticated antenna patterns with desirable accuracy and analytical tractability are proposed to approximate the actual antenna pattern. Compared with previous works, the proposed approximate antenna patterns help to obtain more insights on the role of directional antenna arrays in mm Wave networks. In particular, it is shown that the coverage probabilities of both types of networks increase as a non-decreasing concave function with the antenna array size. The analytical results are verified to be effective and reliable through simulations, and numerical results also show that large-scale antenna arrays are required for satisfactory coverage in mm Wave networks.

Keywords

Antenna pattern, coverage probability, directional antenna array, millimeter wave, stochastic geometry.

Workwise: Fostering Productivity by Smart Break Scheduling

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Abstract

Prolonged laptop use while sitting can lead to technical drawbacks involving musculoskeletal, visual, and physiological issues. Static sitting stresses the musculoskeletal system, potentially causing Sedentary Load Syndrome, leading to muscle stiffness and spinal misalignment like kyphosis or lordosis. Visual problems like Computer Vision Syndrome (CVS) arise from extended screen exposure, resulting in eye strain, dry eyes, and discomfort. Physiologically, sedentary behavior reduces caloric expenditure, hampers blood circulation, and may lead to metabolic challenges such as metabolic syndrome, affecting muscle oxygenation and cognitive function. These concerns emphasize the importance of proactive approaches, like the proposed software, to mitigate health risks associated with extended computer use and sedentary work habits.

Our project introduces a software solution that effectively promotes healthy work practices, all while maintaining productivity. By utilizing webcam-based motion tracking to monitor shoulder coordinates, we can intelligently recommend employees to take breaks and engage in movement. In instances where extended screen usage is detected, the software may suggest a pause or encourage movement to prevent screen freeze. The results of this project highlight the immense potential of this technology as a valuable tool, benefiting both employers and employees by fostering a health-conscious work environment.

Keywords

Prolonged computer, detrimental effects, real-time monitoring, breaks, activity, tracking.

Analysis of Factors Influencing Bagging Performance using Supervised Machine Learning Method in the Fertilizer Industry

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Abstract

Urea fertilizer is an essential product mainly for people working in an agriculture field. The demand increases every year caused by rapidly growth globalization. This problem obliges fertilizer industry to be more competitive by reducing products losses and production cost. This study introduces supervised machine learning to predict which factors influence fertilizer weight losses during bagging process, such as water content, products temperature, and wind pressure. Method used in this study is Random Forest Regressor, a well-known method that combines several decision trees into a single output commonly for classification and regression. Factors studied were analysed using Random Forest resulting MAPE and Spearman's method to determine the correlation between the factors towards fertilizer weight. MAPE value obtained from this study was 0.003. Low MAPE result may be caused by insufficient data. The Spearman coefficients of water content, products temperature, and wind pressure were 0.035, 0.244, 0.013, respectively. Spearman coefficient shows good result if the value ranging from -1 to +1, which obtained from products temperature. This study shows that Random Forest Regressor can predict several factors that influence productivity of fertilizer industry, particularly in bagging system. However, further research with larger data range is still needed.

Keywords

Bagging, fertilizer, industry, Random Forest Regressor, regression.

G-App: Guidance Application for the General Management of Student Information and Services

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Abstract

Guidance services play a significant role in student's lives as they encourage students' academic, social, emotional, and personal development. This study aimed to develop an effective management of students' information and services in the Guidance office that supports the student's academic, social, emotional, and personal development. The study made use of the Rapid Application Development process and a survey questionnaire to evaluate the perceived performance of the system. The findings of the study revealed that it has satisfied the features of the system in managing the student information and services in the Guidance office and was found to be functional, usable, and secured and likewise lessened the burden of the Guidance Counsellor in managing the student record.

Keywords

Guidance management system, Application development, Guidance student services.

Storage and Process Improvement in Manufacturing System

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Abstract

Storage systems and warehouse processing in factories are integral to manufacturing operations and logistics procedures. Proper factory layout, storage locations, and procedures save time and reduce cost and wastes. This study examines a real case scenario of a metal industry and sheet metal factory manufacturing commercial easy-to-install metal racks. We collected data, investigated the current situation of the factory, and specified the difficulties and problems regarding the procedures, storage system, and distribution of machines. Furthermore, several proposed solutions were presented and analyzed using simulation, followed by the selection of the best solution. Then, we applied 5S methodology to improve productivity and reduce waste. The findings reveal that reducing waste and time, enhancing productivity, and better space utilization can be achieved significantly. Moreover, this study indicates the feasibility of the proposed solutions, which can be adopted by similar factories and other industries.

Keywords

Manufacturing systems, sheet metal factory, warehouse, storage, simulation, 5S.

SeDi LMSS: A Self-Directed Learning Management and Support System for Flexible Teaching and Learning Experience

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Abstract

This study explored the customization of a platform for the Learning Management and Support System (LMSS) dubbed as SeDi: Self Directed LMSS and examined how usable the platform is using the quantifiable usability metrics such as completion rate, overall relative efficiency, and task level satisfaction. The development of the platform followed the four-phased rapid application development methodology to meet the requirements of the target beneficiaries more quickly. Participants in the evaluation of usability were users who are computer literate and first-time users of the platform. Results show that the customized platform is effective in terms of completion rate, efficient in terms of overall relative efficiency, and very easy to use in terms of task-level satisfaction.

Keywords

Self-directed learning, learning management and support system, flexible teaching and learning.

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