

# **Engineering Technology International Conference (ETIC 2022)**

Held Online

IET Conference Publications 808

Kuantan, Malaysia  
7-8 September 2022

ISBN: 978-1-7138-7261-0

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2022) by the Institution of Engineering and Technology  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2023)

For permission requests, please contact the Institution of Engineering and Technology  
at the address below.

Institution of Engineering and Technology  
P. O. Box 96  
Stevenage, Hertfordshire  
U.K. SG1 2SD

Phone: 01-441-438-767-328-328  
Fax: 01-441-438-767-328-375

[www.theiet.org](http://www.theiet.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

## TABLE OF CONTENTS

Sensorless Force Estimation on Fingertip with Gravitational Compensation for Heavy-Duty Pneumatic Tri-Grasper Robot.....	1
<i>Addie Irawan, Mohd Iskandar Putra Azahar, Muhammad Afiq Hashimi</i>	
Image Approach to English Digits Recognition Using Deep Learning .....	6
<i>Fatin NA Zainol, Mohd Zamri Ibrahim</i>	
Effectiveness of Portable Eddy Current Inspection on Welding Pipeline.....	12
<i>Muhammad Firdaus Abdul Halim, Siti Norbaya Sahadan</i>	
Signal-Based Feature Extraction for Makhraj Emission Point Classification .....	19
<i>Nurul Wahidah Arshad, Mohd Zamri Ibrahim, Rohana Abdul Karim, Yasmin Abdul Wahab, Nor Farizan Zakaria, Tuan Sidek Tuan Muda</i>	
Brain Capillary Geometry Development for Multiscale Modelling Study .....	26
<i>Abbas Shabudin, Maryah Harzarina Jasni, Mohd Jamil Mohamed Mokhtarudin</i>	
Sequential Monte Carlo in Sequence.....	31
<i>Nur Nabihah Rusyda Roslan, Noorfsatin Farhanie Mohd Fauzi, Mohd Ikhwan Muhammad Ridzuan</i>	
Well-Being in High-Rise Construction Sites: Key Factors.....	36
<i>Sofiyaa A. Halim, Afiqah R. Radzi, Ahmad Rizal Alias, Rahimi A. Rahman</i>	
Evaluation of Fault Location Algorithm in Distribution Power System Lines Using Differential Equation Method with Fault Indicator Approach .....	43
<i>Izatti Md Amin, Mohd Rafi Adzman</i>	
Flow Pattern Around Traditional Malay House Using Enhanced Smoke Wire Technique in a Boundary Layer Wind Tunnel .....	49
<i>Kamil KH Abdullah, Nurizzatul Atikha Rahmat, Khairun A Khairunizam</i>	
A Simulation of Insertion and Retention Forces in Cantilever Hook Snap-Fit Joint.....	57
<i>Siti Sarah Abdul Manan, Law Ping Chien, Muhammed Nafis Osman Zahid</i>	
Simulation of Frequency Selection for Invasive Approach of Electrical Capacitance Tomography for Conducting Pipe Application Using Oil-Gas Regimes .....	63
<i>Ain Eazriena Che Man, Yasmin Abdul Wahab, Nurhafizah Abu Talip Yusof, Suzanna Ridzuan Aw, Mohd Mawardi Saari, Ruzairi Abdul Rahim, Sia Yee Yu</i>	
Investigation of the Effects of Turbine and Pipe Design on Pico-Hydropower Generator System Performance in Flowing Water .....	69
<i>Nurhafizah Abu Talip Yusof, Haziq Irfan Hamdan, Lai Kok Lee, Yasmin Abdul Wahab, Mohamad Shaiful Abdul Karim, Ahmad Syahiman Mohd Shah</i>	
Comparative Study of Thermal Modelling Using Eulerian and SPH Techniques for FSW .....	76
<i>Sacheth S K Bellala, Srinivasa Rao Pedapati, Roshan V Marode</i>	
Simulation of Direct Injection, Mixing and Combustion of CNG Fuel in a Single-Cylinder Engine with Different Injector Orientations Using CFD .....	83
<i>Mohd A Azmi, Mohd Fa Rahim, Rizalman Mamat</i>	

Comparative Study of Fuzzy Symbiotic Organism Search Variants for Pairwise Test Suite Generation .....	91
<i>Nurul Asyikin Zainal, Kamal Z Zamli</i>	
Comparative Study of Submerged Friction Stir Welding of Aluminium Alloy Using Different Cooling Medium.....	97
<i>Nur SN Sofian, Luqman HA Shah</i>	
Structure Vulnerability and Risk Analysis of 3-Legged Offshore Structure.....	105
<i>T. K Kee, C. J Cheok, M. A Amzar Kamarudin, Saffuan Wan Ahmad</i>	
Morphological Analysis of Polyaniline (PANI) Integrated Cotton Fabric.....	113
<i>Md Shohan Parvez, Md Mustafizur Rahmana, Mahendran Samykanoa, Mohammad Yeakub Ali</i>	
A Thematic Review on Contributing Factors to Construction Delays in Malaysia .....	118
<i>Yap Wan Heong, Nor Haslinda Abas, Hairuddin Mohammad</i>	
Optimal Power Flow Solutions Incorporating Stochastic Wind Power Generators by Moth Flow Optimizer.....	124
<i>Mohammad Khurshed Alam, Mohd Herwan Bin Sulaiman, Md Shohan Parvez, Shahriar Imtiaz, Md. Shaoran Sayem</i>	
Zebrafish Larvae Locomotor Activity Detection Using Convolutional Neural Network (CNN).....	130
<i>WNAW Samsudin, M. Harizan. Z, M. Z. Ibrahim, Rohana Abdul Karim, WNW Ibrahim</i>	
Fatigue Analysis of Steering Rack and Pinion System.....	136
<i>S. K. Sean, A. M. Adam, M. R. M. Akramin, M. S. Shaari</i>	
Investigation of the Effect of Print Parameter on Dimensional Accuracy for Fused Deposition Modelling (FDM) 3D Printer .....	141
<i>S. Nurul Najaa, Mohd Hamka Jaapur, Khairul Fikri Bin Muhamad</i>	
The Comparison of Solar Irradiance Assessment at Different Terrain in West Malaysia.....	145
<i>Ahmad YAA Termuzi, Nurmunira Muhammad</i>	
Effect of Seismic Design on the Cost of Structural Works for Two-Storey Residential Building.....	152
<i>Hanis A Roslan, Mohd I Adiyanto</i>	
Investigation of Stabilizing Internal Temperature and Humidity of Peltier-Based Cooling Refrigerator Supplied by Small Scale PV .....	158
<i>Amerrudin Azizi, Norazlianie Sazali, Mohd Nizar Mhd Razali, Muhamad Zahim Sujod, Ahmad Afif Mohd Faudzi, Januar Parlaungan Siregar</i>	
Performance Analysis of Sigfox Deployment .....	163
<i>Aisyah I. Sulaiman, Mohd S. Ahmad, Roshahliza M. Ramli, Waheb A. Jabbar, Ammar Tajuddin</i>	
Vibration Characteristic of Piezoelectric Attached to Substrate .....	169
<i>Muhammad Mohamed Salleh, Hafiz Ghazali, Izzuddin Zaman, Hasril Amiruddin, Reyhanhealme, N. Baharudin, Mohd Erfy Rahim, Mohd Bazli</i>	
A Numerical Study of Brace-Viscous Damper System of Fixed Offshore Jacket Platforms Under Extreme Environmental Loads .....	175
<i>Salahaldeen M. A. Alwashali, Siewchoo Chin</i>	

Study on Effect of Dual-Layer Polyvinylidene Fluoride Nanofiber Membrane Towards Quasi-Solid State Dye-Sensitized Solar Cell's Characteristics .....	182
Wan Nur Ainna Amirah Wan Zulkifli, Nik Fatin Qistina Amran, Alyaa Afiqah Fauzi, Faiz Arith, Ahmad Syahiman Mohd Shah	
Allocation and Sizing of Distributed Generation (DG) Using Multi Verse Optimizer (MVO) .....	189
Nori Elfahmi Darwis, Nor Rul Hasma Abdullah, Ibrahim Haruna Shanono, Mahfuzah Mustafa, Rosdiyana Samad	
Simulation of Microbubble Reconstruction Using Compressive Holography .....	197
Syukran Hakim Norazman, Erny Afiza Alias, Izzati Salwani Zaidi	
Geo-Analytical Hierarchy Process for Flood Risk Mapping Using Moderate Resolution of Satellite Images .....	202
Syarifuddin Misbari, Jacqueline Ia Gisen, Amir Am Fauzi, Nur Afni Rosli	
2D Analysis of VIV Enhancement Via Dual Isosceles Triangular Bluff Bodies \in Tandem Arrangement for Electrical Generation .....	209
Mohd Kazim MN. Fakhzan, Rasani M. Rasidi, Nuawi M. Zaki, Harun Zambri	
Computational Fluid Dynamics of Patient-Specific Coronary Artery During Stent Treatment.....	215
Nur Syuhada Che Amdilah, Yu Shi Lau, Yih Miin Liew, Wan Naimah Wan Ab Naim, Mohd Jamil Mohamed Mokhtarudin	
Finite Element Study: Effect of Emergency Brake on Total Knee Arthroplasty .....	220
Iskandar S. F., Mas Ayu H., Rosdi Daud, Tomadi S. H., Shah A.	
Tip Mass Effect of Piezoelectric Energy Harvester on Power Generation .....	225
Muhammad Izzat Badrin, Bukhari Manshoor, Amir Khalid, Muhammad Mohamed Salleh, Mohd Hafiz Ghazali, Hanif Abdul Latif, Izzuddin Zaman	
User, Industry, and Waste Management Perspectives on Single-Use Plastic's Environmental Impact During the Pandemic: A Pilot Study .....	231
Kamal Yousef Ali Zreba, Tengku Nuraiti Tengku Izhar, Irnis Azura Zakarya, Rajeb Salem A Hwidi	
Epoxy-Barium Titanate Nanocomposite Fabrication Process and Dielectric Properties at S and G Band .....	237
Nurulfadzilah Hasan, Nurul Hazlina Noordin, Mohamad Shaiful Abdul Karim, Nurhafizah Abu Talip Yusof, Mohd Ruzaimi Mat Rejab	
Disparity Map Algorithm Using Census Transform and Hierarchical Segment-Tree from Stereo Image .....	243
Muhammad Nazmi Zainal Azali, Rostam Affendi Hamzah, Zarina Mohd Noh	
Turnkey Fibre Bragg Grating Interrogator for Real-Time Static and Dynamic Monitoring Applications.....	249
Z. M. Hafizi, E. Vorathin, M. S. N. A. Adhreena	
An Internet of Wearable Things (IOWT) Based System for Smart Healthcare Monitoring.....	254
Suliman Abdulmalek, Abdul Nasir, Waheb A. Jabbar, Mukarram A. M. Almuhaya, Devin Babu	
Design Study of Torque Power Output of Pelton Turbine Based on Variable Parameter Bucket and Angle Deflection Geometry .....	261
Febrian Idral, Ahmad Fuad Abdul Rasid, Abdul Munir Hidayat Syah Lubis, Kevin Yii Shun Jing	

Development of 3-Way Loudspeaker System with Trapezoidal Enclosure.....	267
<i>Mohd Zamri Jusoh, Rafidah Rosman, Ahmad Farid Abidin, Nazli Che Din, Mohd Saiful Najib Ismail Marzuki</i>	
Computation of Walkability Index with Weightage for BRT Sunway Line.....	274
<i>Hamsareka Thevadass, Edwin Goh Boon Hoe, Teo Fang Yenn, Wong Kok Cheong, Christina Chin May May, Yuen Choon Wah, Yap Eng Hwa</i>	
Investigation the Contribution of Process Areas to Lower Back Pain Among Manual Assembly Workers in Medical Device Industry .....	280
<i>Mohammad S Md Noh, Saiful A Che Ghani, Wan NH Wan Harun</i>	
Numerical Simulation on the Elucidation of Wake Flow Structure Behind a Single Quarter Elliptic-Wedge Spire.....	288
<i>Muhammad Arifuddin Fitriady, Nurizzatul Atikha Rahmat, Ahmad Faiz Mohammad</i>	
Anomalous Resistance and Its Effect on Neutron Yield Production in Mather Type Dense Plasma Focus Devices.....	297
<i>Arwinder Singh, Saw Sor Heoh, Lee Sing</i>	
Effect of Heat Treatment to Clitoria Ternatea and Hibiscus Sabdariffa-Based Dye-Sensitized Solar Cells' Characteristics .....	303
<i>Nik Fatin Qistina Amran, Wan Nur Ainna Amira Wan Zulkifli, Alyaa Afiqah Fauzi, Siti Noor Hidayah Mustapha, Ahmad Syahiman Mohd Shah</i>	
Dynamic Control and Performance of Dual Active Bridge Converter-Based Particle Swarm Optimization.....	311
<i>Suliana Ab-Ghani, Hamdan Daniyal, Norazila Jaalam, Norhafidzah Mohd Saad, Nur Huda Ramli</i>	
Finger Knuckle Recognition with PCANet .....	316
<i>Nordiana Mukahar</i>	
Study on Criticality Minimizing Cost in Power System with Optimal Design of Stochastic Wind Power Generators Using Moth Flow Optimization .....	322
<i>Mohammad Khurshed Alam, Mohd Herwan Bin Sulaiman, Md. Shaoran Sayem, Jannat Khair Chowdhury, Md. Foysal, Md. Mahfuzur Akter Ringku</i>	
Impacts of Incorporating Distributed Generation (DG) to the Reliability of Electric Distribution Network Using Monte Carlo Simulation (MCS).....	328
<i>Ahmad Zairi Mohd Zain, Mohd Ikhwan Muhammad Ridzuan, Nur Zahirah Mohd Ali</i>	
Performance Analysis of the PV Module Mitigation Method Affected by Hotspot Condition .....	334
<i>Mohd Munif Rosli, Mohd Shawal Jadin, Mahfuzah Mustafa, Norizam Sulaiman, Mohd Shafie Bakar</i>	
Monitoring Sitting Posture: A Low-Cost Wearable Device Using Alarm and Vibration Method.....	340
<i>Siti Rashidah Binti Abd Hamid, Lee Ming Foong</i>	
Analysis of Personal Protective Equipment Classification Method Using Deep Learning .....	346
<i>Siti Z. N. A Silopung, Rosdiyana Samad, Mahfuzah Mustafa, Nor RH Abdullah, Norasyikin Fadilah</i>	
Design of Vivaldi Antenna for Non-Destructive Measurement Applications.....	355
<i>Mohd Zulfikri Elvis Syefrizal, Nurhafizah Abu Talip Yusof, Mohamad Shaiful Abdul Karim, Nurulfadzilah Hasan, Nor Farizan Zakaria</i>	

Methodology on Wind Noise Reduction for Vehicles Segment .....	363
<i>N. Baharudin, M. Razi Jusoh, Debie Devisser, Raja Mariatul Qibtiah, Muhammad Mohamed Salleh, Khairul Anuar Abdul Rahman, N. Nashima Ali</i>	
Hill-Climbing Search (HCS) MPPT Algorithm for Hydrokinetic Energy Harnessing.....	370
<i>Nasiruddin Sadan, Wan Ismail Ibrahim</i>	
Vision-Based Toddler Physical Activity Recognition Using Deep Learning .....	376
<i>Norasyikin Fadilah, Mohd Zamri Ibrahim, Rosdiyana Samad</i>	
Study on Effect Demand Side Management and Penalty Assessment Based on Guaranteed Standard Performance on Reliability Performance of Distribution Network .....	383
<i>Muhamad Haziq Mohd Khairi Azahar, Nurul Najihah Azizan, Mohd Ikhwan Muhammad Ridzuan</i>	
Sensorless Fuzzy Logic Controller (FLC) Based Maximum Power Point Tracking (MPPT) Algorithm for Hydrokinetic Energy Harnessing .....	390
<i>Wan I. Ibrahim, Mohd. I. Hamid, Mohd. R. Mohamed, Mohd. R. Ghazali, Raja M. T. R. Ismail</i>	
Improving System Static Security Via Optimal Placement of Static VAR Compensator Using Multi Verse Optimizer (MVO).....	396
<i>Siti Nur Hazirah Asmadi, Nor Rul Hasma Abdullah, Ibrahim Haruna Shanono, Mahfuzah Mustafa, Rosdiyana Samad</i>	
Hydroponic Plantation Monitoring System: An IOT-Based Hardware .....	404
<i>Kheong J. Yeo, Nik M. Z. Hashim, Abd S. Ja'Far, Nur A. Ali, Azahari Salleh, Mohd S. Ahmad</i>	
Automated Clothesline Retrieval System Using LDR and Raindrop Sensors.....	413
<i>M. Y. Hew, A. M. Andrew, Y. Z. Q. Faith, Y. Y. Low, M. K. Y. Natasha</i>	
Development of a Real Time Wearable System for Monitoring Sprint Running Performance .....	421
<i>N. M. Ziyad, A. A. Sharizli, K. Z. Han, Mohd Shawal Jadin, Norizam Sulaiman, Fairuz Rizal Mohamad Rashidi</i>	
Integration Design of 2.4 GHz Microstrip Patch with SIW Antenna Structure.....	428
<i>Kamleshvari Panerselvan, Nurul 'afifi Alias, Mohamad Shaiful Abdul Karim, Ahmad Syahiman Mohd Shah, Syamimi Mardiah Shaharum</i>	
Effects of Portable Computing Device Usage on Posture and Health Among University Students .....	435
<i>Nur Diana Farhana Zulkiflee, Munira Mohd Ali</i>	
Adaptive Cruise Control of Hybrid Electric Vehicle Using Fuzzy Logic Based Parallel Coupling Model .....	439
<i>Desmond Teo Kai Xiang, Vimal Rau Aparow</i>	
Numerical Simulation of Influence of Eccentric Needle Movement on Internal Flow Characteristics of Groove-Type VOC Nozzle.....	446
<i>Lu Hongkun, M. M. Noor, K. Kadirgama</i>	
Experimental Validation of Reinforced Concrete Beam Incorporating Coal Fly Ash and Coal Bottom Ash Using Numerical Analysis.....	457
<i>Nurul Natasha Nasrudin, Nur Farhayu Ariffin, Aizat Alias, Abdul Muiz Hasim, Muhammad Nor Syahrul Zaimi</i>	
Resistive Sensor Array Readout Circuit: Nodal Array Approach.....	464
<i>Muhammad Farid Akmal Fahrurrazi, Airul Sharizli Abdullah, Fairuz Rizal Mohamad Rashidi</i>	

Modeling of Smart Energy Management System for Residential Sector .....	472
<i>Ousama M, Tammam Ajami, Farah Adilah Jamaludin</i>	
An Investigation of Heat Treatment Effect on the Mechanical Properties of the Aluminium Alloy .....	479
<i>Muhammad Aizuddin Fikry, Radhiyah Abd Aziz</i>	
Head Injury Evaluation Strategy for Sepak Takraw Ball Heading: A Systematic Review .....	483
<i>N. M. H. M. Hassan, N. H. Johari, M. N. Omar, M. H. A. Hassan, Z. Ahmad</i>	
Solar-Powered Irrigation System Using Blynk .....	492
<i>Muhammad Bin Noh, Muhammad Arifuddin Bin Rosdin, Mazratul Firdaus Binti Mohd Zin, Ku Siti Syahidah Binti Ku Mohd Noh</i>	
Modelling the Effect of Ischemia on Myocardial Electrophysiology .....	497
<i>Putri Nur Alia Nasuha Mohd Nor, Mohd Jamil Mohamed Mokhtarudin</i>	
A Multilevel Thresholding Algorithm for Image Segmentation Based on Barnacle Mating Optimization.....	503
<i>Nurul Farhana Mohd Fakri, Nor Farizan Zakaria, Mohd Herwan Sulaiman, Rohana Abdul Karim, Nurul Wahidah Arshad, Yasmin Abdul Wahab</i>	
Study of the Correlation Between the Surface Roughness and the Characteristic of the Acoustic Signal from Laser Texturing Process.....	511
<i>Aliff W. M., Yusof M. F. M., Quazi M., Halil M. A., Ishak M.</i>	
Prediction on the Mechanical Strength of Coal Ash Concrete Using Artificial Neural Network .....	516
<i>Muhammad Nor Syahrul Zaimi, Nur Farhayu Ariffin, Sharifah Maszura Syed Mohsin, Abdul Muiz Hasim, Nurul Natasha Nasrudin</i>	
A Deep Learning-Based Smart Application for Malay Vowel Recognition Toward Rehabilitation Treatment.....	524
<i>Nur S. A. Azhar, Nik M. Z. Hashim, Afiqah I. Kamaruddin, Maisarah Kamal, Mahmud D. Sulistiyo</i>	
A Review and Methodological Framework of Advanced Water Quality Monitoring System for Agriculture.....	531
<i>Nor Azlina Ab. Aziz, Kamarulzaman Ab. Aziz, Jesmeen M. Z. Hoque, Norhidayah Mohamad, Muharniza Azinita Binti Musa, Md. Jakir Hosen, Wan Zakiah Wan Ismail</i>	
Unmanned Aerial Vehicle (UAV) for Slope Mapping at Perumahan Gambang Damai, Pahang: A Case Study.....	538
<i>M. F. Ishak, M. F. Zolkepli, S. Daud, N. Z. M. Yunus, A. S. A. Rashid</i>	
Performance Evaluation of the Non-Local Cost Aggregation in Stereo Matching Algorithm .....	546
<i>Madiha Zahari, Rostam A Hamzah, Nurulfajar A Manap, Adi Irwan Herman</i>	

#### **Author Index**