

PROGRAMME BOOK

**THE 6TH NATIONAL
CONFERENCE FOR
POSTGRADUATE RESEARCH
(NCON-PGR 2022)**

"Advancing Technology for Community"

15TH NOVEMBER 2022

VIRTUAL CONFERENCE

ORGANIZER:



**COLLEGE OF
ENGINEERING**

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CONFERENCE BACKGROUND

The National Conference for Postgraduate Research (NCON-PGR) has been aspired as a regular event for the Universiti Malaysia Pahang (UMP) to bring together graduate researchers and practitioners from technology and engineering disciplines.

The first event was jointly organized by the Institute of Postgraduate Studies (IPS) and the Faculty of Chemical and Natural Resources Engineering (FKKSA) in 2012 (also known as 'NCON-PGR 2012') which has successfully earned great compliments amongst the national postgraduate researchers.

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On 2015, Institute of Postgraduate Studies (IPS) and Faculty of Industrial Management (FIM), had successfully organize the second NCON-PGR 2015 with the theme of "Creativity+ Engineering + Technology + Business", which had attracted more than 100 participants form around Malaysia.

In 2016, Institute of Postgraduate Studies (IPS) in collaboration with Faculty of Electrical & Electronic (FKEE) with the theme " Knowledge Discovery for Wealth Creations" had successfully organize (NCON-PGR 2016).

This year, Institute of Postgraduate Studies (IPS) in collaboration with College of Engineering, Universiti Malaysia Pahang (KKEJ) with the theme "Postgraduate: Intersection of Knowledges" acknowledge postgraduate as the knowledge creation. This conference will serve as a friendly scientific platform for the postgraduates in all aspects from technology, engineering to social science to share their latest research findings in their respective fields. It will be great experience and opportunity to all the participants to share their research among themselves.

Additionally, we are very keen to promote the conference to a wider community and would be very interested in discussing how the conference could be used to promote research products, consultancy services, innovations etc.

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This can either be one through sponsorship or by registering as a conference delegate. As an industrial delegate you pay the same rate as other delegate and are not require to submit a paper and we will assign you a presentation slot in which you could give a talk about your company, products, problems that you face etc.

If this is of interest, please contact us at nconpgr@ump.edu.my

WELCOMING ADDRESS

Message from the Deputy Vice-Chancellor (Research & Innovation)



Assalamualaikum Warahmatullahi Wabarakatuh,

First and foremost, I would like to welcome everyone to Universiti Malaysia Pahang (UMP), and to the 6th National Conference For Postgraduate Research (NCON-PGR) 2022.

The objective of NCON-PGR was to provide a platform for Postgraduate students in UMP to present their paper, to receive feedback and also to share their research findings. This conference is also to provide an opportunity for the students to communicate and network amongst themselves. It is opened to all Postgraduate students from within and outside UMP with the theme “Communitising Technology”.

Thus in this context, UMP attempts to provide an ecosystem that is conducive for knowledge sharing and one such platform is today’s NCON-PGR 2022 where there will be ‘new discoveries’ that will be shared by the Postgraduate students. The conference theme “Communitising Technology” is also link with UMP aspiration toward creating “Technology for Society”.

This year’s NCON-PGR 2022 theme also in line with Industrial Revolution (IR) 4.0. The government has recognized the importance of integrating the IR4.0 initiative into the national agenda as a means to keep pace with the latest advancements. In Malaysia, we need to find ways to incorporate the elements of the fourth industrial revolution in our approach to address challenges faced in education sector especially in postgraduate and research sectors.

I would like to congratulate those who have their papers accepted and also I would like to thank Institute Of Postgraduate Studies (IPS) and College of Engineering for their time and commitment to make NCON-PGR 2022 a reality. My thanks to our both keynote speakers: Professor Dr. Ida Madeha Binti Abdul Ghani Azmi, and Professor Dr. Mohd Shahrizal Bin Sunar; who are willing to share their knowledge with our participants, all moderators, all chair persons for the conference parallel session, all committee members, post graduate association, and all divisions that have contributed to the conference today.

Best Wishes to all.

Thank you.

**PROFESSOR TS. DR. KAMAL ZUHAIRI BIN ZAMLI
DEPUTY VICE-CHANCELLOR
RESEARCH & INNOVATION**

Message from the Dean, Institute of Postgraduate Studies

Greetings from Universiti Malaysia Pahang!

Universiti Malaysia Pahang (UMP) welcomes all delegates to the The 6th National Conference For Postgraduate Research (NCON-PGR) 2022.

The conference serve as a platform for postgraduate students to share their research findings. It is also intended to provide an opportunity for communications and networking amongst them. I do hope through this conference all participants would be able to broaden their knowledge and enhance their research skills and competency.

This year, Institute of Postgraduate Studies (IPS) organized the conference with the theme "**Advancing Technology For Community**". This conference will serve as a friendly scientific platform for the postgraduates in all aspects from technology, engineering to social science to share their latest research findings in their respective fields. It will be a great experience and opportunity to all the participants to share their research among themselves.

The conference gathers postgraduate research from various background that includes Engineering, Engineering Technology, Science, Mathematics, Computer, Social Science, Humanities, Economy, Business and Management. We received a large number of research paper to be presented at the conference. Therefore, we are very keen to promote the conference to a wider community and would be very interested in discussing how the conference could be used to promote research products, consultancy services, innovations etc.

Finally, the Institute OF Postgraduate Studies, UMP would like to thank all presenters, conference non-presenter's participants, and conference committee for their commitment, dedication and steadfast in ensuring the success of this conference.

Best Wishes to all.

Thank you.

**PROFESOR DATIN TS. DR. MIMI SAKINAH BINTI ABDUL MUNAIM
DEAN
INSTITUTE OF POSTGRADUATE STUDIES**



Message from the Conference Chair

We warmly welcome you to the 6th National Conference for Postgraduate Research (NCON-PGR 2022) at Universiti Malaysia Pahang (UMP). The postgraduate conference has been started since 2012 with great success, as an opportunity for Postgraduate Research Students to showcase their research in an informal, supportive environment.



Our keynote speaker this year is Professor Dr. Ida Madiha Abdul Ghani Azmi is Professor, Ahmad Ibrahim Kuliyyah of Laws, IIUM, and Dean, Centre For Postgraduate Studies IIUM, and Professor Dr. Mohd Shahrizal Sunar, Director, Institute of Human Centered Engineering (iHumEn), Research Fellow Media and Games Innovation Centre of Excellence (MaGICX), UTM. We are delighted that both Professors have accepted our invite to attend the conference and we are very much looking forward to their presentation.

To many of us, pursuing postgraduate research in these situations can be challenging financially, physically, and mentally. This event therefore aims to bring our postgraduate back together in communicating their research experience and work to colleagues and lecturers in the faculty. I hope that this will provide a supportive environment for all to stay motivated during candidature and ensuring that the research culture always flourishes in UMP. I encourage all of you to make the most of this one-day conference by getting involved in as many panel discussions as possible, both as presenters and as audience.

To conclude, I would like to express my sincere gratitude to the organizing committee for their commitment to organizing this conference. Congratulations to all postgraduate students for your participation in this conference, and for dedicating your time on your research that I believe will bring positive long-term impact to the faculty and society. I wish you all a productive and enjoyable conference.

Best Wishes to all.

Thank you.

**PROFESOR MADYA IR. DR MUHAMAD ZAHIM BIN SUJOD
CONFERENCE CHAIR
NATIONAL CONFERENCE FOR POSTGRADUATE RESEARCH (NCON-PGR) 2022**

ORGANIZING COMMITTEE



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Zainuddin



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CO-CHAIRMAN

Associate Professor Dr. Mohd Nizam Mohmad Kahar

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Puan Aisyatul Hanisah binti Mazri
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- Muhammed Qasim
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- Siti Norsyahira binti Mohd Zahari
- Mohammad Ismail
- Kamrul Hasan
- Abdelrahman Farook

KEYNOTE SPEAKER



KEYNOTE SPEAKER 1

Professor Dr. Ida Madieha Bt.
Abdul Ghani Azmi
Professor, Ahmad Ibrahim
Kuliyah of Laws, IIUM
Gombak Campus

KEYNOTE SPEAKER 2

Prof. Dr. Mohd Shahrizal
SunarInstitute Director, Institute
of Human Centered Engineering
(iHumEn), Research Fellow
Media and Games Innovation
Centre of Excellence
(MaGICX)



PROGRAMME TENTATIVE

Time	15 th November 2022 (Tuesday)
08:30 – 09:00	Welcoming Speech by Chairman Opening Ceremony by TNC P & I Link: NCON 2022 Opening Ceremony
09:00 – 9.45	Keynote 1 - (online streaming) Link: Keynote Speaker 1 <i>Title: PG research for society and with society: the role of ethics and intellectual property</i> Keynote Speaker: Prof. Dr. Ida Madieha Bt. Abdul Ghani Azmi Professor, Ahmad Ibrahim Kuliyyah of Laws, IIUM Gombak Campus <i>Chairperson: Assoc. Prof. Dr. Mohd Nizam Bin Mohamad Kahar</i>
9:45 – 10:30	Keynote 2 - (online streaming) Link: Keynote Speaker 2 <i>Title: Directions for extended reality research in multidisciplinary fields</i> Keynote Speaker: Prof. Dr. Mohd Shahrizal Sunar Institute Director, Institute of Human Centered Engineering (iHumEn), Research Fellow Media and Games Innovation Centre of Excellence (MaGICX) <i>Chairperson: Assoc. Prof. Ir. Dr. Muhamad Zahim bin Sujod</i>
Venue/ Time	Parallel Session 1
10:30 – 13.00	Track 1: Chemical and Bioprocess Engineering I Link: Track 1-Parallel 1: Chemical & Bioprocess Engineering I
	Track 2: Chemical & Bioprocess Engineering II Link: Track 2-Parallel 1: Chemical & Bioprocess Engineering II
	Track 3: Mechanical and Manufacturing Engineering I Link: Track 3- Parallel 1: Mechanical and Manufacturing Engineering I
	Track 4: Mechanical and Manufacturing Engineering II Link: Track 4-Parallel 1: Mechanical and Manufacturing Engineering II
	Track 5: Civil Engineering & Mechanical Engineering I Link: Track 5-Parallel 1: Civil Engineering & Mechanical Engineering I
	Track 6: Civil Engineering I Link: Track 6-Parallel 1: Civil Engineering I
	Track 7: Electrical & Electronics Engineering I Link: Track 7-Parallel 1: Electrical & Electronics Engineering I
	Track 8: Electrical & Electronics Engineering II Link: Track 8-Parallel 1: Electrical & Electronics Engineering I
	Track 9: Business & Management I Link: Track 9-Parallel 1: Business & Management I
	Track 10: Linguistic & Language Management / Humanities Sciences Link: Track 10- Parallel 1: Linguistic & Language Management / Humanities Sciences
	Track 11: Material Sciences & Physical Sciences I Link: Track 11- Parallel 1: Material Sciences & Physical Sciences I

Venue/ Time	Parallel Session 2
14:00 – 17.15	Track 1: Chemical and Bioprocess Engineering III Link: Track 1-Parallel 2: Chemical & Bioprocess Engineering III
	Track 2: Chemical & Bioprocess Engineering IV Link: Track 2-Parallel 2: Chemical & Bioprocess Engineering IV
	Track 3: Chemical & Bioprocess Engineering V Link: Track 3- Parallel 2: Chemical & Bioprocess Engineering V
	Track 4: Mechanical and Manufacturing Engineering IV Link: Track 4-Parallel 2: Mechanical and Manufacturing Engineering IV
	Track 5: Mechanical & Civil Engineering II Link: Track 5-Parallel 2: Mechanical & Civil Engineering II
	Track 6: Civil Engineering II Link: Track 6-Parallel 2: Civil Engineering II
	Track 7: Material Sciences Link: Track 7-Parallel 2: Material Sciences
	Track 8: Material Sciences & Physical Sciences II Link: Track 8-Parallel 2: Material Sciences & Physical Sciences II
	Track 9: Computer Science Link: Track 9-Parallel 2: Computer Science
	Track 10: Computer Science & Data Science Link: Track 10-Parallel 2: Computer Science & Data Science

DETAILS PROGRAMME TENTATIVE

OFFICIAL OPENING CEREMONY

Tuesday, 15 November 2022		
Time		Programme
8:00 a.m.	:	Arrival of the Participants
8:15 a.m.	:	Arrival of VIPs
8:20 a.m.	:	Arrival of YBhg. Professor Ts. Dr. Kamal Zuhairi bin Zamli Deputy Vice Chancellor of Universiti Malaysia Pahang
8.30 a.m.	:	Recitation of Du'a
8:35 a.m.	:	Welcoming Speech by Associate Professor Ir. Dr. Assoc. Prof. Ir. Dr. Muhamad Zahim bin Sujod, Chairman of NCON-PGR 2022, Universiti Malaysia Pahang
8:40 a.m.	:	Opening Speech and Officiating the Launch of NCON-PGR 2022 by YBhg. Professor Ts. Dr. Kamal Zuhairi bin Zamli Deputy Vice Chancellor (Research & Innovation), Universiti Malaysia Pahang
8:45 a.m.	:	Montage Presentation
9:00 a.m.	:	Keynote 1 - (online streaming) Link: Keynote Speaker 1 Title: PG research for society and with society: the role of ethics and intellectual property Keynote Speaker: Prof. Dr. Ida Madieha Bt. Abdul Ghani Azmi
9.45 a.m.	:	Keynote 2 - (online streaming) Link: Keynote Speaker 2 Title: Directions for extended reality research in multidisciplinary fields Keynote Speaker: Prof. Dr. Mohd Shahrizal Sunar
10.30 a.m.	:	Parallel session 1
14.00 p.m.	:	Parallel session 2

PARALLEL SESSION 1

	<p>Track 1: Chemical and Bioprocess Engineering I</p> <p>Link: Track 1-Parallel 1: Chemical & Bioprocess Engineering I</p> <p>Chairperson: Dr. Mazni binti Ismail</p> <p>Co-chairperson: Aiman Awadh Saleh Bin Mokaizh</p>
10.30 – 10.45	<p>Siti Zaniza Tohar (Universiti Malaysia Pahang)</p> <p>REE-ion adsorption clay type deposit characteristics in Kuantan's weathered granite profiles</p> <p>NCON-PGR_2022_028</p>
10.45 – 11.00	<p>Karthick Murugan Palanisamy (Universiti Malaysia Pahang)</p> <p>Influence of photobioreactor on cultivation of Tetraselmis sp. under various colors and light intensities for biodiesel production</p> <p>NCON-PGR_2022_037</p>
11.00 – 11.15	<p>Nurul Izzati Azahar (Universiti Malaysia Pahang)</p> <p>Evaluation of Antioxidant, Antibacterial and Anticancer Activities of Ganoderma lucidum Extracts</p> <p>NCON-PGR_2022_074</p>
11.15 – 11.30	<p>Sia Yiik Swan (Universiti Malaysia Pahang)</p> <p>Sequential adaptation to serum-free medium for Vero cells cultivation on ultraviolet/ozone (UVO) treated microcarrier</p> <p>NCON-PGR_2022_075</p>
11.30 – 11.45	<p>Siti Zubaidah Adnan (Universiti Malaysia Pahang)</p> <p>Effects of Different Seed Dynamics on Crystal Size Distribution for Seeded Batch Crystallization Process</p> <p>NCON-PGR_2022_077</p>
11.45 – 12.00	<p>Ros Shazuin Rayyanu Mohd Zaki (Universiti Malaysia Pahang)</p> <p>Photocatalytic Degradation of Organic Pollutants and Heavy Metal: A Review</p> <p>NCON-PGR_2022_084</p>
12.00 – 12.15	<p>Siti Nurqurratulainie Miskan (Universiti Malaysia Pahang)</p> <p>Mini-Review on CO₂ Reforming Methane in Aspect of Fibrous Zeolite's Properties</p> <p>NCON-PGR_2022_085</p>
12.15 – 12.30	<p>Sarmilaah Dewi Subramaniam (Universiti Malaysia Pahang)</p> <p>Carrageenan-Nanocomposite Film Incorporated with Bentong Ginger Extracts for Active Food Packaging: Synthesis and Characterization</p> <p>NCON-PGR_2022_090 FYP</p>

PARALLEL SESSION 1

	<p>Track 2: Chemical & Bioprocess Engineering II</p> <p>Link: Track 2-Parallel 1: Chemical & Bioprocess Engineering II</p> <p>Chairperson: Ts. Dr. Azizan bin Ramli</p> <p>Co-chairperson: Muhammed Qasim</p>
10.30 – 10.45	<p>Siti Noraishah Ismail (Universiti Malaysia Pahang)</p> <p>Safety Culture Awareness and Practices in the Malaysian Mining Industry: A Preliminary Study</p> <p>NCON-PGR_2022_088</p>
10.45 – 11.00	<p>Nuramira Fateha Sukor (Universiti Malaysia Pahang)</p> <p>Controlled Release of Niacinamide from Fibrous Silica Nanocarrier in Face Serum Formulation</p> <p>NCON-PGR_2022_054</p>
11.00 – 11.15	<p>Sin Phin Yin (Universiti Malaysia Pahang)</p> <p>Grwoth Pattern and Physicochemical Evaluation of Water Kefir Fermentation</p> <p>NCON-PGR_2022_065</p>
11.15 – 11.30	<p>Chaitanya Reddy Chilakamarry (Universiti Malaysia Pahang)</p> <p>Growth profile study of Escherichia coli K12 by Optical density measurement</p> <p>NCON-PGR_2022_066</p>
11.30 – 11.45	<p>Md Arfat (Universiti Malaysia Pahang)</p> <p>Lignin Extractions from Oil Palm Empty Fruit Bunch under Pressurized and Inert Conditions</p> <p>NCON-PGR_2022_106</p>
11.45 – 12.00	<p>Muhammad Syahrul Ridhzuan Mazilan (Universiti Malaysia Pahang)</p> <p>The Physicochemical Properties and Thermal Behaviour of Rice Husk for Dust Explosion Study</p> <p>NCON-PGR_2022_107</p>
12.00 – 12.15	<p>Yung Sheng Yong (Universiti Malaysia Pahang)</p> <p>A Preliminary Study of Pyrolysis Kinetics among Various Types of Oil Palm Wastes</p> <p>NCON-PGR_2022_119</p>
12.15 – 12.30	<p>Nur Atikah Md Azni (Universiti Malaysia Pahang)</p> <p>Qualitative Risk Assessment in V-blender Using Bayesian Network</p> <p>NCON-PGR_2022_109</p>

PARALLEL SESSION 1

	<p>Track 3: Mechanical and Manufacturing Engineering I Link: Track 3- Parallel 1: Mechanical and Manufacturing Engineering I Chairperson: Profesor Ir. Ts. Dr. Kumaran A/L Kadirgama Co-chairperson: Hasan Najafi Khaboshan</p>
10.30 – 10.45	<p>Syed Qutaba (Universiti Malaysia Pahang) Development of fiber metal laminate composite with different glass fiber GSM NCON-PGR_2022_004</p>
10.45 – 11.00	<p>Norhana Mohd Aripin (Universiti Malaysia Pahang) Sustenance Strategies for Lean Manufacturing Implementation in Malaysian Manufacturing Industries NCON-PGR_2022_007</p>
11.00 – 11.15	<p>Muhammad Hanafi Yusop (Universiti Malaysia Pahang) Leakage Identification Based on Hydraulic Transient Analysis NCON-PGR_2022_009</p>
11.15 – 11.30	<p>Muhammad Arifuddin Fitriady (Universiti Malaysia Pahang) Effect of Mesh Refinement on Vertical and Lateral Velocity Profiles of the Wake Flow behind a Spire based on CFD NCON-PGR_2022_149</p>
11.30 – 11.45	<p>Pari Fareek (Universiti Malaysia Pahang) Review of heat transfer enhancement by using hybrid nanofluid through backward facing steps NCON-PGR_2022_042</p>
11.45 – 12.00	<p>J Mogan (Universiti Malaysia Pahang) Parameter Influence on Mechanical Properties of ABS; Using FDM NCON-PGR_2022_047</p>
12.00 – 12.15	<p>L Sandanamsamy (Universiti Malaysia Pahang) Investigation of Mechanical Properties of 3D-printed PLA NCON-PGR_2022_048</p>
12.15 - 12.30	<p>Azizol Heirey Bahari (Universiti Malaysia Pahang) Lean Management in Quality Improvement of Cutting and Hot Forming Process for Window Tint NCON-PGR_2022_050</p>

PARALLEL SESSION 1

Track 4: Mechanical and Manufacturing Engineering II

Link: [Track 4-Parallel 1: Mechanical and Manufacturing Engineering II](#)

Chairperson: Dr Mohd Jamil Bin Mohamed Moktharudin

Co-chairperson: Siti Norsyahira binti Mohd Zahari

Nelfiyanti N (Universiti Malaysia Pahang)

10.30 – 10.45

Integration of QRM and Ergonomics in the Design of a Framework in Identification Complaints Among Automotive Assembly Line Workers
NCON-PGR_2022_010

10.45 – 11.00

Rajan Kumaresan (Universiti Malaysia Pahang)

Parameter influence on the tensile properties of FDM printed PLA/ C. wood

NCON-PGR_2022_015

11.00 – 11.15

Agus Nugroho (Universiti Malaysia Pahang)

Central Composite Design Adoption for Assessing the TiO₂-POE Nanolubricant Dispersion Quality Using Response Surface Method

NCON-PGR_2022_019

11.15 – 11.30

M.S.N.A. Adhreena (Universiti Malaysia Pahang)

Water Temperature Monitoring by Using Fiber Bragg Grating Sensor

NCON-PGR_2022_030

11.30 - 11.45

Nurul Shuhada Mohamed (Universiti Malaysia Pahang)

Benzotriazole (BTA) as corrosion inhibitors encapsulated in the micro/nanocontainer for smart coating: A Review

NCON-PGR_2022_033

11.45 – 12.00

Nur Naajihah Ab Rahman (Universiti Malaysia Pahang)

System Identification for a Mathematical Model of DC Motor with PI Controller

NCON-PGR_2022_053

12.00 – 12.15

Muhammad Faez Mohamad Tajudin (Universiti Malaysia Pahang)

Microstructure Characteristic of Aluminium 6061 Semi-Solid Feedstock Billet Produced with Direct Thermal Method

NCON-PGR_2022_056

12.15 – 12.30

Nik Mohd Azrin Nik Aziz (Universiti Malaysia Pahang)

Stability Analysis of Multirotor Drone with Water Jet Payload

NCON-PGR_2022_057

12.30 – 12.45

Elnaz Yousefi (Universiti Malaysia Pahang)

Experimental Investigation of Temperature-Dependent Thermal Stability of Eicosane-Based Nano-Enhanced Phase Change Materials

NCON-PGR_2022_059

12.45 - 13.00

Nabilla Mohamad (Universiti Malaysia Pahang)

Fresh and Mechanical Properties of Concrete Containing Crushed Brick Waste as Partial Fine Aggregate Replacement

NCON-PGR_2022_071

PARALLEL SESSION 1

	<p>Track 5: Civil Engineering & Mechanical Engineering I</p> <p>Link: Track 5-Parallel 1: Civil Engineering & Mechanical Engineering I</p> <p>Chairperson: Professor Madya Dr. Azrina binti Abd Aziz</p> <p>Co-chairperson: Mohammad Ismail</p>
10.30 – 10.45	<p>Rashida Ferdaus (Universiti Malaysia Pahang)</p> <p>Application of Different Binders to Optimize the Characteristics of asphalt: A Review</p> <p>NCON-PGR_2022_200</p>
10.45 – 11.00	<p>Nur Shairah binti Zulkibri (Universiti Malaysia Pahang)</p> <p>Cost Evaluation for 12-Storey Reinforced Concrete Apartment Building in Sabah due to Seismic Design</p> <p>NCON-PGR_2022_012</p>
11.00 – 11.15	<p>Mohammad Al Biajawi (Universiti Malaysia Pahang)</p> <p>Impact of Recycled Coal Bottom Ash as Mixing Ingredient in Fresh and Mechanical properties of Concrete: A Review</p> <p>NCON-PGR_2022_013</p>
11.15 – 11.30	<p>Chia Min Ho (Universiti Malaysia Pahang)</p> <p>Prediction of Concrete Residual Compressive Strength under Elevated Temperatures: Response Surface Methodology (RSM) Approach</p> <p>NCON-PGR_2022_021</p>
11.30 – 11.45	<p>Md. Ikramul Hoque (Universiti Malaysia Pahang)</p> <p>Municipal Solid Waste Management in Khulna City Corporation, Bangladesh</p> <p>NCON-PGR_2022_058</p>
11.45 – 12.00	<p>Ng Cui Ming (Universiti Malaysia Pahang)</p> <p>The Effect of Mineral Bottle as Fine Aggregate for Manufacturing Sustainable Road Construction</p> <p>NCON-PGR_2022_068 (belum daftar & buat bayaran)</p>
12.00 – 12.15	<p>Siti Zun Nurain Mohd Ali (Universiti Malaysia Pahang)</p> <p>Study of Young Motorcyclists' Risk Behaviours Towards Road Crashes in Kuantan</p> <p>NCON-PGR_2022_070</p>
12.15 – 12.30	<p>Arjun Asogan (Universiti Malaysia Pahang)</p> <p>Factors that impact the efficiency of cream separator machine for the food industry</p> <p>NCON-PGR_2022_172</p>
12.30 - 12.45	<p>Niellambare Nadumaran (Universiti Malaysia Pahang)</p> <p>Validation Study of Microbubbles Characteristics and Formation in Venturi Channels via Computational Simulation</p> <p>NCON-PGR_2022_158</p>

PARALLEL SESSION 1	
	Track 6: Civil Engineering I Link: Track 6-Parallel 1: Civil Engineering I Chairperson: Dr. Rohana binti Hamzah Co-chairperson: Kamrul Hasan
10.30 – 10.45	Yu Xuan Liew (Universiti Malaysia Pahang) Impact of Micro POFA and Nano POFA in Cementitious Materials: A Review NCON-PGR_2022_022
10.45 – 11.00	Alaa Tanash (Universiti Malaysia Pahang) Rehabilitation of Fire-damaged Reinforced Concrete Members by Using Fiber-Reinforced Polymers and Ultra-High Fiber Reinforced Concrete: An Overview NCON-PGR_2022_034
11.00 – 11.15	Alaa Tanash (Universiti Malaysia Pahang) Effect of fire exposure on mechanical properties of normal strength concrete: An Overview NCON-PGR_2022_035
11.15 – 11.30	Xiaofeng Li (Universiti Malaysia Pahang) Durability Properties of Mortar Containing Steel Slag as Supplementary Cementitious Material NCON-PGR_2022_046
11.30 – 11.45	Hanis Nadiyah Ruslan (Universiti Malaysia Pahang) Study of Workability and Compressive Strength of Eggshell Concrete NCON-PGR_2022_073
11.45 – 12.00	Farah Amalina Ishak (Universiti Malaysia Pahang) The Synthetization of Activated Carbon from Electrocoagulated Palm Oil Mill Effluent Sludge for Wastewater Treatment NCON-PGR_2022_079
12.00 – 12.15	Mohd Hilmy Naim Mohd Yakin (Universiti Malaysia Pahang) 1D Peridynamics subjected to quasi-static load with Adaptive Dynamic Relaxation NCON-PGR_2022_080
12.15 – 12.30	Muhammad Syamsul Imran Zaini (Universiti Malaysia Pahang) Shear Strength of Soft Soil Reinforced with Singular Bottom Ash Column NCON-PGR_2022_081
12.30 - 12.45	Jeevithan Kirushna Moorthi (Universiti Malaysia Pahang) Effects of Concrete Debris and Bottom Ash Usage on the Improvement of Ballast Degradation NCON-PGR_2022_086

PARALLEL SESSION 1

	<p>Track 7: Electrical & Electronics Engineering I</p> <p>Link: Track 7-Parallel 1: Electrical & Electronics Engineering I</p> <p>Chairperson: Dr Izzeludin Ibrahim Mohamed Abdelaziz</p> <p>Co-chairperson: Abdelrahman Farook</p>
10.30 – 10.45	<p>Nur Diyana Rahim (Universiti Malaysia Pahang)</p> <p>PSO Tuned PI Controller for Multilevel Inverter Output Voltage Regulation</p> <p>NCON-PGR_2022_014</p>
10.45 – 11.00	<p>Mohammad Khurshed Alam (Universiti Malaysia Pahang)</p> <p>Moth Flame Optimization for Transmission Loss Minimization in Optimal Power Flow Using Renewable Energy</p> <p>NCON-PGR_2022_025</p>
11.00 – 11.15	<p>Anbananthan Pillai Munanday (Universiti Malaysia Pahang)</p> <p>Facial Recognition for Human Disposition Identification</p> <p>NCON-PGR_2022_038</p>
11.15 – 11.30	<p>Janandra Krishna Kishore Dokala (Universiti Malaysia Pahang)</p> <p>A Hybrid PEO Based Maximum Power Point Tracking Controller for PV System under Partial Shading Conditions</p> <p>NCON-PGR_2022_039</p>
11.30 – 11.45	<p>Nor Su'Aida Yusof (Universiti Malaysia Pahang)</p> <p>Review on Energy Management System in Microgrids</p> <p>NCON-PGR_2022_114</p>
11.45 – 12.00	<p>Mohd Iskandar Putra Azahar (Universiti Malaysia Pahang)</p> <p>Improving Pressure Valve Precision using Finite-time Prescribed Performance with Fractional-Order Proportional, Integral and Derivative Control</p> <p>NCON-PGR_2022_117</p>
12.00 – 12.15	<p>Nurul Najihah Zulkifli (Universiti Malaysia Pahang)</p> <p>Comparative Analysis of Model-free Tuning Techniques for Integral State Feedback Controller of A Liquid Slosh Suppression System</p> <p>NCON-PGR_2022_126</p>
12.15 – 12.30	<p>Norizam Sulaiman (Universiti Malaysia Pahang)</p> <p>EEG Mechanism Interaction to Evaluate Vehicle's Driver Microsleep</p> <p>NCON-PGR_2022_102</p>

PARALLEL SESSION 1

	<p>Track 8: Electrical & Electronics Engineering II</p> <p>Link: Track 8-Parallel 1: Electrical & Electronics Engineering II</p> <p>Chairperson: Dr. Rozlina Binti Mohamed</p> <p>Co-chairperson: Dawn Sivan</p>
10.30 – 10.45	<p>Muhammad Izzat (Universiti Malaysia Pahang)</p> <p>Evaluation of ABP and OTAA in IoT-Based Flood Monitoring and Warning System using LoRaWAN</p> <p>NCON-PGR_2022_076</p>
10.45 – 11.00	<p>Nurfahana Mustafa (Universiti Malaysia Pahang)</p> <p>Study on Effect of Barium Titanate Concentration in Epoxy Based Composite Towards Dielectric Material</p> <p>NCON-PGR_2022_083</p>
11.00 – 11.15	<p>Alyaa Afiqah Fauzi (Universiti Malaysia Pahang)</p> <p>Chlorophyll's Dependency towards Electrical Characteristics of Banana Midrib-Based Dye-Sensitized Solar Cell for Waste Management Solution</p> <p>NCON-PGR_2022_096</p>
11.15 – 11.30	<p>Renhao Mok (Universiti Malaysia Pahang)</p> <p>Power Production Optimization of Model-Free Wind Farm using Simulated Annealing algorithm</p> <p>NCON-PGR_2022_099</p>
11.30 – 11.45	<p>Farra Herliena Binti Md Zin (Universiti Malaysia Pahang)</p> <p>Investigation of Traffic Sign Image Classification for Self-Driving Car FYP</p>
11.45 – 12.00	<p>Norizam Sulaiman (Universiti Malaysia Pahang)</p> <p>Intelligent Patient Monitoring System to Analyze Patient Health Efficiently</p> <p>FYP</p>
12.00 – 12.15	<p>Muhammad Faisal Hashim (Universiti Malaysia Pahang)</p> <p>Analysis study of the carbon monoxide sensor system for conducting vehicle safety system</p> <p>NCON-PGR_2022_181</p>
12.15 – 12.30	<p>Nurin Athirah Mat Yamin (Universiti Malaysia Pahang)</p> <p>The analysis on IoT Edukit using Casier cloud platform based on Science, Technology, Engineering and Mathematics (STEM) training</p> <p>NCON-PGR_2022_184</p>
12.30 - 12.45	<p>Mohd Aufa Hadi Putera Zaini (Universiti Malaysia Pahang)</p> <p>Development of a Differential Magnetic Probe to evaluate Metal Loss due to Corrosion</p> <p>NCON-PGR_2022_055</p>

PARALLEL SESSION 1

	<p>Track 9: Business & Management</p> <p>Link: Track 9-Parallel 1: Business & Management</p> <p>Chairperson: Profesor Madya Dr. Puteri Fadzline binti Muhamad Tamyaz</p> <p>Co-chairperson: Rashida Ferdaus</p>
10.30 – 10.45	<p>Nor Ika Shahirah Ramli (Universiti Malaysia Pahang)</p> <p>Study of Employee Satisfaction Against Different Aspects: A Case Study of Manufacturing Industry (DRB-Hicom Sdn Bhd)</p> <p>NCON-PGR_2022_069</p>
10.45 – 11.00	<p>Zarifa Amira Zulkeflee (Universiti Malaysia Pahang)</p> <p>“I Have Adopted It, But I Failed”: The Critical Success Factors on Lean Management in Malaysian Public Sectors</p> <p>NCON-PGR_2022_008</p>
11.00 – 11.15	<p>Wafa Rashid Al Aliyani (Universiti Malaysia Pahang)</p> <p>A systematic review on identifying factors influencing Total Quality Management Implementation</p> <p>NCON-PGR_2022_201</p>
11.15 – 11.30	<p>N.E.Mat Nawati (Universiti Malaysia Pahang)</p> <p>Challenges in Managing Occupational Safety and Health for SMEs in The Construction Industry: A Review</p> <p>FYP</p>
11.30 – 11.45	<p>H.C.Hian (Universiti Malaysia Pahang)</p> <p>Emergency Response and Preparedness Assessment among Migrant Construction Workers</p> <p>FYP</p>

PARALLEL SESSION 1

	Track 10: Linguistic & Language Management / Humanities Sciences Link: Track 10-Parallel 1: Linguistic & Language Management / Humanities Sciences Chairperson: Dr. Umi Kalsom Masrom Co-chairperson: Nor Hazwani Binti Ahmad @ Shafei
10.30 – 10.45	Norhazwanie Jatin (Universiti Malaysia Pahang) Automated Writing Evaluation: Catering for Creativity NCON-PGR_2022_134
10.45 – 11.00	Mohd Khairi Razali (Universiti Malaysia Pahang) Questioning Strategy in Process Writing Approach: Evidence for Idea Extension in Introductory Paragraph NCON-PGR_2022_138
11.00 – 11.15	Roszalina Abdul Rahim (Universiti Malaysia Pahang) Insightful Gains from a Needs Analysis on Islamic Studies Practitioners' English Skills Essentials NCON-PGR_2022_165
11.15 – 11.30	Wan Alisa Hanis Wan Abdul Halim (Universiti Malaysia Pahang) The Influence of Common European Framework of Reference (CEFR) on a Malaysian language assessment NCON-PGR_2022_082
11.30 – 11.45	Brennen Joseph Sta Maria (Universiti Malaysia Pahang) The Utilisation of Digital Tools on ESL Learners' Creativity: A Systematic Literature Review NCON-PGR_2022_116
11.45 – 12.00	Fatima Lardhi (Universiti Malaysia Pahang) Phonetic Instruction in English Language Learning: Perceptions of Yemeni Elementary Students NCON-PGR_2022_118
12.00 – 12.15	Mohd Amir Izuddin Mohamad Ghazali (Universiti Malaysia Pahang) Examining ESL Pre-service Teachers' Perceived Roles and Perceived Responsibilities of Teaching Writing Skills NCON-PGR_2022_125
12.15 – 12.30	Sheikh Mohammad Maniruzzaman Al Masud (Universiti Malaysia Pahang) Re-evaluation of Foreign Workers' Placement and Repatriation Factors NCON-PGR_2022_003
12.30 – 12.45	Girthan A/L Morli (Universiti Malaysia Pahang) The Association between Psychosocial Factors and Musculoskeletal Symptoms among Construction Workers FYP

PARALLEL SESSION 1

	<p>Track 11: Material Sciences & Physical Sciences</p> <p>Link: Track 11-Parallel 1: Material Sciences & Physical Sciences</p> <p><u>Chairperson: Dr. Ali bin Turab</u></p> <p>Co-chairperson: Yasmin Amirah Che Yahaya</p> <p>Safriil Safriil (Universiti Malaysia Pahang)</p>
10.30 – 10.45	<p>The Tribology Evaluation on a Four-ball Tribometer Lubricated by Al₂O₃/PAG Nanolubricants</p> <p>NCON-PGR_2022_168</p>
10.45 – 11.00	<p>Muhammad Fikri (Universiti Malaysia Pahang)</p> <p>Design and Fabrication of Thermophoretic Soot Sampling Device</p> <p>NCON-PGR_2022_185 FYP</p>
11.00 – 11.15	<p>Norhaida Ab Razak (Universiti Malaysia Pahang)</p> <p>Fatigue cyclic hardening and softening of high-strength steel material</p> <p>NCON-PGR_2022_189</p>
11.15 – 11.30	<p>Firdaus Ismail (Universiti Malaysia Pahang)</p> <p>Phytoremediation and Bioremediation of Heavy Metal from Domestic Wastewater by Lepironia Articulata, Monochoria Vaginalis and Typha Angustifolia</p> <p>NCON-PGR_2022_202</p>
11.30 - 11.45	<p>Zaiton Ibrahim (Universiti Malaysia Pahang)</p> <p>Efficiency Of Mixed Activated Carbon Layer from Sugarcane Bagasse And Coconut Shell In A Biological Sand Filter For Peat Swamp Groundwater Treatment</p> <p>NCON-PGR_2022_207</p>
11.45 – 12.00	<p>Nor Hanuni Ramli (Universiti Malaysia Pahang)</p> <p>Decolorization of Synthetic Textile Wastewater by Adsorption onto Corn Stalk Activated Carbon</p> <p>FYP</p>
12.00 – 12.15	<p>Shing Wei Siew (Universiti Malaysia Pahang)</p> <p>Isolation of Proteus mirabilis from microwave treatment of medical waste</p> <p>NCON-PGR_2022_051</p>
12.15 – 12.30	<p>Nur Azmi (Universiti Malaysia Pahang)</p> <p>The Theories of Accident Causation Model Development</p> <p>NCON-PGR_2022_087</p>
12.30 – 12.45	<p>Zannat Urbi (Universiti Malaysia Pahang)</p> <p>Recent Advances In Pharmacotherapeutics Application Of Hyaluronic Acid: A Review</p> <p>NCON-PGR_2022_120</p>
12.45 – 13.00	<p>Rozina Abdul Rani (Universiti Malaysia Pahang)</p> <p>Uniform Formation of ZnO Nanorods in the y-axis Direction of the Glass Substrate via a Seed Layer Assisted Technique</p>

PARALLEL SESSION 2

	<p>Track 1: Chemical and Bioprocess Engineering III</p> <p>Link: Track 1-Parallel 3: Chemical and Bioprocess Engineering III</p> <p>Chairperson: Dr. Mazni binti Ismail</p> <p>Co-chairperson: Aiman Awadh Saleh Bin Mokaizh</p>
14.00 – 14.15	<p>Abdullah Nayeem (Universiti Malaysia Pahang)</p> <p>Waste Cooking Palm Oil as Sustainable Material for Polysulfide Synthesis: Characterization as a Crosslinker for Inverse Vulcanization</p> <p>NCON-PGR_2022_128</p>
14.15 – 14.30	<p>Nornasuha Abdullah (Universiti Malaysia Pahang)</p> <p>Facile Synthesis of Fibrous Zeolite Y with a Radial Wrinkle Structure</p> <p>NCON-PGR_2022_136</p>
14.30 – 14.45	<p>Motia Azmana (Universiti Malaysia Pahang)</p> <p>A Review on Transfersomes: Promising Carrier for Transdermal Drug Delivery</p> <p>NCON-PGR_2022_137</p>
14.45 – 15.00	<p>Ramzi Qasem (Universiti Malaysia Pahang)</p> <p>Polyvinylidene fluoride (PVDF) / Poly (ether sulfones) (PES) Blend Membrane CO₂/CH₄ for Gas Separation</p> <p>NCON-PGR_2022_140</p>
15.00 – 15.15	<p>Siti Zulaiha Zailani (Universiti Malaysia Pahang)</p> <p>FTIR Characterization of Polysaccharides of Pineapple Wastes Extracts</p> <p>NCON-PGR_2022_142</p>
15.15 – 15.30	<p>Nur Azizah Johari (Universiti Malaysia Pahang)</p> <p>Preliminary Study of COF-Based Mixed Matrix Membranes for Improved Antifouling Property</p>
15.30 – 15.45	<p>Nor Amirah Safiah Muhamad (Universiti Malaysia Pahang)</p> <p>Current research on the application of membrane distillation technology in industrial wastewater treatment-a review</p>
15.45 – 16.00	<p>Fatin Azira Abd Rahim (Universiti Malaysia Pahang)</p> <p>Microwave Torrefaction of Sawdust as Biomass Energy Source</p> <p>FYP</p>
16.00 – 16.15	<p>Nor Shafiqah Mohd Nasir (Universiti Malaysia Pahang)</p> <p>Synthesis and Characterization of Stearic Acid/Waste Filler Materials as Composite Phase Change Material in Thermal Energy Storage Application</p> <p>NCON-PGR_2022_016</p>

PARALLEL SESSION 2

Track 2: Chemical & Bioprocess Engineering IV

Link: [Track 2-Parallel 3: Chemical and Bioprocess Engineering IV](#)

Chairperson: Ts. Dr. Azizan bin Ramli

Co-chairperson: Muhammed Qasim

Aini Hashim (Universiti Malaysia Pahang)

14.00 – 14.15 Impact of Air-Dry Flowrate on Moisture Content and Chemical Constituents of Spray Dried Fish Oil

NCON-PGR_2022_144

14.15 – 14.30 Norliana Munir (Universiti Malaysia Pahang)

Enzymatic Analysis and Characterization of Fruit and Stem Bromelain from Two Varieties of Pineapple (*Ananas comosus*)

NCON-PGR_2022_150

14.30 – 14.45 Wan Amnin Wan Yahaya (Universiti Malaysia Pahang)

Mechanical Properties and Antioxidant Activity of Carrageenan-Cnf Film Incorporated With Butylated Hydroxyanisole (Bha) As Active Food Packaging

NCON-PGR_2022_155

14.45 – 15.00 Md. Belal Hossain Sikder (Universiti Malaysia Pahang)

Enzymatic Cellulose Nanocrystal (CNC) Production from Pretreated Palm Oil Empty Fruits Bunch Fiber

NCON-PGR_2022_163

15.00 – 15.15 Varun Geetha Mohan (Universiti Malaysia Pahang)

A Survey on Artificial Intelligence Techniques for Various Wastewater Treatment Processes

NCON-PGR_2022_169

15.15 – 15.30 Zulkifly Jemaat (Universiti Malaysia Pahang)

Recovery of Dodecanol from Alkyl Polyglycosides using Solvent Extraction

FYP

15.30 – 15.45 Farhana Sultana Toma (Universiti Malaysia Pahang)

Isolation and Characterization of Soda Lignin from OPEFB and Evaluation of its Performance as Wood Adhesive

FYP

Nur Aqilah Kamaludin (Universiti Malaysia Pahang)

15.45 – 16.00 Green Surfactants for Enhanced oil Recovery: A Review

FYP

PARALLEL SESSION 2

	<p>Track 3: Chemical & Bioprocess Engineering V</p> <p>Link: Track 3-Parallel 3: Chemical and Bioprocess Engineering V</p> <p>Chairperson: Ts. Dr. Ahmad Rosli bin Abdul Manaf</p> <p>Co-chairperson: Hasan Najafi Khaboshan</p>
14.00 – 14.15	<p>Tanisha Thanaseelan (Universiti Malaysia Pahang)</p> <p>Evaluation of Antioxidant and Anti-Tyrosinase Activities of Surfactant and Alcohol Extracted Combretum Indicum Leaves NCON-PGR_2022_196</p>
14.15 – 14.30	<p>Tanisha Thanaseelan (Universiti Malaysia Pahang)</p> <p>Formulation of Face Serum from Combretum Indicum Leaves Extract NCON-PGR_2022_197</p>
14.30 – 14.45	<p>Siti Nur Syazana Zakaria (Universiti Malaysia Pahang)</p> <p>Preliminary Study of COF-Based Mixed Matrix Membranes for Improved Antifouling Property</p>
14.45 – 15.00	<p>Adil Hussein (Universiti Malaysia Pahang)</p> <p>Study on a Potential of Microalgae Biomass Producing Biopolymer Material: A review</p> <p>NCON-PGR_2022_020</p>

PARALLEL SESSION 2

	<p>Track 4: Civil Engineering & Mechanical Engineering II</p> <p>Link: Track 4- Parallel 3: Civil Engineering & Mechanical Engineering II</p> <p>Chairperson: Profesor Ir. Ts. Dr. Kumaran A/L Kadirgama</p> <p>Co-chairperson: Siti Norsyahira binti Mohd Zahari</p> <p>Helen May Shian Lee (Universiti Malaysia Pahang)</p>
14.00 – 14.15	<p>Fabrication of Glass Microlens Array Using Laser-Assisted Contactless Hot Embossing</p> <p>NCON-PGR_2022_067</p>
14.15 – 14.30	<p>Akhil Vinayak (Universiti Malaysia Pahang)</p> <p>A Comprehensive Review on Different Path Planning Methods For Autonomous Vehicles</p> <p>NCON-PGR_2022_089</p>
14.30 – 14.45	<p>Mohamad Faizal Ridzwan (Universiti Malaysia Pahang)</p> <p>Numerical Analysis of Internal Flow in Internally Cooled Cutting Tool</p> <p>NCON-PGR_2022_098</p>
14.45 – 15.00	<p>Emilawati Othman (Universiti Malaysia Pahang)</p> <p>Investigation The Effect Of Different Fraction EG:H2O Composition And pH Of Base Fluid On The Stability Of TiO2 Nanofluid</p> <p>NCON-PGR_2022_100</p>
15.00 – 15.15	<p>Amiir Haamzah Mohamed Ismail (Universiti Malaysia Pahang)</p> <p>The Employment of Transfer Learning for Covid-19 Diagnostics: A Resnet Evaluation</p> <p>NCON-PGR_2022_111</p>
15.15 – 15.30	<p>Muhammad Aizzuddin Abdullah (Universiti Malaysia Pahang)</p> <p>Simulation of the Ground Heat Exchanger under Malaysian Environment Based on Different Thermal Conductivity of Soil and Pipe Materials</p> <p>NCON-PGR_2022_141</p>
15.30 – 15.45	<p>Ali Zainal-Abidin Mohamad Termizi (Universiti Malaysia Pahang)</p> <p>The Mixing of Solid Waste from Palm Acid Oil and Palm Kernel Cake as a Source of Animal Feed (Free Range Chicken)</p> <p>NCON-PGR_2022_192</p>
15.45 – 16.00	<p>Teoh Chee Shan (Universiti Malaysia Pahang)</p> <p>Biogeochemistry of Toxic Gas in The Aquatic Subsystem of Selected Peat Swamp Area in Kuala Pahang</p> <p>NCON-PGR_2022_204</p>
16.00 – 16.15	<p>Nur Anis Syazwani Huzairi (Universiti Malaysia Pahang)</p> <p>Seismic Performance of Three-Storey Bungalow under Different Time History Analysis</p> <p>FYP</p>
16.15 – 16.30	<p>Nur Nabila Syazwani Marsidi (Universiti Malaysia Pahang)</p> <p>Effect of Elevated Temperature of Hybrid Fiber Cement Mortar</p> <p>FYP</p>
16.30 – 16.45	<p>Siti Nur Syasya Samson (Universiti Malaysia Pahang)</p> <p>Seismic Analysis for Low-Rise Buildings Based on Different Types of Soil Consideration</p> <p>FYP</p>

PARALLEL SESSION 2

	<p>Track 5: Civil Engineering II</p> <p>Link: Track 5-Parallel 3: Civil Engineering II</p> <p>Chairperson: Professor Madya Dr. Azrina binti Abd Aziz</p> <p>Co-chairperson: Mohammad Ismail</p>
14.00 – 14.15	<p>Nicole Siaw Ing Liew (Universiti Malaysia Pahang)</p> <p>Influence of Aggregates Shape on Porous Asphalt Mixture</p> <p>NCON-PGR_2022_094</p>
14.15 – 14.30	<p>Shoaib Md Shahnewaz (Universiti Malaysia Pahang)</p> <p>The Modification of Fiber-Containing Porous Asphalt with Various Additives: A Review</p> <p>NCON-PGR_2022_127</p>
14.30 – 14.45	<p>Muhammad Azri Muhammed Nor (Universiti Malaysia Pahang)</p> <p>Reliability, Availability, Maintainability and Safety (RAMS) in Railway's Assurance System and Implementation Challenges: A Review</p> <p>NCON-PGR_2022_133</p>
14.45 – 15.00	<p>Siti Nor Umirah Binti Hamizan (Universiti Malaysia Pahang)</p> <p>Physical and Morphological Properties of Asphalt Binder Incorporating Polyethylene Fiber</p> <p>FYP</p>
14.45 – 15.00	<p>Nur Farah Aziera Jamaludin (Universiti Malaysia Pahang)</p> <p>Effect of Crushed Palm Oil Clinker as Partial Fine Aggregate Replacement on Mechanical Properties of Mortar</p> <p>NCON-PGR_2022_072</p>
15.00 – 15.15	<p>Muhammad Aimran Amzar Kamarudin (Universiti Malaysia Pahang)</p> <p>Seismic Assesment of Highrise Building with Different Number of Story</p> <p>NCON-PGR_2022_159</p>
15.15 – 15.30	<p>Kamrul Hasan (Universiti Malaysia Pahang)</p> <p>Experimental Study on Environment-Friendly Concrete Production Incorporating Palm Oil Clinker & Cockle Shell Powder as Cement Partial Replacement</p> <p>NCON-PGR_2022_186</p>
15.30 – 15.45	<p>Eng Hwai Ern (Universiti Malaysia Pahang)</p> <p>Elemental Characteristics of Particulate Matter (PM10 and PM2.5) From Peat Swamp Area In Kuala Pahang</p> <p>NCON-PGR_2022_188</p>
15.45 – 16.00	<p>Nurul Farah Anisa Hairolnizam (Universiti Malaysia Pahang)</p> <p>Potential of Biodegradable Compostable Eco-straw from Lepironia Articulata sp. (Purun/Kercut)</p> <p>NCON-PGR_2022_190</p>
16.00 – 16.15	<p>Muhammad Amirul Syafiq Nasarudin (Universiti Malaysia Pahang)</p> <p>The Mixing of Solid Waste from Palm Acid Oil (PAO) and Palm Kernel Cake (PKC) As A Source of Animal Feed (Broiler)</p> <p>NCON-PGR_2022_191</p>

PARALLEL SESSION 2

	Track 6: Material Sciences Link: Track 6-Parallel 3: Material Sciences Chairperson: Profesor Madya Dr. Puteri Fadzline binti Muhamad Tamyez Co-chairperson: Kamrul Hasan
14.00 – 14.15	Soon Poh Lee (Universiti Malaysia Pahang) Phenothiazine-functionalized rGO for Electrochemical Capacitor NCON-PGR_2022_023
14.15 – 14.30	Sharifah Aminah Tuan Said (Universiti Malaysia Pahang) In vitro Safety & Quality Analysis on Three Tongkat Ali Plants & their in vivo Elevation of Testosterone in Fowls NCON-PGR_2022_026
14.30 – 14.45	John Paul (Universiti Malaysia Pahang) Thermophysical characterization of paraffin/palmitic acid binary eutectic composite for thermal energy harvesting NCON-PGR_2022_043
14.45 – 15.00	Siti Nur Atikah Rosli (Universiti Malaysia Pahang) Comparison of Graphene Oxide Properties Synthesized by Electrochemical Exfoliation and Hummers' Method NCON-PGR_2022_061
15.00 – 15.15	Norfatihah Mazuki (Universiti Malaysia Pahang) Studies on the impedance spectroscopy and dielectric properties of ionic liquid (BmimCl) based hybrid gel polymer electrolytes. NCON-PGR_2022_063
15.15 – 15.30	Puhanes Murthy (Universiti Malaysia Pahang) The Optical and Structural of the Synthesised Cu Nanostructure using Hydrothermal Microwave-assisted Method NCON-PGR_2022_078
15.30 – 15.45	Siti Musa (Universiti Malaysia Pahang) Isolation of <i>Meyerozyma caribbica</i> , <i>Penicillium georgiense</i> , and <i>Pichia kudriavzevii</i> from Harumanis Mango (<i>Mangifera Indica</i> L.) NCON-PGR_2022_093
15.45 – 16.00	Md Shohan Parvez (Universiti Malaysia Pahang) Advances in Fabric-based Airbag Materials for Emerging Automobile Applications and Their Promising Future NCON-PGR_2022_105
16.15 – 16.30	Omama Javed (Universiti Malaysia Pahang) Effect of Graphene Oxide Loading on Cobalt Oxide Performance as Electrocatalyst for Methanol Oxidation Reaction NCON-PGR_2022_108
16.15 – 16.30	N.M. Khan (Universiti Malaysia Pahang) Superiority Of Gel Polymer Electrolytes as an Application in Lithium-Ion Batteries NCON-PGR_2022_123
16.30 – 16.45	Ahmad Faizrin Ahmad Fuzlin (Universiti Malaysia Pahang) Review on Provision of Solid-state Polymer Electrolytes for Electrochemical Energy Storage Devices NCON-PGR_2022_129
16.45 – 17.00	Nuraziliana Muhd Ghazali (Universiti Malaysia Pahang) Study of Electrical Properties of Alg-PVA-NH ₄ NO ₃ Complexed Polymer Electrolyte Films NCON-PGR_2022_130

PARALLEL SESSION 2

Track 7: Material Sciences & Mathematics

Link: [Track 7-Parallel 3: Material Sciences & Mathematics](#)

Chairperson: Dr Rohana Binti Hamzah

Co-chairperson: Abdelrahman Farook

Muhammad Fahmi (Universiti Malaysia Pahang)

14.00 – 14.15

Epidemiological Parameter Estimation of SIRD Model for COVID 19 Outbreak

NCON-PGR_2022_029

14.15 – 14.30

Mohd Syafiq Asyraf Suhaimi (Universiti Malaysia Pahang)

A Review on Predictive Model for Heart Disease Using Wearable Devices Datasets

NCON-PGR_2022_122

14.30 – 14.45

Noratikah Abu (Universiti Malaysia Pahang)

A Study of Online and Offline Shopping in Malaysia
FYP

14.45 – 15.00

Husna Izzati Osman (Universiti Malaysia Pahang)

The Convection of Unsteady Casson Fluid Over an Infinite Inclined Isothermal Plate

NCON-PGR_2022_151

15.00 – 15.15

Nor Azura Che Mahmud (Universiti Malaysia Pahang)

Factorial Screening on the Development of Cellulose Nanocrystal/ Multi-walled Carbon Nanotube Polyethersulfone Membrane for Humic Acid Rejection

NCON-PGR_2022_131

15.15 – 15.30

Afkar Rabbani Hidayatullah Bin Hipeni (Universiti Malaysia Pahang)

Variation of Nanocellulose Reinforced Recycle Paper: Effect on Tensile Strength

NCON-PGR_2022_139

15.30 – 15.45

Md. Ashraful Kader (Universiti Malaysia Pahang)

Applications of nanomaterials for biosensor fabrication based on redox enzyme and protein: A mini-review

NCON-PGR_2022_156

15.45 – 16.00

Gayathry Ganesh (Universiti Malaysia Pahang)

Degradation in Perovskite Solar Cells: A Comprehensive Review

NCON-PGR_2022_162

16.00 – 16.15

Abd Anasghaneem Abd Aziz (Universiti Malaysia Pahang)

Performance of Graphene as the Corrosion Inhibitor of Magnesium Alloy for Automotive Application

FYP

PARALLEL SESSION 2

	<p>Track 8: Computer Science Link: Track 8-Parallel 3: Computer Science Chairperson: Dr. Izzeludin Ibrahim Mohamed Abdulaziz Co-chairperson: Dawn Sivan</p>
14.00 – 14.15	<p>Saydul Akbar Murad (Universiti Malaysia Pahang) Prognosis of Crop Fertilizer in Maize Crop using Machine Learning NCON-PGR_2022_018</p>
14.15 – 14.30	<p>Mohammad Badal Ahmmed (Universiti Malaysia Pahang) A Population Division Based Multi-Task Optimization Algorithm for Solving Multiple-Team Formation Problem Based on Tiki-Taka Optimization Algorithm NCON-PGR_2022_027</p>
14.30 – 14.45	<p>Dawn Sivan (Universiti Malaysia Pahang) Speech Emotion Recognition Using Spectrogram Based Neural Structured Learning NCON-PGR_2022_060</p>
14.45 – 15.00	<p>Mohammad Badrul Alam Miah (Universiti Malaysia Pahang) KDA: An Unsupervised Approach for Analyzing Keyphrase Distance from News Articles as a Feature of Keyphrase Extraction NCON-PGR_2022_064</p>
15.00 – 15.15	<p>Ainie Hayati Noruzman (Universiti Malaysia Pahang) FURIA Stacking Ensemble for ASD Classification NCON-PGR_2022_092</p>
15.15 – 15.30	<p>Siti Hawa Apandi (Universiti Malaysia Pahang) A Model of Web Page Classification Using Convolutional Neural Network (CNN): A Tool to Prevent Internet Addiction</p>
15.30 – 15.45	<p>Md Munirul Hasan (Universiti Malaysia Pahang) An Overview of Effect of Activation Functions on Training and Performance of Artificial Neural Network Modelling NCON-PGR_2022_097</p>
15.45 – 16.00	<p>Ahmad Azwan Abdul Razak (Universiti Malaysia Pahang) Gradient-based Mutation Manta Ray Foraging Optimization (GbM-MRFO) for Solving Constrained Real-World Problems</p>
16.00 – 16.15	<p>Tanvir Ahmad (Universiti Malaysia Pahang) Cross Technology Communication (CTC) between DSRC/WAVE and TVWS: From Survey towards Framework NCON-PGR_2022_112</p>
16.15 – 16.30	<p>Suliman Abdulmalek Hamood Ahmed (Universiti Malaysia Pahang) Machine Learning Based Data Monitoring System for Chicken Poultry NCON-PGR_2022_121</p>

PARALLEL SESSION 2

	<p>Track 9: Computer Science & Data Science Link: Track 9-Parallel 3: Computer Science & Data Science Chairperson: Dr. Jamaludin bin Sallim Co-chairperson: Rashida Ferdaus</p>
14.00 – 14.15	<p>Muhammad Ezzuddeen Suratman (Universiti Malaysia Pahang) Investigation And Analysis of Deep Learning and Machine Learning Algorithm For Face Mask Detection System FYP</p>
14.15 – 14.30	<p>Ahmad Cucus (Universitas Bandar Lampung) Bibliometrical Analysis of Workers Quality on Crowdsourcing Based on Vos Viewer NCON-PGR_2022_001</p>
14.30 – 14.45	<p>Afrig Aminuddin (Universiti Malaysia Pahang) Convolutional Search for Image Authentication on Fragile Watermarking NCON-PGR_2022_167</p>
14.45 – 15.00	<p>Nur Aidil Jazmin Juhari (Universiti Malaysia Pahang) Fuzzy Logic Based MPPT Control for a Thermoelectric Generator System FYP</p>
15.00 – 15.15	<p>Bahirah Mohd Bashah (Universiti Malaysia Pahang) Classification of Cervical Cancer using Random Forest NCON-PGR_2022_032</p>
15.15 – 15.30	<p>Darren Dean Tay (Universiti Malaysia Pahang) Isolation and genome sequencing of Bacillus megaterium found from the gut sea cucumber (Holothuria leucospilota) NCON-PGR_2022_052</p>
15.30 – 15.45	<p>Nurul Habibah Abdul Rahman (Universiti Malaysia Pahang) A Review on Machine Learning Techniques used for Students' Performance Prediction NCON-PGR_2022_101</p>
15.45 – 16.00	<p>Siti Nur Syamimi Mat Zain (Universiti Malaysia Pahang) Customer Sentiment Analysis through Social Media Feedback - FYP</p>
16.00 – 16.15	<p>Siti Nur Avivah (Universiti Malaysia Pahang) Detecting Beef and Pork Adulteration using Principal Component Analysis NCON-PGR_2022_132</p>
16.15 – 16.30	<p>N.N.R.Roslan (Universiti Malaysia Pahang) Effect of Input Convergence Using Different Size of Input Data FYP</p>
16.30 – 16.45	<p>Siti Nur Fathin Najwa Binti Mustaffa (Universiti Malaysia Pahang) Improve the algorithm cyclomatic complexity for determining level of user story severity NCON-PGR_2022_161</p>

ABSTRACT

NCON-PGR_2022_001

Bibliometrical Analysis of Workers Quality on Crowdsourcing Based on Vos Viewer

Ahmad Cucus¹, Luhur B.A^{2}, Al-Fahim Bin Mubarak Ali³, Robby Yuli Endra⁴ and Yuthsi Aprlinda⁵*

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Abstract

Data collection activities are used for various needs in human life, such as business, education, health, transportation, and various other services. Data collection techniques through human assistance are also called crowdsourcing. Crowdsourcing is a distributed problem-solving mechanism that is available to the general public over the Internet. Crowdsourcing is one way to collect data and analyze data in big data. Some of the problems in collecting data from workers are as follows data received from workers have a high potential for noise because there has been no selection and validation on the quality of workers. However, it is not certain what factors can affect the quality of workers in crowdsourcing. This paper tries to explore the criteria that become the quality of workers in crowdsourcing activities by using Bibliometric Mapping by using tools such as VOS viewer.

Keywords: Crowdsourcing; VOSViewer; Worker quality.

Re-Evaluation of Foreign Workers' Placement and Repatriation Factors

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Abstract

Malaysia has witnessed an influx of foreign workers (FWs), mainly due to its rapidly expanding economy. However, Malaysian labour migration policies have remained a short-term solution to fill instant labour shortages since they were introduced. The current policy has weaknesses due to not successfully controlling FWs at all phases, including the placement and repatriation stages. The focus of policies on public safety—rather than on labour administration and long-term sustainable development—has left room for abuse of and restrictions on FWs by employers and agents. This study aimed to identify crucial factors related to FWs' placement and repatriation phases, and focused on SDG 08 due to the connection between detected factors and sustainability via decent work. It adopted a sequential exploratory mixed methods design, characterised by qualitative (in-depth interviews) and quantitative (face-to-face survey) data collection and analysis, respectively. The results highlighted the need to re-evaluate certain placement and repatriation factors for faultless placement and impeccable return of FWs. The findings of this study will help in redesigning FWs' placement and repatriation policies. Moreover, the results will also assist in reducing illegal/irregular FWs as well as mistreating of FWs inside Malaysia, and ensuring FWs' contribution to Malaysian society and the economy.

Keywords: Foreign workers; Placement factors; Repatriation factors; Reassessment; Sustainability

Development of Fiber Metal Laminate Composite with Different Glass Fiber GSM

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Abstract

The fiber metal laminates based on aluminum-lithium alloy (FMLs) and glass fiber sheets were investigated to improve the stiffness tolerance. The aluminum-lithium sheets were treated with different techniques for getting the desired thickness and strength. Then, FMLs 4/2 were prepared by the optimized process. The two different types of GSM (gram square meter) glass fiber sheets have been used for the development of FMLs, GSM of the sheet are 300 and 600. Floating roller and tensile strength tests were used to gauge the FMLs' mechanical qualities. The results showed that the T3 doping state was primarily responsible for strengthening the aluminum-lithium alloy. When compared to high GSM, however, FMLs showed a small gain in strength and a clear improvement in elastic modulus regardless of the fibres plies and sampling orientation. However, during various GSMs, FMLs show outstanding interlaminar characteristics despite their dissimilar densities. A new design of composite with a high GSM value was also confirmed to improve FMLs' tensile resistance. Microscopy and morphological analysis have been performed, and the findings provide insight into the rationale for the enhanced properties of fibre metal laminate composites. The epoxy-aluminum alloy sheet interface morphologies were then studied using SEM. In this investigation, apparent surface energy was found to have a major role in enhancing adhesive bonding at the fully wetted stage, while the value of roughness might significantly affect adhesion strength at the partially wetted condition.

Keywords: Fiber metal laminate; Composite Technology; Fiber orientation.

Sustenance Strategies for Lean Manufacturing Implementation in Malaysian Manufacturing Industries

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Abstract

This study aims to investigate the relationship between sustaining factors and lean manufacturing implementation. This survey-based study was a cross-sectional study and the samples were drawn by using cluster sampling procedure from medium and large manufacturing companies based on the Federation of Manufacturers Malaysia (FMM) with the final number of 151 respondents. In total, four hypotheses were developed and tested statically using PLS-SEM through SmartPLS software. The result provided evidence that lean culture, lean leadership, and lean knowledge management have a positive relationship on lean manufacturing implementation. However, lean supplier management does not have a positive relationship on lean manufacturing implementation. The survey was responded by middle and top-level management from the discrete manufacturing industries. Although there is growing interest in empirical shreds of evidence in favor of sustaining lean, this study provides a comprehensive view of sustaining factors for lean manufacturing implementation. Hence, this study contributes to expanding the boundary of the existing literature and contributes to the body of knowledge while providing insights to practitioners in tailoring strategies to sustain lean manufacturing implementation and leverage their performance.

Keywords: Lean manufacturing; Sustenance strategies; Malaysia; Resource-based view; Manufacturing excellence

“I Have Adopted it, but I Failed”: The Critical Success Factors of Lean Management Implementation Among Malaysian Public Sectors

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Abstract

This paper investigates the critical success factors for the implementation of lean management among the Malaysian public sectors as they are now consistently striving to improve their organizational performance. This cross-sectional quantitative study involved 131 public organisations that were selected through a stratified random sampling procedure. Data were analysed by using the structural equation modelling (SEM) approach with SmartPLS 4.0. Lean resources, lean culture, and lean knowledge management are found to be critical success factors for lean implementation among public sectors in Malaysia, while lean leadership is not. Theoretically, this study is expected to extend the boundaries of knowledge in operations management by looking into public sector organisations from the perspective of the resource-based view theory. As a result, practitioners and policymakers could gain insights to strategise the implementation of lean management to improve their overall organisational performance

Keywords: Critical success factors; Lean management; Malaysia public sectors.

Leakage Identification Based on Hydraulic Transient Analysis

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Abstract

Due to the ever-increasing degree of water loss, researchers and water utility corporations are becoming increasingly concerned about water leakage control. The purpose of this paper is to apply Empirical Mode Decomposition (EMD) and Synchrosqueezed Wavelet Transforms (SWT) as signal processing to locate leaks in pipelines. The objective of this study is related with to investigate leakage detection and signal processing methods, as well as to use them to detect and locate leaks. This paper explains how to run an experiment to visualize the most common types of leakage in a pipeline system. The experiment was set up that include a specific component of the piping system and leakage attached to it. This experimental test rig also attached with pressure sensor at the top of the solenoid valve. The piezoelectric pressure sensor is used in this experiment. The findings show that the method is superior to current signal processing methods for the conditions used. The recommendation is that research can be extended by running field test in order to observe the efficiency of the method used.

Keywords: Leak; Pressure transient; Hydraulic transient; EMD; Wavelet.

Integration of QRM and Ergonomics in the Design of a Framework in Identification Complaints among Automotive Assembly Line Workers

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Abstract

The assembly line is the most critical area of automotive manufacturing. The smoothness of the production process depends on the situation and conditions of the environment and its workers. The assembly process is done manually by using humans to install all the related components in the production line. Complaints felt by workers during the manufacturing process can hinder the smooth running of production in meeting capacity, thus affecting the company's performance. Therefore, the purpose of this study is to design a framework for identifying workers' complaints by using a combination of the Quick Response Manufacturing (QRM) and ergonomics. This framework is expected to identify grievances felt by workers from all aspects of the assembly environment that could potentially impact employment grievances. Framework design is created using the main concept of QRM which consists of time is money, tailoring your dynamics, focusing on the target market segment and thinking gold. Each of these concepts contains ergonomic elements such as workload variables and complaints of musculoskeletal disorders related to production schedules, production time, overtime, facility layout and equipment used. It is hoped that this framework can achieve the desired goal of minimizing work risk in optimizing the production process of the assembly line.

Keywords: Assembly Line; Assessment; Ergonomic; Framework; QRM.

Cost Evaluation for 12-Storey Reinforced Concrete Apartment Building in Sabah due to Seismic Design

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Abstract

In June 2015, Ranau stated earthquake of moment magnitude M_w 6.1 which cause a lot of damage to buildings. Therefore, seismic design input should be applied for new buildings to minimize damage. This work investigates the influence of seismic design on structural works cost. A 12 storey apartment reinforced concrete apartment has been used as a model for the project. In this research, soil type D and 3 levels of seismicity were used as design variables. The reference peak ground acceleration, α_{gR} used were 0.08g, 0.12g and 0.16g. The results indicate that models with seismic design have greater structural costs, increasing 3.4% to 19.1%.

Keywords: Cost; Estimation; Seismic Design; Eurocode 8; Structural Work.

Impact of Recycled Coal Bottom Ash as Mixing Ingredient on Fresh and Mechanical properties of Concrete: A Review

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Abstract

Concrete is one of the most demanding building materials in the world. However, the escalating need for concrete in the continuing construction industries all over the globe necessitates the increased extraction of raw materials from the main resources such as rock, sand, etc., which contributes more to the devastation of the natural environment. Awareness that this action has a negative effect on plants and animals as well as people, a technique of using by-products from the industry as partial replacements in mixing ingredients of concrete would decrease the use of main resources and make the environment more sustainable. Coal Bottom Ash (CBA) is a by-product of the coal industry generated in thermal power plants. The large amount of CBA waste generated annually from thermal power plants and its improper landfilling have caused serious environmental problems due to the harmful effects of the wastes on the environment and human health. Meanwhile, the use of the main resources as mixing components for concrete production continues to increase. As the use of CBA as a mixing ingredient in concrete materials is the best solution to reduce the dependence on main raw materials or perhaps to reduce the environmental concerns involved with landfilling. The aim of this review to summarize the previous findings on utilization of CBA as replacement materials in concrete production. Also, this research discusses the influence of CBA in the fresh and mechanical properties of concrete. This review paper is intended to help beginners understand the scope and evolution of the use of CBA as a component in concrete production. Overall, using CBA in the appropriate proportions is able to increase the fresh and mechanical properties of concrete. However, further research is needed to investigate the possibility of using CBA in large quantities to produce high performance and durable concrete.

Keywords: Coal bottom ash; Fresh properties; Mechanical properties; Mixing ingredient; Concrete; Replacement materials.

PSO Tuning PI Controller for Multilevel Inverter Output Voltage Regulation

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Abstract

In recent decades, renewable energy production has been an underlying trend in the energy sector. Multilevel inverter has been used especially in renewable energy aspects in order to assess Total Harmonics Distortion (THD). Multilevel inverters have shown superior performance in terms of reducing harmonic disturbances, torque pulsations, and voltage stress through switching devices. Conventionally, PI controller are preferable to be applied in multilevel inverter due to its simplicity. However, it has a limitation of optimization when it comes to increase of loads under working condition. This paper focuses on developing a Particle Swarm Optimization (PSO) algorithm for optimal tuning of PI controller for Cascaded H-Bridge Multilevel Inverter (CHMI) in order to regulate a smooth output voltage of the system. PSO controller is implemented to produce an optimum regulated output voltage using MATLAB/Simulink. The system will go under three load variation conditions. The PSO-PI controller have been applied to a 7-level CHMI that uses 12 IGBTs with 20kHz switching frequency and 0.9 modulation index with 0.4 μ s of sample time. As compared PSO-PI to conventional PI controller during nominal load, 20 % reduction in THD is observed. In addition, voltage drop and transient time during no load to full load shows an improvement after applying PSO-PI. During load variation was halved and varied at certain point, PSO-PI also exhibit improvement in transient time and reduction in THD is observed compared to conventional PI controller.

Keywords: Multilevel inverter; Particle swarm optimization; Voltage regulation.

Parameter Influence on the Tensile Properties of FDM Printed PLA/ Coconut Wood

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Abstract

Due to its adaptability in allowing for individualized production, 3D printing technology has quickly become a viable option in the fabrication of parts. Recent years have seen a plethora of research devoted to enhancing the quality of 3D printed components. However, the performance of the printed part depends heavily on the correct selection of process parameters for Fused deposition modeling (FDM), making it a significant task. Therefore, studying how different process parameters affect the final product's quality characteristics is essential. So, it's helpful if a good option for customizing the mechanical properties of 3D-printed components. This study aims to determine how factors affect the tensile properties of a composite made from PLA and coconut wood. The material in the form of a filament, such as thermoplastic polymers, was used. Coconut wood has been prized for centuries for its durability, beauty, and ecological friendliness. This research aims to create and compare the tensile properties of specimens featuring different infill patterns (concentric, cubic, gyroid, and triangle) and infill percentages (25%, 50%, 75%). Ultimate tensile strength of 37.21 MPa and elastic modulus of 1.12 GPa were achieved with the concentric infill pattern at 75% infill

Keywords: Fused deposition modeling; Tensile properties; PLA; Coconut wood; Infill density.

Synthesis and Characterization of Stearic Acid/Waste Filler Materials as Composite Phase Change Material in Thermal Energy Storage Application

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Abstract

This paper investigates the potential of waste materials, i.e. recycled aluminum cans and carbon biochar (carbon BC) wastes as fillers in stearic acid as PCM supporting matrix material. Using recycled aluminum powder (recycled Al powder) and carbon BC, a new invention of composites phase change material (C-PCM) was established. These C-PCM, which has been incorporated with different waste fillers, were prepared at different waste mass loading and further characterized using scanning electron microscope (SEM), Fourier infrared spectroscopy (FTIR), differential scanning calorimetry (DSC), pycnometer density analysis, and thermal thermogravimetric analysis (TGA). The result showed that both C-PCM were uniformly dispersed into stearic acid (SA) and portrayed a good contact surface area. The C-PCM with recycled Al powder filler results in higher melting and freezing latent heat than C-PCM with carbon BC filler. Thermal cycle test analysis of selected C-PCM exhibited good thermal stability, reliability, and effective latent heat storage. From the thermal evaluation test, the storage performance of C-PCM was found to perform better compared to lone SA as PCM (SA-PCM). Despite having low latent heat compared to lone PCM, the addition of waste materials into SA has increased C-PCM's thermal stability. Al/SA C-PCM is identified as the most effective TES medium since it gives the best thermal stability and latent heat values.

Keywords: Waste material filler; Recycled aluminum can; Carbon biochar; Phase change material composite; Thermal energy storage.



NCON-PGR_2022_017

Autonomous Driving Threat Assessment for Multiple Vehicle Collisions on Mixed Traffic Stream

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Abstract

Autonomous vehicles will become part of the existing traffic mix of traditional vehicles in the initial integrative phase. An excellent threat assessment framework always calculates the criticality of the situation and helps ensure the driving safety of autonomous vehicles. the basis for optimal policies. Unanticipated and abrupt lane changes need to be highly severe which are not exist in most current research projects. This type of accident usually leads to multiple accidents and in traditional transport systems, this type of crash severity is very high. We present a novel approach to risk assessment that enables the actions of autonomous vehicles to be monitored. This real-time risk assessment integrally considers conflict with uncertainty as well as accident severity forecasts.

Keywords: Multiple vehicle collision avoidance; Threat assessment; Autonomous driving.

Prognosis of Crop Fertilizer in Maize Crop using Machine Learning

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Abstract

Application of a reasonable number of fertilizers is one of the most significant agronomic implementations to sustain the production of the crop on soils that are mainly acidic and low in nutrients in the tropical regions. Formerly, various statistical or computational techniques were adopted by researchers for the prediction of fertilizer. One of the critical issues in the agriculture industry is lack of an accurate way of identifying the appropriate fertilizer for crops. Since the effect of fertilizer tightly coupled with crop yields, so it impacts harvest of crops. Aiming to enhance yielding of crops, this study presents a system to recommend suitable fertilizers based on soil parameters for maize plant. The prediction model is built with logistic regression machine learning algorithm. For this model, the basic soil nutrient amount is taken as the inputs and fertilizer recommended is considered as the output. By analyzing the result, the value computed for the model produce high accuracy. The logistic regression developed explained 97% prediction from input parameters. The relevance of this study lies with the fact that the findings of the study would form the foundation for the use of other machine learning techniques in agriculture.

Keywords: Machine learning; Logistic regression; Fertilizer; Soil parameters.

Central Composite Design Adoption for Assessing the TiO₂-POE Nanolubricant Dispersion Quality Using Response Surface Method

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Abstract

Stability is a major issue in every nanolubricant. The UV visible spectrophotometry approach is one method for assessing the dispersion quality standard of a nanolubricant. UV visible spectrophotometry is adopted to determine the absorbance level of a nanolubricant. This method assesses how well a nanolubricant absorbs UV rays emitted by a light source. A central composite design based on surface response was used to assess the influence of concentration and standing time on the absorbance ratio of TiO₂-POE nanolubricant. The TiO₂-POE sample was synthesized in two steps with a 0.02-0.2 vol% concentration range. A homogenizer was used to ultrasonicate the samples for 80 min. Then, U.V. visible spectrophotometry was used to examine the absorbance ratio of each sample from day 1 to day 15. Sixteen runs were performed to comply with a quadratic design for experimental data collection, then fitted using face center alpha. The ANOVA analysis revealed that the experimental data fit the polynomial model, with an R² value of 0.9902 and a model F-value of 201.91. This phenomenon confirms the significance of the model. The Predicted R² of 0.9038 agrees reasonably with the Adjusted R² of 0.9853. The findings suggest that the optimum concentration is 0.11 vol%, with an absorbance value of 0.990206 and a desirability level of 1.000.

Keywords: UV Vis; TiO₂-POE nanolubricant; Response surface method; Dispersion quality; Stability.

Study on a Potential of Microalgae Biomass Producing Biopolymer Material: A Review

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Abstract

Researchers, scientists, and engineers are interested in studying microalgae because of their high biotechnological potential for sustainable renewable energy and as a source of biofuels, biopolymers, electrical power generation, and pharmaceutical and cosmetic resources. Algae microorganisms grow in ponds, lakes, and rivers, as well as in custom-designed vessels/tubes known as photo-bioreactors, where they produce biomass, organic matter, and can be used as a sustainable fuel resource. Microalgae has been identified as a green energy resource capable of mitigating greenhouse gas (GHG) emissions, primarily CO₂ gas, and is regarded as a promising approach to addressing Global Warming issues and climate change. On the other hand, global co-products from fossil resources, such as plastic waste petroleum base, are increasing dramatically and causing global environmental pollution. There is a great deal of interest in developing a technology to address the global incremental petroleum-based plastic products, which are currently difficult to control. Microalgae is a promising and new technology that has the potential to be improved further to produce biodegradable plastic and polymers that will be as sustainable and alternative sources to fossil-based plastic in the market share. The research focuses on bioplastic technology derived from microalgae spies and emphasizes an accurate and in-depth understanding of the process and application areas.

Keywords: Microalgal biomass; Biofuels; Biopolymer; Biodegradable plastic; Algae photo-bioreactor.

Prediction of Concrete Residual Compressive Strength under Elevated Temperatures: Response Surface Methodology (RSM) Approach

C. M. Ho, S. I. Doh, S. C. Chin and X. Li*

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Abstract

Exposure of concrete to elevated temperatures causes irreversible damage to the concrete structure and poses a serious threat to the service life of the concrete. Owing to the importance of concrete fire performance, many researchers have extensively studied the behavior of concrete under elevated temperatures with different conditions. The properties of concrete have been significantly affected by the distinct heating and cooling conditions, which include heating temperatures, heating durations, and cooling methods. The residual compressive strength of concrete is considered the most important characteristic after being exposed to elevated temperatures. In this paper, the present work targets to develop the mathematical models for analyzing and predicting the residual compressive strength of concrete at high temperature. Three independent factors were identified in this study, which are heating temperatures, heating duration, and cooling method. Two groups of datasets on the residual compressive strength of concrete under elevated temperatures were reviewed and collected from previous studies and were set as the benchmark dataset and validate dataset, respectively. Response Surface Methodology (RSM) was used to analyze the dataset. The results of various statistical parameters, such as coefficient of determination, sum of square, F-value, and P-value, indicate the significance of predicted model for predicting concrete residual compressive strength under elevated temperatures. From the RSM analysis, the factor of heating temperatures has the most significant effect on the residual compressive strength of concrete. In short, RSM model correlates well with those validate dataset with a coefficient of determination (R^2) of 0.8547

Keywords: Concrete; Elevated temperature; Prediction; Residual compressive strength; RSM.

Impact of Micro POFA and Nano POFA in Cementitious Material: A Review

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Abstract

The utilization of palm oil fuel ash as cement replacement in concrete and mortar mix design could be a solution for reducing the demand for cement. However, according to previous investigations palm ash-based concrete and mortar had lower fresh properties and hardened properties than usual concrete. Thus, modification of the ash's particle sizes, as well as the mix design, was made and eventually nano palm ash was introduced into the mix design. This review article provides a detailed examination of the impact of particle size; micro and nano palm ash in concrete and mortar mix design to explore the potential of nano palm ash in future work. A detailed comparison between micro and nano palm ash in terms of ash particle characteristics, mix design, fresh properties and hardened properties are presented. Nano palm ash possesses lower unburnt carbon, higher silica content and smaller particle size than the micro palm ash. This led to the improvement in the nano palm ash-based concrete's fresh properties and the early age-hardened properties of concrete. Overall, the purpose of this review article is to provide a detailed understanding of the impact of micro and nano palm ash in cementitious materials.

Keywords: Comparison; Impact; Micro POFA; Nano POFA; Palm oil fuel ash.

Phenothiazine-functionalized rGO for Electrochemical Capacitor

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Abstract

The functionalization arose as a technique to improve the physicochemical properties of the reduced graphene oxide (rGO) and consequently enhance the supercapacitor performance. The functionalization compound, phenothiazine (PTZ) introduces nitrogen and sulfur heteroatoms into rGO *via* the one-pot hydrothermal method. Incorporation of PTZ on the rGO sheets in PTZ-rGO 5 contributes to the high surface area (163.49 m² g⁻¹) and pore volume (0.3187 cm³ g⁻¹) properties. Contradictory, overloaded PTZ not only shows a lower reduction effect but also reduces the amount of PTZ functionalized in the PTZ-rGO and consequently shows lower electrochemical performance. The excellent properties enable PTZ-rGO 5 enable it to achieve 119.5 F g⁻¹ at 0.5 A g⁻¹ for its specific capacitance and drive it to be the promising electrode material for supercapacitors.

Keywords: Freeze-drying; Surface modification; EDLC; Pseudocapacitive; Redox activity.

Moth Flame Optimization for Transmission loss Minimization in Optimal Power Flow Using Renewable Energy

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Abstract

The reduction of line losses due to current heating is known as loss minimization in optimal power flow (OPF). This is accomplished by selecting and enhancing an existing power solution from the system's past cost reduction. This paper offers a collection of methods for assessing congested power networks to achieve the lowest operating cost with the fewest line losses. The approaches are computer-simulated in MATLAB, and convergence is reached at ranges. As a result, the focus of this research is on designing appropriate OPF algorithms to address the 'congestion management quandary.' To evaluate the efficacy of the suggested method, simulations are run on the IEEE 57-bus system. For network security, transmission line capacity and bus voltage restrictions, as well as generator capacities and limited working zones for thermal devices, are all considered. Moth Flame Optimization (MFO) outperforms other stochastic algorithms in terms of solution quality and practicality, indicating its use and expertise. The results are promising, indicating that the MFO is a highly successful optimization tool for dealing with a wide range of OPF problems.

Keywords: Economic load dispatch; Valve point loading; Prohibited zone; Line losses; Grey wolf optimization.

In Vitro Safety & Quality Analysis on Three Tongkat Ali Plants & In Vivo Elevation of Testosterone in Fowls

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Abstract

Eurycoma longifolia (EL), *Polyathia bullata* (PB), and *Stema tuberosa* (ST) are three species of plants sharing the synonym of "Tongkat Ali" and commonly known as Tongkat Ali Putih, Tongkat Ali Hitam, and Tongkat Ali Merah, respectively. The roots of the plants were encapsulated and given to fowls. Before being tested on animals, the capsules' content was analyzed on a few safety and quality parameters, i.e., pH and moisture tests, heavy metal content, microbial load, and steroid presence. 12 mg of each Tongkat Ali powder included in a capsule was given to fowls for 30 days. The outcome showed an increase in testosterone in fowls with the highest value of 9.73 ± 1.20 nmol/L obtained by PB, followed by EL and ST, 7.70 ± 0.59 nmol/L, and 6.25 ± 0.70 nmol/L, respectively. The Tongkat Ali plants were concluded to be safe in vitro and able to boost the male hormone in vivo.

Keywords: Tongkat ali; Aphrodisiac; Testosterone; Fowls.

A Population Division Based Multi-Task Optimization Algorithm for Solving Multiple-Team Formation Problem Based on Tiki-Taka Optimization Algorithm

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Abstract

The Team Formation Problem (TFP) has recently gained popularity in Operation Research (OR). The challenge of finding the lowest or maximum values from a massive pool of solutions is called optimization. Often, meta-heuristic algorithms are chosen to solve optimization issues because they are fast and use few resources. Recent literature research has focused on a new optimization issue termed multi-task optimization (MTO). This article updates our ongoing efforts to address the MTO issue. Specifically, our research examines the use of Tiki-Taka, a football-inspired meta-heuristic algorithm, to solve the MTO issue by adopting a partitioned population method. We use UMP Experts dataset as a case study to optimize team connection costs. Our study proved that TTA could solve MTO Team Formation Problem effectively.

Keywords: Optimization; Meta-heuristic algorithm; Team formation problem (TFP); Multi-task optimization (MTO).

REE-Ion Adsorption Clay Type Deposit Characteristics in Kuantan's Weathered Granite Profiles

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Abstract

Kuantan district, Pahang is part of The Eastern Belt Granite of Peninsular Malaysia consist mainly of I-type granites. Three weathered granite profiles from Kuantan, were sampled and analyzed for their mineralogy and rare earth elements (REEs) characteristics. The I-type parent granites of Kuantan consist of quartz (29- 35 %), K-feldspar (23-30 %), plagioclase (18-28%), biotite (10%), hornblende (5-8 %) and 0.6-1.4 % accessory minerals (zircon, apatite, monazite-(Ce) and chlorite) respectively. The granite weathering profiles have been divided into three main horizons with increasing depth above the parent granite: 1) saprock horizon (slightly weathered); 2) saprolite horizon (highly weathered) and 3) topsoil (completely weathered with rich organic matters). The concentrations of REEs in the weathering profiles considered to be economic for ion adsorption clay type deposits with rule of thumb >500 ppm in 1 g of sample. In order to produce an exploration model for REEs in Peninsula Malaysia, the formation process of the different weathering horizons was investigated, and the REEs concentrations has been identified. All the soil samples show prominent positive Ce anomalies with lower REEs contents (64 – 107 ppm). In contrast, the saprolite horizon is a leached zone characterized by a negative Ce anomaly and elevated REEs contents. The negative Ce anomaly and REEs enrichment in the saprolite layer indicates immobilization of REE³⁺ by adsorption and distribution into secondary REEs minerals with REEs distribution agent such as clay minerals. The ion-adsorption (leached) fraction was enriched in light rare earth elements (LREE) with accounted for 80–90 % of the total REE content in the investigated saprolite and saprock samples

Keywords: Ce Anomaly; Ion adsorption clay; I-type weathering granites; Rare earth elements.

Epidemiological Parameter Estimation of SIRD Model for COVID-19 Outbreak

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Abstract

COVID-19 is a highly transmissible epidemic that has impacted worldwide. It became important to study the transmission pattern and forecast the changes in the pandemic curve with the implementation of non-pharmaceutical interventions (NPIs). Epidemiological parameters of the Susceptible-Infected-Removed (SIR) model are widely used in explaining the characteristics and behavior of the disease spreading. The epidemiological parameter of the model changes throughout the epidemic due to external factors such as NPIs enforcement, public reactions to the control measures, and improvements in healthcare facilities. This paper is devoted to the parameter estimation of the SIRD model using the Markov Chain Monte Carlo (MCMC) method of the Metropolis Hasting algorithm. The data from Malaysia, Thailand, and Indonesia are used and the dynamic behavior of the COVID-19 outbreak in these three countries is simulated. The results show the parameter changing due to the NPI enforced influencing the trend of the pandemic curve.

Keywords: COVID-19; MCMC; Deterministic SIRD; SRK4; Parameter estimation.

Water Temperature Monitoring by using Fiber Bragg Grating Sensor

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Abstract

Fiber Bragg grating (FBG) sensors have been widely utilized as a sensor for measuring strain, temperature, and vibration measurements. In this study, an optical FBG sensor system was developed to monitor the temperature fluctuation in water. The sensor was delicately packaged in order to eliminate the influence of strain acting on the sensor. The sensor had been submerged in iced water and the temperature was constantly increased by using an electric immersion heater. The experimental data were obtained to determine the temperature sensitivity of the FBG sensor. It is found that the relationship between the changes in temperature and changes in Bragg wavelength is virtually higher in linearity with $R^2 = 0.9997$ and has superior sensitivity which is $10.1 \text{ pm}/^\circ\text{C}$. This finding proves that the FBG sensor could be a good candidate for temperature sensing devices.

Keywords: Fiber Bragg grating; Temperature sensor; Water temperature monitoring.

Classification of Cervical Cancer using Random Forest

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Abstract

Cervical cancer is the second most common cancer among Malaysian women between 15 to 44 although the morbidity and the mortality of cervical cancer have been decreasing in recent years. Developing supervised models for cervical cancer is a challenging task. By gleaning deeper insights from the data, data mining knowledge has capability to learn from data, identify the patterns with meaningful in that they lead to some advantages in many real-world applications. In this research, the cervical cancer risk classification model was used by using data mining approach which consider Decision Tree and Random Forest algorithm. These two models have been implemented by using JupyterLab on the UCI datasets. Model evaluation has been conducted to identify the robust data mining algorithm in the prediction of cervical cancer risk. The model gives 67% for the precision and 95% of accuracy. However, decision tree is the best method compared to Random Forest since Random Forest has the lowest AUC which indicated that it is the worse model. To improve this study, other method such as Artificial Neural Network, Support Vector Machine or ensemble classifiers can be applied to the dataset to see if there is a better model to predict cervical cancer.

Keywords: Cervical cancer; Data mining; Classification; Random forest.

Benzotriazole (BTA) as Corrosion Inhibitors Encapsulated in the Micro/ Nanocontainer for Smart Coating: A Review

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Abstract

The development of functional smart coating with the ability for active anti-corrosion and self-healing are significant for long term performance of numerous engineering application. Smart coating is a multifunctional coating containing self-healing chemical and corrosion inhibitor incorporated into the coating, allowing the metallic structure to recover from any damages. The most important aspect in developing smart coating is creating micro/nano-container that are compactible to encapsulate and sustain the active substance by having permeability shell that can respond to the external stimuli. Benzotriazole (BTA) has been extensively studied as corrosion inhibitor to regulate of iron, steel, copper, nickel, aluminum, and zinc by the formation of a protective surface film. This review presents the fabrication technique of the BTA loaded micro/nano-container, characterization of the chemical structure and evaluation of the corrosion performance.

Keywords: Smart coating; Corrosion inhibitor; Benzotriazole; Nano-container; Corrosion

Rehabilitation of Fire-Damaged Reinforced Concrete Members by using Fiber-Reinforced Polymers and Ultra-High Fiber Reinforced Concrete: An Overview

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Abstract

Concrete is one of the most commonly used building materials because it has many advantageous mechanical properties. These properties include high compressive strength, durability, hardness, workability, and fire resistance. On the other hand, the mechanical properties of concrete deteriorate when it has been exposed to fire for a long period of time. The repair and rehabilitation of existing concrete buildings that have suffered damage are one of the most important construction projects currently underway in various parts of the world. This paper provides an overview of the ultra-high performance fibre reinforced concrete (UHPFRC) and fibre-reinforced polymers (FRP) to repair materials for concrete structures, focusing on the area of fire-damaged concrete structures. It has been shown that fibre-reinforced polymers (FRP) can effectively increase the load-bearing capacity and ductility of repaired concrete members. In addition, it was found that carbon fibre reinforced concrete (CFRP) was more efficient than glass fibre reinforced concrete (GFRP) in terms of strength and ductility enhancement. The UHPFRC has a high modulus of elasticity and long service life. It has excellent rehabilitation results in terms of increasing compressive and flexural strength. During rehabilitation, it is recommended to prepare the saturated dry (SSD) concrete surface by sandblasting to achieve the highest bond strength.

Keywords: Fire damage concrete; Rehabilitation method; Fibre-reinforced polymers; Ultra-high-performance fibre reinforced concrete.

Effect of Fire Exposure on Mechanical Properties of Normal Strength Concrete: An Overview

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Abstract

Concrete is widely utilized as a construction material owing to its desirable mechanical properties, which include high compressive strength, durability, hardness, workability, and fire resistance. In addition, concrete is often utilized as a structural element in buildings where fire resistance is one of the main design concerns. Nevertheless, the prolonged vulnerability of concrete to fire resulted in the deterioration of its mechanical properties. This represents a significant vulnerability for concrete structures. Therefore, researchers need to pay more attention to the issue. In addition, the thermal and mechanical properties of concrete affect fire behavior of concrete. These characteristics fluctuate substantially with temperature and rely on the constitution and properties of the concrete mixture, as well as the temperature range and further external factors. The aim of this paper is to lay out an overview of the impact of fire exposure on the mechanical properties of concrete and to identify specific areas that could be investigated by further researchers. A review of the data revealed that the mechanical properties of normal concrete go through three main phases. Strength increases slightly in the first phase (20°C-300°C), decreases sharply in the second phase (300°C-800°C), and is lost in the third phase (above 800°C). In addition, the type of aggregate, moisture content, concrete grade, heating rate, heating duration, and additives were found to strongly influence the fire resistance of concrete. Optimal use of admixtures improves the fire behavior of concrete through pozzolanic reaction.

Keywords: Fire Damage concrete; Mechanical properties; Porosity; High temperature; Elevated temperature.

Influence of Photobioreactor on Cultivation of *Tetraselmis* Sp. under Various Colors and Light Intensities for Biodiesel Production

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Abstract

In microalgae cultivation, artificial light sources have impactful influences on their growth pattern. The biomass production rate, lipid and pigment accumulation, fatty acid profile is observed in microalgae under various color of lights. Artificial lighting will enhance not just production but also the costs related with microalgae cultivation. Therefore, microalgae *Tetraselmis sp.* was cultivated in 20 L photobioreactor under different color (Blue= 490 nm, Green= 560 nm, Red= 635 nm) with different light intensities (120, 240 and 480 $\mu\text{mol photon m}^{-2}\text{s}^{-1}$) at $24\pm 2^\circ\text{C}$ for 15 days to determine the specific light absorption rate. The highest biomass 42.34 mg/L and lipid $35\pm 2\%$ was obtained under blue light with 240 $\mu\text{mol photon m}^{-2}\text{s}^{-1}$ light intensity as compared to other lights. Palmitic acid and Stearic acids were dominant fatty acids which found from the lipid analysis. The observation proves that there is a compelling association between light colors, intensity, and the growth of microalgae.

Keywords: Biodiesel; Light intensity; Photobioreactor; Lipid; Photosynthesis.

Facial Recognition for Human Disposition Identification

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Abstract

Autonomous human facial disposition identification is beneficial in the majority of applications, including healthcare, customer satisfaction, criminal investigation and Human-Robot Interaction (HRI). Deep learning techniques able to classify human expressions into emotion categories via Convolutional Neural Network (CNN), which is well known example of deep learning concepts in maintaining accuracy. CNN can be trained to analyze and differentiate multiple human facial dispositions, since it made up of many intermediate states namely input layer, hidden layer and output layer which plays the significant part in generating the precise outcome and helps to reduce elimination tasks in easier way with minimal steps. In this research, we study to develop an autonomous system that can recognize and differentiate multiple human facial dispositions. This study will validate the models by creating a real-time vision system mainly includes three phases which are face detection through Haar Cascades, normalization and emotion recognition and classification using proposed CNN architecture on FER-2013 database with seven different sorts of universal emotions such as Happiness, Sadness, Anger, Disgust, Surprise, Fear and Neutral.

Keywords: Convolution Neural Network (CNN); Emotion recognition; FER2013; Haar cascades; Human robot interface (HRI).

A Hybrid PEO Based Maximum Power Point Tracking Controller for PV System under Partial Shading Conditions

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Abstract

Solar photovoltaic (PV) energy plays a potential role in the generation of electricity and is eco-friendly to the environment. However, PV systems face the challenge to extract maximum peak power (MPP) on the account of partial shading conditions (PSC). To encounter this problem previously various conventional and soft computing based maximum power point tracking (MPPT) controllers are used to track the MPP. Nevertheless, inaccuracy occurred in the tracking of MPP, hence in this paper, a new metaheuristic hybrid method is introduced such as premature equilibrium optimizer (PEO). This PEO method acts as an MPPT controller and can track the MPP without any oscillation under PSC and has less convergence time, settling time and high efficiency.

Keywords: Maximum peak power (MPP); Maximum power point tracking (MPPT); Partial shading conditions (PSC); Photovoltaic (PV); Premature equilibrium optimizer (PEO).

Application of MT Method of Mahalanobis-Taguchi System in Methadone Flexi Dispensing Program

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Abstract

Patient under methadone flexi dispensing (MFlex) program are required to perform blood tests like lipid profile. To verify the patient does have a lipid disorder, a doctor analyse 3 parameters such as cholesterol, HDL cholesterol, and LDL cholesterol. However, the present system lacks a robust ecology for categorization and optimization due to imprecise measuring methods and a lack of rationale for major elements that impact diagnostic accuracy. The goal is to implement the Mahalanobis-Taguchi system (MTS) into the MFlex programme. The data was acquired at the Bandar Pekan clinic and included 34 lipid profile measures. For classification and optimization, two categories of MTS techniques are being used, which are RT-Method and T-Method. As a result of the lipid profile analysis, the healthy Mahalanobis distance (MD) is 1.0000, whereas the unhealthy MD is 79.5876. Positive contributions are made by parameters 1, 3, 4, 6, 7, 8, 9, 11, 12, 17, 18, 23, 26, 27, 28, 30, 31, 33, and 34. 15 unknown samples were diagnosed with varying degrees of positive and negative contribution to obtain a smaller MD. The best recommended way has been type 5 from overall 6 modifications. Finally, the pharmacist acknowledged that MTS can tackle the issue of MFlex programme categorization and optimization

Keywords: Classification; Mahalanobis distance; Mahalanobis-Taguchi System, MFlex, Optimization.

Review of Heat Transfer Enhancement by using Hybrid Nanofluid Through Backward Facing Steps

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Abstract

Convective heat transfer as well as fluids flow through backward facing step BFS by nanofluids and hybrid nanofluids utilizing have been extensively studied over the last several decades. The separation of flow which occur due to sudden expansion in the flow through BFS has been reported as important situation for many applications. It is focused to the studies revealed to increase of heat transfer by using hybrid nanofluids with various nanoparticle volumes concentration. This study reviews the experimental and numerical studies of using pure water, hybrid nanofluids and nanofluids flow over BFS. The nanofluids preparation technique and effective thermophysical properties have been discussed. It was observed that the hybrid nanofluid has significant properties to utilize in the BFS for increasing heat transfer.

Keywords: Hybrid nanofluid; Backward facing step; Heat transfer.

Thermophysical Characterization of Paraffin/Palmitic Acid Binary Eutectic Composite for Thermal Energy Harvesting

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Abstract

The twenty-first century is witnessing a quite rapid shift towards eco-friendly and green energy sources to reduce global warming. Solar energy is the cleanest, most abundant renewable energy source available and hence it is extensively utilized despite its uneven nature in distribution. The inconsistency in solar irradiation can be managed by incorporating latent heat energy storage materials within solar energy harvesting systems. Phase Change Materials (PCM) are the most extensively preferred material for thermal energy harvesting (TEH). The effective thermal management capability of the TEH system was greatly hampered by the low thermal conductivity of PCMs. The current work focuses on the development of an appropriate binary eutectic PCM for medium-temperature applications like thermal management of PV, PVT, CPVT systems, electronic devices, and even desalination. Organic PCMs, paraffin (melting point 58-60°C), and palmitic acid (melting point 61-62.5°C) were mixed in the ratio (60.3:39.7) to form a binary eutectic composite followed by its thermophysical characterization. Thermogravimetric analyzer (TGA) and Fourier Transform Infrared spectroscopy (FTIR) results ensured thermal and chemical stability of the synthesized binary eutectic PCM. The newly synthesized eutectic PCM clocked a thermal conductivity of 0.257 W/mK (11.26% increment compared to palmitic acid). Thus, a new economical, PW-PA-based binary eutectic PCM was fabricated. The enhanced thermophysical properties make the composite suitable for medium-temperature applications.

Keywords: Binary eutectic; Thermal conductivity; Thermal energy storage; Paraffin wax; Palmitic acid.

Durability Properties of Mortar Containing Steel Slag as Supplementary Cementitious Material

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Abstract

The use of steel slag (SS) as supplementary cementitious material (SCM) is promising from the perspective of environmental protection and resource utilization. Previous studies have shown that using < 20% SS powder to replace cement is able to ensure the strength of concrete, while > 20% SS replacement tends to decrease the strength of concrete. However, few studies have investigated the effect of SS on the durability properties of concrete, such as resistance to ammonium nitrate attack and resistance to sulfate attack. In this study, SS powder has been used as SCM with replacement ratio of 0, 10%, 20%, 30% and 40% to manufacture mortar. Compressive strength test, ammonium nitrate attack test and sulfate attack test have been conducted to investigate the properties of hardened mortar specimens. From this study, it is concluded that the increase in SS replacement ratio caused the decrease in mortar strength, the exposure to sulfate solution could increase the strength of mortar, and the exposure to ammonium nitrate solution led to the decrease in strength of mortar.

Keywords: Steel slag; Supplementary cementitious material; Ammonium nitrate; Sulfate.

Parameter Influence on Mechanical Properties of ABS; Using FDM

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Abstract

Additive manufacturing (AM), also known as solid-freeform, fast prototyping, and three-dimensional (3D) printing, is one method for creating goods from 3D model data. This cutting-edge technology has the potential to replace many existing production procedures and open up new markets for new products. The AM technology known as fused deposition modelling (FDM) is very popular. The mechanical characteristics of 3D printed goods made by FDM, however, are significantly impacted by a small range of variables. This study examines how the tensile characteristics of ABS printed using different raster angles and infill density affect the final product. Acrylonitrile butadiene styrene (ABS), a thermoplastic substance derived from petroleum, was the material employed in the study's filament. Due to its characteristics, ABS is a great material for a variety of structural applications. This study is to fabricate tensile specimens with various temperatures of 50%, 75% and 100% also raster angles of 0°, 45° and 90°. The result shows that maximum ultimate tensile strength (UTS), elasticity, and yield strength were obtained at an infill density of 100% with a raster angle of 90°. Thus, infill percentage and raster angle play an important role in deciding better properties of ABS samples produced using FDM.

Keywords: FDM; ABS; 3D printing; Ttensile; Properties; Process parameter.

Investigation of Mechanical Properties of 3D-Printed Polylactic Acid (PLA)

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Abstract

In recent years, 3D printing has contributed to developing new materials and applications, owing to its technological flexibility and distinct characteristics. Polylactic Acid (PLA) polymer samples have been produced using one of the additive manufacturing (AM) processes called fused deposition modelling (FDM). However, poor mechanical characteristics are the most prevalent problem due to the processing parameter when parts are fabricated with FDM. The research aims to study the tensile properties of PLA by varying the processing parameter. In this study, PLA material was used due to its biocompatibility properties. This research is to analyze and compare the tensile properties of 3D printed samples by varying the infill density and raster angle. The change in the circumstances has a discernible impact on the tensile strength based on varied infill densities and raster angles. The results show that infill density of 100% and 45° raster angle performs better tensile strength than 50% and 75% infill density. Hence, it can be concluded that the tensile strength of the printed samples has a noticeable effect when the processing parameters vary.

Keywords: Fused Deposition Modelling; 3D printing; PLA; Tensile properties.

Lean Management in Quality Improvement of Cutting and Hot Forming Process for Window Tint

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Abstract

The objective of this study is to describe the application of the DMAIC (Define, Measure, Analyze, Improve, and Control) technique at a Malaysian company that forms and cuts window tint film. This case research focuses on the Define, Measure, Analyze, Improve, and Control (DMAIC) phases for a full and effective project implementation and presentation. According to the findings of this case study, dust is a significant flaw in the cutting process. It was also discovered that the upgrades initiative directly benefits others, including economic benefits. The application of this powerful tool has not only reduced the rate of defects, but also in the areas of product development, customer retention analysis, cycle time optimization, productivity improvement and market share.

Keywords: DMAIC; Lean management; Lean principle; SMART, OEM.

Isolation of *Proteus Mirabilis* from Microwave Treatment of Medical Waste Associated with Urinary Infection

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Abstract

Proteus mirabilis is a clinical pathogen harbouring antibiotic resistance genes and has been identified to cause various healthcare-acquired infections in immunocompromised patients. This study aimed to isolate pathogenic bacteria *Proteus mirabilis* from microwave pre-treated medical waste. A 100 µL of serially diluted medical waste sample was cultured on Luria Bertani (LB) agar containing ampicillin, and the presumed colonies of *P. mirabilis* were extracted using FastDNA Stool Mini Kit, followed by species identification *via* Sanger sequencing. Antibiotic resistant bacteria were successfully cultured, and the swarming behavior was observed on the surface of culture medium. The sequence reads generated from Sanger sequencing compared against reference sequences in NCBI database confirmed that the isolates was *P. mirabilis* with 99% percentage identity. The presence of antibiotic-resistant *P. mirabilis* isolated from microwave pre-treated medical waste indicated the microwave had minimal effect in eliminating antibiotic resistant bacteria in medical waste. This study also highlights the potential risk of antimicrobial resistance transmission when improperly handled medical wastes are discharged into the environment. Thus, the discovery of pathogenic *P. mirabilis* from medical waste necessitated public attention to improve medical waste management.

Keywords: *Proteus Mirabilis*; Pathogen; Medical waste; Microwave; Antibiotic resistance.

Isolation and Genome Sequencing of *Bacillus Megaterium* Found from the Gut Sea Cucumber (*Holothuria Leucospilota*)

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Abstract

Bacillus megaterium is a bacterium that is widely used in the application of biotechnology. Often its popularity is due to its ability to represent a suitable host to generate compounds such as cobalamin and perform biosynthesis production of smaller biological molecules. The bacterium can also be found in a wide variety of habitats including sea water. The interest towards sea cucumbers have skyrocketed to a point of extinction in certain species. This popularity could be due to the uniqueness associated to the gut microbiome observed within sea cucumber or just the organism itself. However, the presence of *B.megaterium* within the gut of *Holothuria leucospilota* could prove an answer to the previous statement. In this study, isolation of an unknown bacterium (which was *B.Megaterium*), identification and genomic analysis of the bacterium which was obtained from the gut of *H.leucospilota* was carried out. DNA was extracted using commercial kits, and later quantified using a NanoDrop Biophotometer. The V3-V4 region of the 16s RNA was used as specific primers for PCR amplification. Quality of DNA and PCR results were verified using agarose gel electrophoresis. Identification was carried out by performing sanger sequencing towards the PCR products obtained. The study identified and reported a complete genome of *B.megaterium* comprising of 5,323,711 bp genome size with a GC content of 37.9%. The annotated genome was submitted to the NCBI database. Overall, this study revealed the complete genome of *B.megaterium* and would serve to potentially explain its association towards the gut microbiome found within *H.leucospilota*.

Keywords: *Bacillus megaterium*; *Holothuria leucospilota*; Gut; Sea cucumber; Genome sequencing.

System Identification for a Mathematical Model of DC Motor with PI Controller

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Abstract

A mathematical model has been proposed for some system that involves a DC motor. It is important to have the best mathematical model as it will improve the performance of the system itself, especially with an existence of a controller. In this study, a DC motor with PI controller will undergo a system identification process where the concept of poles and zeros will be applied by using the MATLAB/Simulink software. Cohen-Coon tuning method also will be used in order to tune the proposed controller's parameters. Furthermore, several test were performed by varying the value of poles and zeros. Comparison will be made between the performance of DC motor PI controller with and without the system identification technique in terms of transient response characteristics. It is clear form the study that system identification is essential to ensuring that the DC motor's performance may be improved. In light of this explanation, the DC motor PI controller with three poles and no zero performs better than the others. Its rising time was 0.082s, settling time was 2.333s, peak time was 1.223s with overshoot was slightly greater at 52.14 percent, and there was no steady-state inaccuracy.

Keywords: DC motor; MATLAB/Simulink; Mathematical model; Poles and zeros; System identification; Transient response.

Controlled Release of Niacinamide from Fibrous Silica Nanocarrier in face Serum Formulation

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Abstract

The current study offers a controlled release of niacinamide from fibrous silica (KCC-1) loaded in face serum formulation. Furthermore, three drug loading methods namely physical mixing, (Phy)/Nia-KCC-1, melting (Mel)/Nia-KCC-1 and solvent evaporation, (Sol)/Nia-KCC-1 were implemented and the percentage loading efficiency were compared. (Mel)/Nia-KCC-1 demonstrated highest percentage drug loading at 33%, followed by (Phy)/Nia-KCC-1 and (Sol)/Nia-KCC-1 at 25% and 17%, respectively. Likewise, the in vitro release study also revealed similar pattern with (Mel)/Nia-KCC-1 recorded highest percentage release at 29%, followed by (Phy)/Nia-KCC-1 and (Sol)/Nia-KCC-1 at 24% and 21%, respectively. As (Mel)/Nia-KCC-1 sample unveiled decent result in transporting the sample drug, the respective sample was then further loaded into the face serum formulation and the pH stability was observed for 7 days. The pH readings were at constant pH 4.3 throughout 7 days, in acceptance range according to the derma-cosmetic product that stated the effective pH is supposed to lies between pH 4 to pH 6. Therefore, it can be stated that the (Mel)/Nia-KCC-1 serum fulfilled the acceptance criteria of pH requirement for the derma-cosmetics products.

Keywords: Controlled release; Niacinamide; Fibrous silica; Drug loading; Serum formulation.

Development of a Differential Magnetic Probe to Evaluate Metal Loss due to Corrosion

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Abstract

Corrosion is one of the most common problems associated with steel structures. The occurrence of corrosion may lead to metal loss, at which point might threaten the integrity of a steel structure. Therefore, the employment of magnetic flux leakage (MFL) and eddy current testing (ECT) is beneficial in providing detection of metal loss due to corrosion. Thus, a differential magnetic probe using both methods is developed. The probe consists of two fluxgate sensors and an excitation coil. Then, a line scan measurement is conducted on a 6mm mild steel sample with metal loss defects. From the result of the line scan measurement of the MFL signals, the presence and depth of the defects could be identified. Meanwhile, only the defect presence can be identified from the ECT signals, although only restricted to higher frequencies detection.

Keywords: Magnetic flux leakage; MFL; Eddy current testing; ECT; Corrosion.

Microstructure Characteristic of Aluminium 6061 Semi-Solid Feedstock Billet Produced with Direct Thermal Method

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Abstract

Direct thermal method is one of the semi-solid metal processing technique to produce a globular microstructure feedstock billet for thixoforming. In this experimental work, the molten Aluminium 6061 with a temperature of 660 °C and 680 °C was poured into a thin cylindrical copper mould. The molten Aluminium 6061 was held within the copper mould with a different holding times of 20 s, 40 s and 60 s. The copper mould was quenched into room temperature water after achieving the specified holding duration. After the feedstock billets were removed from the mould, the microstructure formation of the feedstock billets was characterized. It was found that sample 1 which was combination of pouring temperature of 660 °C and holding time of 20 s has the lowest grain size at 2507.87 μm^2 . The circularity, aspect ratio and ferret diameter was found at 0.75, 1.34 and 69.4 μm , respectively. It was apparent that sample 1 produced finer and globular microstructure. The rapid cooling condition of the molten metal within the copper mould resulted in more globular grain structure. Based on the result, it can be concluded that the microstructure were merely depended on the heat convection between molten alloy and the copper mould. The rapid cooling condition produced smaller and more globular microstructure feedstock billet that suitable for thixoforming

Keywords: Semi-solid processing; Globular microstructure; Semi-solid feedstock billet; Aluminium 6061.

Stability Analysis of Multirotor Drone with Water Jet Payload

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Abstract

Multirotor stability is achieved when all rotors generate equal thrust to stay hovering and throttle mode. It's required the control system algorithm for propulsion speed adjustment, which is related to translational vector and rotation angle. Even with external disturbance, control system algorithm can adjust tilting angle to stabilize quadcopter. Therefore, this study focuses on developing quadcopter with waterjet system and datalogging to analyse the flight stability. It is developed with quadcopter configuration and integrating waterjet nozzle as a payload. The process includes frame development, propulsion sizing, speed calibration for each rotor, trim calibration, and a proportional integral derivative (PID) control tuning. For data collecting, copter is equipped with data storage to store flight log in form off log file. Quadcopter is test flight outdoor to embraced wind factor. The data logger shows quadcopter tilting at certain angle cause by external forces created by waterjet.

Keywords: Stability analysis; Attitude tracking; External disturbance.

Municipal Solid Waste Management in Khulna City Corporation Bangladesh

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Abstract

Bangladesh has the eighth-highest population in the world and the sixth-highest population density. In Bangladesh, a 3.09% urban population growth rate is anticipated between 2016 and 2020. Waste management is becoming a bigger issue as a result of the exponential population growth rate, especially in the bigger cities. The amount of trash produced in Bangladesh's cities now is about 25000 tons per day or 170 kg per person each year (as of 2021). Only around 37% of garbage is collected in big cities. However, once this garbage is collected, handling it in a way that is acceptable to society and the environment is difficult. Solid waste management accounts for 15–25% of the budgets of municipal entities. Incorporating the informal garbage industry in rising cities presents a barrier for effective data collection and analytical management. This essay intends to shed light on Khulna, a significant Bangladeshi city, and its municipal solid waste management system. This study focuses on the municipal solid waste of Khulna City Corporation (KCC) and examines the creation and management status of several types of garbage. It also demonstrates the damaging effects of inadequate garbage management. Finally, it makes some appropriate and cost-effective recommendations for trash management.

Keywords: Municipal solid waste; Waste collection; Waste generation; Khulna city; Corporation

Experimental Investigation of Temperature-Dependent Thermal Stability of Eicosane-Based Nano-Enhanced Phase Change Materials

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Abstract

Recently, studying phase change materials (PCMs) has brought many researchers' attentiveness to be applied in thermal energy storage and battery thermal management (BTM) applications. According to this fact that PCM requires to be thermally stable. Hence, the principal aim of this study is to analyze the thermal stability of PCMs composites by loading different mass fractions of CuO nano-particles. Results demonstrated that 0.5 wt% is the best value of additive nano-particle which showed a remarkable increment in thermal stability. Therefore, all the presented results indicate the importance of selecting an optimal PCM nanocomposite for various applications including NePCM-based thermal energy storage and BTM systems. The brand and model of the device used in this study are Hitachi and STA7000 respectively.

Keywords: Phase change material; CuO nano-particles; Nano-enhanced phase change materials; Thermal stability.

Speech Emotion Recognition Using Spectrogram Based Neural Structured Learning

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Abstract

Human emotions are extremely crucial in our daily life. Emotion analysis based solely on auditory data is difficult due to the lack of visible visual information on human faces. Thus, a unique emotion recognition system based on robust characteristics and machine learning from the audio speech is reported in this paper. Audio details are used as input to the person-independent emotion recognition system, from which the spectrogram values are extracted as features. The generated features are then used to train and understand the emotions via Neural Structured Learning (NSL), a fast and accurate deep learning approach. During studies on an emotion dataset of audio speeches, the proposed approach of integrating spectrogram and NSL produced improved recognition rates compared to other known models. The system can be used in smart environments like homes or clinics to provide effective healthcare, music recommendations, customer support, and marketing, among several other things. As a result, rather than processing data and making judgments from far distant data sources, the decision-making could be made closer to where the data lives. The Toronto Emotional Speech Set (TESS) dataset that contains 7 emotions has been used for this research. The algorithm is successfully tested with the dataset with an accuracy of ~97%.

Keywords: Deep learning; Human computer interface; Neural structured learning spectrogram; Speech emotion recognition.

Comparison of Graphene Oxide Properties Synthesized by Electrochemical Exfoliation and Hummers' Method

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Abstract

Graphene oxide (GO) is one of the nanoscales materials that have a unique property thus exhibit great potential applications in various field. However, to synthesize high- quality GO, environment- friendly and fast production rate is a huge challenge that needs to overcome. Although chemical synthesis method is the easiest, inexpensive, and high amount production rate as compared to the other methods but there are some drawbacks using chemicals such as toxicity, poisonous and corrosive which are harmful to the human health and environment. Therefore, researchers suggested a green route as an alternative method. This study compares the dissimilarities in properties such as morphologies, presence of functional groups and crystallization of GO synthesized by using electrochemical exfoliation method and the improved Hummers' method. This research delivers a useful guideline to compare the effectiveness of both methods to benefit researchers who keen to synthesize GO. It also discussed the characterization results of GO using of X-ray diffraction (XRD), scanning electron microscopy (SEM), Energy Dispersive X-Ray (EDX) and Fourier transform infrared spectroscopy (FTIR).

Keywords: Graphene oxide; Green route; Electrochemical exfoliation method; Improved Hummers' method.

Studies on the Impedance Spectroscopy and Dielectric Properties of Ionic Liquid (BmimCl) Based Hybrid Gel Polymer Electrolytes

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Abstract

In this present work, gel polymer electrolytes (GPE) based polylactic acid (PLA) and polymethyl methacrylate (PMMA) blend polymer doped lithium bis (trifluoromethanesulfonyl) (LiTFSi) and added with various composition of ionic liquid (IL), 1-Butyl-3-methylimidazolium chloride (BmimCl) were successfully prepared. The electrical conduction properties study was carried out via a.c. impedance spectroscopy analysis and the ionic conductivity was calculated based on the Cole-Cole plot of the imaginary part versus the real part of the complex impedance. The addition of IL into the GPE system was found to increase the ionic conductivity and achieved the optimum value at $1.63 \times 10^{-3} \text{ S cm}^{-1}$ for GPE system containing with 15 wt.% BmimCl. The temperature dependence – ionic conductivity study for (PMMA-PLA-20 wt.% LiTFSI) + wt.% IL were found to be obey to Arrhenius relationship. The dielectric behaviour was investigated using real and imaginary parts of dielectric permittivity (ϵ_r and ϵ_i) and electrical modulus (M_r and M_i). The dielectric properties revealed that the present system follow non-Debye characteristic.

Keywords: Arrhenius behaviour; BmimCl; Dielectric properties; Impedance studies; Hybrid polymer.

KDA: An Unsupervised Approach for Analyzing Keyphrases Distance from News Articles as a Feature of Keyphrase Extraction

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Abstract

Automatic keyphrase extraction remains a significant and difficult issue in the current research domain because of the exponential explosion of information and internet sources. Various activities involving natural language processing and information retrieval systems greatly benefit from the use of keyphrases. To extract the best keyphrases and summarize the documents to the highest standard, feature extractions for those keyphrases are crucial. This paper proposes an unsupervised region-based KDA technique for analyzing the distance of keyphrases from news articles as feature of keyphrase extraction. The proposed technique is divided into eight phases: data collection, data pre-processing, data processing, keyphrase searching, distance calculating, distance averaging, curve-plotting, and curve-fitting. At first, the proposed technique collects two different datasets that contain the news articles; it is then applied to the data pre-processing step that uses a few preprocessing algorithms. Then this pre-processing data is used in the data processing stage, where it is sent to the keyphrase searching step, the distance calculation process, and then the distance averaging steps. Curve plotting analysis is then applied, and finally the curve fitting technique is used. Afterwards, the performance of the proposed technique is put to test and evaluated using two of the most accessible benchmark datasets. The proposed method is then compared to other available methods in order to demonstrate its efficiency, advantages, and importance. Lastly, the results of the experiment demonstrated that the proposed approach efficiently analyzed the keyphrase distance from news articles, produced an F1-score of 96.91%, and presented keyphrases of 94.55%, as well as greatly improved the effectiveness of the current keyphrase extraction methods.

Keywords: Curve fitting technique; Data pre-processing; Data processing; Feature extraction; KDA technique; Keyphrase extraction.

Microbiological and Physicochemical Evaluation on the Fermentation of Water Kefir Using Brown Sugar and Palm Sugar

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Abstract

Probiotics are live microorganisms which when administered in sufficient amounts confer a health benefit on the host. They are gaining increasing interest from the public due to their health benefits. Probiotics can be administered as food supplements or food ingredients. Particularly, the fermented beverage is a popular vehicle to deliver probiotics. Therefore, present work aimed to develop a non-dairy probiotic water kefir beverage using brown sugar and palm sugar that is suitable to be consumed by vegans and consumers with lactose intolerance and milk allergies. Brown sugar and palm sugar were prepared as the substrate for kefir grains, in the ratio of 2:1, which were 50 g/L and 25 g /L respectively. The fermentation process was carried out for 72 hours. The fermented water kefir was collected every 6 hours interval to evaluate the microbiological and physicochemical characteristics of the water kefir. The result indicated that the longer fermentation time produced lower pH values, higher lactic acid, higher reducing sugars, and lower total soluble solids. In conclusion, the ideal fermentation time to produce water kefir using brown sugar and palm sugar was 48 hours, with greater amount of lactic acid bacteria (6.43×10^6 CFU/mL), yeasts (7.23×10^6 CFU/mL), and acetic acid bacteria count (8.07×10^6 CFU/mL).

Keywords: Fermentation; Water kefir; Probiotics; Brown sugar; Palm sugar.

Growth Profile Study of Escherichia Coli K12 by Optical Density Measurement

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Abstract

Bioconversion by microorganisms plays an important role worldwide over chemical transformation. Thus, microbial fermentation offers a significant advantage in producing value-added products. The biodiesel industry's primary by-product is crude glycerol. The glycerol waste from the biodiesel industry was used as the carbon source for the fermentation process. The biodiesel industry will benefit from the bioconversion of glycerol into valuable chemicals because it is a widely accepted renewable fuel. For the fermentation process for conversion of valuable product, bacteria's stability and growth conditions were monitored using the glycerol as a substrate. Therefore the growth of E.coli cells were required so bacterial growth are commonly analysed using optical density measurements in microbiology. Hence, in the present research focussed on the growth profile study of Escherichia coli K12 by optical density measurement using the spectrophotometer.

Keywords: Bioconversion; E.coli; Fermentation; Growth; Glycerol; LB medium.

Fabrication of Glass Microlens Array using Laser-Assisted Contactless Hot Embossing

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Abstract

Contactless hot embossing is one promising replication-based method for fabrication of high quality microlens array (MLA) with different sag height but suffers long thermal cycle. Herein, rapid fabrication of glass MLA using laser-assisted contactless hot embossing process is proposed. CO₂ laser irradiation that passes through the micro holes mold promotes surface heating at the glass surface and speed up the formation of spherical MLA. The effect of the laser irradiation conditions, preheating temperature and holding time to the formation of MLA was discussed. Finally, high aspect ratio and smooth spherical glass MLA array with different sag height were successfully fabricated.

Keywords: Microlens array (MLA); Optical glass; Contactless hot embossing; Laser-irradiation.

The Effect of Mineral Bottle as Fine Aggregate for Manufacturing Sustainable Road Construction

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Abstract

Sustainable construction in a variety of industries has motivated the use of waste materials in various forms as a substitute for raw materials. Currently, the plastic waste quantity in municipal solid waste is increasing due to population growth and lifestyle changes. Thus, disposal of waste mineral bottles is hazardous to the environment due to their non-biodegradable materials. Therefore, this study aims to evaluate the performance of mineral bottles (0,4,8 and 10%) as fine aggregate in hot mix asphalt. The waste mineral bottle was cleaned and crushed into the size passed through 5mm sieve with different contents (0, 4, 8 and 10%) were used as a fine aggregate in the asphalt mixture. Asphaltic concrete AC14 was used in this study. The weight for the total mixing of aggregates used is 1200g, while the bitumen 60/70 penetration grade. The Marshall stability and flow and Cantabro tests were performed to determine the optimum percentage of asphalt mixture incorporated with the mineral bottle as fine aggregate. It has been observed that 8% of mineral bottles as fine aggregates significant improvements the properties of Marshall stability from 17.81kN to 31.87kN and reduced the Cantabro loss of the asphalt mixture from 2.17% to 0.96% compared to the conventional mix. Hence, the use of mineral bottles will not only strengthen the road construction but also increases the road life as well as help to improve the environment.

Keywords: Waste mineral bottle; Asphalt mixture; Engineering properties; Marshall stability; Cantabro.

Study of Employee Satisfaction Against Different Aspects: A Case Study of Manufacturing Industry (DRB-Hicom Sdn Bhd)

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Abstract

Job Satisfaction refers to how employees view their work, as well as the psychological attitudes that people have towards their jobs. Given the strong association between the impact of job performance, it is important to better identify and acknowledge the factors which affect the overall employee job satisfaction which correlated to the employee performance. A study to analyze the factors affecting employee satisfaction that affect employee performance is necessary. The objective of this research is to investigate the association between job satisfaction and different factors affecting employee performance among employees in the DRB-Hicom Sdn Bhd manufacturing industry. This research uses a quantitative method where a questionnaire survey is used to assess job satisfaction based on variables which are work, salary, management communication, and demographic profiling and how they can affect job satisfaction. The demographic profiling contribute to minimally to none to the employee satisfaction whereas work, salary, and management greatly affect the entire employee satisfaction rate according to the high mean value of the factors. Correlation study shows that there is a positively high level of correlation strength between work, salary, and management communication against the employee performance which supports the hypothesis made for this research.

Keywords: Job satisfaction; Correlation; Relationship; Management; Salary.

Study of Young Motorcyclists' Risk Behaviours Towards Road Accidents in Kuantan

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Abstract

In Malaysia, the number of motorcycle-related traffic accidents has gradually climbed over time. Road traffic accidents are typically caused by a combination of individuals and environmental circumstances. Young motorcyclists had significantly over-represented number of deaths in motorcycle road accidents. Many aspects, such as inexperience, lack of riding competence, and risky riding behaviour, have been linked to road traffic crashes among young adults aged 16 to 19 years old. However, less study has been conducted to analyze these young motorcyclists (high school students) riding behaviour. Therefore, this review aims to identify secondary school student's risk behaviours for road traffic accidents among motorcyclists in Kuantan with young motorcyclists being the main contributor to the road accidents. Most of the youngster use motorcycles as their daily mode of transportation. Methods: This study used a cross-sectional study design and a simple random sampling method. It was conducted among students in three different school in Kuantan area. This study used on-site behavioural observation survey which data observation forms are specifically designed to collect data on motorcyclists' risk behaviours by using a video camera in the school area. Results: The findings proved that the male students had higher frequency number that contribute to break the speed limits behaviour compare to the female students. Subsequently, breaking the speed limit and riding without crash helmets, failing to keep proper side to side movement with another vehicle and tailgating with another vehicle with unsafe distance are the most influenced risk riding behaviour factors among the students. Apart from that, riding while impaired, performing stunting acts, riding against traffic and riding without headlights on & traffic violation are the behaviours that less contributed to the number of motorcycle accidents. Conclusion: Each risky riding behavior factor has a different effect on road safety among young mototcyclists, especially the students in urban areas. Other than that, the estimated number of crashes can be a reference to authority to reduce the number of accidents in Malaysia.

Keywords: Road traffic accidents; Risk riding behaviors; Urban areas.

Fresh and Mechanical Properties of Concrete Containing Crushed Brick Waste as Partial Fine Aggregate Replacement

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Abstract

Concrete is one of the oldest established construction materials, and it is employed in the design of many structures all over the globe. Because of strong demand, the material used in concrete production, particularly natural sand, is dwindling year after year. The ongoing extraction of these natural resources is harmful to the ecosystem. Simultaneously, crushed brick debris from building sites pollutes the environment. Crushed Brick Waste (CBW) was employed as a fine aggregate substitute for genuine production in this investigation. This study looks at the fresh qualities, mechanical characteristics, and durability of concrete (concrete including crushed brick debris as a partial fine aggregate substitution). In this experiment, five different combinations were employed. Concrete mixtures with 0%, 10%, 20%, 30%, and 40% CBW replacement amounts were cast and water cured till the testing age. To investigate the workability, compressive strength, and water absorption of concrete containing CBW, slump tests, compressive strength tests, and water absorption tests were performed. The results reveal that the application of CBW has an effect on the workability and strength of concrete. When the amount of crushed brick waste utilised as a partial fine aggregate replacement increase, the workability of the concrete decreases. In conclusion, using CBW as a partial fine aggregate replacement saves river sand and minimises the amount of CBW disposed away at the landfill.

Keywords: Fine aggregate; Crushed brick waste; Slump test; Compressive strength; Water absorption.

Effect of Crushed Palm Oil Clinker as Partial Fine Aggregate Replacement on Mechanical Properties of Mortar

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Abstract

Concrete is one of the oldest established construction materials, and it is employed in the design of many structures all over the globe. Because of strong demand, the material used in concrete production, particularly natural sand, is dwindling year after year. The ongoing extraction of these natural resources is harmful to the ecosystem. Simultaneously, crushed brick debris from building sites pollutes the environment. Crushed Brick Waste (CBW) was employed as a fine aggregate substitute for genuine production in this investigation. This study looks at the fresh qualities, mechanical characteristics, and durability of concrete (concrete including crushed brick debris as a partial fine aggregate substitution). In this experiment, five different combinations were employed. Concrete mixtures with 0%, 10%, 20%, 30%, and 40% CBW replacement amounts were cast and water cured till the testing age. To investigate the workability, compressive strength, and water absorption of concrete containing CBW, slump tests, compressive strength tests, and water absorption tests were performed. The results reveal that the application of CBW has an effect on the workability and strength of concrete. When the amount of crushed brick waste utilised as a partial fine aggregate replacement increases, the workability of the concrete decreases. In conclusion, using CBW as a partial fine aggregate replacement saves river sand and minimises the amount of CBW disposed away at the landfill.

Keywords: Palm oil clinker; Fine aggregate; Mortar; Flowability; Compressive strength; Water absorption.

Study of Workability and Compressive Strength of Eggshell Concrete

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Abstract

Considering the damage that has resulted to the river's ecosystem, sand mining from the river without any regulation has been a huge concern in the construction industry. Meanwhile, the disposal of egg shell as waste results in a large number of landfills and pollution. As a result, the present investigation explores the effect of eggshell as a partial fine aggregate replacement on the workability and compressive strength of concrete. Five concrete mixes were prepared by integrating 0%, 10%, 20%, 30%, and 40% of egg shell as partial fine aggregate replacement by weight of sand. Slump test and Compressive strength test were conducted. The finding shows that the use of egg shell exhibit lower workability and strength. The use of egg shell as a fine aggregate replacement will lower the demand for natural river sand while also reducing pollution caused by egg shell dumping.

Keywords: Concrete; Fine aggregate; Eggshell; Waste; Pollution.

Evaluation of Antioxidant, Antibacterial and Anticancer Activities of Ganoderma Lucidum Extracts

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Abstract

G. lucidum is an oriental fungus loaded with antioxidant, antimicrobial and anticancer properties. *G. lucidum* extracts obtained by using soxhlet and Ultrasonic-Assisted Extraction (UAE). The antioxidant activity determined by DPPH assay resulting in IC₅₀ value of extract for soxhlet water 372.21 µg/mL followed by soxhlet ethanol 431.00 µg/mL, UAE ethanol 541 µg/mL and UAE water 560.90 µg/mL shown weak antioxidant properties. Well plate diffusion used for antimicrobial activity test against *E. coli* and *S. aureus*. The UAE water extract shown highest antibacterial activity against *S. aureus* (20-23) mm followed by soxhlet water extract (6-13) mm. The ethanol extract for both soxhlet and UAE are (5-13) mm and (4-14) mm respectively. *G. lucidum* extract exhibited zero inhibition zone against *E. coli* due to presence of barrier membrane. CCK-8 used to test anticancer activity against MCF-7 cells. The IC₅₀ values of soxhlet ethanolic extract is 4.797 µg/mL followed by UAE ethanolic extract 5.291 µg/mL, soxhlet water extract 7.196 µg/mL and UAE water extracts 9.455 µg/mL. The lower IC₅₀ value indicated that the extracts inhibited cell viability of MCF-7.

Keywords: *Ganoderma lucidum*; GC-MS; Antioxidant; Antimicrobial; Anticancer.

Sequential Adaptation to Serum-Free Medium for Vero Cells Cultivation on Ultraviolet/Ozone (UVO) Treated Microcarrier

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Abstract

Vero cells are continuous mammalian cell lines that are commonly used in research, viral vaccines production, recombinant protein production, and many others. The main objective of this study was to adapt the Vero cells in serum-free medium (SFM) from serum supplemented medium (SSM) prior to culture upscale from T-flask to spinner vessel using ultraviolet/ozone (UVO) treated polystyrene (PS) and polycaprolactone (PCL) microcarriers. The number of cells was counted using hemocytometer and microscope. From the results, it was observed that the maximum cell concentration of SFM adapted cells is higher than the cells cultured in SSM along with shorter doubling time. Culture of Vero cells in spinner vessel showed lower maximum cell concentrations compared to in T-flask due to several factors such as cell inoculum size, hydrophilicity of microcarriers and elevated temperature during incubation.

Keywords: Vero cell; Serum-free medium; Polystyrene microcarrier; Polycaprolactone microcarrier.

Evaluation of ABP and OTAA in IoT-Based Flood Monitoring and Warning System using LoRaWAN

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Abstract

Rapid development and poor drainage management are the ingredients for flash floods in the city during the heavy raining season. Flash flood refers to the body of water that suddenly exist in an area where primally dry. This event can be detected by Flood Monitoring and Warning System (FMWS) using LoRaWAN. However, there are two types of activation that are offered by LoRaWAN, Activation-By-Personalization (ABP) and Over-The-Air-Activation (OTAA). This paper discusses on the performance of developed FMWS while using both activation and evaluating which activation is suitable for FMWS. To assess the performance of FMWS, an ABP activation is chosen due to it provides full control over the device. For OTTA activation, a test is performed using OTTA activation since it is the most recommended due to its protection features. The LoRaWAN has a great performance-based up to 1.5km and can achieve 100% Percentage Data Received (PDR). The testing shows that the PDR values decrease as the distance communication increase. But the OTAA only limit the performance of FMWS in reliability test. Thus, making the device perform with 89% PDR maximum. In conclusion, OTAA activation is good for setting up the system, and the ABP is chosen for a long-run operation.

Keywords: LoRaWAN; IoT; Flood monitoring; ABP; OTAA.

Effects of Different Seed Dynamics on Crystal Size Distribution for Seeded Batch Crystallization Process

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Abstract

The effects of different seed crystal such as lognormal and bimodal on crystal product distribution are presented for optimizing crystal size distribution (CSD) in the case of seeded batch cooling crystallization process. The different seed crystal recipes are introduced as variable parameter for CSD control of seeded batch crystallization process via simulation in Matlab software. Cubic cooling profile is adapted as the temperature profile for potash alum crystallization system due to its ability to control secondary nucleation. Four seed recipes which are lognormal with different standard deviation of 0.37 and 0.31, and bimodal recipes with different mean at 80/250 μm and 80/190 μm , are used as input for seeded batch crystallization process. Based on these input variables, the final CSD of all seed recipes are further evaluated against experimental data of cubic cooling profile for comparison. Lognormal seed recipe with standard deviation of 0.31 (narrow distribution), labelled as L_2 produces the best seed recipe for seeded batch potash alum crystallization process because it has the largest size of crystals at mean crystal size of 500 μm grown from 90 μm of seed crystals. However, considerable fine crystals are also obtained at mean crystal size of 35 μm , thus trade-off between large size of crystals and fine crystals are needed to be considered. Additionally, the resulted CSD of simulated bimodal seed recipes emphasize that good quality of final crystal products is highly dependent on the good quality of seed crystals. In conclusion, this work highlights the effects of different seed quality in terms of distribution and shape (lognormal or bimodal) on crystal size distribution as one of the important quality specifications in crystallization process and demonstrates narrow distribution of seed crystals as recommendation on the best seed quality for producing desired CSD.

Keywords: Seed crystal; Cubic profile; Crystal size distribution; Crystallization; Potash alum.

The Optical and Structural of the Synthesised Cu Nanostructure using Hydrothermal Microwave-Assisted Method

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Abstract

Cu nanostructure is a potential cost-saving conductive material that might be used in the development of nano-electronic devices. However, the development of Cu nanostructure as an alternative source for silver or gold is hampered not only by its stability in atmospheric surroundings in the nanometer range but also by the lack of a straightforward synthetic approach to create them in excellent yield as well as enhance their optical and structural properties. Therefore, a hydrothermal microwave-assisted method is used to synthesize Cu nanostructure using PVP as a structure-directing agent and PEG as a reducing agent. The absorbance range of Cu nanostructure is observed between 300 to 400 nm. The energy bandgap rises when the concentration increases. While, the average crystallite diameter of each sample is obtained less than 50nm.

Keywords: Cu nanostructure; Hydrothermal; Microwave; Optical properties; Structural properties.

The Synthetization of Activated Carbon from Electrocoagulated Palm Oil Mill Effluent Sludge for Wastewater Treatment

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Abstract

Activated carbon (AC) as an adsorbent has been used widely to remove pollutants in wastewater. Many attempts have been made to produce economically accessible AC. This paper explores the idea of producing an AC, a value-added product from the by-product, sludge produced from the electrocoagulation process of palm oil mill effluents (POME) through chemical activation. AC has different applications after its discovery as a solid and reliable adsorbent. Its microporous structure, high surface reactivity, and surface area make it versatile and viable for removing pollutants from aqueous solutions. Electrocoagulation (EC) is a process whereby contaminants are removed by generating an electric current flow through the aqueous solution by using two electrodes made of iron and immersed into the solution. Aside from the wastewater treatment, the resulting by-product of the EC process known as sludge is recovered and converted into AC. POME sludge was utilized as a precursor of AC. The sludge is then carbonized and activated with an activating agent. The activating agents are phosphoric acid (H_3PO_4) and potassium hydroxide (KOH) solutions. The electrocoagulated sludge-based AC is characterized by its surface characteristics, elemental compositions, surface morphology, and available functional group. To validate the adsorption capacity of electrocoagulated sludge-based AC, textile dye wastewater treatment was carried out to test the efficiency of AC. The AC was used as an adsorbent to test the total suspended solids (TSS) and color removal of textile dye wastewater. The performance of this low-cost AC is comparable to that of many conventional adsorbents. Results indicate that TSS in textile dye wastewater decreased as the adsorbent dosage increased. The values of TSS removal by AC from H_3PO_4 activation decreased steadily compared to AC from KOH activation. Meanwhile, the color removal percentage decreased when the dye concentration increased. AC from H_3PO_4 activation has higher color removal percentage compared to AC from KOH activation. This shows that AC from H_3PO_4 activation has better adsorption due to its more extensive surface area. From BET analysis, AC by H_3PO_4 activation offers a higher surface area, $36.1017 \text{ m}^2/\text{g}$, compared to AC by KOH activation, which is $8.9460 \text{ m}^2/\text{g}$. A more extensive surface area has a higher tendency to adsorb contaminations. The findings of this work confirmed the potential use of electrocoagulated sludge-based AC as an alternative and economically adsorbent for effective dye pollution removal in wastewater.

Keywords: Activated carbon; Electrocoagulation; POME; Waste; Chemical activation; Wastewater treatment.

1D Peridynamics Subjected to Quasi-Static Load with Adaptive Dynamic Relaxation

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Abstract

Peridynamics is a nonlocal theory of continuum mechanics, which was developed by Silling (2000). However, the utilization of explicit time integration in the peridynamics implementation introduces difficulties when it comes to problem involving quasi-static conditions. As a consequences, there exist a necessity obtain a steady-state solutions in an effort to validate the peridynamic predictions against analytical or experimental measurements. In this paper, by implementing the bond-based peridynamics method in an in-house Matlab code, combined with the utilisation of Adaptive Dynamic Relaxation, we analyse a 1-dimensional bar problem and compare with the classical analytical solution. The comparison plot between peridynamics solver and analytical solution obtained showed a very good agreement. The numerical example illustrates that successful material deformation can be achieved by using bond-based peridynamics with adaptive dynamic relaxation.

Keywords: Peridynamics; Bond-based; Dynamic relaxation.

Shear Strength of Soft Soil Reinforced with Singular Bottom Ash Column

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Abstract

Structures construct on soft clays are often affected by stability and settle-ment problems due to high compressibility, low shear strength and low per-meability of soft clay which will lead to bearing capacity failure and exces-sive settlement. The soft clay samples had the dimensions of 50 mm diameter and 100 mm in height. The bottom ash column had two (2) different area re-placement ratios which were 4% and 9% (10 mm and 15 mm diameters re-spectively) with the bottom ash column penetration ratio of 0.3, 0.7 and 1.0. The results of the unconfined compression test show that there is an im-provement in shear strength of soft kaolin clay when reinforced with bottom ash column. For samples with area replacement ratio 4%, the results show the increment of 25%, 37.5% and 50% at H_c/H_s of 0.3, 0.7 and 1.0, respectively in shear strength. Meanwhile, for samples of 9% area replacement ratio, the shear strength of the soft kaolin clay increased about 14.29, 28.57 and 57.14%, respectively. It can be concluded that by reinforcing the soft clay us-ing singular bottom ash column, the shear strength of the soils increases and become more significant as the area replacement ratios and the column pene-tration ratios increase.

Keywords: Ground improvement; Bottom ash column; Shear strength; Stone column; Bottom ash.

The Influence of Common European Framework of Reference (CEFR) on a Malaysian Language Test

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Abstract

The Common European Framework of Reference for Languages (CEFR) is a document utilised worldwide in language policies and assessments. This article investigates the influence of the Common European Framework of Reference for Languages (CEFR) on a high-stake Malaysian language test, namely the Malaysian University English Test (also known as MUET). MUET is used to evaluate the English proficiency of Malaysian students at university entrance. The current study conducted a document analysis on the 800 Malaysian University English Test (MUET) Regulations and Test Specifications to understand the development of MUET language test. The study aimed to (a) identify details provided in the document, (b) identify the details regarding MUET Writing test, and (c) determine influence of the CEFR on MUET. The results of the current study agree that the researched document follow the dimensions of test development. Though there is a disparity between the earlier section of the test specification with the assessment and scoring criteria, the developed assessment and scoring criteria still follows the same overall theoretical model. In short, based on the detailed analysis on the 800 Malaysian University English Test (MUET) Regulations and Test Specifications, it is determined that CEFR has had a positive influence on MUET test development.

Keywords: English language testing; CEFR; MUET; Test specification.

Study on Effect of Barium Titanate Concentration in Epoxy Based Composite Towards Dielectric Material

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Abstract

The properties of dielectric material can be controlled by introducing new composite material from filler (barium titanate) and matrix (epoxy resin). This paper focuses on the development of epoxy–barium titanate composites at different filler concentrations. To develop new composite material, mixing, degassing, and curing are common procedures to be implemented. However, the preparation of composite materials is difficult when the filler concentration is higher than 20% due to the viscosity of the composite mixture. In this work, the complex permittivity of composite materials of epoxy resin and filler barium titanate is measured between 4 and 6 GHz using the waveguide technique. As a results, the permittivity of epoxy–barium titanate grows continuously as the filler volume increases.

Keywords: Barium titanate; Epoxy resin; Composite material; Filler concentration; Complex permittivity.

**Recent Advances in Photocatalyst for Photocatalytic Degradation of Organic Pollutants:
Short Review**

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Abstract

Wastewater from industries that predominantly consist of organic pollutants significantly contributes to water pollution and harms the environment, which should be urgently solved. Among available wastewater treatment technologies, photocatalysis has attracted much interest because of its high efficiency, cleanliness, and sustainability. Various metal oxides photocatalysts have been explored, but each of the metal oxides photocatalyst has its limitation, such as agglomeration, rapid electron-hole recombination, and photo corrosion. Thus, practical design and facile synthesis of photocatalysts are still significant challenges. Due to that, various researchers have introduced and studied photocatalyst modification, such as doping with noble metal or non-noble metal, crystal facet engineering, surface modification, dye sensitization, and Z-scheme photocatalyst system to enhance the photocatalyst's catalytic properties. It was also reported that modifying the photocatalyst's catalytic properties would able to enhance the degradation of organic pollutants. In this review article, the recent advances in photocatalysts for photocatalytic degradation of organic pollutants are reported. The future prospect and conclusions are also discussed. This review is expected to provide an in- depth understanding of photocatalyst development, thus accelerating the evolution of the photodegradation field for pollutant degradation.

Keywords: Wastewater; Photocatalysis; Photocatalyst; organic compounds.

Mini-Review on CO₂ Reforming Methane in Aspect of Fibrous Zeolite's Properties

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Abstract

The threat of climate change resulting from the excessive emission of greenhouse gases remains intractable. CO₂ reforming of methane (DRM) has attracted considerable attention owing to its advantages in converting two primary greenhouse gases (CH₄ and CO₂) into synthesis gas (H₂ and CO). However, catalyst deactivation arose from sintering and carbon formation is the primary problems for DRM that must be urgently solved. In this regard, creating support materials with fibrous morphology and dendrimeric structures is becoming an intriguing approach demonstrating its advantages in improving catalyst's physicochemical properties thus promote an excellent catalytic activity, stability, and deactivation resistance during reaction. This mini-review focuses on the physicochemical features of fibrous zeolite-supported type catalysts and their significance in DRM catalytic performance, including the interaction between metal and support, metal dispersion, particle size, porosity, and surface area. This study also provide the understanding of catalytic properties and their correlation with catalytic performance needed for the design of catalysts and suitable for DRM.

Keywords: CO₂ reforming methane; Fibrous type.

Effects of Concrete Debris and Bottom Ash Usage on the Improvement of Ballast Degradation

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Abstract

Railway track bed degradation happens due to single-particle and angular corner breakage, which is the current research interest. However, there is a lack of study on the effects of certain inventory waste incorporation in reducing the particle damages. This study evaluates the damage that can be reduced by incorporating waste into conventional ballast (CB). The optimum percentage of waste that can be incorporated in order to have an undisrupted ballast function were also evaluated. Concrete debris (CD) waste from construction and demolition works and bottom ash (BA) waste from coal power plants were incorporated with conventional ballast (CB) in twelve different track design mixtures (TDM). These mixtures were studied by conducting Los Angeles Abrasion (LAA) to fasten deterioration and obtaining the initial and final particle size distribution (PSD). The Hardin breakage index (HBI), ballast breakage index (BBI), void contamination index (VCI) and fouling index (FI) were obtained through the PSD of each TDM. Using the data obtained the damage that is reduced and the optimum amount of CD and BA that can be incorporated with conventional ballast were determined. The microscopic image was used to support and validate the outcomes. When bottom ash and concrete debris were added in various percentage no more than 50% in total, the BBI value within the TDM improved by 22.95%. The HBI, FI, and VCI have all seen improvement of 64.52%, 5.5%, and 18.22%, respectively. This proves that waste incorporation reduces the overall track bed deterioration effectively. As a result, the BBI for waste-containing ballast fall between 0.34 and 0.6, whereas the HBI was in the range of 0 to 0.61. The fouling index was recorded less than 15.5%, and the VCI was in the range of 33.28% to 62.45%. Therefore, provision of various waste materials into conventional ballast considerably reduces the damages. In conclusion, the usage and the dependency of natural ballast can be reduced which promotes sustainable development in the railway construction industry.

Keywords: Los Angeles abrasion; Breakage reduction; Conventional ballast; Concrete debris; Bottom ash; Breakage index; Fouling index.

The Theories of Accident Causation Model Development

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Abstract

Accidents occur in all types of industry resulting in injury, fatalities and damage to human, assets or environment. Occupational accidents are substantial expense to the society and individual companies. Accident causation models can specify and explain from different perspectives how an accident occurs. The following concepts are successfully explained by accident causation models: (i) why accidents happen, and (ii) how accidents happen. These models serve as a crucial theoretical foundation for safety research because they provide support for a thorough method of accident analysis and prevention. This study reviews accident causation models established by previous researchers and summarizes their findings as follows: (i) the function and history of accident causation models, and (ii) the strength and limitation of accident causation model. The development trends of several accident causation models are compared and analyzed.

Keywords: Accident causation model; Accident causation; Accident.

Safety Culture Awareness and Practices in the Malaysian Mining Industry: A Preliminary Study

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Abstract

Presently, safety culture is receiving attention for the prevention of mining disaster or accidents. The mining industry in Malaysia has been around for 200 years and fortunately, to date, there is no large-scale mining disaster that has occurred in Malaysia. However, that led to a lack of study on the safety culture in Malaysian mining industry. The study aims at exploring the current status of safety culture awareness and practices in Malaysian mining industry. A qualitative, open-ended interview session was conducted in April 2021 via the online Google Meet platform. Six mining experts had agreed and volunteered to be involved in the interview session. Three themes were created: (1) Significance of safety culture in mining; (2) Factors that make up the safety culture in mining industry; and (3) Adopting safety culture in mining industry. Three themes and eight sub-themes were validated by the mining expert interviewers. In conclusion, the current status of safety culture awareness and practices in mining industry is very low. It was observed that there was a huge gap between small-scale and large-scale mining operation in Malaysia. For small-scale mining operation, it was below 50%, where one of expert claimed it to be approximately 30%. It is recommended that the top management of mining companies have their mindset changed, not only focusing on the profit but to strengthen the safety aspects as well. A good safety culture will increase the workers and operational productivities and prevent mining accident or disaster in Malaysia in the near future.

Keywords: Mining operation; Mining disaster; Mining accident; Safety culture awareness; Small-scale mining operation.

A Comprehensive Review on Different Path Planning Methods for Autonomous Vehicles

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Abstract

Autonomous vehicle is an active field where researches are going on to improve the vehicle's capability to travel autonomously from one place to another. Vehicle has to progress through different levels of control structure to navigate through different environments. Among those path planning plays a major role in autonomous vehicles navigation as different planning methods need to be used for planning the path at different intersections for the vehicle. However, AVs still face some challenges in urban intersections such as roundabouts, obstacle avoidance, which need to be resolved for completely automated path planning in AVs. So, this paper presents an overview on different path planning methods implemented in autonomous navigation. A description on different path planning methods and implementation of these methods by different authors is presented.

Keywords: Motion planning; Autonomous vehicle; Path planning.

Carrageenan-Nanocomposite Film Incorporated with Bentong Ginger Extracts for Active Food Packaging: Synthesis and Characterization

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Abstract

Bentong Ginger (BG), Malaysia patented ginger consist of various bioactive compounds such as gingerols which account for the various pharmacological benefits in human including antioxidant, antimicrobial, and anticancer. This study was conducted to analyze the potential of BG extracts different concentrations (5, 10 and 20 % v/v) incorporated in plasticized carrageenan nanocellulose (CN) as active film packaging in foods. The bioactive constituents in BG extracts were identified using Liquid Chromatography Quadrupole Time-of-Flight Mass Spectrometry (LC-QTOF/MS) and the possible interaction between the carrageenan-nanocellulose film network and BG were confirmed using Fourier-Transform Infrared (FTIR) Spectroscopy. The effects of BG extracts formulated in CN film on the antioxidant release, physical and mechanical properties of the films were studied. The CN film with 20% BG showed the best improvement on its tensile strength, elongation at break, thickness, opacity, water solubility and moisture content. Antioxidant release test showed continuous release of antioxidant and total phenolic content in food simulant 95 % food simulants for 28 days. This study validated that incorporation of BG extract can a promising natural additive for active packaging materials.

Keywords: Carrageenan; Nanocellulose; Active packaging film; Bentong ginger; Antioxidant; Mechanical properties; Physical properties

FURIA Stacking Ensemble for ASD Classification

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Abstract

Autism Spectrum Disorder (ASD) is an illness that affects many children nowadays. It is a condition that causes parents to be concerned about detecting early autistic traits in their children because they are not visible until an expert diagnosis them using screening tools. However, screening tools consist of specific criteria domain rules such as behaviour, communication, and social emotions that comprise various questions, resulting in excessive questions and significantly lengthening the autism screening process. Instead of relying on conventional domain expert rules, one possible solution is adapting fuzzy rules by proposing the Fuzzy Unordered Rule Induction Algorithm (FURIA) and the machine learning algorithms by collaborating them into the stacking ensemble framework. The results show that the stacking ensemble of FURIA with the Logistic Regression generated ten rules and a 95.072% classification accuracy with 0.965 precision in predicting ASD traits. These findings will be an alternative option to make the screening questions much simpler yet give an alternative to the parents in predicting earlier with less time and good accuracy results.

Keywords: FURIA; Fuzzy-rule-based; ASD; Ensemble method; Stacking; Machine learning algorithms.

Isolation of *Meyerozyma Caribbica*, *Penicillium Georgiense*, and *Pichia Kudriavzevii* from Harumanis Mango (*Mangifera Indica L.*)

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Abstract

Microbes from the environment usually spoil fruits. Thus, this study was carried out to study fungi that play an important role in rot fruits. Several microbes were isolated using the culture-dependent method, *Penicillium georgiense*, *Meyerozyma caribbica*, and *Pichia kudriavzevii*. All these gDNA extracted can be identified with their characteristic pathogenic properties or benefits through high-throughput sequencing technology and compared from the NCBI database's known sequence. This finding can be explored further in the future with further experimental validation processes.

Keywords: Mango; Harumanis; High-throughput sequencing technology.

Influence of Aggregates Shape on Porous Asphalt Mixture

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Abstract

Porous asphalt (PA) is a porous pavement layer made of an open graded aggregate that has a lot of linked air voids. The technical qualities and performance of PA are heavily influenced by the aggregate shape and surface roughness. Granite aggregate was use in this research to study the effect of aggregate shape on volumetric and mechanical properties of porous asphalt mixture and to evaluate the quality of aggregate shape of porous asphalt mixture (PAM) in relation to aggregate shape. To classify the aggregate size, Sieve Analysis Test was carried out and followed by Flakiness and Elongation Index Test. Marshall Stability Test and Resilient Modulus Test were conducted to study the behavior of PAM by replacing different shape of aggregate. Based on the result cubical shaped aggregates are more recommended to be use in PAM, due to the strength is higher than the conventional PA.

Keywords: Porous asphahlt; Aggregate shape; Flakiness index; Elongation index; Flaky aggregate; Cubical aggregate.

A Model of Web Page Classification using Convolutional Neural Network (CNN): A Tool to Prevent Internet Addiction

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Abstract

Game and Online Video Streaming are the most frequently visited web pages. Internet addiction may be negatively impacted by users who spend too much time on these types of web pages. Access to Game and Online Video Streaming web pages needs to be limited in order to combat the issue of internet addiction. Therefore, a tool that can categorize incoming web pages based on their content is required. This paper is proposing a web page classification model using a Convolutional Neural Network (CNN) to classify the web page whether it is a Game or Online Video Streaming based on the pattern of words in the word cloud image generated from the web page text content. The proposed web page classification model has achieved 85.6% accuracy.

Keywords: Web page classification; Deep learning; Convolutional neural network; Word cloud image; Internet addiction.

Chlorophyll's Dependency Towards Electrical Characteristics of Banana Midrib-Based Dye-Sensitized Solar Cell for Waste Management Solution

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Abstract

The application of Banana Midrib waste chlorophyll as an alternative natural dye in Dye Sensitized Solar Cell (DSSC) could be advantageous. The natural colors utilized in this study were derived from the chlorophyll of the banana midrib. TiO_2 , chlorophyll and KI serve as a working electrode, photosensitizer, and electrolyte in the DSSC respectively. Chlorophyll, which can be extracted from majority of greenly plants, is one of the important substances in absorbing the light for energy harvesting. Since the concentration level of chlorophyll defers for each type, age or part of the plants, numerous studies related to these scopes have been actively performed. In this study, banana midrib that are mostly common waste will be benefited to extract different concentration levels of chlorophyll for the fabrication of DSSCs' purpose. The relationship between the chlorophyll's concentration level and the output of electrical properties will be further analyzed.

Keywords: Dye-sensitized solar cell; Chlorophyll; Banana midrib.

An Overview of Effect of Activation Functions on Training and Performance of Artificial Neural Network Modelling

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Abstract

This paper presents an overview of the effect of the activation functions on the training and performance of artificial neural network modelling. An artificial neural network's activation functions are mathematical formulas that are essential to its design. Activation functions are a critical component of artificial neural networks since they impact the performance of the ANN model to a considerable extent. It is a function that is utilized in order to obtain the output of the node. In an artificial neural network, defining an activation function is critical, as it directly affects the network's success rate. A concise summary of some of the most frequent activation functions that are utilized in neural networks. Activation functions are defined, their properties are compared, and their advantages and disadvantages are described in this paper. This review is provided with the definitions, features, performance comparisons, merits and demerits and applications of activation function in various areas. The activation function has an impact on the development of ANN models. It is found that sigmoid, Tanh and ReLU are the most used activation function and give better performance compared to others.

Keywords: Activation functions; ANN; Sigmoid; Tanh; ReLU.

Numerical Analysis of Internal Flow in Internally Cooled Cutting Tool

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Abstract

Metal cutting process often accompanied by heat generation at the contact area between cutting tool and the workpiece. Cutting fluid is used to remove the excessive heat generated and decrease the temperature of cutting tool. The benefits come with several drawbacks as cutting fluids are not environmentally friendly, high cost, and contain hazardous substance which may cause health issues to the workers. One of the green alternatives to conventional flood cooling is by using internal cooling channel embedded in the cutting tool. The aim of this study is to evaluate the flow regime of the cooling fluid in the cooling channel of 2 mm diameter, finding the friction factor, and to determine the pumping required to supply the fluid at each inlet velocity. Calculations has been done to determine the flow regime and the mapping of the velocity profile of the cooling fluid. The fluid is assumed to be Newtonian, incompressible, single-phase fluid. The result shows that the Reynolds number is in the range of 468 to 7027 where it is considered to be turbulent flow if the Reynolds number exceed 2300 and the fluid start behaving as turbulent flow at velocity of 1 m/s. In addition, with increasing Reynolds number, the friction factor decrease while on the other hand the pumping power required to overcome the pressure drop increase.

Keywords: Cutting tool; Fluid dynamics; Internally cooled cutting tool.

Power Production Optimization of Model-Free Wind Farm using Simulated Annealing Algorithm

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Abstract

This research set to appraise the potency of Simulated Annealing (SA) based method within enhancement of wind farms' power generation performance. Horns Rev Offshore Wind Farm with a total magnitude of 80 wind turbines was hereby replicated to study the recommended SA based method. Core objective of the simulation then focused maximization of power output through parametric fine-tuning of individual wind turbine through the SA based method. Recorded findings on boosted convergence rate, elevated accuracy and magnified power production consequentially verified efficacy of the SA based method towards operational improvement of wind farms.

Keywords: Simulated Annealing; Model-free; Wind farm optimization; Power Production; Random-walk; Renewable Energy.

Investigation the Effect of Different Fraction EG:H₂O Composition and pH of Base Fluid on the Stability of TiO₂ Nanofluid

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Abstract

Numerous studies show that a tiny quantity of nanoparticles that have been added to conventional fluids improves thermo-physical properties significantly. This research focuses on improving and evaluating thermal fluid stability and thoroughly investigates various factors contributing to the enhancement of the thermophysical properties of the base fluid. The initial stage of the preparation of nanofluid is the synthesis of nano-sized solid particles using a suitable technique, and these particles then are dispersed in base fluids such as Ethylene Glycol, and distilled water. This research focuses on the sonication process and pH modification as two strategies for maintaining the stability of nanofluids. Visual observation of base fluid composition (EG: H₂O), zeta potential analysis, and UV-Vis spectroscopy are frequently used methods to analyze the stability of nanofluids. Previous research discovered that types of nanoparticle, particle volume concentration, pH, temperature, and base fluids all have a major influence on the stability of nanofluid properties. The preceding mass ratios are as follows: 20:80, 40:60, 60:40, 80:20, and 100, and the weight of TiO₂ is 0.077 g with a volume fraction of 0.1 %. When the EG and distilled water ratios reached 80:20 and 100 EG at pH 5, the particle size of TiO₂ was 21nm and the stability of TiO₂ was substantial. Finally, this research also presented the findings and strategies to enhance the stability of the properties as well as the factors influencing TiO₂ nanofluid stability.

Keywords: Titanium dioxide; Ethylene glycol; Nanoparticle; Nanofluids; Stability; UV-Vis Spectroscopy; Zeta potential.

A Review on Machine Learning Techniques used for Students' Performance Prediction

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Abstract

Research on predictive models has been widely used in higher educational institutions, especially in predicting students' performance. Results that were obtained through predictive models can help lecturers in ensuring students' achievement so that students' failure rates can be reduced. Higher failure rates have a negative impact not only on students but also on institutions and shareholders. In this paper, thirty journals and case studies have been reviewed where the most important part highlighted is machine learning techniques that have been used in developing predictive models to predict students' performance from the previous six years. Although the main objective of this paper is to provide an overview of machine learning techniques in predicting students' performance, it is also important for researchers to identify the target variable used in those techniques as these two objectives are related to each other. In conclusion, a student's final grade is the most widely used as a target variable, and the Decision Tree method is the most frequently used machine learning technique by the authors in the previous studies.

Keywords: Higher education; Machine learning; Predictive models; Students' performance.

EEG Mechanism Interaction to Evaluate Vehicle's Driver Microsleep

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Abstract

Microsleep or more commonly known as momentary uncontrollable fall asleep in a very short period of time usually occurs between one second to fifteen seconds. In Malaysia, one of the factors that contribute to accidents is due to the microsleep factor when the driver is driving without them being aware. This factor also often occurs when driving in a tired state and traveling too long distance. Weather factors can also contribute to microsleep. Therefore, in this research, a system has been developed to detect frequency waves from the brain based on signals from electroencephalogram (EEG) electrodes to prevent drivers from experiencing microsleep and getting involved in accidents. To conduct this research, five subjects of different ages and gender were selected to collect their brainwave data using the NeuroSky Mindwave Mobile Headset device and the EegID Record application in two different situations, namely by driving the simulation in a challenging condition for 30 minutes and the second situation is by driving the simulation in a relaxed condition for 30 minutes. In addition, the use of MATLAB in this research is to pre-process the wave signal to remove unwanted noise interference. Then, a bandpass filter is used to classify and separate the signal into Theta, Alpha, and Beta waves. These three waves will be analyzed and studied based on the age and gender differences of the subjects. After the spectrum of the wave is drawn to trigger the alarm system and the steering vibration motor if microsleep is detected for some period of one to 3 seconds.

Keywords: Driving simulation; EEG; Microsleep detection system; Neurosky mindwave.

Customer Sentiment Analysis through Social Media Feedback

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Abstract

Customer sentiment analysis is an automated way of detecting sentiments in online interactions in order to assess customer opinions about a product, brand or service. It assists companies in gaining insights and efficiently responding to their customers. This study presents a machine learning approach to analyse how sentiment analysis detects positive and negative feedback about a telecommunication company's products. Customer feedback data were taken from Twitter through Streaming API (Application Programming Interface), where Tweets are retrieved in real time based on search terms, time, users and likes. Responses from the twitter API are parsed into tables and stored in a CSV file. Based on the analysis, it was found that there was no negative sentiment from the customers. The data were then split into training and testing to be tested on the three different supervised learning algorithms used in this study which are Support Vector Machine, Random Forest, and Naïve Bayes. Lastly, the performance of each model was compared to select the most accurate model and from the analysis, it can be concluded that Support Vector Machine gives the best performance in terms of accuracy, Mean Squared Error, Root Mean Squared Error and Area Under the ROC curve.

Keywords: Sentiment analysis; Twitter; machine learning; Natural language processing.

Gradient-Based Mutation Manta Ray Foraging Optimization (GbM-MRFO) for Solving Constrained Real-World Problems

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Abstract

In this paper, a new variant of Manta Ray Foraging Optimization (MRFO) algorithm is introduced to deal with real parameter constrained optimization problem. Gradient-based Mutation MRFO (GbM-MRFO) is derived from basic strategy of MRFO and synergized with the Gradient-based Mutation strategy. MRFO is a recently new introduced algorithm that consists of strategy of foraging adopted by Manta Ray while Gradient-based Mutation (GbM) is a feasibility-and solution repair strategy adopted from ϵ -Matrix-Adaptation Evolution Strategy (ϵ -MAES). MRFO is proven to solve artificial benchmark-function test by relatively good performance compared to several state-of-the-art algorithm while GbM is a productive approach to repair solution which led to improve the feasibility of the solution throughout the search by using Jacobian approximation in finite differences. GbM-MRFO turn out to be a competitive optimization algorithm on solving constrained optimization problem of Three-bar Truss problem. The performance of GbM-MRFO is proven to be efficient in solving the problems by providing lighter weight of truss with better accuracy of solution.

Keywords: Manta ray foraging Optimization; Constrained optimization problem; Gradient-based Mutation; Three-bar truss; Accuracy.

Advances in Fabric-based Airbag Materials for Emerging Automobile Applications and Their Promising Future

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Abstract

This paper presents the fabric-based airbag materials' future development and prospects for automotive applications. Safety measures like airbags are vital for both occupants and the vehicle itself. For a long time, airbags in vehicles were made of conventional materials. The airbag is merely a piece of clothing but a functional interface for the latest technological advancements. The integration of more innovative materials is currently limited, despite the rapid progress in this field. Different textile-based airbags are being introduced in multiple arbitrary positions of a vehicle to mitigate injuries in car accidents. Apart from saving lives, the global airbag market is also expanding at a staggering speed, and the forecasted value is worth USD 48.10 Billion by 2030 at a CAGR of 7% during the year (2022~ 2030). Airbag fabric is growing lighter from coated to uncoated fabric to fit with the emergence of lightweight materials. And more preferences are given to the materials to be more durable for years and functionally. This paper signifies the choice of airbag manufacturing materials, types of airbags used in automobiles, forthcoming innovations, problems with airbag misplacement in futuristic vehicles. It is speculated that this review will help understand the current challenges and give insight into future progress in advanced airbag utilization.

Keywords: Airbags; Textiles; Nylon 6.6; Lightweight material; Automotive.

Lignin Extractions from Oil Palm Empty Fruit Bunch under Pressurized and Inert Conditions

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Abstract

In this study, for the first time, lignin was extracted from palm oil empty fruit bunch (EFB) by using a pressurized reactor in the presence of deep eutectic solvents (DES). DES is prepared by mixing choline chloride and oxalic acid at a ratio of 1:1, successfully extracting around 30 wt.% of lignin under a relatively mild temperature. Fourier transform infrared spectroscopy (FTIR) and differential scanning calorimetry (DSC) are used in order to analyse lignin, whereas X-ray powder diffraction (XRD) is used to investigate the solid residues. FTIR analysis revealed the characteristics of lignin with a major functional group composed of phenolic, aliphatic hydroxyl and conjugated alkene in the FTIR spectra. This was further confirmed with thermal stability data using DSC. The crystallinity of the solid residue consisting of cellulose was observed to be affected by different temperatures, with the highest value (43.5 %) at 80 oC. The yield of lignin extracted under a pressurized and inert environment shows more than double the value of lignin as compared to the analogue process under atmospheric pressure and also shows comparable lignin yield with microwave assisted extraction systems. Thus, it provides a new, facile, and efficient approach to the delignification of lignocellulosic biomass.

Keywords: Empty fruit bunch (EFB), Lignin, Deep eutectic solvents (DES), High-pressure reactor

The Physicochemical Properties and Thermal Behaviour of Rice Husk for Dust Explosion Study

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Abstract

Combustible dust is present in a great variety of industries. It is estimated there are about 13 million workers in the manufacturing industry and thousands of these may be at risk of injury related to combustible dust. In order to reduce dust explosion in this industry, a study on the physicochemical properties thermal behaviour on explosion characteristic of rice husk is carried out with range size of rice husk is 63 μ m - 355 μ m. Thermal gravimetric analyzer (TGA) which is used to test the present of moisture content, rice husk ash, volatility and fixed carbon shows that the value is 15.55%, 0.17%, 50.19% and 34.05% accordingly. Decreasing of moisture content and increasing of volatile matter were tend to increase the explosion hazard which mean can lead to explosion as the moisture content of a sample may act as a prevention or mitigation factor for dust explosions while high volatile content may increase the maximum rate of pressure rise. Meanwhile, four size of rice husk samples; 63 μ m, 106 μ m, 125 μ m and 355 μ m were analysed along with the elemental identification by scanning electron microscopy with energy dispersive x-ray (SEM-EDX) analysis. The size of the sample may influence the ignition and severity of a combustible dust explosion.

Keywords: Calorific Value; Combustible Dust; Explosion Severity; Rice Husk

Effect of Graphene Oxide Loading on Cobalt Oxide Performance as Electrocatalyst for Methanol Oxidation Reaction

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Abstract

In this paper, cobalt oxide with graphene oxide included were prepared using a straightforward hydrothermal approach in this study for the electrocatalytic oxidation of methanol. Scanning electron microscopy (SEM), and X-ray diffraction (XRD), FTIR, and XPS techniques were used to evaluate the produced cobalt oxide with graphene oxide. Cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS) techniques were used to examine the electrochemical behaviour of an electrode modified with GO-CO₃O₄. In regard to the oxidation of methanol in an alkaline medium, the electrocatalytic performances of electrodes modified with graphene oxide at various graphene oxide weight percentages were examined. The graphene oxide, and cobalt oxide modified electrodes, the GO-CO₃O₄ modified electrode displayed higher current density brought on by the oxidation of methanol.

Keywords: Cobalt Oxide, Graphene Oxide, Fuel Cell, Renewable Energy

Qualitative Risk Assessment in V-Blender Using Bayesian Network

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Abstract

The development of solid dosage is very important in the production process, especially in powder blending. Moreover, the homogeneity of products can be influenced by the performance of powder blending operations that do not conform to the desired specifications and therapeutic effect as regulation by the Food and Drug Administration (FDA) may be detrimental to consumers. In addition, the International Conference on Harmonization (ICH) has also taken initiatives to improve production standards by establishing ICH 9 for Quality Risk Management (QRM). This is why drugs must be manufactured with high quality, safety, and effectiveness to ensure the safety of drug manufacturers as well as consumers. The objective of this research work is to study and investigated the probabilistic relationship between process parameters that can affect the blender performance that led to blending inhomogeneity by using the Qualitative Risk Assessment (QRA) method. QRA method is performed in order to categorize the identification risk level exposed in powder blending with low, medium, and high levels. The method of QRA that has been applied in this study is the Bayesian Network (BN) model. Furthermore, the BN is one of the risk assessment tools that present the parameters and their conditional independence using a directed acyclic graph (DAG). The BN was used to verify the process parameters that could cause the failure of blending unit operation are fill level, loading order, blending time, and blending speed. However, from the outcome, the critical process parameters (CPPs) that have a greater risk of affecting homogeneity are a combination of fill level, loading order, and blending speed with 0.62 while the highest probabilities value of failure was a combination of fill volume, loading order and blending time with 0.92. The medium probabilities value of failure was a combination of fill level, blending time, blending speed, and combination of loading order, blending time and blending speed, which was 0.77 and 0.69, respectively. Moreover, it can be concluded that the failure that caused by the related process parameter is 0.75 for a true statement while the false statement is 0.25. This can be concluded that not all of the process parameters can impact the blender operation on the degree of product homogeneity. For further studies, it is possible to address the limitation of the BN in combination with a quantitative risk assessment to confirm the results and minimize the risk of failure by practicing the preventive method.

Keywords: Qualitative Risk Assessment; Blending unit operation; Bayesian network; Risk analysis.

The Employment of Transfer Learning for Covid-19 Diagnostics: A Resnet Evaluation

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Abstract

Artificial intelligence (AI) have made significant gains and contribution, particularly owing to the introduction of powerful graphical processing units in recent times. Furthermore, the advent of transfer learning models, which is a subset of deep learning models such as VGG16, InceptionV3, and ResNet, to name a few, have further allowed for the accomplishment of a variety of tasks. In modern medicine, AI has been used for the detection of diseases. The recent virus outbreak has gravitated the capabilities of AI to be deployed in a short time as the virus evolves. This study demonstrated that medical data is sensitive, and the learning model should be tuned for each dataset. The findings from the present study suggest that the ResNet101V2-sigmoid pipeline shows the most promising results in detecting COVID-19 from chest x-ray images. This will pave the way for the development of high-performance detection models, albeit with limited datasets.

Keywords: Activation function; Covid-19; ResNet; Transfer learning; X-Ray.

Cross Technology Communication (CTC) between DSRC/WAVE and TVWS: From Survey Towards Framework

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Abstract

Cross Technology Communication (CTC) adjoin two or more different radio access technology (RAT) so that they can communicate directly. As vehicular communication has become a part of modern life and many applications like IoT, smart city is incomplete without vehicular network, it has become a research challenge to integrate it with other RAT's. For the scarcity of spectrum and increasing demand on cellular spectrum, unused TVWS spectrum has become an undeniable choice for integrating it with vehicular communication technology, DSRC/WAVE. Several researches on CTC for Wifi, Zigbee, Bluetooth Low Energy (BLE) have been published that operate in the ISM spectrum. This is the first attempt to constitute a framework for CTC of two different spectrums, DSRC/WAVE and TVWS so that the implementation would become feasible.

Keywords: CTC; DSRC; WAVE; TVWS; Vehicular communication; H-CTC; Cross technology communication.

Review on Energy Management System in Microgrids

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Abstract

Microgrid has been widely used as an approach for the integration of distributed energy sources with energy storage systems in the electrical distribution network. It is developed as a building block for the smart grid system. In this paper, the review focuses on a comparative controller in a microgrid for energy management systems (EMS) is presented. The EMS is crucial in microgrid operation as it is used to control the power flow to the load demands and voltage sharing due to uncertainties of the input energy sources. As an outcome, the review provided the researcher with viewing the existing approaches and possibilities for improvement.

Keyword: Microgrid, Energy management, Network of microgrids, Energy internet, Microgrid control.

The Utilisation of Digital Tools on ESL Learners' Creativity: A Systematic Literature Review
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Abstract

In order to effectively incorporate the use of digital tools, educators should consider how digital tools influence student learning, most importantly ESL learners' creativity. Existing research suggests that digital tools can help ESL learners be more creative, but new research in this area has yet to be assessed. This systematic literature review attempts to identify and synthesise journal articles on the use of digital tools in the fields of creativity and education. To this end, journal articles was reduced to 13 relevant papers from an initial sample of 207 journal articles. The journal articles were assessed to arrive at a clear understanding of the state of research. Analysis reveals a positive outcome on the use of digital tools on ESL learners' creativity. Findings conclude that research related to digital tools and creativity has dealt with major concerns in the field overall. Notably, additional research on the impact of digital tools on creativity in ESL education is recommended. The synthesis will be of interest to both researchers and practitioners in the field of creativity and education, concerning the use of digital tools.

Keywords: Digital tools; ESL learners; Creativity.

Improving Pressure Valve Precision using Finite-time Prescribed Performance with Fractional-Order Proportional, Integral and Derivative Control

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Abstract

The paper presents the improvement of precision control on pneumatic system pressure using Finite-time Prescribed Performance Control with the Fractional-Order Proportional, Integral, and Derivative (FOPID-FTPPC) control. The control strategy is proposed to overcome the nonlinearity produced by the pneumatic system in regulating the pressure on positioning operation. The study was conducted through several experiments with a 5/3-way pneumatic proportional valve that configured with pressure transducers as feedback responses. The study was done with two different types of common input trajectories: step and sinusoidal inputs. The proposed FOPID-FTPPC controller outperforms the FOPID controller by 26% in terms of minimizing the overshoot of the step input trajectory. On the other hand, the proposed controller exhibits significant performance with a sine wave input trajectory, and the advantage of its integration with FTCPPC frameworks allows it to achieve steady state performance even more quickly. The findings demonstrate that the proposed the proposed FOPID-FTPPC controller can regulate the pneumatic systems pressures while eliminating steady-state errors, fast response as well as reducing the overshoot.

Keyword: Pneumatic system; Prescribed performance control; Pressure control; Finite time.

Phonetic Instruction in English Language Learning: Perceptions of Yemeni Elementary Students

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Abstract

The ultimate goal of this research is to explore the EFL students' opinions on the teaching of English phonetics (IPA) at the elementary level. To achieve the purpose of the study, a semi-structured interview was conducted. All interviews were audio recorded with the participants' consent. The participants were 25 female students at Almina Educational Complex for Girls who were in elementary 2 (Year 8) which is their second year of studying English as the school's main subject. The participants received a 3-week IPA instructions of English diphthong sounds. All recorded interviews were analyzed manually. Semistructured interview data revealed that students' fear of making mistakes was the dominant reason behind their difficulties in English pronunciation. Moreover, lack of practice and the absence of pronunciation training were viewed as the main causes for the students' mispronunciation in English language. The results of the current study provide empirical evidence to the importance of the phonetics instructions at the elementary level.

Keywords: Phonetic instruction; Perceptions; Diphthong sounds; EFL

A Preliminary Study of Pyrolysis Kinetics among Various Types of Oil Palm Wastes

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Abstract

Oil palm waste such as empty fruit bunch (EFB), mesocarp fibre (MF) and palm kernel shell (PKS) are some of the abundant wastes produced by oil palm mills which have great potential to replace fossil fuel through the application of thermochemical processes like torrefaction which produces solid biofuel and pyrolysis that produces bio-oils. The study of the kinetics of a reaction indicates the activation energy and frequency factor of the reaction are often applied in the design of a reactor. In this study, the kinetics of pyrolysis of oil palm wastes were investigated with the aid of a derivative thermogravimetric graph (DTG) using thermogravimetric analyzers. Model-fitting methods including Arrhenius, Coats-Redfern (CR) and Kennedy-Clarke (KC) models were applied to obtain the kinetic parameters which are activation energy (E) and pre-exponential factor (A). As a result, it is clear that the CR model provides the most accurate estimates of the kinetics of the pyrolysis of oil palm wastes.

Keywords: Pyrolysis; Kinetics; Model-fitting methods; Oil palm waste.

Recent Advances in the Pharmacotherapeutics Application of Hyaluronic Acid: A Review

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Abstract

Hyaluronic acid (HA), a natural non-sulphated glycosaminoglycan and biopolymer, plays a multifaceted role in regulating various biological processes. HA is found in many tissues and fluids but is abundantly available in articular cartilage and synovial fluid. HA has been used for different pharmacotherapeutics for the last few decades, including osteoarthritis, cartilage repair, and wound healing. Due to its distinct physicochemical properties, HA is used to make scaffold materials suitable for tissue engineering. Recent advanced research has revealed that the effectiveness of HA depends on its molecular weight (M_w). This review summarised the recent progress in different pharmacotherapeutics applications.

Keywords: Biomedical application; Biopolymer; Glycosaminoglycan; Tissue engineering; scaffolds

Machine Learning Based Data Monitoring System for Chicken Poultry

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Abstract

Livestock is one of the production sectors that can produce many resources for human needs such as meat, egg, milk, leather, wool, and fur. Farmer must ensure that all farm animals are in good condition to achieve optimum level of production. The welfare of livestock can be determined by observing and analyzing the animal's health and behaviour. The livestock that has a symptom of being sick leads to a low level of production compared to good animal welfare. In the case of chicken poultry, a low nutrient diet and inconsistent daylight may lead to decreased of laid eggs. As a result, the poultry are unable to produce the desired amount of egg to end consumer which trigger an issue in food security. The objective of this study is to evaluate chicken production based on its effectiveness by implementing machine learning. The level of chicken production is determined by using fuzzy logic as the machine learning platform based on the collected data. After the data were evaluated by fuzzy logic, the result of the system will indicate whether the chicken will produce a low, normal, or high level of production. By using this system, farm owners are able to predict whether the chickens on their farms are able to produce the desired quantity of chicken.

Keywords: Food security; Livestock; Production; Fuzzy logic; Machine learning.

A Review on Predictive Model for Heart Disease using Wearable Devices Datasets

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Abstract

Heart diseases were the number one killer in Malaysia based on the data from the Department of Statistics Malaysia in the previous year. The number of cases has been increasing from 2156 in 2020 to 2693 in 2021. There were lots of studies that had been done in discovering the factors that cause heart disease and ways to prevent it. Among the ways to prevent heart disease include analysis on the patients' historical data, developing predictive modeling involving statistical and machine learning techniques and monitoring health conditions through wearable devices. This paper reviewed the predictive model that had been applied in heart disease prediction by using wearable devices datasets. Artificial neural networks (ANN) have grown in popularity in data mining and machine learning for its ability to classify input data into several categories by detecting hidden connections in the data, which is beneficial in predicting correct classifications. Other approaches, such as Naive Bayes, neural networks, and Decision Tree algorithms, are used to analyze medical data sets to forecast cardiac disease. Based on the degree of accuracy, Naive Bayes looks to be the most successful model for predicting heart disease patients, followed by Neural Network and Decision Trees.

Keywords: Heart disease; Machine learning; Predictive modeling; Wearable devices.

Superiority of Gel Polymer Electrolytes as an Application in Lithium-Ion Batteries

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Abstract

In the era of technological development, electronic devices such as laptops, cameras, and electric vehicles have been significantly important for humans in their daily lives. Thus, a battery system with extremely high stability, long cycle life, high energy density and environmentally friendly is expected to be the main power supply. Lithium-ion batteries (LIBs), widely used in the market nowadays, have offered good electrical performances as required. Yet, the safety problems from the liquid electrolyte itself impede their applications whenever the batteries were subjected to thermal, mechanical or electrical abuse conditions. Hence, gel polymer electrolytes (GPEs) are being investigated as a viable alternative to replace the organic liquid electrolyte currently available for developing safer LIBs. This review paper discussed recent development in GPEs as an effort to develop a better performance of LIBs. Besides that, to fabricate a device with good physical and electrochemical behaviours, the GPEs need to be improved significantly in providing the solution for the growth of dendrites, unstable electrode-electrolyte contact and ion transports. Additionally, incorporating bio-based polymer in the GPEs with high capability was suggested to produce LIBs with promising energy and power density besides its eco-friendly behaviour.

Keyword: Gel polymer electrolyte; Lithium-ion battery.

A Study on Online and Offline Shopping in Malaysia

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Abstract

Online shopping is an online purchase for shoppers to save their time without leaving home while offline shopping is a traditional method of shopping in which customers physically visit a store buying their needs. Number of online shopping platforms has increasing due to the country's development and the increase of places where people can access the internet and given the opportunity for them to shop anywhere. The offline shopping costs the customer's time and effort, but also provides enjoyment because they can evaluate the products, they wished to buy by themselves. The propose of this study is to analyse the satisfaction and preference of customers for online and offline shopping in Malaysia. The data in this study will be collected using questionnaires and descriptive approach will be used to analyse the data. Results found that people satisfaction towards offline shopping is more than online shopping with the percentage of very satisfied 66.7% for offline and 18.5% for online. Besides that, people prefer online shopping compared to offline shopping with 17.6% differences.

Keywords: Descriptive approach; Offline shopping; Online shopping.

Examining ESL Pre-service Teachers' Perceived Roles and Perceived Responsibilities of Teaching Writing Skills

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Abstract

Practicum is a crucial assessment component for English as Second Language (ESL) pre-service teachers (PSTs). However, evidence suggested that they encountered many challenges, including the lack of experience and skill to teach language skills, mainly writing skills. Significantly, this paper intends to explore the perceived roles and perceived responsibilities of PSTs when conducting writing classes during their practicum stint. This study employed a qualitative approach involving five (5) ESL PSTs as its samples. A focus group interview was carried out, and the data was analyzed thematically. Three (3) themes were generated, suggesting specific roles and responsibilities that a PST must carry out for each stage, i.e., prewriting, while-writing, and post-writing stages. Overall, these findings underscore the necessity of developing a framework for ESL PSTs' roles and responsibilities to guide them when teaching writing skills, eventually improving their teaching performance during practicum.

Keywords: Pre-service teacher; Practicum; Perceived roles; Perceived responsibilities; Writing skills

Comparative Analysis of the Model-free Tuning Techniques for Integral State Feedback Controller of a Liquid Slosh Suppression System

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Abstract

This paper presents a comparative study of the model-free controller tuning for a liquid slosh suppression system. Data-driven Pole Placement (DPP) and Fictitious-Reference-Iterative-Tuning with Particle Swarm Optimization (FRIT-PSO) are the two algorithms proposed as the tuning methods for the selected controller structure. These techniques are desirable to obtain the optimal parameters gain of the state feedback controller with the integral term by utilizing only the recorded input-and-output data generated from a one-shot experiment. The system's performance analysis of the controlled system is carried out using MATLAB Simulink. The assessment proves that the model-free control approaches exhibit a good response of the cart in terms of the trajectory tracking of the cart's motion while maintaining the liquid slosh motion at the minimum level.

Keyword: Integral state feedback controller; DPP; FRIT-PSO.

The Modification of Fiber-Containing Porous Asphalt with Various Additives: A Review

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Abstract

The use of porous asphalt pavement has increased in recent years compared to conventional asphalt pavement. In this regard, pedestrian walkways and parking lots often make use of porous asphalt. These kinds of additives should be used in porous asphalt pavement because they enhance the pavements serviceability and mechanical performance. These types of pavement are used in various types of fiber and additives to improve the porous asphalt pavements physical characteristics and decrease the air void in the asphalt mixture. Incorporating different types of fibers with various types of additives should increase the overall performance of porous asphalt pavement though fiber has a significant impact over the additives on pavement structure. However, some additives increase the mechanical properties of porous asphalt. Pavement design mechanism and size of aggregate is a valuable component of serviceability of porous asphalt pavement. Consider all this factor it is easily determines the strength and durability of porous asphalt pavement in the context of physical and mechanical performances. This review focus on the overall performances of porous asphalt incorporating fiber with various types of additives

Keywords: Porous asphalt; Asphalt modification; Aggregate gradation; Additives; Incorporating fiber

Waste Cooking Palm Oil as Sustainable Material for Polysulfide Synthesis: Characterization as a Crosslinker for Inverse Vulcanization

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Abstract

Edible oils are becoming popular as crosslinkers to produce inverse vulcanized polysulfides. Waste palm cooking oil can be a suitable alternative as it is inexpensive and abundant in Malaysia. In the current work, the physicochemical properties were studied to analyze the potential of using waste palm cooking oil as a crosslinker. FTIR and GC-MS were done for molecular study, functional group analysis, and percentage of constituents. Data interpretation and comparison between fresh and waste palm cooking oil shows no significant structural and spectroscopic change. TGA was done to study the thermal stability and decomposition of both fresh and waste cooking oil. It is concluded that waste palm cooking oil can be a potential feedstock for inverse vulcanized polysulfides based on the experimental results.

Keywords: Waste palm cooking oil; Characterization; Crosslinker; Polysulfide; Inverse vulcanization.

Review on Provision of Solid-state Polymer Electrolytes for Electrochemical Energy Storage Devices

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Abstract

Solid-state electrochemical energy storage (EES) development has recently attracted considerable attention due to their practical application in portable energy devices. One of the issues with recent portable energy devices is high cost and adverse environmental effects during production, mainly brought on by the rise of the stationary applications. The electrochemical performance and mechanical stability of devices during charge/discharge are generally influenced by the design and method of synthesis, especially on the development of solid-state polymer electrolytes (SSPEs). The present review provides an overview of the solvent-free process used to make solid-state polymer electrolytes (SSPEs) and its challenges. Four methods are described: solution casting technique, heat-based method (hot-pressing and melt processing), spin coating, and 3D printing. Despite being the most recent approach for creating SSPEs, 3D printing is still a bottleneck for all-printed batteries and is still intensively studied. Hot-pressing and melt processing were employed as approaches for not only SSPEs preparation but also for electrodes preparation. Solution casting is the most straightforward approach to produce flexible and transparent SSPEs compared to the other three methods. Due to its convenience, many researchers have chosen this approach to prepare their SSPEs. The solution was homogeneously placed onto a flat substrate and spread using a spin coater, which can be rotated at varying rotation speeds to generate a uniform film. This procedure is similar to the solution casting technique. The solution viscosity, spinning time, and spin coater speed all influence how thick the final coating is (production). Lastly, the challenges for SSPEs preparation development in EES devices are outlined.

Keywords: Solvent-free method; Solid-state polymer electrolytes; Heat-based method; Spin coating; 3D printing; Solution casting technique.

Study of Electrical Properties of Alg-PVA-NH₄NO₃ Complexed Polymer Electrolyte Films

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Abstract

In this work, the studies on electrical properties of bio-polymer blend electrolytes (BBEs)-based alginate-poly (vinyl alcohol) (Alg-PVA) blend complexed with various NH₄NO₃ salt weight percent was carried out and successfully prepared via solution casting method. Electrical impedance spectroscopy (EIS) was used to analyze the film's conducting behavior, and it was found that both salt content and temperature improved the ionic conductivity of the BBEs system with the highest ionic conductivity reach at 5.20×10^{-4} S cm⁻¹ for a sample containing with 35 wt.% of NH₄NO₃. The BBEs were found to follow the Arrhenius relation as a function of temperature. From the impedance analysis, the electrical properties of the BBEs system were examined using complex permittivity, ϵ^* and complex electrical modulus, M^* to further study the relation between the Alg-PVA bio-polymer blend with NH₄NO₃.

Keywords: Alginate; Polymer blend films; Impedance spectroscopy; Dielectric; Electrical modulus

Factorial Screening on the Development of Cellulose Nanocrystal/ Carboxylated Multi-walled Carbon Nanotube Polyethersulfone Membrane for Humic Acid Rejection

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Abstract

A two-level factorial experimental design was used to formulate the dope composition of cellulose nanocrystal (CNC) multi-walled carbon nanotube (MWCNT) polyethersulfone (PES) membrane for humic acid (HA) rejection. Four factors were screened, which are the composition of PES (15-17 wt.%), polyvinylpyrrolidone (PVP, 1-4%), CNC (0.01-0.75%), and carboxylated MWCNT (0-0.025%). The membranes were evaluated based on HA rejection from a 10-ppm aqueous feed solution. The percentage of MWCNT was the most significant factor, accounting for 72.31 % of the contribution. The highest HA rejection of 90% was obtained from the membrane fabricated using 17 % PES, 1% PVP, 0.01 % CNC, and 0.025% MWCNT. The predicted values generated from the model agreed reasonably with the experimental data, demonstrating the model's validity.

Keywords: Humic acid rejection; Cellulose nanocrystal; Multi-walled carbon nanotubes; Polyethersulfone membrane.

Detecting Beef and Pork Adulteration using Principal Component Analysis

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Abstract

Principal Component Analysis (PCA) is proposed for the automatic detection of beef and pork adulteration images in this paper. The method is used for the feature extraction phase. Two database resources are used in the research. They are Kaggle database to obtain the beef and pork images and previous research by L. Handayani et al. to get the adulteration images. The images are divided into two processes that are training and testing. For the training process, this experiment was conducted on 100 images of beef, 100 images of pork, and 50 images of adulteration. Whereas for testing, this study used 25 images for each category. The proposed research requires three phases to obtain the detection result, i.e., the first phase is resizing images to 300x300 pixels for both the training and testing dataset. The second is implementing the proposed method to obtain the featured images. The last is the detection process of testing images using Mean Squared Error (MSE). The results of this research show that the PCA method is very effective for detecting beef and pork adulteration, reaching average accuracy values up to 96%.

Keywords: Meat detection; Principal component analysis (PCA); Mean squared error (MSE).

Reliability, Availability, Maintainability and Safety (RAMS) in Railway's Assurance System and Implementation Challenges: A Review

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Abstract

RAMS forms an integral part of railway's system assurance. It integrates reliability engineering, availability or performance calculation, maintenance strategies and system safety. While RAMS is widely implemented in other industries like petroleum, aviation and chemical, the practice in railway is relatively new. RAMS task needs to be implemented from earliest phase of system design, tendering, project execution, operation up to decommissioning. Due to its compulsory extensive involvement of railway personnel as well as authorities, RAMS is not being fully utilized as an assurance tool in railway industry. This paper will introduce the core components of RAMS and their stakeholders

Keywords: RAMS railway; System assurance; Railway stakeholder.

Automated Writing Evaluation: Catering for Creativity

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Abstract

A lot of studies on creativity have been conducted for the past three decades as its role in every aspect of life has been more recognized. Against the backdrop of the use of technology during the COVID-19 pandemic, current studies have drawn more attention to the incorporation of creativity in technology-integrated teaching and learning. This paper calls into question the interplay between creativity as an essential learning skill and technology-driven language instructions emphasizing writing instructions. The AI-powered writing assistant, Automated Writing Evaluation (AWE), has been used in writing classrooms as a form of formative assessment to facilitate self-learning and expedite feedback. When used regularly, AWE is deemed effective in augmenting students' writing performance, especially in an ESL environment. This paper links the models across three disciplines; writing, creativity, and technology, while accentuating the role of AWE in fostering creativity. Pedagogically, writing teachers who wish to embed creativity in their AWE-assisted lessons would benefit from this paper as they would gain a better understanding of the theoretical nature of the constructs.

Keywords: Creativity; Automated writing evaluation (AWE); Writing instruction.

Facile Synthesis of Fibrous Zeolite Y with a Radial Wrinkle Structure

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Abstract

In this study, typical zeolite Y was successfully transformed into dendritic morphology named as Fibrous Zeolite Y (FZY) by employing microwave-assisted microemulsion system. The physicochemical properties of the ZY and FZY were investigated by XRD, N₂ physisorption, FTIR and TEM. The BET analysis showed that the surface area of FZY is lower than ZY. with the value of 406 m² g⁻¹ and 736 m² g⁻¹, respectively. However, the FZY possesses higher porosity than ZY due to the formation of radial wrinkle fibre observed from TEM analysis. This provide a huge amount of interparticle pore that facilitate the molecules absorption within the material under a minimal obstruction, thus improving the internal surface accessibility of FZY. The findings of this study predicted that FZY would find widespread use in catalysis, waste water treatment, energy storage, drug delivery, and other fields.

Keywords: Fibrous zeolite Y; Morphology modification; Interparticle porosity.

Review on Transfersomes: Promising Carrier for Transdermal Drug Delivery

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Abstract

The transdermal drug delivery systems (TDDS) facilitate over the traditional techniques by including the ability to deliver a drug more selectively to a specific point; more straightforward, more accurate, and less frequent dosing besides decreasing variability in systemic drug concentrations; absorption that is more consistent with the site and mechanism of action; and minimized toxic metabolites. Moreover, these are painless and self-administered delivery systems that can increase patient compliance and provide a controlled release of the medications. However, the greatest challenge of TDDS is the barrier function of stratum corneum (SC), the outermost layer of the skin which allows only unionised molecule and molecule with molecular weight less than 500 Da to pass through it. As a result, this method can only be used to provide a restricted number of medications. Now a days, some of the possible alternatives to this challenge are chemical permeation enhancer, iontophoresis, sonophoresis, microneedles, electrophoresis and vesicular system such as liposome, transfersome, ethosome etc. Transfersomes appear to be one of the most promising of these techniques, as they feature a bilayered shape that allows lipophilic and hydrophilic drugs, as well as amphiphilic drugs, to be encapsulated with better penetration efficiencies than typical liposomes. Transfersomes are elastic in nature, which can deform and squeeze themselves as an undamaged vesicle through narrow pores that are significantly smaller than its size. This review discusses the concept of transfersomes, composition of transfersomes, mechanism of action and various preparation techniques. Also, this review focuses on recent applications of transfersomes along with their benefits and drawbacks. Additionally, this review sheds light on future research scope to motivate the researchers for future outstanding research works.

Keywords: Transdermal drug delivery systems; Stratum corneum; Transfersomes; Liposomes; Mechanism of action.

Questioning Strategy in Process Writing Approach: Evidence for Idea Extension in Introductory Paragraph

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Abstract

Many students at the tertiary level find it hard to have ideas in the introductory paragraph. One way to overcome that issue is by applying a questioning strategy. The convergent parallel design of qualitative and quantitative methods is adopted to collect data through a need assessment survey, diagnostic tests, and face-to-face interviews. Process writing activities were designed after the needs assessment survey findings, and pre-test scores showed the necessity to introduce the questioning strategy to the experimental group. On the other hand, the control group was formed to contrast the strategy with free writing activities. Tests scores of the two groups after 18 weeks of the writing process activities were compared using Klimova's (2014) writing assessment criteria. The scores of diagnostic pre and post-tests on ideas extension showed that most of the experimental students' scores were better than those in the control group. The questioning strategy in the process writing approach improved the students' ideas for the introductory paragraph compared to free process writing. The strategy's effectiveness could be extended to help students develop ideas and organise content paragraphs.

Keywords: Ideas; Extension; Introductory paragraph; Questioning; Process writing

Variation of Nanocellulose Reinforced Recycled Paper: Effect on Tensile Strength

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Abstract

The idea of paper recycling was done due to environmental issue. However, the properties of recycled paper like tensile will decrease each time it is recycled. Addition of reinforcing filler may increase the properties of recycled paper. Thus, in this research, nanocellulose was used as reinforcing filler in recycled paper. The objectives of this research are to fabricate papers from recycled paper and to investigate the effect of different nanocellulose and pressure of compression molding in paper fabrication towards tensile strength of recycled paper. Two types of nanocellulose used were commercialized cellulose nanofiber (CNF) and cellulose nanocrystals (CNC). CNC from filter paper and empty fruit bunches (EFB) were isolated via acid hydrolysis. The recycled paper was fabricated using traditional methods (net) and further processed with compression molding. All samples with nanocellulose increase in tensile strength. The tensile strength recorded 114% improvement at 15.28 N/mm² with 5wt% of CNF.

Keywords: Recycled paper; Cellulose Nanofiber (CNF); Cellulose Nanocrystals (CNC); Tensile strength.

Polyvinylidene Fluoride (PVDF)/Poly (Ether Sulfones) (PES) Blend Membrane for CO₂/CH₄ for Gas Separation

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Abstract

In this study, a combination of Polyvinylidene fluoride (PVDF) and Poly (ether sulfones) (PES) blend membrane and DMF as solvent component was developed to evaluate the CO₂ and CH₄ separation performance. The gas permeation test was thereafter conducted on the membrane produced. The separation through a membrane works on the theory of permeation based on permeability and selectivity. These two important values were estimated using a set of analytical functions. The membranes produced was then characterized using scanning electron microscopy (SEM) and the Fourier Transform Infrared Spectroscopy (FTIR). The result obtained revealed a higher permeability for the CO₂ and CH₄ gases when the blending ratio of PVDF: PES: DMF/ 5:15:80 were applied. Moreover, the selectivity results showed that the use of the blending ratio of PVDF: PES: DMF/20:0:80 produce the highest selectivity (1.3086 GPU) while blending ratio of PVDF: PES: DMF/10:10:80 exhibited the least selectivity. Moreover, the morphological elucidation revealed the presence of pores for every cross-section composite membrane and this aids the permeability properties of the membrane aggregates at different blending ratio. Also, the FTIR results showed nearly similar functional group characteristics

Keywords: Permeability; Selectivity; Membrane, Gas separation blending.

Simulation of the Ground Heat Exchanger under Malaysian Environment Based on Different Thermal Conductivity of Soil and Pipe Materials

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Abstract

Energy is a major global issue that is essential to the advancement of technology and humanity. Renewable energy is becoming increasingly important as primary energy consumption rises year after year. Renewable energy from geothermal sources, namely ground heat exchangers (GHE), has a lot of potential for use in building applications. Over the past few decades, extensive research has been conducted and GHE technology is well known. The main idea behind GHE is to use the ground as an endless thermal reservoir for fluid medium cooling and heating. Air is used as a fluid medium of work in the GHE system. The air cools in the summer and heats in the winter due to the temperature differential between the air and the ground. In this study, a simulation was conducted to examine the effects of pipe materials and soil thermal conductivity on the performance of the GHE. According to the findings of the study, the materials of the pipe does not have a significant impact on the overall performance of the GHE. As a result, low-cost pipe materials with low thermal conductivity can be used in GHE configurations. The study also showed that the thermal conductivity of soil should be between 1.5 and 10W/m.K for optimal ground heat exchanger performance. In addition, the length of the pipe was reduced from 25 to 14m, thereby decreasing the land area.

Keywords: Ground heat exchanger; GHE performance; Pipe materials; Thermal conductivity.

FTIR Characterization of Polysaccharides of Pineapple Waste

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Abstract

The increase of pineapple production due to demand from worldwide creates a huge number of wastes accumulated in landfill which later contributed to the environmental concern. In order to overcome this issue, utilization waste is thought to be beneficial way to save the environmental problems. The most sustainable way of handling these residues is to exploit the residues from pineapple production to create valuable products via technological method. Pineapple waste has been known for being a reliable source of value-added product such as polysaccharide. This indicated that the characterization of polysaccharide is important for value added product industry which can be extracted from pineapple waste. Thus, this study is to examined the characterization of polysaccharide from different sources of pineapple wastes including leaves, peel, pomace and stem. Fourier- transform infrared spectroscopy (FTIR) was used to characterize the polysaccharide compound in sample extracts as it is a well-established technique which has been widely applied in polysaccharide structural analysis. It was found that the FTIR spectrum of leaves, peel, pomace and stem displayed the characteristic peaks of polysaccharides. The IR spectra of the four samples are almost identical to each other, indicating that they have the same chemical structure. These results provide a scientific basis for the further use of polysaccharides from pineapple leaves, peel, pomace and stem.

Keywords: Characterization; FTIR; Pineapple waste; Polysaccharides

Impact of Air-Dry Flowrate on Moisture Content and Chemical Constituents of Spray Dried Fish Oil

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Abstract

Fish oil contains high docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) and is considered as a good source of polyunsaturated fatty acids (PUFAs). Regular intake of fish oil in the daily diet may provide several health benefits, including the prevention of diabetes, inflammation and arthritis. In this study, commercial Menhaden fish oil was microencapsulated using a spray drying approach with air-dry flowrates of 3.14, 4.19 and 5.24 m/s. The spray dried fish oil powder was characterised to determine moisture content and chemical composition using moisture content analyser and gas-chromatography mass spectrometry (GCMS), respectively. The moisture content of the spray dried powder was significantly affected by the changes of the air-dry flowrate but the chemical compositions remain the same. The lowest moisture content of 3.33% and the presence of Hexadecenoic acid and Pentadactyl acid (C15:0) was recorded at air-dry flowrate of 4.19 m/s.

Keywords: Fish oil; Spray drying; Microencapsulation, Air-dry flowrate.

Investigation of Traffic Sign Image Classification for Self Driving Car

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Abstract

Artificial Intelligence has had a good impact on all fields and is making our lives easier. With the growth of autonomous vehicles, the automotive industry is improving rapidly. Autonomous vehicles are a certain conclusion in the future, and they are intended to be both safe and convenient. One of the most critical issues for autonomous vehicles is traffic sign classification. Half occlusion, colour fade by surrounding barriers, variations in shadows, reflections on signboards during the day, and movement blurring different lighting and weather situations are some of the most typical issues that might occur when identifying and detecting traffic signs. In the classification and identification of road signs, the performance of a Convolutional Neural Network (CNN) has outperformed the same of humans. The purpose of this study is to boost the accuracy of this classification in order to minimize accidents and enhance the credibility of self-driving vehicles. Otherwise, the ecology of traffic may be jeopardised. Using image processing and machine vision processing technologies, as well as the use of in-depth learning in target classification, the traffic sign recognition method based on CNN is studied. A traffic sign detection and classification method with high efficiency and high efficiency are proposed. The German Traffic Sign Recognition Benchmark (GTSRB) is employed to test the approach method, and the results reveal that it outperforms state-of-the-art approaches.

Keywords: CNN; GTSRB; Traffic sign classification; Deep learning.

A Review on Creep Deformation and Damage Mechanism of Grade 91/92 Steels

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Abstract

Creep deformation and damage are a significant issue for power generation plant sectors. This paper presents a review covering alloy elements, creep deformation and rupture mechanisms of Grade 91/92 steel. Factors that are affecting the creep deformation and rupture are also discussed. Based on the review, it is found that the creep deformation and rupture is mainly controlled by the dislocation and diffusion at high and low stresses, respectively. In addition, stress and temperature are the two important factors that affect the rate of creep deformation. This implies by the temperature-dependence of mechanical properties, dislocation, diffusion and other mechanisms at atomic level. Furthermore, higher stress values increase creep rates and shorten creep life.

Keywords: Grade 91/92 Steel; Creep; Mechanism; Failure.

Effect of Mesh Refinement on Vertical and Lateral Velocity Profiles of the Wake Flow behind a Spire based on CFD

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Abstract

The application of CFD to simulate the phenomenon based on a wind tunnel experiment has been widely studied. A large number of cells may produce accurate results but requires a high computational load. In this study, the effect of mesh refinement on the vertical and lateral velocity profiles of the wake flow behind a single spire is discussed. Three different mesh refinement levels, i.e. coarse, medium and fine, each with 9 million, 12.7 million, and 16.9 million cells, respectively, were applied to the computational domain. The standard k- ϵ model was used for CFD simulations. The variable mesh was generated by using *blockMesh* and *snappyHexMesh* features in the OpenFoam® software. The result shows no significant difference between the various mesh refinement levels for the velocity profiles. However, there is a significant difference in the time needed to complete the iteration for each case whereby the shortest duration was taken for the coarse mesh.

Keywords: Computational fluid dynamics; Mesh refinement; Spire; Wind tunnel; Velocity profiles.

Enzymatic Analysis and Characterization of Bromelain from Two Varieties of Pineapple (*Ananas comosus*) Fruit and Stem Extracts

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Abstract

This study was designed to examine the presence of enzymatic activity of fruit and stem bromelain extracted from two varieties of pineapple (*Ananas comosus*): Morris and Sarawak. The bromelain crude extract obtained from fruits and stems were tested for their protein content via Bradford's assay, and both crude extract from Morris variety showed the highest value. Further analysis was done to investigate the proteolytic activity of the crude fruit and stem bromelain, resulting in Morris variety having the highest activity for fruit bromelain, while Sarawak variety having the highest activity for stem bromelain. The Gelatin Digestion Unit (GDU) analysis performed revealed both fruit and stem bromelain from Morris variety exhibited the highest activity. Furthermore, the temperature optimization showed that both fruit bromelain of Morris and Sarawak varieties were optimum at 35 °C, while stem bromelain from both pineapple varieties were optimum at 45 °C. Meanwhile, pH optimization for Sarawak variety extract of fruit and stem bromelain were found at pH 5.6, while Morris variety were optimum at pH 6.6. These results indicated both varieties of pineapple extracts of fruits and stems were having bromelain enzyme that can be further developed for application at industrial level

Keywords: Pineapple; Enzyme activity; Bromelain; Protease; Fruit; Stem.

The Convection of Unsteady Casson Fluid Over an Infinite Inclined Isothermal Plate

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Abstract

An analytical solution of chemical reaction on unsteady Casson fluid over an infinite inclined isothermal plate has been presented in this article. Laplace transform technique has been used in this study to obtain the results of velocity, temperature and concentration. The analytical solution for governing equations are solved by using this method. The effects of various embedded solution on velocity, temperature and concentration such as chemical reaction, magnetic parameter and radiation has been discussed graphically with numerical results.

Keywords: Casson; Magnetohydrodynamic; Inclined plate.

Design and Analysis of an Early Heart Attack Detection using OpenCV

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Abstract

Millions of people die every year from heart attacks, according to research. The healthcare industry generates massive volumes of data related to heart attacks, but this data is sadly not being processed for hidden insights that could improve decision-making. Early detection of heart attack symptoms is a crucial part of treatment at the moment. Numerous researchers, each applying their own unique machine learning approach, have used the UCI machine learning heart attack dataset. This research aims to detect cardiac events with the use of four different algorithms: logistic regression, decision trees, random forest, and k nearest neighbor using python language. Next, in this project, website prediction of the heart attack prediction are build using python and flask framework. Hyper-parameter tuning method also has been applied to see does the algorithm increase accuracy or not.

Keywords: Heart attack; Algorithm; Website-prediction; Hyper-tuning method; Python.

Mechanical properties and Antioxidant activity of Carrageenan-CNF Film Incorporated with Butylated Hydroxyanisole (BHA) as Active Food Packaging

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Abstract

Incorporated BHA in biopolymer film is one of strategy to minimize the direct contact of BHA into the food product without limits their function as food preservative. Thus, the aim of this study was to formulate the active packaging film using semi refined carrageenan (SRC) biopolymer plasticized with glycerol (G), reinforced with 10% v/v CNF and incorporates antioxidant agent (BHA) with different concentrations (0.1 to 0.5% v/v) as antioxidants. Physical properties (thickness, opacity measurement, moisture content and solubility in water) and mechanical properties (tensile strength (TS) and elongation at break (EAB)) were analyzed. Active SGC-BHA films improved overall the tensile strength and the value of elongation at break significantly. Opacity, thickness, water solubility and moisture content were improved with increasing concentration of BHA in the film samples. Active SGC-BHA films showed highest improvement on the mechanical properties due to the uniform dispersion between CNF-SRC matrix interactions. Hence, the new formulation of active SGC-BHA films may be an alternative plastic packaging not only to avoid the direct contact of synthetic preservative on to food products but also can prolong the shelf life.

Keywords: Butylated hydroxyanisole; Food preservative; Semi-refined carrageenan; Mechanical and physical properties; Plastic packaging.

Applications of Nanomaterials for Biosensor Fabrication Based on Redox Enzyme and Protein: A Mini-Review

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Abstract

Redox enzyme and protein modified biosensors are commercially triumphant bioelectronic devices used in the point-of-care analysis. The use of nanotechnology derived nanomaterials during enzyme immobilization creates a synergistic effect by integrating enzyme's recognition and catalytic properties with the electronic properties of nanomaterials. This synergy improves the biosensor's sensitivity, conductivity stability, surface-to-volume ratio, selectivity, detection limit and other analytical features. This critical review focuses on the redox enzymes and proteins most frequently used in glucose and hydrogen peroxide sensing, such as horseradish peroxidase (HRP), glucose oxidase (GOx), hemoglobin (HB), and cytochrome C (Cyt c). Besides, we evaluate the state of art of this approach, selection of nanomaterials, preparation and immobilization mechanisms, their role and sensing applications. Besides advantages, we have discussed the pressing challenges of developing these sensors. This review will guide the research community to develop rational and highly efficient nanomaterial immobilized biosensors.

Keywords: Biosensor; Horseradish peroxidase; Glucose oxidase; Hemoglobin; Cytochrome C; Nanomaterials; Au NPs; MWCNTs.

Validation Study of Microbubbles Characteristics and Formation in Venturi Channels via Computational Simulation

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Abstract

Divergent angle and water flowrate are two important parameters in venturi type generator which can be used to control bubble size distribution (BSD) of generated microbubbles (MBs). However, the relation between these two parameters and BSD is yet understood. Many previous researchers conducted investigation on these parameters and BSD either experimentally or through simulation analysis only. Thus, one must understand the underlying mechanism of bubbles generation. Nevertheless, inclusion of simulation analysis has been proven to be an efficient tool for investigating the complex flow characteristics and obtaining a fundamental understanding of the bubble generation mechanism which are incapable to obtain through experimental analysis. Thus, this study focuses on validation of the comparison between microbubbles size obtained in computational simulation by using ANSYS FLUENT and experimental visualization by using nozzles with different divergent angle and water flowrates. Furthermore, detailed characteristics also presented to support the findings. As the results, the relative error of both experimental and simulation results was below than 5% for all venturis. The analysis also shows that, increasing divergent angle and water flowrate increases water velocity, which correlatedly contribute to smaller MBs generation due to larger flow resistance in water. All venturis show the same pattern of rise in water velocity at divergent section because the presence of constriction at the throat section of the venturi induce great rise in the velocity at this section compared to convergent section especially in higher flowrates.

Keywords: Bubble mean diameter; Microbubble; Multiphase model; Venturi; Thin film.

Seismic Assesment of Highrise Building with Different Number of Story

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Abstract

Seismic assessment of a building is essential nowadays. This is because in recent times earthquakes often occur either in local or long-distance earthquakes from neighboring countries. A well-designed and well-built structure with adequate strength will prevent major damage from occurring whenever there are tremors from nearby or from afar. Therefore, seismic structural vulnerability is very important to recognize the behavior of the highrise building when subjected to seismic load. Simulation and analysis procedures were performed in a nonlinear method. In this analysis, two models with different numbers of the story will be modeled. Free vibration analysis and nonlinear dynamic analysis will carry out to evaluate the behavior of the structure. The result showed that the different heights of building present a significant effect when subjected to seismic load.

Keywords: Highrise; Free vibration; Time history; Nonlinear; IDA curve.

Improve the Algorithm Cyclomatic Complexity for Determining Level of User Story Severity

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Abstract

Complexity is properties of piece software since it is a fundamental reason of decreasing software quality. Measuring the complexity using some metrics is one of the important factors that were made by many research activities to avoid complex requirement. As to ensure the high quality of user story requirements, we need to analyze the level of severity by respective user story' requirement which can minimize the error at a later stage of development. This helps to produce clean, concise, and structured user story which be as a guideline for a development team to proceed the activities based on the user requirement. In this paper, we improve the algorithm Cyclomatic Complexity (CC) using combination of intra and inter modular metrics which help to indicate the source code complexity based on the level of severity classification. This research suggested formulas to measure the system's complexity: Total Cyclomatic Complexity (TCC) and Coupled Cyclomatic Complexity (CCC). Based on this improved algorithm, it helps to map the raw requirement into a structured user story (role, means, end) and able to classify level of severity (high, medium, low) based on the raw user story input. The CC calculation help to identify the source code complexity which less than $CC < 10$ is less complex, $CC = 10$ is average and $CC > 10$ is complex. The lower the Cyclomatic complexity value, the better the code where it helps to classify levels of severity based on the type of metric from QUS framework.

Keywords: Cyclomatic complexity; Software quality; User story quality.

Degradation in Perovskite Solar Cells: A Comprehensive Review

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Abstract

Perovskite solar cells are one of the promising and fastest developing technology that can replace the conventional silicon solar cells. However, their long-term stability is a bottleneck that impedes the commercialization of these devices. Several material aspects such as structural and phase stabilities and defect tolerance appear as the primary source of performance degradation. These material aspects make perovskites susceptible to degradation under environmental stimuli such as light, oxygen, moisture, heat, and electric field. This review briefly discusses the mechanism behind each of the degradation routes with an aim to help new material and device architectures engineering that can improve the stability of the perovskite solar cells to the commercial standards.

Keywords: Perovskite solar cells; Degradation mechanisms; Material stability; Environmental stability.

Enzymatic Cellulose Nanocrystal Production from Pretreated Palm Oil Empty Fruits Bunch Fiber

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Abstract

Cellulose nanocrystal (CNC) is a biopolymer which has wide application in packaging industries, biomedical fields etc. due to its some desirable characteristics like biodegrade ability, thermal stability etc. CNC is produced from different lignocellulosic biomass by different chemical and physio-co-chemical methods which released more hazardous discharge and not friendly. The enzymatic method can be the alternative and sustainable method for CNC. Palm oil empty fruit bunch (OPEFB) is a major biowaste material from edible oil industries in Malaysia has no measurable value-added process. So, there is looking for environmentally friendly and green process to convert OPEFB to biopolymer like CNC. In this research work, CNC was produced from the extracted cellulose fibre from OPEFB which was delignified by commercial free laccase and hydrolysed using free cellulase as a biocatalyst. Field emission scanning electron microscopy (FESEM) was used to examine the morphology. The yield of CNC reached to 22.53% (w/w) from the enzyme pre-treated 2% (w/v) OPEFB cellulose fibre from 96 hours hydrolysis by 80 International unit (IU) of cellulase. Nano-dimensioned CNC is seen in the morphological study. So, the production of CNC from OPEFB may be value added to the product which support waste to wealth concept. The isolated CNC from pretreated palm oil empty fruits bunch (OPEFB) cellulosic fibre shows a promising characteristic, and the enzymatic hydrolysis is a potential method for CNC production which is environmentally friendly.

Keywords: Cellulose nanocrystal; Cellulase; Enzymes; Hydrolysis; Laccase.

Insightful Gains from a Needs Analysis on Islamic Studies Practitioners' English Skills Essentials

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Abstract

Recent development and changes in the field of English language learning have led to a repetitively renewed interest in designing and developing pedagogical materials for English for Specific Purposes (ESP) courses for Islamic institutions. As the name suggests, ESP is designed for a particular group of learners in a particular setting or field, and the materials are to cater to the learners' specialized field of study. ESP emphasis is on needs analysis (NA). NA is the fundamental property of ESP because it is either related to the learners' educational needs, the learners' professional needs or both. Learners, curriculum and context, resources and facilities, personal confidence and competence are the key aspects in designing and developing effective ESP pedagogical materials.

Keywords: English for specific purpose; Teaching material development; Islamic institutions; Needs analysis.

Investigation and Analysis of Deep Learning and Machine Learning Algorithm for Face Mask Detection System

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Abstract

People nowadays tend to wear a protective facemask because of the pandemic COVID-19 that strike our world few years ago and wear protective facemask has become a new normal. Many public place that provides a certain service want people to wear mask correctly before entering the place. Therefore, by developing the facemask detection system, it tends to help a global society to aware the environment that surround by the virus and to prevent the infections. Although vaccines have been developed, people still need to be aware because of some society that stick not to wanting a vaccine. For develop this system, machine learning and deep learning is the best method to use by using some basic machine learning package such as Tensorflow, Keras and OpenCV. This method detects the image of someone face from the image, video and real time monitoring correctly and then identifies it has a facemask on it or not and will alert the authority if not wearing a facemask. This system can be use at the premise before people entering the place and would eliminate the need to place a worker to monitor the people coming in at the entrance and minimize the infections.

Keywords: Object Detection; Real time; Machine learning; Deep learning, OpenCV.

Convolutional Search for Image Authentication on Fragile Watermarking

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Abstract

This paper presents an image authentication technique using a convolutional search to localize the tampered area of an image. The scheme generates the authentication data based on the six Most Significant Bit (MSB) of each pixel of the cover image. The authentication data is then embedded into two Least Significant Bit (LSB) of the cover image using the LSB shifting algorithm. The scheme then extracts and reconstructs the watermark data from the tampered image. To localize the tampered area, the scheme compares the extracted and reconstructed watermark data. The convolutional search is proposed to increase the detection rate. The experimental results show that the scheme can detect and localize the tampered area up to 100% detection rates. In addition, the scheme can maintain the quality of the watermarked image to 46 dB of PSNR value. The comparative analysis shows that the scheme outperforms the existing methods in terms of accuracy and precision.

Keywords: Fragile watermarking; Image authentication; Tamper detection; Tamper localization.

The Tribology Evaluation on a Four-ball Tribometer Lubricated by Al₂O₃/PAG Nanolubricants

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Abstract

Lubricants generally increase the service life of mechanical equipment by slowing down the friction rate of steel/steel friction pairs. This study mainly investigated and compared the coefficient of friction (COF) and the friction torque of lubricated steel surfaces with polyalkylene glycol (PAG ND12) containing Al₂O₃ nanoparticles at volume concentrations of 0.01%, 0.03%, and 0.05%. PAG ND12 is a lubricant for automotive air conditioning pairs with R1234yf refrigerant. The stability investigations were carried out by comparing absorbance conditions at each volume concentration for 210th days. Koehler's four-ball tribometer measured COF and friction torque at a load of 40.0 Kg and a speed of 1200 rpm. The stability of nanolubricant Al₂O₃/PAG ND12 investigated at volume concentrations of 0.01%, 0.03% and 0.05% resulted in an average sedimentation stability of 0.752, 0.755, and 0.684, respectively. The volume concentration of 0.03% resulted in the highest stability value. Investigations on pure lubricants and nanolubricant Al₂O₃/PAG ND12 were then compared. The results of the study of pure lubricants and Al₂O₃/PAG ND12 nanolubricant with volume concentrations of 0.01%, 0.03%, and 0.05% resulted in an average COF value of 0.104, 0.078, and 0.117, respectively. Further investigation on friction torque resulted in a decrease in the pure lubricant of 1.537 and for nanolubricant Al₂O₃/PAG ND12 with volume concentration of 0.1%, 0.3%, and 0.5% resulted in a decrease of 1.601, 1.427, and 1.699 respectively. The results showed that the concentration of 0.03% had the best stability of 0.755 and resulted in the highest reduction in COF and torque of 0.078 and 1.427, respectively. Therefore, it is recommended to use Al₂O₃/PAG ND12 nanolubricant at a volume concentration of 0.03% because it is the most optimal in stabilization and the highest reduction in COF and frictional torque.

Keywords: Tribological; Nanolubricant; Polyalkylene glycol; R1234yf; Coefficient of friction.

A Survey on Artificial Intelligence Techniques for Various Wastewater Treatment Processes

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Abstract

Pollutant removal percentage is a key parameter for every WWTPs, and it is crucial to predict pollutant removal efficiency. The efficiency of pollutant removal processes can be increased with the help of modeling and its optimization. Statistical models are not practical enough for wastewater treatments due to complicated relationship among input and output parameters. AI models are generally more flexible while modeling complex datasets with missing data and nonlinearities. Many AI techniques are available, and the aim is to sort out the best AI technique to design predictive models for WWTPs. Deep Learning and Ensemble are the main techniques reviewed in this work. The Ensemble Learning models showing the most successful performance among other techniques by generally showed their accuracy and efficiency.

Keywords: Artificial intelligence; Deep learning, Wastewater treatment processes.

Intelligent Patient Monitoring System to Analyze Patient Health

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Abstract

The Internet of Things (IoT) is a recent development that connects all objects and has been identified as the next technological revolution. Smart parking, smart homes, smart cities, smart environments, industrial places, and health monitoring are some of the applications of the Internet of Things (IoT). One of the applications is in healthcare, where it is used to monitor the health of patients. The system is designed to prevent delays in the arrival of patient medical information to healthcare providers, particularly in accident and emergency situations, to reduce manual data entry and to increase bed capacity in hospitals, particularly during busy hours where a large number of people gather in one location. This system's architecture is based on medical sensors that use wireless sensor networks to measure the physical parameters of patients. These sensors transmit data from the patient's bodies to the cloud environment via a wireless network, where it is displayed on the Things board dashboard. In this project, we will look at how to use the Raspberry Pi board to monitor a patient's body temperature, blood oxygen level and pulse rate.

Keywords: Healthcare parameter; Internet of Things (IOT); Monitoring system; Patient and sensors.

The Electrokinetic Impact on Heavy Metals Remediation of Tasik Chini Iron Ore Mine Tailings at Pahang State, Peninsular Malaysia

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Abstract

The improper disposal of mining tailings is a severe threat to the surrounding environment because it comprises high concentrations of heavy metals contamination. Any precious metal extraction (mining) produces millions of tons of waste; iron ore extraction is common globally, unlike other metals extraction. The iron ore tailings contain heavy metals such as Arsenic (As), Cobalt (Co), Manganese (Mn), Lead (Pb), Copper (Cu), and Zinc (Zn). This study focuses on extracting hazardous metals such as As, V, and Zn from the disposed waste and improving its geotechnical properties. Nine samples were collected from Tasik Chini Iron ore mine, Pekan district, Pahang State, Malaysia. The initial data were prepared for elemental analysis by following ICP-OES analysis. The results showed that As, Co, Mn, Pb, Cu, and Zn concentrations exceeded the standard guidelines. In recent years, sustainable remediations techniques (EKR) have attracted extensive attention, including the electrokinetic remediation technique. The (EKR) method was applied to extract these metals from iron ore tailings specimens. A comprehensive approach of EKR shows an outstanding result where the highest removal efficiency of As was 68.4 %, Co 64.5%, Mn 67.8%, Pb 67.1%, and Cu was 64.1% and Zn 64.9% with the voltage gradient of 100 and 150 V for 4 and 8 hours constantly. Increasing the voltage gradient could be a cost-effective long-term solution for the remediation of iron ore tailings. The existing method was experienced as an effective and green technique for extracting heavy metals and recycling the mining waste materials.

Keywords: Heavy metals; Contamination; Environment; Toxicity; Electrokinetic remediation.

Factors that Impact the Efficiency of Cream Separator Machine for the Food Industry

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Abstract

The primary function of cream separator machine is to separate the milk into two products i.e., cream and skimmed milk. The intention of this study is to evaluate the factors that has direct relationship with low performance and come up with a process that can enable to enhance the process of cream separation. The factors that were focused on the study were the understanding of centrifugal forces, impact of temperature towards cream separation efficiency, impact of vibration towards cream separation efficiency, and exploring the application of ultrasonic waves for efficient cream separation. And lastly, it was assessed that ultrasonic machine was an eco-friendly technology that could boost the separation process and it could act as supplement to heat-based technology.

Keywords: Cream separator; Centrifugal forces; Ultrasonic waves; Temperature; Vibrations.

Poly (Lactic Acid) / Linear Low-Density Polyethylene Binary Blend with Recycled Rubber and Graphene Nanocomposite: Thermal and Morphological Properties

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Abstract

This paper reports the thermal and morphological properties of poly (lactic acid) (PLA)/ linear low-density polyethylene (LLDPE) binary blend with recycled rubber (RW) and graphene nanocomposite (GNP). A melt blending of PLA/LLDPE with compatibilizer grafted low density polyethylene maleic anhydride (PE-g-MA), RW and GNP was prepared by a twin-screw extruder. The blends were characterized according to their thermal, and morphological behaviour. Based on the SEM results, it was found that a size reduction of the dispersed phases can be seen with addition of PE-g-MA, RW and GNP compared with PLA/LLDPE blend and TGA revealed that the incorporation of LLDPE, PE-g-MA, RW and GNP lead to an improvement in the stability of the PLA matrix.

Keywords: PLA; Recycled rubber; LLDPE; GNP; Nanocomposites.

Analysis Study of the Carbon Monoxide Sensor System for Conducting Vehicle Safety System

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Abstract

Carbon monoxide sensor is the device to detect the occurrence of the carbon monoxide in certain area in this case the application of the carbon monoxide sensor was used in the system which is the vehicle safety system. The intention of this study is to design the suitable output of the carbon monoxide system that will improve the vehicle safety system and the driver performance and to let the driver drive safely in the carbon monoxide environment. The factor of the study is to find the best suitable system for the carbon monoxide detection in vehicle, design the circuit for the system and design the output that will not affect the driver performance. The buzzer was used as the sound warning device in this system which is the function is to make the driver notice the vehicle are in unsafe environment. The motor controller was used to create the window automatically open to let the oxygen enter the car interior part to react with the carbon monoxide and turn the carbon monoxide to carbon dioxide which is the safe gas for the human respiration system. The circuit design was test by the Proteus software and Tinkercad software. Graph distributions in Proteus has been come out to determine the value of current flow inside the circuit for the buzzer and the motor. This is to compete the differences in current flow from the buzzer and motor.

Keywords: Carbon monoxide; Monitoring system; Vehicle assistive technology; Gas detector.

The Analysis on IoT Edukit Using Casier Cloud Platform Based on Science, Technology, Engineering and Mathematics (STEM) Training

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Abstract

This research was conducted to study and analyze the Edukit IoT using the Casier Cloud Platform Based on Science, Technology, Engineering and Mathematics (STEM) Training. This study was done on LPG gas leaking in kitchen areas, restaurants and at home for safety purposes and to prevent accidents caused by gas leaks. According to some previous research, by connecting to an IoT gateway or other device, IoT devices can share sensor data, which can then be sent to the cloud for analysis or checked locally. The objective of this thesis is to reduce the occurrence of accidents involving fire and gas by using this gas leak detection system by sending signals to users who have Blynk applications. From there, simulations using Blynk, ThingSpeak and Arduino IDE C ++ software were performed. There are several components involved in the success of this system namely NodeMcu, MQ2 Sensor, Buzzer and 16 x 2 LCD as a leak detection device. The results of this simulation are collected as evidence that this LPG gas can be controlled through the IoT system created namely Blynk and ThingSpeak applications. This data can be accessed with permission from any person as long as there is WIFI in the area the person is in and also to those who have an email address and password to access Blynk and ThingSpeak. This simulation was carried out and as a result of this simulation, it was found that the area had a safe gas because the trigger did not exceed the 1400 ppm range. As a comparison between the first, second and third studies, there were differences in terms of the data recorded. For these three studies, the Smoke line (ppm) shows that the decreasing value is equal to the Analog Value. When the Smoke (ppm) is higher, the Analog value is also higher. Finally, this IoT simulation shows that the system works well with accurate values and stable data. The conclusion suggests that this tool uses IoT to meet the study's needs and responds to technology utilizing the IoT concept and develop a system that can detect natural gas activity utilizing Blynk, and ThinkSpeak as an IoT platform.

Keywords: IoT Edukit; NodeMcu; Blynk application.

Design and Fabrication of Thermophoretic Soot Sampling Device

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Abstract

To reduce soot emission from diesel engine combustion, an improved understanding related to its formation process is important. The soot morphology and emission can be investigate using different methods. One of the most common methods is to collect the soot samples using thermophoretic sampling device (TSD) and use microscopic method to study soot morphology and microstructure. In this project, a thermophoretic sampling device has been designed and fabricated. For results, a theoretical calculation and simulation was conducted to find the extension and retraction speed of the selected. The cylinder extension speed for fabricated TSD is 72.3 mm/s while retraction speed is 62.2 mm/s. Then, this TSD was used to collect the soot samples from engine exhaust tail pipe. Finally, the soot samples were analysed by SEM (scanning electron microscope) method. The collected soot samples shoed chain like structure of the soot agglomerates. In addition, the size of the agglomerates was in the range of 100 nm to 1000 nm. The results of SEM analysis revealed capability of fabricated TSD to collect appropriate sample for soot emission microscopic analysis.

Keywords: Soot; Diesel; Engine; Sampling; SEM; Microstructure.

Experimental Study on Environment-Friendly Concrete Production Incorporating Palm Oil Clinker & Cockle Shell Powder as Cement Partial Replacement

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Abstract

The demand for civil construction has increased recently; cement is now the most produced and consumed material globally. The cement sector contributes significantly to world carbon dioxide (CO₂) emissions, ejaculating at a rate of 1 tonne of (CO₂) per tonne of cement production, corresponding to 5-7% of total global emissions. Therefore, to mitigate and minimize the environmental impact of cement production, supplementary cementitious materials such as palm oil clinker powder (POCP), a waste by-product of palm oil mills, which is obtained after burning the solid palm oil waste for producing electricity and cockle shell powder (CSP), an agricultural and aquaculture by-product derived from cockle shell combustion used as partial cement replacement in concrete. This study investigates the effects of POCP and CSP on concrete by substituting cement in different weight ratios from 0 to 20%. The experimental work examines compressive and flexural strength for different percentages of POCP and CSP after 7 and 28 days of curing. The study showed that samples with 10% cement replacement (including 5% POCP and 5% CSP) had good results in terms of mechanical properties. The research findings suggest that studying concrete structures with POCP and CSP is a novel and significant scientific topic that should be highlighted.

Keywords: Plam oil clinker powder; Cockle shell powder; Cement replacement; Compressive strength; Flexural strength

Elemental Characteristics of Particulate Matter (Pm₁₀ and Pm_{2.5}) from Peat Swamp Area in Kuala Pahang

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Abstract

Particulate matter (PM) is normally being divided into two common groups known as: the coarse fraction particle with a range of sizing from 2.5 to 10 UM (PM₁₀–PM_{2.5}), and the fine fraction particles with a dimension smaller than 2.5 UM (PM_{2.5}). It is also can be defined as a sum of solid and liquid particles which suspended in the air. The contribution of particulate matter towards the air pollution from peat swamp area in Kuala Pahang can be generated from various sources such as unpaved road, vehicle, open burning and uncover soil. In fact, monsoon season also play an important role where PM can be conveyed by wind from one location to another. Air pollution has become a matter of concern over Malaysia. The objective of this survey is to determine the particular matters in the air by using Aeroqual AQM 65 which is located in Kuala Pahang, Pekan. Air Pollution Index (API) is the reading to determine the quality of air whether it suitable and safe for human being. The data is obtained from the Aeroqual AQM 65 machine starting for April 2019 till March 2020. The survey will last for 12 months to generate a reliable result. From the API gain, the government can work out with some ideal on improving the surrounding air quality in the meantime to generate different strategy to overcome the problems. According to Aeroqual AQM 65, the reading of concentration of PM₁₀ and PM_{2.5} are almost the same yet the concentration of PM₁₀ is still slightly higher than PM_{2.5}. According to the analysis, there is a rapid increase of concentration of PM form June to September and a sharp drop from September to March due to the happening of monsoon season. When the direction of monsoon season change, the graph tends drop because the wind tends to convey the PM away. Therefore, the reading of API of PM_{2.5} is higher than PM₁₀ and the highest reading for both particular matter API is on September yet the lowest reading of API for both particular matters is on November.

Keywords: Air particulate matter; Air pollution Malaysia monsoon season; Peat swamp area.

Fatigue Cyclic Hardening and Softening of High-Strength Steel Material

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Abstract

316L and P91 steel materials were developed for high-temperature applications in power generation and have been subjected to strain-controlled low cycle fatigue conditions. Previous studies of low cycle fatigue experiment data are extracted to develop a material model for the finite element analysis. The cyclic stress-strain behaviour of 316L and P91 material were analysed under low cycle fatigue loading by using ABAQUS software. The main objective of this study is to analyze the fatigue hardening and cyclic softening of 316L and P91 steel. The low cycle fatigue numerical simulation under various strain amplitudes of 0.4% and 0.6% by using the displacement-controlled model in the simulation. A higher number of cycles causes a decrease in stress amplitude where cyclic softening occurs in P91 whereas 316L steel undergoes cyclic hardening behaviour. This is due to the different microstructure of the materials. The FE results of hysteresis loops are then compared with the experimental results of various strain amplitudes.

Keywords: P91 steel; 316L steel; Low cycle fatigue; Cyclic hardening; Cyclic softening

The Potential of Biodegradable Compostable Eco-Straw from *Lepironia Articulata* sp. (Purun/Kercut)

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Abstract

Plastic drinking straws are widely used to drink water and have shown to be a useful tool in restaurants. Excessive usage, on the other hand, generates a large amount of plastic garbage that is hazardous to the environment can harmful the endangered species. According to the findings, subjective norms and perceived behavioural control all have a significant influence on their receptive purpose toward biodegradable drinking straws. The goals of this study were to look into the degradable duration of biodegradable straw, analyse the density of *Escherichia coli* in biodegradable straw as an indicator of potentially harmful bacteria, and estimate the cost and benefit analysis of producing biodegradable straw from *Lepironia Articulata* sp. The methods such as tensile testing, flexural testing, Young's modulus testing, and organoleptic testing will be covered in this technique. *E. coli* test for straw hygiene utilising water and waste-water treatment guidelines. In terms of straw structure that can be dissolved in less than 6 months, hygiene test that thinks there is no *E. coli* in this straw, and public and consumer approval of straw purun Finally, *Lepironia Articulata* Sp. (purun/kercut) has the potential to become a biodegradable compostable eco-straw and a plastic straw alternative. The respondents chose biodegradable straws because they can lessen the hazard of ocean waste, reduce microplastics at sea and on land, and are non-toxic. From tensile test, flexural test and young's modulus test can conclude that the rate of reduction of fiber strength from straw purun increases in the presence of NaOH as a decomposition reagent. Biodegradable straw from *Lepironia Articulata* sp. In accordance with the toward sustainable development goal.

Keywords: Biodegradable straw; *Lepironia Articulata* sp.; Plastic waste; Drinking straw.

The Mixing of Solid Waste from Palm Acid Oil (PAO) and Palm Kernel Cake (PKC) as a Source of Animal Feed (Broiler)

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Abstract

Today, waste and waste management has given rise to many pressing issues. Waste management is a crucial area related to the economic status of a country and the lifestyle of its population. Wastewater pollution from high production of palm oil results in high production of palm oil mill effluent (POME) is a main problem throughout the world. This study is to analyze palm oil waste characteristics in making of the formulated chicken feed. Therefore, this study also focuses on the chicken feed formulation production by the mixture of palm acid oil (PAO) and palm kernel cake (PKC). This study also to investigate the growth rate of chicken towards the formulation of the chicken feed. In experiment, types of chickens used was broiler and divided into 2 groups with different formulation which are Diet 1 (D1) and Diet 2 (D2). Each diet contains different nutrient and composition. The chicken was fed with the formulation continuously for 42 days. The parameters to be analyze were body weight change (BWC). The result obtained from Diet 2 (D2) was recorded and compared with Diet 1 (D1) which are control diet.

Keywords: Animal feed; Broiler; PAO; PKC; Poultry; Solid Waste

The Mixing of Solid Waste from Palm Acid Oil and Palm Kernel Cake as a Source of Animal Feed (Free Range Chicken)

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Abstract

Today, waste and waste management has given rise to many pressing issues. Waste management is a crucial area related to the economic status of a country and the lifestyle of its population. Wastewater pollution from high production of palm oil results in high production of palm oil mill effluent (POME) is a main problem throughout the world. This study is to analyze palm oil waste characteristics in making of the formulated chicken feed. Therefore, this study also focuses on the chicken feed formulation production by the mixture of palm acid oil (PAO) and palm kernel cake (PKC). This study also to investigate the growth rate of chicken towards the formulation of the chicken feed. In experiment, free range chickens were used and divided into 2 groups with different formulation which are Diet 1 (D1) and Diet 2 (D2). The chicken was fed with the formulation continuously for 5 months (free-range chicken). The result obtained from Diet 2 (D2) was recorded and compared with Diet 1 (D1) which are control diet.

Keywords: Animal feed; Chicken; PAO; PKC; Poultry; Solid waste.

Uniform Formation of ZnO Nanorods in the y-axis Direction of the Glass Substrate via a Seed Layer Assisted Technique

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Abstract

Dip coating is a dependable, precise, and straightforward process for producing Zinc oxide (ZnO) nanostructures. We investigate the formation of ZnO nanostructures on glass slides using a dip coating technique and zinc nitrate as a precursor solution in this research. Using a Field Emission Scanning Electron Microscope, the influence of precursor concentration and seed layer on ZnO morphology is investigated (FESEM). The results show that when concentration increases, the diameter of ZnO nanostructures grows. The synthesis of ZnO on glass substrate produced in an irregular structure of ZnO nanorods, whereas with the assistance of a seed layer, uniform, well-defined nanorods with consistent diameter and high quality of ZnO nanorods are synthesized.

Keywords: Dip coating; Nanorods; Seed layer; Spin coating; Zinc oxide.

Isolation and Characterization of Soda Lignin from OPEFB and Evaluation of its Performance as Wood Adhesive

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Abstract

The purpose of this study was to explore the mechanical properties of plywood panels that had been bound with lignin-phenol formaldehyde (LPF) resin. To do this lignin was extracted from oil palm empty fruit bunch (OPEFB) fiber by soda pulping method, and characterized by FT-IR, ¹HNMR, and TGA analysis. Then, various compositions of soda lignin (10-50 wt %) was used as phenol substitute in lignin-based phenol-formaldehyde (PF) resin synthesis. The characteristics of the synthesized resin were compared to the properties of PF resin. Plywood was fabricated with LPF and its mechanical properties were studied and evaluated using industry standards. Increasing the substitution of phenol with soda lignin up to 40%, improves the mechanical properties of plywood. This research demonstrated that the lignin is used as a renewable replacement of phenol in PF resin synthesis.

Keywords: Soda lignin; Lignin phenol formaldehyde resin; Plywood performance; Formaldehyde emission; Tensile strength.

Evaluation of Antioxidant and Anti-Tyrosinase Activities of Surfactant and Alcohol Extracted *Combretum Indicum* Leaves

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Abstract

Antioxidant activity of surfactant (Triton X-100 and Vitamin E TPGS) and alcohol (acetone, methanol, and ethanol) extracted *Combretum Indicum* (CI) leaves have been tested using Total Phenolic Content (TPC) and 2,2-diphenyl-1-picrylhydrazyl (DPPH). The anti-tyrosinase activity was performed by using a mushroom tyrosinase inhibition assay. Prior to analysis, CI leaves had been extracted through maceration and freeze-dried for further analysis. The study proved that Ethanol 50% is the best solvent for its excellent antioxidant and anti-tyrosinase activity. Hence, CI extracts that generate outstanding results can give credence as local cosmetic usage to overcome oxidative stress and hyperpigmentation issues.

Keywords: Antioxidant; Anti-tyrosinase; *Combretum indicum*; Maceration.

Formulation of Face Serum from *Combretum Indicum* Leaves Extract

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Abstract

This research aims to evaluate the antioxidant and anti-tyrosinase activity of a formulated face serum using *Combretum Indicum* (CI) leaves extract by comparing it to a commercial serum. The results showed that the formulated serum with 0.004% of extract and 1% of Alpha Arbutin had an anti-tyrosinase activity with Half Maximal Inhibitory Concentration (IC₅₀) of 0.225 mg/mL, which was less effective than commercial serum by threefold. The pH of the formulated serum was 5.27 with a viscosity of 12.35 cP. The spreadability was 3.44%. This evaluation disclosed that the developed serum was almost similar to the benchmarked serum with minor deviations.

Keywords: Antioxidant; Anti-tyrosinase; *Combretum Indicum*; Face serum; Skin lightening agent.

Synthesis and Characterization of Microcrystalline Cellulose-g Poly (Acrylamide) Superporous Absorbent Composite using Graft Copolymerization Methods

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Abstract

Superabsorbent polymer was synthesized using graft copolymerization method incorporated with micro crystalline cellulose (MCC) as filler and sodium bicarbonate (NaHCO_3) as foaming agent. The addition of organic filler and porosity generator produced a highly porous biodegradable superabsorbent polymer composite (HP-PAM-g-MCC), which improves the characteristics of the acquired products, in comparison with the conventional SAP. Determination of water absorbency was tested using tea bag method after immersed in distilled water. The effects on amount of MCC and sodium bicarbonate addition towards water absorbency were studied to determine the optimum condition of PAM-g-MCC SAPs. The maximum water absorbency of PAM-g-MCC-SAPs was achieved at 1.0wt% of MCC and 1 wt% NaHCO_3 which resulting 74.01 g/g and 93.96 g/g of water absorbency. The FTIR and SEM analyses data reveal the presence of chemical bonding and morphological characteristics correspond to the water absorption capacity of the HP-PAM-g-MCC.

Keywords: Cellulose; Biodegradable; Highly porous; Superabsorbent polymer.

Physical and Morphological Properties of Asphalt Binder Incorporating Polyethylene Fiber
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Abstract

Asphalt pavement is widely used in highway engineering due to its high strength, low noise, high wear resistance, and high comfort. Asphalt pavements are easily aged as a result of the rapid increases in traffic volumes and loads, as well as the effects of sunlight and moisture, resulting in fatigue damage and an inability to provide minimal conditions for preventing destructions such as rutting at high temperatures and cracking at low and medium temperatures. Many polymers, including Polyethylene (PE) fiber have been incorporated into asphalt binders to reduce the major causes of asphalt pavement failures. The goal of this study is to improve road pavement properties and performance by enhancing the performance of virgin asphalt binder with Polyethylene (PE) fiber. Softening Point test, Penetration test, Ductility test, Viscosity test, SEM test and FTIR test were all performed. The results show that adding 4% PE fiber contributes to the highest softening point value. The penetration test results also show a decrease with the addition of PE fiber, indicating that the presence of 4% PE improves the hardness and consistency of asphalt. Furthermore, ductility revealed that 0% PE has the highest value and viscosity at 80rpm revealed that 3% PE has the highest value. From SEM image analysis, the existence of Polyethylene (PE) inside the asphalt binder was verified. The FTIR test results show that no new chemical functional groups were formed. This leads to the conclusion that incorporating PE fiber into asphalt binder can improve its performance while also reducing road pavement distress. It is recommended that future research analyses the performance of asphalt binder with different types of fiber to find the best polymer modified asphalt that can solve all future problems.

Keywords: Physical; Morphological; Polyethylene fiber; Asphalt binder; SEM; FTIR.

Application of Different Binders to Optimize the Characteristics of Asphalt: A Review

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Abstract

The worldwide use of bitumen as a binder for flexible pavement has significant environmental repercussions. At room temperature, bitumen is non-hazardous, but it becomes poisonous between 165 and 200 degrees Celsius. This study discusses an overview of replacement binder materials. In addition, this article discusses the polymers, bio-oil, waste cooking oil (WCO), and waste engine oil (WEO) used in asphalt pavement and their influence on the rheological and morphological properties of modified asphalt binders. A good modifier affects the failure characteristics of the binder, enabling it to withstand higher stresses and strains before failing. The asphalt industry has a long history of modifying asphalt binders to improve their durability and strength. Due to the low solubility of polymers, alternative binder-modified asphalt binders could have significant drawbacks. Numerous research studies have been done better to comprehend the internal structure of asphalt-modified binder materials. The literature review on the criteria that influence the properties of modified asphalt binders is reviewed. This article also discusses the multiple positives and disadvantages. And finally discusses the sustainable influence of renewable applications of binders on asphalt pavement.

Keywords: Alternative binders; Modified asphalt; Reclaimed asphalt pavement (RAP); Properties; Renewable

A Systematic Review on Identifying Factors Influencing Total Quality Management Implementation

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Abstract

In the era of globalization and advanced international trade, the importance of using total quality management (TQM) in the manufacturing companies is growing rapidly. This paper systematically reviews previous literature on the factors influencing total quality management implementation. While introducing TQM, previous studies have measured critical success factors. A systematic review of previous literature was performed from 2007-2020 and the analysis of 153 studies revealed that there are 10 key dimensions of TQM that are widely used as a measurement. Our examination shows that, despite having a shared relationship with its customers and "consumer attention/satisfaction" being unmistakably recognized as one of the major CSFs of TQM. The linkages between TQM Critical success factors, TQM and leadership and promotion, have received minimal research so far. People are the most important emphasis of business, even though consumer happiness may be thought of as the Quality management philosophy's main goal. Positive results are anticipated when cultures and quality management systems attempted to demonstrate are taken into account together. TQM literature from the past has noted that systemic behavior results either via the creation of an attitude or through the primary aspect of the quality management system. Businesses invest in cultural and structural resources to provide the right environment for TQM.

Keywords: TQM; Systematic review; Performance; Implementation.

Phytoremediation and Bioremediation of Heavy Metal from Domestic Wastewater by *Lepironia Articulata*, *Monochoria Vaginalis* and *Typha Angustifolia*

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Abstract

Wastewater from domestic effluents and industrial discharges continues contaminating freshwater resources. It could contain different chemicals and various of heavy metals. Heavy metals are toxic to human, causing water and soil pollution. The objectives of this research are to investigate the concentration of heavy metals in wastewater and to determine the percentage concentration of contaminants removal after using aquatic plants as phytoremediation agents. Three aquatic plants were used in this study; *Lepironia Articulata*, *Monochoria Vaginalis* and *Typha Angustifolia*. Ten parameters are used to measure the effectiveness of phytoremediation process which are; Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solid (TSS), pH, Turbidity, Chromium, Copper, Iron, Lead and Zinc. The results comply with Standard A in the Environmental Quality Act 1974. All three aquatic plants have 100% potential removal of Copper, Iron, Lead and Zinc metal. Oval-Leaf Pondweed (*Monochoria Vaginalis*) has 70% potential in removal of Chromium metal. Grey Sedge (*Lepironia Articulata*) has proven high percentage of removal for BOD with 85%, TSS removal with 92% and Turbidity removal with 97%. Meanwhile, Oval-Leaf Pondweed (*Monochoria Vaginalis*) has proven a high percentage of removal for COD, i.e., 97%.

Keywords: Phytoremediation; Wastewater; *Monochoria vaginalis*; *Typha angustifolia*; *Lepironia articulata*; Heavy metal.

Photodegradation of 2-Chlorophenol over ZnO/KCC-1: Reaction Optimization by Response Surface Methodology

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Abstract

Removing 2-chlorophenol (2CP) from water is an imperative task due to its toxicity. Various methods have been introduced for 2CP removal, and photocatalytic degradation is one of the best alternative solutions due to its effectiveness and simple process. This study focused on the potency of ZnO/KCC-1 as an effective photocatalyst for 2CP elimination from aqueous solutions. ZnO/KCC-1 was prepared by impregnation of commercial ZnO precursor into the synthesized KCC-1. The synthesized Zn/KCC-1 was characterized by using TEM, FESEM, XRD, FTIR, and PL. The characterization results revealed that the addition of ZnO did not cause the collapse of the dendrimeric structure of KCC-1. The analysis via response surface methodology (RSM) over independent variables of initial concentration (X_1), catalyst dosage (X_2), and pH (X_3) revealed that X_2 was the most essential variable, while X_1 was the least significant variable. The ideal parameter for 2CP degradation was achieved at $X_1 = 10$ mg/L, $X_2 = 2$ g/L, and $X_3 = 10$ with photodegradation efficiency (Y) of 90.62% (predicted) and 88.93% (experimental). This research revealed that ZnO/KCC-1 had a good potential for photocatalytic degradation of 2CP from an aqueous solution.

Keywords: 2-chlorophenol; Photocatalyst; ZnO/KCC-1; Photodegradation; Response surface methodology.

Biogeochemistry of Toxic Gas in The Aquatic Subsystem of Selected Peat Swamp Area in Kuala Pahang

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Abstract

Peat land is formed by the accumulation of partially decomposed and undecomposed organic material such as mosses and plants under anaerobic waterlogged situation, it is considered as the most dominant type of organic soils that formed under wetland conditions through centuries [1]. When dead plants are unable to decompose in the flooded environment, it will build up the partially decomposed organic matter which will form dome-shaped “ombrogenous” raised bogs which have ability to absorb and hold water by capillary forces [2]. In this situation, the aquatic subsystem in peat swamp area can be affected due to the chemical breakdown process slower than the production of biomass. Through this study, the biogeochemistry of toxic gases in peat land including Sulphur Dioxide (SO₂), Carbon Monoxide (CO), Nitrogen Dioxide (NO₂) and Ozone (O₃) are analysed by using Aeroqual AQM 65 instrument. All the data recorded are then being converted into Air Pollutant Index (API) value which is recognized by US National Ambient Air Quality Standards (NAAQS) by using a specific mathematical formula. Moreover, the target study place is located at Kuala Pahang, Pekan where contains copious of peat swamp areas. The trends of biogeochemistry of toxic gases at peat swamp area for the past whole year are demonstratively reviewed through graphical representation in this context for identifying the air quality condition at peat swamp area.

Keywords: Air pollution; Peat swamp area; Toxic gases.

Current Research on The Application of Membrane Distillation Technology in Industrial Wastewater Treatment: A Review

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Abstract

Membrane distillation (MD) is an emerging technology for separations and purifications that claims to be a cost-effective separation process, has high removal capacity and flexibility of operation. As an attractive separating process, MD has been the subject of worldwide academic studies. Unfortunately, from the commercial standpoint, MD has gained only little acceptance and yet to be implemented in industry. The purpose of this review is to provide an overview of the recent applications of MD in treatment of industrial wastewater in order to obtain clean water and to recover valuable compounds. Besides, the limitation encountered during MD process including membrane fouling, membrane pore-wetting, thermal polarization, concentration polarization and energy consumption were also discussed.

Keywords: Membrane distillation; Industrial wastewater; Membrane fouling; Pore wetting; Energy consumption.

Efficiency of Mixed Activated Carbon Layer from Sugarcane Bagasse and Coconut Shell in a Biological Sand Filter for Peat Swamp Groundwater Treatment

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Abstract

Globally, 998 million tonnes of agricultural waste are produced per year. In Malaysia, 1.2 million tonnes of agricultural waste are disposed into landfills annually. The production of activated carbon from local agricultural waste is one of the environment-friendly ways to transform the waste to value. The focus of this study is to investigate the effectiveness of mixed activated carbon layer from sugarcane bagasse and coconut shell in a biological sand filter for peat swamp groundwater treatment. Twelve parameters that will be analysed are pH, colour and turbidity, total suspended solid (TSS), biochemical oxygen demand (BOD), chemical oxygen demand (COD), lead, iron, zinc, manganese, E.coli and total coliform (TC) of groundwater. In this study, the sugarcane bagasse and coconut shell are first dried at 105°C for 24 hour and undergo carbonization process by burning in furnace at 500°C and 400°C after impregnation by phosphoric acid to activate a pore surface for the carbon. Two models of biological sand filter will be built with one conventional biosand filter and one integrated biosand filter by additional mixed activated carbon layer to carry out water parameter quality test. The material for biosand filters are wash sand (0.30mm - 0.60mm), support gravel (6.30mm-10mm), underdrain gravel (>10.00mm) and mixed activated carbon (0.63mm-2.00mm). The data obtained were used to determine the performance efficiency of conventional and integrated biosand filter. All the analytical measurements performed in this study were conducted according to the Standard Methods for the examination of water and wastewater by APHA (2007). The Drinking Water Quality Standard and National Water Quality Standards for Malaysia are used to establish the quality of treated water while the analysis of variance (ANOVA) is used in this study to determine whether each water parameter is significant differences between the means of three or more independent (unrelated) groups. The peat swamp groundwater was in the pH range of 3.81-3.90, colour range of (1080 - 1098) TCU, turbidity range of (60.4 - 64.8) NTU, BOD range of (12.4 - 12.85) mg/l, COD range of (110 - 125) mg/l, TSS range of (14 - 21) mg/l, total coliform more than 2419.6 MPN, iron range of (8.284 - 8.312) mg/l and zinc range of (0.185 - 0.204) mg/l. The peat swamp groundwater was absent of E.coli, lead and zinc. The performance efficiency of conventional biosand filter in pH was 71.00%, 80.88% for color, 70.08% for turbidity, 49.09% for BOD, 55.16% for COD, 59.06% for TSS, 95.59% for total coliform, 77.86% for iron and 64.69% for zinc. However, the performance efficiency of integrated biosand filter was 81.34%, 90.60% for color, 69.58% for turbidity, 63.32% for BOD, 69.47% for COD, 81.29% for TSS, 87.11% for total coliform, 81.51% for iron and 70.3% for zinc. In overall, all two objectives in this study were achieved. The physical, chemical, biological characteristics of peat swamp groundwater were determined. The integrated biosand filter was more effective than conventional biosand filter in increasing pH value, reduction of colour, BOD, COD, TSS, iron and zinc. However, conventional biosand filter was more effective than integrated biosand filter in reducing turbidity and total coliform.

Keywords: Agricultural waste; Biosand filter; Coconut shell activated carbon; Groundwater; Sugarcane activated carbon.

Preliminary Study of COF-Based Mixed Matrix Membranes for Improved Antifouling Property

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Abstract

A covalent organic framework (COF) was successfully incorporated to construct a new ultrafiltration (UF) membrane via interfacial polymerization. A mixed-matrix UF membranes with concentrations COF range of 0 to 1 wt% have been prepared and characterized. The influence of COF concentration on the membrane morphology and antifouling property has been evaluated. Increasing COF concentration from 0 to 1 wt% could significantly enhance the rejection rate from 26.11% to 95.87% for bovine serum albumin (BSA). Moreover, membrane hydrophilicity significantly improved by 30.53%, with the decrease of water contact angle from 66.94° to 46.50°.

Keywords: Covalent organic framework (COF); Ultrafiltration; Anaerobic membrane bioreactors (AnMBRs); Antifouling property.

Decolorization of Synthetic Textile Wastewater by Adsorption onto Corn Stalk Activated Carbon

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Abstract

The adsorption technique is one of the most widely used methods for effectively removing color. In the present investigation, easily available raw material, corn stalk, has been used to produce an activated carbon act as the adsorbent. This paper presents an experimental and numerical study to evaluate the performance of corn stalks for color removal from synthetic textile wastewater. The procedure is conducted by treating the synthetic textile wastewater using corn stalk activated carbon under different operational parameters. In order to produce activated carbon, corn stalks were treated by chemical activation using acidic treatment, 0.1 M hydrochloric acid (HCl). The development of porosity on the corn stalk surface is analyzed by Brunauer – Emmett- Teller (BET) analysis. The influence of two operating variables where adsorbent dosage (1, 2, 3, 4 g) and time taken (30, 60, 90 minutes) were studied. The result shows that the percentage of color removal increased with the increase of adsorbent doses and contact time until it reached a maximum point, and the percentage remained constant. The best condition of a parameter that gives maximum adsorption of color onto corn stalk activated carbon was at 3 g of adsorbent doses. The time taken was 60 minutes, resulting in an 81.67% degradation of color.

Keywords: Corn stalk; Activated carbon; Chemical activation; Braeuer-Emmet-Teller analysis; Adsorption; Textile wastewater.

Green Surfactants for Enhanced Oil Recovery: A Review

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Abstract

Enhanced oil recovery (EOR) has been shown to be an efficient oil recovery technology for recovering bypassed oil and residual oil that has been stranded in the reservoir. The goal of adopting EOR is to increase reservoir life by aiding in the use of water floods or other traditional methods of extending reservoir life beyond past economic restrictions. Among all improved oil recovery approaches, the flooding method has been demonstrated to be the most effective, and it is known as the surfactant flooding method, because to its capacity to minimize interfacial tension and improve mobility control. It has been demonstrated to be one of the most effective tertiary recovery strategies for obtaining high displacement efficiency. The performance of the tertiary approach is heavily dependent on numerous essential components, including surfactant content, pH, and salinity. GEOR, or green enhanced oil recovery, is the current trend that academics are looking at since it will help drive down costs while also being more ecologically friendly. Researchers have demonstrated that creating a green-based surfactant for surfactant flooding is feasible and, in certain situations, more efficient. Therefore, this review paper presented the latest research on green surfactants from various resources used for surfactant flooding for enhanced oil recovery.

Keywords: EOR; Green surfactant; Surfactant flooding; Oil recovery.

Seismic Performance of Three-Storey Bungalow under Different Time History Analysis

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Abstract

It is essential to use seismic analysis design in a structure, especially in multi-story buildings, because Malaysia is now experiencing mild earthquakes and also felt the vibrations from neighboring countries. A well-designed and well-built structure with adequate strength will prevent major damage from occurring whenever there are tremors from nearby or from afar. As a result, in order to assure the safety of the public and the environment, a seismic performance of the three-story building under different seismic loadings was conducted. This research study describes the results of a time history analysis performed with SAP 2000 software, to evaluate the performance, dynamic characteristics and to determine vulnerability of the building under different excitation of Aceh, Rapid KL and El Centro earthquakes. The model has been designed according to Eurocode 8, to the Malaysia National Annex (NA). According to the findings of the study, higher Peak Ground Acceleration (PGA) causes larger values of base reaction, higher displacement at joints, higher IDR (%), and largest forces, compared to lower PGA values.

Keywords: Base Shear; Earthquake; Inter storey drift ratio time history; Seismic performance.

Microwave Torrefaction of Sawdust as Biomass Energy Source

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Abstract

Sawdust is one of the wood wastes produced by the timber industry. Sawdust has excellent potential as an energy source. However, sawdust needs to undergo some improvements by the torrefaction process as it contains higher moisture content and volatile matter. Torrefaction is a thermal method that can enhance sawdust properties as it operates at low temperatures within 200-300°C with the presence of nitrogen gas. Microwave torrefaction is introduced to shorten residence time due to fast heating rather than conventional heating. This study focused on microwave torrefaction of sawdust to be used as an energy source by improving the sawdust's chemical compositions and energy potential. The experiment was conducted at different residence times (5, 10, 20 and 30 minutes) and nitrogen gas flowrate (30, 60 and 90 mL/min) for 20 minutes at 1000W microwave power. The colour of torrefied sawdust was observed, and the result showed it turned from light brown to slightly black because of the higher carbon content inside it as the removal of volatile matter during the process. The HHV values were measured by bomb calorimeter, and proximate analysis was determined using TGA. The result showed the improvement in torrefied sawdust that it becomes low in moisture content, higher carbon content and heating value due to the degradation of the structural components, mainly hemicellulose inside the sawdust that releases the volatile matter as the temperature increases. Overall, the microwave torrefaction process reduced the moisture content to 28%, increased HHV to 50%, and increased carbon to 60%, making sawdust a good energy source

Keywords: Biomass; Microwave torrefaction; Sawdust; Energy source.

Biodegradability Effects on the PHA/NFC Nanocomposite

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Abstract

Plastic has been harmful to the environment and lead to endless pollution due to years of disposal. However, its usage is undeniable hence an alternative to using biodegradable plastic replacing regular everyday plastic is highly recommended. Polyhydroxyalkanoates (PHA) have all characteristics needed as a biodegradable plastic however, it exhibits brittleness, poor thermomechanical properties, and low heat distortion temperature. Therefore, the objective was to investigate the effect of nanofibril cellulose (NFC) addition on the biodegradability properties of PHA composite. The biodegradation properties were investigated using a soil burial test. The samples were incubated for 7, 14, 21, and 28 days under control conditions, and weight loss for both characterizations was recorded to identify the effectiveness of NFC in the PHA composite. For the result, the weight of samples was decreased with an increase in incubation time, while its percentage of weight loss was increased as the hydrophilicity of NFC caused the sample to degrade at a higher rate. Although PHA/NFC samples were having a lag time at the earliest stage, it is then degraded better than pure PHA after 21 days. In conclusion, the addition of NFC has greatly improved PHA properties where PHA/NFC 8% is the most sufficient nanocomposite to turn PHA into promising biodegradable plastics and safe for daily usage

Keywords: Biodegradable plastic: Nanofibril Cellulose (NFC): Thin Film: Polyhydroxyalkanoates (PHA): Soil burial analysis.

Thermal Investigation of the Plastic Brick Made Up from Plastic Waste

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Abstract

The study intends to investigate the practicability of reusing plastic waste as an alternative to traditional bricks as eco-bricks. The study compares the thermal performance of buildings made of traditional bricks and buildings made of plastic waste. The researchers created three sample bricks digitally, each with 5%, 10%, and 15% HDPE in a plastic brick. The energy performance of the brick-filled plastic bottle walls was then measured on-site using a chamber. It was tested using a thermocouple connected to a data logger T08 software, to assist in building environmental analysis and to compare the efficiency of three materials: plastic brick, standard brick, and concrete brick. The findings revealed that building with plastic waste bottles has some environmental advantages over standard brick. It reduces heat gain and improves thermal comfort. More research and experiments are encouraged as the plastic contaminant problem becomes more important in modern societies and threatens the ecological balance.

Keywords: Environment; Construction; Technology; Energy; Plastic waste; Thermal performance.

Produce an Emulsion Paint by Using Vegetable Oils Painted on Plastic Brick

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Abstract

Emulsion paint is water-based and contains coloured polymer particles. These pigment-containing particles may contain acrylic or vinyl to make them more durable and easier to apply to walls and ceilings. When paint dries, the particles mix to form a wall film. Emulsion paint is used indoors and outdoors. Interior emulsion paint is required when painting a room. Emulsion paint can be used for a complete redecoration, a feature wall, or a touch-up before moving. Some emulsion paints trap heat, increasing the room's temperature. Cracking, fading, blistering, and poor aesthetics are common emulsion paint issues. Heat-reflecting paints are used on building exteriors to reduce solar heat. Compared to oil-based paints, emulsion paints are less harmful, with fewer volatile organic compounds. Emulsion paints have a mild-to-high washability indicator. Washability affects surface lustre. Depending on the type, some emulsion paints can be washed. Emulsion paint is glossy, semi-glossy, eggshell, matt, and smooth. The paint is water-resistant, making it easy to clean. There are many ways to apply paint. Spraying, dipping, flowing, rolling, and brushing are options. Emulsion paint is nonflammable and odourless. It's great for kitchens and bathrooms. Paintings can fail for many reasons. Misapplication, defective paint, incorrect paint selection, or environmental exposure are common causes. There are more fundamental reasons why paintings fail than these four. Emulsion paint has a better finish than distemper and doesn't dry or crack in sunlight. Their colour doesn't fade or peel when wet. Less toxic, easy to apply, and safe for wood, concrete, and metal. Emulsion paint doesn't dry or crack in sunlight and has a better finish than distemper. They don't peel or fade when wet. This research aims to develop an emulsion paint using vegetable oil that can help with temperature changes.

Keywords: Environment; Construction; Technology; Thermal performance; Coffee ground; Emulsion Paint.

Fabrication and Characterization of the Eco-Brick using Plastic Waste

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Abstract

Plastics are one the useful daily improvements and hazardous substances. At the time of necessity, plastic is found to be very useful, but after its use, it is only removed and creating all kinds of hazards. Plastic cannot be biodegradable, so it will continue to be dangerous for more than a century. The idea of this project is to find the use of this waste in something beautiful. Plastic waste mixing with cement, plastic wastes, and sand to make new types of bricks have thought. Plastic scrap used is a selection of waste bottles cans, and so on. So, as an experiment, plastic was cut into small pieces. To mold, cement, plastic waste, and sand were added in appropriate proportions. After thorough mixing, the mixture is poured into a rectangular mold with standard brick dimensions. Local brick test methods have been conducted such as compressive strength and water absorption. The eco-brick has undergone a test of compression test and water absorption test. The results showed that there was a difference between eco-brick and local cement bricks.

Keywords: Plastic waste; Biodegradable; Brick; Compressive strength; Water Absorption.

Fuzzy Logic Based MPPT Control for a Thermoelectric Generator System

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Abstract

Thermoelectric generators (TEGs) are used in small power applications to generate electrical energy from waste heats. Maximum power is obtained when the connected load to the ends of TEGs matches their internal resistance. However, impedance matching cannot always be ensured. Therefore, TEGs operate at lower efficiency. For this reason, maximum power point tracking (MPPT) algorithms are utilized. In this study, both TEGs and a boost converter with MPPT were modeled together. Detailed modeling, simulation, and verification of TEGs depending on the Seebeck coefficient, the hot/cold side temperatures, and the number of modules in MATLAB/Simulink were carried out. In addition, a boost converter having a Fuzzy Logic Controller (FLC) based MPPT algorithm was added to the TEG modeling. After the TEG output equations were determined, the TEG modeling was performed based on manufacturer data sheets. Thanks to the TEG model and the boost converter with FLC MPPT, the maximum power was tracked with a value of 99.68% and the power derived from the TEG was nearly unaffected by the load changes. The power outputs obtained from the system with FLC MPPT were then compared with others MPPT algorithm which are the Perturb & Observe (P&O) and the Sliding Mode Control (SMC) to emphasize the power transfer efficiency of the TEG. Ultimately, the proposed modeling provides a system of TEGs and a boost converter having FLC MPPT.

Keywords: Thermoelectric generator (TEG); Modeling; MPPT; MATLAB/Simulink.

Recovery of Dodecanol from Alkyl Polyglycosides using Solvent Extraction

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Abstract

Dodecanol, known as lauryl alcohol, is commonly used in production of Alkylpolyglycosides (APG) by reacting the dextrose with an excess of dodecanol in the presence of an acid catalyst. After the reaction ended, the challenging part, which is the purification step, to separate unreacted dodecanol from APG to ensure the final product meets an industrial specification which requires less than 5% of the dodecanol residue. Current separation methods i.e. evaporation, and distillation, require high energy and could deteriorate the product quality if it is not operated carefully. The recovered dodecanol will be sent back then to the process stream to reduce the alcohol consumption in the APG production. In this research, the extraction process was chosen as an alternative way in which it can separate the unreacted dodecanol without compromising the quality of the final product. The study investigates the effect of a solvent matrix, temperature, and agitation for the extraction of dodecanol using water as a solvent and ethanol, propanol and toluene as a solvent matrix. The composition ratio of sample: solvent: matrix was fixed to 10:10:10. The extraction temperature was manipulated between 60°C and 80°C and agitation speed at 5 and 7 rpm. In addition, the extraction was also subjected to the ultrasonic frequency set at 9 Hz for 30 minutes and using toluene as a matrix solvent. Results show that lower temperature and stirrer speed produced higher extraction yield. Solvent matrix toluene leads to the highest extraction yield of 15.02 w/w%. Applying ultrasonic during the extraction process increased the extraction yield to 30 w/w%, indicating that the ultrasonic has intensified the extraction process. In conclusion, the excess of dodecanol in the alkyl polyglycoside sample can be separated via the extraction process. This potential allows an alternative separation method at a low investment cost, energy saving, and eventually meeting the APG's product specifications requirement.

Keywords: Solvent extraction; Dodecanol recovery; APG purification; Ultrasonic extraction.

Solubility of Carbamazepine-Saccharin (Cbz-Sac) Co-Crystals in Polyvinylpyrrolidone (PVP) Solution

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Abstract

Co-crystals as well as pharmaceutical co-crystals indicates crystalline molecular complexes of two or more neutral molecules which allows two or more crystal components to bind in a single crystalline lattice without making new covalent bonds or breaking them. Co-crystals play a critical role in the pharmaceutical industries as it can be used to improve the properties of active pharmaceutical ingredients (APIs) such as stability, dissolution rate, solubility and mechanical properties. There are several factors that affect the properties of APIs especially solubility as most of the drugs in pharmaceutical industries being consumed by human that need to be made with highly soluble. In this study, the effect of ratio of solvent (ethanol/water) was studied on carbamazepine (CBZ), saccharin (SAC), and carbamazepine-saccharin (CBZ-SAC) co-crystal solubility in polymer solution (polyvinylpyrrolidone-PVP). CBZ-SAC co-crystals were crystallized using cooling co-crystallization techniques and mixed based on selected molar ratio of 1:1 and based on stoichiometric coefficient of the theoretical co-crystals structure. The co-crystals produced were characterized using X-Ray powder diffraction (XRPD), differential scanning calorimetry (DSC), fourier transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA). Polymer solution was prepared by dissolving PVP different ratios of ethanol/water. It was found that as ratio of ethanol/water solvent decreased, the solubility of CBZ, SAC and CBZ-SAC co-crystals increased. Thus, the ratio of the solvent used (ethanol/water) does affect the solubility trends of the CBZ, SAC, and CBZ-SAC co-crystals in PVP solution.

Keywords: Co-crystal; Carbamazepine; Saccharin; Polyvinylpyrrolidone; Ethanol; Solubility.

Design and Simulation Study of Antenna for Wireless Body Area Network (WBAN)

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Abstract

In this work, a flexible microstrip patch antenna has been designed to be operated at frequency 2.45GHz (ISM band). Three different materials have been used in this work which is rubber with permittivity of 3.0, loss tangent of 0.02 and thickness of 2.70mm, polydimethylsiloxane (PDMS) with dielectric constant of 2.71, loss tangent of 0.0134 and thickness of 1mm, and jeans with permittivity of 1.7, loss tangent is 0.025 and thickness of 1mm. Different substrate permittivity affect the antenna performance in various ways. The antenna is designed using CST Studio Suite 2019 software and the parameter such as return loss, VSWR, gain, directivity, and radiation pattern are analyzed. Here, the antenna performance when bending at five different angle, SAR value using human body layer and antenna performance when attach to the human arm model will be discuss in this paper.

Keywords: Microstrip patch antenna; ISM band; WBAN; PDMS; Wearable antenna; SAR; CST SS.

Effect of Elevated Temperature of Hybrid Fiber Cement Mortar

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Abstract

Concrete structures often subjected to damages such from fire and it can severely affect the stability of a concrete structure where cement is used as binding material. Hence, the aim of this experimental study is to investigate the effect of elevated temperature towards basalt fibre, bamboo fibre and combined fibres of bamboo and basalt fibres cement mortar, and to determine mechanical performance of different percentage of hybrid fibre concrete in terms compressive strength and flexural tensile strength. Cement mortar blocks (50 mm x 50 mm) and prisms (40 mm x 40 mm x 160 mm) with and without fibres are prepared. Basalt fibres of 0.1%, 0.25% and 0.5% and 0.5% of bamboo fibres by cement weight were added. The strength of the mortar exposed to various temperatures, 400 °C, 800 °C and 1000 °C for 2 hours was determined after curing for 28 days. The test result indicates that the optimum hybrid fibres was specimen that contained 0.10% basalt fibre and 0.50% bamboo fibres. Even after being heated to 1000°C, the mortar that is produced with this mix showed the highest compressive strength. Overall, the combination of basalt and bamboo fibres can be seen to exhibit higher strength compared to single fibre specimens after elevated temperature.

Keywords: Cement mortar; Hybrid fibres; Bamboo fibre; Basalt fibre; Furnace; Elevated temperature.

Challenges in Managing Occupational Safety and Health for SMEs in The Construction Industry: A Review

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Abstract

The construction industry is known as one of the largest industries in Malaysia. In the construction industry, different parties include clients, consultants and contractors that perform various roles in completing the project. It is believed that small-grade contractors are widely exposed to the highest rate of accidents or risks compared to medium and large-grade contractors (G5- G7) in the construction industry. Therefore, to clarify the issues on the safety matter, this paper has discussed the problem faced by small-grade contractors that influence the implementation of safety practices on site. It is hoped issues that arose will be caught by other parties to further work on improving construction safety as a whole.

Keywords: Construction Industry; Small grade contractors, Safety practices.

Seismic Analysis for Low-Rise Buildings Based on Different Types of Soil Consideration

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Abstract

The earthquakes around the neighboring country caused Malaysia to experience small tremors from the quake. One of the distant earthquakes is the West Sumatra earthquake that affected several tremors felt in Peninsular Malaysia, causing vibrations in some areas and causing damage to buildings and injuries to people. The earthquake disaster that hit Ranau, Sabah on the 5th of June, 2015, increased the awareness of Malaysians on the matter of considering seismic design for the building. Consequently, the engineers in Malaysia should have to consider the seismic design and construction even though Malaysia has not encountered an active seismic fault zone. This undertaking will impact construction costs, specifically in terms of materials. As a result, this research analyses the cost of steel tonnage for structural work on a double-storey house with a seismic design. Because this study focuses on seismic design buildings in Malaysia, we applied the Malaysia National Annex to Eurocode 8. In this study, three steps involved which is the design of a primary model, structural analysis and seismic design, and finally, the take-off procedure. As a starting point, a double-storey house was constructed. The model considered all soil types. The reference peak ground acceleration, α_{gR} 0.07g applied for DCL. According to the simulation data, the expenditure of steel tonnage for the soil types A and B structure reduces the cost of steel reinforcement by approximately 0% to 3%, against a non-seismic model, and, the expenditure of steel tonnage for the other soil types which are C, D and E structure increase the cost of steel reinforcement by approximately 4%, against a non-seismic model. By this means, the non-seismic models in this study required more steel reinforcement than the soil types A and B models due to the domination of wind load on the structure that produces a bigger force, and for the soil types C, D, and E models required more steel reinforcement than the non-seismic models because the soil softer compared to soil types A and B. In this study, the softer soil required more steel reinforcement compared to the stiff soil and the cost of steel reinforcement is anticipated to rise depending on the type of soil and the level of seismicity.

Keywords: Seismic design; Steel tonnage; Soil type.; Seismicity; Civil engineering; Eurocode 8.

Performance of Graphene as the Corrosion Inhibitor of Magnesium Alloy for Automotive Application

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Abstract

Magnesium is important in the automotive industrial sector as a lightweight metal in its pure and alloy form. Due to the low corrosion resistivity exhibit by magnesium alloys, their usages are restricted in the industrial environment. To contribute solving this problem ECO-24 asbestos coating and graphene nano-platelets (GNPs) as corrosion inhibitor are used in this research. The alloy corrosion behavior of the alloy was investigated to measure the performance of the coating and the inhibitor in the 3.5 % Sodium Chloride (NaCl) solution. Electrochemical measurement such as potentiodynamic polarization were used to investigate the corrosion resistance of the ten samples. The result demonstrated the coating is able to reduce the corrosion rate of the alloy and the inhibitor is able to bond properly with the coat to reduce the corrosion rate of the AZ91 magnesium alloy respectively.

The Association between Psychosocial Factors and Musculoskeletal Symptoms among Construction Workers

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Abstract

Construction workers are usually required to do labour-intensive and physically demanding activities (including psychosocial), affecting the health and well-being of employees. This study aims to identify the association of psychosocial factors with musculoskeletal symptoms among construction workers. A total of 72 construction workers were involved in this study. The musculoskeletal discomfort and psychosocial factors data were collected from a composite questionnaire including the Nordic Musculoskeletal Questionnaire (NMQ) and the Malaysian version of Copenhagen Psychosocial Questionnaire (BM-COPSOQ) respectively. Descriptive analysis of test data was performed to determine the prevalence of psychosocial factors and musculoskeletal symptoms among construction workers. The Chi-Square test was used in determining the association between psychosocial factors and the development of musculoskeletal disease (MSD). All p - values were set at 2-tailed. The significant values $p \leq 0.05$ were considered statistically significant. The shoulder had the highest frequency of musculoskeletal discomfort (82%), followed by lower back (73.6%), knees (72.2%), upper back (70.8%), feet and elbow (66.7%), hip/thighs and forearm (62.5%), and neck (61.1%). It was shown that most psychosocial factors were found to have a statistically significant relationship with musculoskeletal symptoms at any of the body regions ($p < 0.05$). There was significant relationship between certain psychosocial factors and musculoskeletal symptoms among construction workers. Identification of these factors and a proper workplace organizational management and culture should be implemented to reduce the risk of musculoskeletal pain.

Keywords: Musculoskeletal disease; Psychosocial factors; Construction worker.

Emergency Response and Preparedness Assessment among Migrant Construction Workers

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Abstract

Emergency can result in various hazards to employers, workers, and other persons at scene. Preparing before emergency can make sure that employees have the knowledge, equipment, and ability to protect themselves. However, the status of emergency response and preparedness among migrant construction workers is unclear in Malaysia. This study aims to assess the emergency response and preparedness among migrant workers from the related implementations, attitudes, and barriers. A quantitative survey method was used to collect the data through questionnaires in a construction company in Johor. A total of 106 respondents (18 from management position, 88 from general position) were participated in the study. The implementations in worker participation involving activities and worker representative were identified as low level. However, the attitude towards emergency response and preparedness among migrant construction workers were generally positive. Lastly, the language, behaviour and management were all barriers in implementing emergency response and preparedness

Keywords: Emergency response and preparedness; Migrant workers; Construction; Implementation; Attitude; Barrier.

The Installation of Solar Panel Plant Based on The Site Selection Assessment, Solar Irradiance and Slope Analysis in Malaysia

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Abstract

Renewable energy sources are superior to fossil fuels because they are often free, abundant, and have little or no environmental effect. Pursuing clean energy is critical for Ampang district in order to diversify their energy portfolios, transition to green economies, and achieve sustainable development. The purpose of this work is to develop a GIS-based model for multi-criteria suitability analysis that can be used to find most suitable solar power plant locations. The suggested model aided in the integration of a number of significant parameters that indicate the potential of different areas between flat and hilly area for solar plant placement. As a result, viable locations for solar energy facilities in Ampang have been identified. The possibility for generating electricity from these more favorable locations was also assessed based on the measurement of solar irradiance. Possibility to install the solar panel on hilly site has been understood by analyzing the factor of safety based on slope analysis. This research potentially exposed to the green technology industry for determining the suitable location for installation of solar panels.

Keywords: Sustainable technology; Insolation; Factor of safety; GIS.

Effect of Input Convergence Using Different Size of Input Data

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Abstract

As a useful tool to analyze reliability, Monte Carlo will be used in this research. By using the IEEE-14 buses network, two fault rates will be used which are large and small values. However, the size of the input data will be tested at input convergence, which are time to fail (TTF) and time to repair (TTR). In a simulation, a variance reduction method will be applied to MCS to watch the effect of input data. However, based on the current discovery, the input convergence with small input data are fails to converge due to the size of the fault rate, despite that, the simulation with bigger fault rates able to stop before the decided years. Based on the calculated reliability indices, the simulation that applied bigger TTF and TTR would help to increase the speed of CPU and reduced the time taken to complete a simulation compared when using smaller input data.

Keywords: Distribution system; Time to fail; Time to repair; Monte Carlo.

The Effect of Ultrasonication Temperature on Yield Nanocellulose Powder from Empty Palm Oil Bunches

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Abstract

In recent years, research has been conducted to synthesize nanocellulose from many bio-mass that is abundant as agro-industrial wastes such as epob. This research is purposed to investigated the effect of temperature. Experiments were performed for the ultrasonication temperature of 40, 50, 60, and 70 °C for 30 minutes. The pretreatment was conducted by acid treatment using chloric acid 32% followed by ultrasonication with varied temperature, and hydrothermal process for 1 hour at 120 °C. The experimental results that the higher temperature the yield is increased. The temperature of 70°C is considered the best ratio due to its highest yield of NC 36.9 %. In accordance with the yield, the effect of temperature gave the smaller size. With the smallest size was gain for temperature 70 °C of 174.85 – 460.84 nm.

Keywords: Acid treatment; Nanocellulose; Ultrasonication temperature; Yield.

Analysis of Anthocyanin Result and Content in Rice Bran Extract (Rice Bran) from Pneumatic Pressure Extraction Results with Variation of Pressure

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Abstract

Rice is a food crop that serves as a source of energy. In order for rice to be consumed, it must be separated from the skin, this produces solid waste in the form of rice bran. Generally, the rice bran produced from the rice milling process is as much as 8-12%. Until 2022, the use of rice bran is still limited and in general, rice bran is only used for animal feed. Rice bran contains various vitamins and antioxidants, one of which is anthocyanins. The benefits of anthocyanins include natural pH indicators, natural dyes that are usually used in food and beverages (beverage), and anti-cancer. Extraction in this study using a pneumatic press machine. The variables used in the extraction process in this study were pressures of 3, 4, 5, 6, 7 bar on the yield and levels of anthocyanins. The highest yield was obtained at the 7th bar pressure, which was 6.45% and the resulting polynomial equation was $y = 0.0471x^2 + 0.0831x + 4.87$ and $R^2 = 0.9969$. This shows that the amount of pressure has a relationship with the yield of rice bran oil. Rice bran oil was then analyzed by spectrophotometric method and showed that the highest anthocyanin content was obtained at the 3rd bar pressure, which was 6.18 Mg/Kg for simplo and 6.01 Mg/Kg for duplo.

Keywords: Pressure; Yield; Anthocyanin content; Pneumatic press.

Drying and Pectin Extraction from Waste Lemon Peel (*Citrus Limon*) Using Extraction Process with Ultrasonic Waves

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Abstract.

Lemon (*Citrus Limon*) is one of the most widely processed horticultural products into lemon juice. Approximately 70% of the weight of the fruit in the lemon juice processing industry will be wasted (including the peel, seeds, pulp and remaining lemon juice). Lemon peel waste will be thrown away and cause environmental problems, even though lemon peel waste can still be processed as a source of pectin raw materials. The benefits of pectin most in food processing because of its ability to form a gel and a source of fiber in food. The purpose of this study was to obtain the drying yield with the best dehydrator and to optimize the extract time and the effect (pH) on the yield of the lemon peel waste extract. The method used is extraction with the help of ultrasonic waves with a wavelength of 40 kHz and the solvent is citric acid. Filtering of lemon peel waste extract using filter paper. This test was carried out with the length of the extraction time (20 minutes, 30 minutes, 40 minutes, 50 minutes) and with the pH (1.5, 2, 2.5). The drying process on waste of lemon peel aims to reduce the moisture content so that the material is more durable and avoids the growth of unwanted fungi and microorganisms. Yields of waste of lemon peel drying is 15.4 %. The results showed that the highest extract yield was 57% with treatment time of 40 minutes and pH 2, based on FTIR analysis, it showed the presence of pectin functional groups. The results of the proximate analysis of the lemon peel extract contains 1.50 % protein, 81.37 % carbohydrates, 0.17 % ash content, 3.87 Kcal/100 g energy from fat, 335.35 Kcal/100 g total energy.

Keywords: Citrus Limon; Extraction; Waste lemon peel; Pectin; Ultrasonic.

Synthesis of Graphene Oxide-Coated Silver Nanoparticles Modified Plastic of Fibre Optic Sensor Configuration

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Abstract

This work reported the synthesis and fabrication method of graphene oxide (GO) loaded with silver nanoparticles (AgNPs) modified conventional fibre optic probe (plastic of fibre; POF) for sensor configuration. The POF was been unclad using mechanical slicing and chemical etching methods, in which the probe was immersed in different concentrations of acetone such as 100 % v/v, 80 % v/v, 60 % v/v and 30 % v/v concentration of acetone in de-ionised water to find the surface defect in the POF core such as if there are any surface scratch and thus minimize the power loss of the sensor. Later, the unclad region of POF was coated with graphene oxide coated with silver nanoparticles (GO-AgNPs) as a sensing material for the sensor. GO was successfully synthesized using the modified Hummers method energy dispersive X-ray spectroscopy (EDX) and scanning electron microscopy (SEM) result. AgNPs were synthesized via the seed-mediated method with a seeds solution of 0.1 mL obtained with LSPR spectrum (353 nm and 440 nm as confirmed via UV-Vis spectroscopy) with sizes obtained in ranges of 5 to 80 nm as confirmed by transition electron microscopy (TEM) images. The morphology of unclad POF via mechanical and chemical etching was characterized using the metallurgical microscope and SEM with the average core thickness found at 0.884 ± 0.009 mm. The GO-AgNPs coated unclad POF was confirmed via SEM analysis in which 60% v/v of acetone was found as the working etcher to remove the cladding layer of the POF. The method to optimize the fabrication of the GO-loaded AgNPs embedded POF to further improve the development of the sensing platform has been discussed.

Keywords: Fibre optic sensor; Graphene oxide; Silver nanoparticles; Chemical etching; Single-mode.



THANK YOU