

# **International Conference on Mechatronics Engineering (ICOM 2022)**

Held online

IET Conference Publications 814

Kuala Lumpur, Malaysia  
9 – 10 August 2022

ISBN: 978-1-7138-6580-3

**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

UMP STEM Bot as Educational Kit for Robotics and Computer Programming..... <i>N. H. Noordin, M. R. Hau, I. H. Mohamad</i>	1
Design of a Neural Network-Based PID Controller for four-DoF Lower Limb Exoskeleton .....	9
<i>K. H. Al-Waeli, R. Ramli, S. M. Haris, Z. B. Zulkoffli, M. S. Amiri</i>	
Hand Gesture-Based Flex Sensor for PC Games.....	16
<i>N. Muthmainnah Mohd Noor, A. Azraei Azim Ng, M. W. Rohidatun</i>	
Design and Development of a Carbon Dioxide Gas Generator for Firefighting Robot Application .....	21
<i>M. T. Ajala, Md. Raisuddin Khan, A. A. Shafie, M. J.-E. Salami, M. O. Oladokun, M. Mel, Md. I. M Nor</i>	
Agile Enterprise Geographic Information System (AEGIS) from Design and Development Perspective.....	26
<i>T. A. T. Ali, R. A. Saeed, O. O. Khalifa, E. S. Ali, N. Odeh, G. Hayder, A. A. Hashim</i>	
A Review of Telemedicine and Its Potential in Developing Countries.....	32
<i>L. S. Lawal, A. M. Aibinu, C. R. Chris, U. Udoeyen, T. Iheanacho, A. Alale, I. A. Ibrahim</i>	
Gesture Based Control for Mitsubishi Industrial Robots.....	41
<i>I. F. b. Iszahar, T. Saleh</i>	
Development of an Angle Sensor Using Optical Polarizer.....	47
<i>M. R. A. Shourov, W. A. B. W. Azhar, T. Saleh</i>	
Three DoF Articulated Robotic Manipulator for Teaching and Learning.....	52
<i>A. Ghnem, T. Saleh</i>	
Development of Solar Thermal Systems for Industrial Water Heating Applications Considering Efficiency .....	57
<i>A. S. Mahadi, M. A. Akbar, Md. M. Rashid, A. Jazlan</i>	
Deep Learning Based Prediction Model of Recurrent Pedal Pressing for Low Speed.....	63
<i>M. K. Idzham, S. Ahmad, M. Abdullah</i>	
Modelling of Vehicle Longitudinal Dynamics Using System Identification .....	68
<i>H. Syahira, M. Abdullah, S. Ahmad, M. A. S. Zainuddin, K. A. Tofrowaih</i>	
Development of a Smart Monitoring System for Ergonomic Sitting Position .....	73
<i>N. N. Sarudin, N. H. Diyana Nordin, N. L. Azmi</i>	
Eye Blink Region Detection in EEG Using Amplitude Thresholding .....	77
<i>L. A. M. Jefri, F. A. Rahman, N. A. Malik, F. N. M. Isa</i>	
Visual Detection of Biofouling Using Hue-Saturation-Value (HSV) Colour for Ship Hull Cleaning Robot .....	84
<i>M. A. N. Azman, E. S. Azian, Z. Z. Abidin, M. M. Yusoff, A. I. Ibrahim, M. N. M. Salim, M. A. Yamin</i>	
A New Approach to Analysis and Simulation of Flywheel Energy Storage System .....	90
<i>S. M. Salam, M. M. Rashid</i>	

Tunable Piezoelectric Generator Coupled with Shape Memory Alloy (SMA) Heat Engine as Thermal Energy Harvester.....	95
<i>H. Hassan, A. N. Wahid, A. G. A. Muthalif</i>	
Green Communication in 6G.....	101
<i>M. Hoque, S. S. B. Farhad, S. Dewanjee, Z. Alom, R. A. Mokhtar, R. A. Saeed, O. O. Khalifa, E. S. Ali, M. Abdul Azim</i>	
Robotics Architectures Based Machine Learning and Deep Learning Approaches.....	107
<i>L. E. Alatabani, E. S. Ali, R. A. Mokhtar, O. O. Khalifa, R. A. Saeed</i>	
Development of Low-Cost Sensory System to Sort Recyclable Materials.....	114
<i>M. S. I. Sallehuddin, F. Jasni, A. N. Wahid</i>	
Development of UV Monitoring System Using Metal Oxide Based Sensor.....	120
<i>M. Hafizuddin, Y. I. Basori, M. M. Yusoff, M. A. M. Razib, M. F. Malek, R. Mohamed, A. H. Kamarzaman</i>	
Early Detection of Tube Leaks Faults in Pulverised Coal-Fired Boiler Using Deep Neural Network .....	125
<i>A. M. A. Karim, Y. M. Mustafah</i>	
Analysis of Power Consumption of Variable Inertia Flywheel.....	133
<i>L. Islam, M. M. Rashid</i>	
Real-Time Wearable Device for Predicting a Long Covid Patient's Condition .....	138
<i>A. R. T. Abdel Gawad, S. F. Toha, N. H. D. Nordin, A. S. Idris</i>	
Artificial Neural Network (ANN) Prediction for Noise Risk Assessment in Industrial Workplace .....	143
<i>A. Shamsul, N. Bt. Ramli</i>	
Ventilation Monitoring System to Improve Indoor Air Quality in Shared Spaces .....	148
<i>M. Z. Muhamad Zulfadhl, N. H. H. M. Hanif</i>	

#### **Author Index**