

Lecture Notes in Electrical Engineering 632

Ahmad Nor Kasruddin Nasir · Mohd Ashraf Ahmad ·  
Muhammad Sharfi Najib · Yasmin Abdul Wahab ·  
Nur Aqilah Othman · Nor Maniha Abd Ghani ·  
Addie Irawan · Sabira Khatun ·  
Raja Mohd Taufika Raja Ismail · Mohd Mawardi Saari ·  
Mohd Razali Daud · Ahmad Afif Mohd Faudzi *Editors*

# InECCE2019

Proceedings of the 5th International  
Conference on Electrical, Control &  
Computer Engineering, Kuantan,  
Pahang, Malaysia, 29th July 2019

# Lecture Notes in Electrical Engineering

## Volume 632

### Series Editors

Leopoldo Angrisani, Department of Electrical and Information Technologies Engineering, University of Napoli Federico II, Naples, Italy

Marco Arteaga, Departament de Control y Robótica, Universidad Nacional Autónoma de México, Coyoacán, Mexico

Bijaya Ketan Panigrahi, Electrical Engineering, Indian Institute of Technology Delhi, New Delhi, Delhi, India  
Samarjit Chakraborty, Fakultät für Elektrotechnik und Informationstechnik, TU München, Munich, Germany

Jiming Chen, Zhejiang University, Hangzhou, Zhejiang, China

Shanben Chen, Materials Science and Engineering, Shanghai Jiao Tong University, Shanghai, China

Tan Kay Chen, Department of Electrical and Computer Engineering, National University of Singapore, Singapore, Singapore

Rüdiger Dillmann, Humanoids and Intelligent Systems Laboratory, Karlsruhe Institute for Technology, Karlsruhe, Germany

Haibin Duan, Beijing University of Aeronautics and Astronautics, Beijing, China

Gianluigi Ferrari, Università di Parma, Parma, Italy

Manuel Ferre, Centre for Automation and Robotics CAR (UPM-CSIC), Universidad Politécnica de Madrid, Madrid, Spain

Sandra Hirche, Department of Electrical Engineering and Information Science, Technische Universität München, Munich, Germany

Faryar Jabbari, Department of Mechanical and Aerospace Engineering, University of California, Irvine, CA, USA

Limin Jia, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China

Janusz Kacprzyk, Systems Research Institute, Polish Academy of Sciences, Warsaw, Poland

Alaa Khamis, German University in Egypt El Tagamoa El Khames, New Cairo City, Egypt

Torsten Kroeger, Stanford University, Stanford, CA, USA

Qilian Liang, Department of Electrical Engineering, University of Texas at Arlington, Arlington, TX, USA

Ferran Martín, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain

Tan Cher Ming, College of Engineering, Nanyang Technological University, Singapore, Singapore

Wolfgang Minker, Institute of Information Technology, University of Ulm, Ulm, Germany

Pradeep Misra, Department of Electrical Engineering, Wright State University, Dayton, OH, USA

Sebastian Möller, Quality and Usability Laboratory, TU Berlin, Berlin, Germany

Subhas Mukhopadhyay, School of Engineering & Advanced Technology, Massey University, Palmerston North, Manawatu-Wanganui, New Zealand

Cun-Zheng Ning, Electrical Engineering, Arizona State University, Tempe, AZ, USA

Toyoaki Nishida, Graduate School of Informatics, Kyoto University, Kyoto, Japan

Federica Pascucci, Dipartimento di Ingegneria, Università degli Studi "Roma Tre", Rome, Italy

Yong Qin, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China

Gan Woon Seng, School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore, Singapore

Joachim Speidel, Institute of Telecommunications, Universität Stuttgart, Stuttgart, Germany

Germano Veiga, Campus da FEUP, INESC Porto, Porto, Portugal

Haitao Wu, Academy of Opto-electronics, Chinese Academy of Sciences, Beijing, China

Junjie James Zhang, Charlotte, NC, USA

The book series *Lecture Notes in Electrical Engineering* (LNEE) publishes the latest developments in Electrical Engineering—quickly, informally and in high quality. While original research reported in proceedings and monographs has traditionally formed the core of LNEE, we also encourage authors to submit books devoted to supporting student education and professional training in the various fields and applications areas of electrical engineering. The series cover classical and emerging topics concerning:

- Communication Engineering, Information Theory and Networks
- Electronics Engineering and Microelectronics
- Signal, Image and Speech Processing
- Wireless and Mobile Communication
- Circuits and Systems
- Energy Systems, Power Electronics and Electrical Machines
- Electro-optical Engineering
- Instrumentation Engineering
- Avionics Engineering
- Control Systems
- Internet-of-Things and Cybersecurity
- Biomedical Devices, MEMS and NEMS

For general information about this book series, comments or suggestions, please contact [leontina.dicecco@springer.com](mailto:leontina.dicecco@springer.com).

To submit a proposal or request further information, please contact the Publishing Editor in your country:

#### **China**

Jasmine Dou, Associate Editor ([jasmine.dou@springer.com](mailto:jasmine.dou@springer.com))

#### **India, Japan, Rest of Asia**

Swati Meherishi, Executive Editor ([Swati.Meherishi@springer.com](mailto:Swati.Meherishi@springer.com))

#### **Southeast Asia, Australia, New Zealand**

Ramesh Nath Premnath, Editor ([ramesh.premnath@springernature.com](mailto:ramesh.premnath@springernature.com))

#### **USA, Canada:**

Michael Luby, Senior Editor ([michael.luby@springer.com](mailto:michael.luby@springer.com))

#### **All other Countries:**

Leontina Di Cecco, Senior Editor ([leontina.dicecco@springer.com](mailto:leontina.dicecco@springer.com))

**\*\* Indexing: The books of this series are submitted to ISI Proceedings, EI-Compendex, SCOPUS, MetaPress, Web of Science and Springerlink \*\***

More information about this series at <http://www.springer.com/series/7818>

Ahmad Nor Kasruddin Nasir ·  
Mohd Ashraf Ahmad · Muhammad Sharfi Najib ·  
Yasmin Abdul Wahab ·  
Nur Aqilah Othman · Nor Maniha Abd Ghani ·  
Addie Irawan · Sabira Khatun ·  
Raja Mohd Taufika Raja Ismail ·  
Mohd Mawardi Saari · Mohd Razali Daud ·  
Ahmad Afif Mohd Faudzi  
Editors

# InECCE2019

Proceedings of the 5th International  
Conference on Electrical, Control &  
Computer Engineering, Kuantan, Pahang,  
Malaysia, 29th July 2019

 Springer

*Editors*

See next page

ISSN 1876-1100                      ISSN 1876-1119 (electronic)  
Lecture Notes in Electrical Engineering  
ISBN 978-981-15-2316-8              ISBN 978-981-15-2317-5 (eBook)  
<https://doi.org/10.1007/978-981-15-2317-5>

© Springer Nature Singapore Pte Ltd. 2020

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

*Editors*

Ahmad Nor Kasruddin Nasir  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Mohd Ashraf Ahmad  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Muhammad Sharfi Najib  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Yasmin Abdul Wahab  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Nur Aqilah Othman  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Nor Maniha Abd Ghani  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Addie Irawan  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Sabira Khatun  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Raja Mohd Taufika Raja Ismail  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Mohd Mawardi Saari  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Mohd Razali Daud  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

Ahmad Afif Mohd Faudzi  
Faculty of Electrical and Electronics  
Engineering  
Universiti Malaysia Pahang  
Pekan, Pahang  
Malaysia

# Preface

The 5th International Conference on the Electrical, Control and Computer Engineering 2019 (*InECCE2019*) is a bi-annual conference, organized by the Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang (UMP). The fifth installation of *InECCE2019*, this year, was held on 29 July 2019 at Swiss-Garden Beach Resort Hotel, Kuantan, Pahang Malaysia. As the 5th in the series, the flagship conference was able to gather experts, research scholars, academicians and engineers from the field of electrical, electronic, control and computer engineering. It attracted participation of esteemed researchers from both the local and international arenas by providing a forum for exchanging novel ideas, knowledge and research outputs confronting the issues related to the advancement of new technologies for shaping the future engineering in our civilized society. This agrees with the conference theme “Sustainable Engineering and Technologies” as both engineering and technologies are two important arenas that need further attention in the modern world.

*InECCE2019* proceeding comprises 74 technical papers contributed by authors from 5 different countries. It provides an opportunity for readers to enjoy with a selection of refereed papers that were presented during the conference. The papers had been classified into the three engineering tracks as: Control and Instrumentation, Applied Electronic and Computer, and Electrical Power and Energy.

Part I of the proceeding presents recent research and development outputs related to control, optimization and instrumentation engineering. The main contributions to this part are various applications of optimization algorithms in the area of control. These include symbiotic organism search algorithm, fish swarm algorithm, simulated Kalman filter, salp swarm algorithm, grey wolf optimizer and sine cosine algorithm. Several related applications are presented in this part including optimization of neural network, Fuzzy-PID controller, PID-P<sub>ω</sub> controller and fictitious reference iterative tuning for autonomous underwater vehicle, DC motor system,

actuated mobile robot and twin rotor system. Sensing devices very important to ensure smooth running of control related applications and instrumentation. Hence, various types of developed sensing devices are also presented here, which include electrical capacitance tomography, thermal sensor and electronic nose.

Part II presents state-of-the-art research findings related to applied electronic and computer engineering. It comprises various techniques and applications of image processing and electroencephalogram, EEG for recognition, detection and classification in health monitoring such as rubeosis iridis, breast cancer, diabetes and salivary ferning pattern. Other related applications are recognition of human activity, gender, face, fingerprint as well as autism pattern are depicted in this part too. Some industry problems solving strategies are also included here, which are tree recognition used in oil palm plantation, skateboard manoeuvring system, intrusion detection, road death forecasting based on machine learning and camera orientation determination for a robotic system. The essential techniques and devices that are need to be used in electronic communication, such as the radio communication network, antenna pattern and RFID, are also presented.

Part III presents the current global challenge related to electrical power and energy. The focus of this part is mainly on developing technologies that can produce sustainable energy without relying on the limited natural fossil fuel and coal. Instead, alternative energy harvesting technologies that can produce energy from natural resources like wind, water and solar are more sustainable. It has significant contribution on reducing pollution and avoid global warming problem. Hence, methods on optimizing energy and power management are great importance in the current trend. Therefore, in part III, various strategies and methods for developing technologies based on wind turbine system, photovoltaic solar module, hydrokinetic river and battery-powered system are presented. Other applications include optimization of energy and power management for various power generation systems.

This conference is the result of the hard work of the organizing committee members as well as all the reviewers who took time off from their busy schedule to help ensure the conference only accepted chapters of the highest quality. The reviewers are the backbone of a conference. Their commitment, diligence and expertise helped maintain the high quality of the technical chapters. On behalf of the committee members, we would like to express our sincere appreciation to the reviewers for their dedication, time and patience.

We would like to take this opportunity to thank all authors for their valuable research contributions and for selecting *InECCE2019* to showcase their state-of-the-art research works. Thanks are also due to the members of our international advisory panel; their presence gave us a sense of assurance and confidence. The keynote speaker, having reached the top of his chosen track, with a great view of the entire territory, would like to express our gratitude. Sincere gratitude to our



supporters and sponsors, especially Faculty of Electrical and Electronics Engineering and UMP who provided the much needed resources and assistance; and Board of Engineers Malaysia for approved continuous professional development hours. Finally, it is a blessing to be associated with the members of *InECCE2019* organizing committee. Their hard work and tireless efforts have made this conference a reality and success.

Pekan, Malaysia

Ahmad Nor Kasruddin Nasir  
Mohd Ashraf Ahmad  
Muhammad Sharfi Najib  
Yasmin Abdul Wahab  
Nur Aqilah Othman  
Nor Maniha Abd Ghani  
Addie Irawan  
Sabira Khatun  
Raja Mohd Taufika Raja Ismail  
Mohd Mawardi Saari  
Mohd Razali Daud  
Ahmad Afif Mohd Faudzi

# Contents

## Instrumentation, Control and Artificial Systems

<b>Position Control of Pneumatic Actuator Using Cascade Fuzzy Self-adaptive PID</b> . . . . .	3
Mohd Iskandar Putra Azahar, Addie Irawan, Raja Mohd Taufika and Mohd Helmi Suid	
<b>Effect of Excitation Frequency on Magnetic Response Induced by Front- and Back-Side Slits Measured by a Differential AMR Sensor Probe</b> . . . . .	15
M. A. H. P. Zaini, M. M. Saari, N. A. Nadzri, A. M. Halil, A. J. S. Hanifah and M. Ishak	
<b>Model-Free PID Controller Based on Grey Wolf Optimizer for Hovering Autonomous Underwater Vehicle Depth Control</b> . . . . .	25
Mohd Zaidi Mohd Tumari, Amar Faiz Zainal Abidin, Ahmad Anas Yusof, Mohd Shahrieel Mohd Aras, Nik Mohd Zaitul Akmal Mustapha and Mohd Ashraf Ahmad	
<b>Experimental Study of Optimization of Electrode Dimension for Non-invasive Electrical Resistance Tomography Application</b> . . . . .	37
Yasmin Abdul Wahab, Mahanum Muhamad Sakri, Mohd Anwar Zawawi, Muhammad Sharfi Najib and Normaniha Abd Ghani	
<b>A Fictitious Reference Iterative Tuning Method for Buck Converter-Powered DC Motor Control System</b> . . . . .	47
Mohd Syakirin Ramli, Seet Meng Sian, Mohd Naharudin Salim and Hamzah Ahmad	
<b>Depth Evaluation of Slits on Galvanized Steel Plate Using a Low Frequency Eddy Current Probe</b> . . . . .	59
N. A. Nadzri, M. M. Saari, M. A. H. P. Zaini, A. M. Halil, A. J. S. Hanifah and M. Ishak	

<b>Sensitivity Maps Preparation for Electrical Capacitance Tomography Using Finite Element Approach</b> .....	67
Wan A. N. Ropandi, N. A. Zulkifli, J. Pusppanathan, F. A. Phang, N. D. Nawi, M. E. Johana and N. H. A. Ngadiman	
<b>Infrared Thermal Sensor for a Low Cost and Non-invasive Detection of Skin Cancer</b> .....	77
A. Noora Safrin, B. Pooja, K. Hema, P. Padmapriya, Vigneswaran Narayanamurthy and Fahmi Samsuri	
<b>T-Way Strategy for Sequence Input Interaction Test Case Generation Adopting Fish Swarm Algorithm</b> .....	87
Mostafijur Rahman, Dalia Sultana, Sabira Khatun, Mohd Falfazli Mat Jusof, Syamimi Mardiah Shaharum, Nurhafizah Abu Talip Yusof, Khandker M. Qaiduzzaman, Md Hasibul Hasan, Md Mushfiqur Rahman, Md Anwar Hossen and Afsana Begum	
<b>Development of AC and DC Drive Coils for a Small Volume Magnetic Particle Imaging System</b> .....	101
Mohd Mawardi Saari, Ahmad Zahir Irsyad Razak, Mohd Aufa Hadi Putera Zain, Nurul A'in Nadzri, Mohd Razali Daud and Hamzah Ahmad	
<b>A Diversity-Based Adaptive Synchronous-Asynchronous Switching Simulated Kalman Filter Optimizer</b> .....	113
Nor Azlina Ab. Aziz, Nor Hidayati Abdul Aziz, Badaruddin Muhammad, Zuwairie Ibrahim, Marizan Mubin, Norrima Mokhtar and Mohd Saberi Mohamad	
<b>Combinatorial Test Suite Generation Strategy Using Enhanced Sine Cosine Algorithm</b> .....	127
Kamal Z. Zamli, Fakhrud Din, Abdullah B. Nasser and AbdulRahman Alsewari	
<b>Classification of Lubricant Oil Geometrical Odor-Profile Using Cased-Based Reasoning</b> .....	139
Suhaimi Mohd Daud, Muhammad Sharfi Najib, Nurdiyana Zahed, Muhammad Faruqi Zahari, Nur Farina Hamidon Majid, Suziyanti Zaib, Mujahid Mohamad, Addie Irawan and Hadi Manap	
<b>Optimization of Quaternion Based on Hybrid PID and <math>P_{\omega}</math> Control</b> . . . .	153
Balya Darohini, M. F. Abas, N. Md. Saad, Dwi Pebrianti, H. Ahmad, M. H. Ariff and M. R. Arshad	

**Elimination-Dispersal Sine Cosine Algorithm for a Dynamic Modelling of a Twin Rotor System** ..... 167  
 Shuhairie Mohammad, Mohd Falfazli Mat Jusof, Nurul Amira Mhd Rizal, Ahmad Azwan Abd Razak, Ahmad Nor Kasruddin Nasir, Raja Mohd Taufika Raja Ismail and Mohd Ashraf Ahmad

**The Investigation of Meat Classification Based on Significant Authentication Features Using Odor-Profile Intelligent Signal Processing Approach** ..... 179  
 Nur Farina Hamidon Majid, Muhammad Sharfi Najib, Suhaimi Mohd Daud, Nurdiyana Zahed, Muhamad Faruqi Zahari, Suziyanti Zaib, Mujahid Mohamad, Tuan Sidek Tuan Muda and Hadi Manap

**The Study of Raw Water Based on Quality Parameter Using Smell-Print Sensing Device** ..... 193  
 Suziyanti Zaib, Muhammad Sharfi Najib, Suhaimi Mohd Daud, Nurdiyana Zahed, Muhamad Faruqi Zahari, Nur Farina Hamidon Majid, Mujahid Mohamad and Hadi Manap

**Camera Orientation Determination Based on Copper Wire Spool Shape** ..... 205  
 Farah Adiba Azman, Mohd Razali Daud, Amir Izzani Mohamed, Addie Irawan, R. M. Taufika R. Ismail and Mohd Mawardi Saari

**A Modified Symbiotic Organism Search Algorithm with Lévy Flight for Software Module Clustering Problem** ..... 219  
 Nurul Asyikin Zainal, Kamal Z. Zamli and Fakhruddin Din

**Classification of Agarwood Types (Malaccensis and Crassna) Between Oil and Smoke Using E-Nose with CBR Classifier** ..... 231  
 Mujahid Mohamad, Muhammad Sharfi Najib, Suhaimi Mohd Daud, Nurdiyana Zahed, Muhamad Faruqi Zahari, Nur Farina Hamidon Majid, Suziyanti Zaib and Hadi Manap

**Applied Electronics and Computer Engineering**

**SCAR-CNN: Secondary-Classification-After-Refinement Convolutional Neural Network for Fine-Grained Categorization** ..... 247  
 Bernard Jun Kai Cheah, Abduljalil Radman and Shahrel Azmin Suandi

**Forecasting Road Deaths in Malaysia Using Support Vector Machine** ..... 261  
 Nurul Qastalani Radzuan, Mohd Hasnun Arif Hassan, Anwar P. P. Abdul Majeed, Khairil Anwar Abu Kassim, Rabi'u Muazu Musa, Mohd Azraai Mohd Razman and Nur Aqilah Othman

<b>Investigation of Dimensionality Reduction on Numerical Attribute Features in a Finger Vein Identification System</b> . . . . .	269
Ei Wei Ting, M. Z. Ibrahim, D. J. Mulvaney, W. N. A. W. Samsudin and S. Khatun	
<b>Intelligent Gender Recognition System for Classification of Gender in Malaysian Demographic</b> . . . . .	283
Yap Su Chi and Syafiq Fauzi Kamarulzaman	
<b>A Novel Approach Towards Tamper Detection of Digital Holy Quran Generation</b> . . . . .	297
Md. Milon Islam, Muhammad Nomani Kabir, Muhammad Sheikh Sadi, Md. Istiak Morsalin, Ahsanul Haque and Jing Wang	
<b>A Comparative Study of AFM-Assisted Direct and Least-Square Attitude Determination Algorithm</b> . . . . .	309
Suqing Yan, Yue Wu, Yuanfa Ji, Kamarul Hawari Ghazali and Xiyan Sun	
<b>Design and Development of Wearable Human Activity Recognition for Healthcare Monitoring</b> . . . . .	323
Hamzah Ahmad, Nurul Syafiqah Mohd, Nur Aqilah Othman, Mohd Mawardi Saari and Mohd Syakirin Ramli	
<b>Region of Interest Extraction of Finger-Vein Image Using Watershed Segmentation with Distance Transform</b> . . . . .	333
Lim Yuan Zhang and Bakhtiar Affendi Rosdi	
<b>The Classification of Skateboarding Trick Manoeuvres Through the Integration of Image Processing Techniques and Machine Learning</b> . . . . .	347
Muhammad Nur Aiman Shapiee, Muhammad Ar Rahim Ibrahim, Mohd Azraai Mohd Razman, Muhammad Amirul Abdullah, Rabiul Muazu Musa, Mohd Hasnun Arif Hassan and Anwar P. P. Abdul Majeed	
<b>Review and Analysis of Risk Factor of Maternal Health in Remote Area Using the Internet of Things (IoT)</b> . . . . .	357
Marzia Ahmed, Mohammad Abul Kashem, Mostafijur Rahman and Sabira Khatun	
<b>Recent Trends and Open Challenges in EEG Based Brain-Computer Interface Systems</b> . . . . .	367
Mamunur Rashid, Norizam Sulaiman, Mahfuzah Mustafa, Sabira Khatun, Bifta Sama Bari and Md Jahid Hasan	
<b>Early Rubeosis Iridis Detection Using Feature Extraction Process</b> . . . . .	379
Rohana Abdul Karim, Nur Amira Adila Abd Mobin, Nurul Wahidah Arshad, Nor Farizan Zakaria and M. Zabri Abu Bakar	

**Multi-hop File Transfer in WiFi Direct Based Cognitive Radio Network for Cloud Back-Up** ..... 389  
 N. J. Shoumy, D. M. Rahaman, S. Khatun, W. N. Azhani, M. H. Ariff, M. N. Morshed, M. Islam, S. N. A. Manap and M. F. M. Jusof

**The Multifocus Images Fusion Based on a Generative Gradient Map** ..... 401  
 Ismail and Kamarul Hawari Bin Ghazali

**A Comparative Analysis of Four Classification Algorithms for University Students Performance Detection** ..... 415  
 Dipta Das, Asif Khan Shakir, Md. Shah Golam Rabbani, Mostafijur Rahman, Syamimi Mardiah Shaharum, Sabira Khatun, Norasyikin Binti Fadilah, Khandker M. Qaiduzzaman, Md. Shariful Islam and Md. Shohel Arman

**Open-Set Face Recognition in Video Surveillance: A Survey** ..... 425  
 Wasseem N. Ibrahim Al-Obaydy and Shahrel Azmin Suandi

**Hardware Development of Auto Focus Microscope** ..... 437  
 Dwi Pebrianti, Rosyati Hamid, Faradila Naim, Mohd Falfazli Mat Jusof, Nurul Wahidah Arshad and Luhur Bayuaji

**Overview on Fingerprinting Authentication Technology** ..... 451  
 N. Sulaiman and Q. A. Tajul Ariffin

**Bandwidth and Gain Enhancement of a Modified Ultra-wideband (UWB) Micro-strip Patch Antenna Using a Reflecting Layer** ..... 463  
 Bifta Sama Bari, Sabira Khatun, Kamarul Hawari Ghazali, Md. Moslemuddin Fakir, Mohd Hisyam Mohd Ariff, Mohd Faizal Jamlos, Mamunur Rashid, Minarul Islam, Mohd Zamri Ibrahim and Mohd Falfazli Mat Jusof

**Oil Palm Tree Detection and Counting in Aerial Images Based on Faster R-CNN** ..... 475  
 Xinni Liu, Kamarul Hawari Ghazali, Fengrong Han, Izzeldin Ibrahim Mohamed, Yue Zhao and Yuanfa Ji

**EEG Pattern of Cognitive Activities for Non Dyslexia (Engineering Student) due to Different Gender** ..... 483  
 E. M. N. E. M. Nasir, N. A. Bahali, N. Fuad, M. E. Marwan, J. A. Bakar and Danial Md Nor

**Intelligent Autism Screening Using Fuzzy Agent** ..... 495  
 Nurul Najihah Che Razali, Ngahzaifa Ab. Ghani and Syifak Izhar Hisham

<b>Ultra Wide Band (UWB) Based Early Breast Cancer Detection Using Artificial Intelligence</b> .....	505
Bifta Sama Bari, Sabira Khatun, Kamarul Hawari Ghazali, Md. Moslemuddin Fakir, Wan Nur Azhani W. Samsudin, Mohd Falfazli Mat Jusof, Mamunur Rashid, Minarul Islam and Mohd Zamri Ibrahim	
<b>Design and Analysis of Circular Shaped Patch Antenna with Slot for UHF RFID Reader</b> .....	517
Mohd Hisyam Mohd Ariff, Muhammad Solihin Zakaria, Rahimah Jusoh, Sabira Khatun, Mohammad Fadhil Abas and Mohd Zamri Ibrahim	
<b>Analysis of EEG Features for Brain Computer Interface Application</b> .....	529
Mamunur Rashid, Norizam Sulaiman, Mahfuzah Mustafa, Mohd Shawal Jadin, Muhd Sharfi Najib, Bifta Sama Bari and Sabira Khatun	
<b>Hybrid Sampling and Random Forest Based Machine Learning Approach for Software Defect Prediction</b> .....	541
Md Anwar Hossen, Md. Shariful Islam, Nurhafizah Abu Talip Yusof, Md. Sakib Rahman, Fatema Siddika, Mostafijur Rahman, Sabira Khatun, Mohamad Shaiful Abdul Karim and S. M. Hasan Mahmud	
<b>kNN and SVM Classification for EEG: A Review</b> .....	555
M. N. A. H. Sha'abani, N. Fuad, Norezmi Jamal and M. F. Ismail	
<b>Flexible Graphene-Silver Nanowires Polydimethylsiloxane (PDMS) Directional Coupler</b> .....	567
Nor Nadiah Aliff, Noorlindawaty Md Jizat, Nazihah Ahmad and Mukter Uz-Zaman	
<b>Investigating the Possibility of Brain Actuated Mobile Robot Through Single-Channel EEG Headset</b> .....	579
Mamunur Rashid, Norizam Sulaiman, Mahfuzah Mustafa, Sabira Khatun, Bifta Sama Bari, Md Jahid Hasan and Nawfan M. M. A. Al-Fakih	
<b>Campus Hybrid Intrusion Detection System Using SNORT and C4.5 Algorithm</b> .....	591
Slamet, Izzeldin I. Mohamed and Fahmi Samsuri	
<b>Image Segmentation of Women's Salivary Ferning Patterns Using Harmony Frangi Filter</b> .....	605
Heri Pratikno and Mohd Zamri Ibrahim	
<b>Autonomous Self-exam Monitoring for Early Diabetes Detection</b> .....	623
Rohana Abdul Karim, Nur Alia Fatiha Azhar, Nurul Wahidah Arshad, Nor Farizan Zakaria and M. Zabri Abu Bakar	

**Quantitative Assessment of Remote Code Execution Vulnerability in Web Apps** ..... 633  
 Md Maruf Hassan, Umam Mustain, Sabira Khatun,  
 Mohamad Shaiful Abdul Karim, Nazia Nishat and Mostafijur Rahman

**Sustainable Energy and Power Engineering**

**A Salp Swarm Algorithm to Improve Power Production of Wind Plant** ..... 645  
 Ahmad Zairi Mohd-Zain and Mohd Ashraf Ahmad

**Improvement of Performance and Response Time of Cascaded Five-Level VSC STATCOM Using ANN Controller and SVPWM During Period of Voltage Sag** ..... 655  
 Mohamad M. Almelian, Izzeldin I. Mohd, Abu Zaharin Ahmad,  
 Mohamed A. Omran, Muhamad Z. Sujod, N. M. Elasager  
 and Mohamed Salem

**Development of Maximum Power Point Tracking for Doubly-Fed Induction Generators in Wind Energy Conversion Systems** ..... 669  
 Duy C. Huynh, Khai H. Nguyen and Matthew W. Dunnigan

**Development of PV Module Power Degradation Analyzer** ..... 681  
 Mohd Shawal Jadin, Muhammad Aiman Ibrahim and Norizam Sulaiman

**Direct Power Control Method of Maximum Power Point Tracking (MPPT) Algorithm for Pico-Hydrokinetic River Energy Conversion System** ..... 691  
 W. I. Ibrahim, M. R. Mohamed and R. M. T. R. Ismail

**Load Estimation of Single-Phase Diode Bridge Rectifier Using Kalman Filter** ..... 705  
 Nor Syuhaida Othman and Hamzah Ahmad

**A Study on Residual Current Device Nuisance Tripping Due to Grounding Resistance Value** ..... 717  
 Izzatul Liyana, Farhan Bin Hanaffi and Mohd Hendra Bin Hairi

**DC-Link Protection for Grid-Connected Photovoltaic System: A Review** ..... 725  
 Wan Nur Huda Aqilah Alias, Muhamad Zahim Sujod  
 and Nor Azwan Mohamed Kamari

**An Improved Efficiency of Solar Photo Voltaic System Applications by Using DC-DC Zeta Converter** ..... 737  
 A. S. Veerendra, M. R. Mohamed, M. H. Sulaiman and K. Peddakapu



<b>Hydrophobic Sol-Gel Based Self-cleaning Coating for Photovoltaic Panels</b> .....	753
Siti Nur Nashya Azlika Hamidon, Amirjan Nawabjan, Ahmad Sharmi Abdullah and Siti Maherah Hussin	
<b>Effect of Graphene Oxide Nanoparticles on Thermal Properties of Paraffin Wax</b> .....	767
Nurul Humaira Muhd Zaimi, Amirjan Nawabjan, Shaharin Fadzli Abdul Rahman and Siti Maherah Hussin	
<b>Reliability Performance of Low Voltage (LV) Network Configuration</b> .....	783
Mohd Ikhwan Muhammad Ridzuan, Muhammad Adib Zufar Rusli and Norhafidzah Mohd Saad	
<b>Detailed Non-Linear Constrained Multi-Objective Optimal Operation of Power Systems Including Renewable Energy Sources</b> .....	795
Duy C. Huynh, Hong V. Nguyen and Matthew W. Dunnigan	
<b>Voltage Sag Immunity Testing for AC Contactors in Industrial Environment</b> .....	809
Hazri Dahalan Razip and Abu Zaharin Ahmad	
<b>Vertical Axis Wind Turbines: An Overview</b> .....	821
A. Yusof and M. R. Mohamed	
<b>Hyperheuristics Trajectory Based Optimization for Energy Management Strategy (EMS) of Split Plug-In Hybrid Electric Vehicle</b> .....	837
Muhammad Ikram Mohd Rashid, Ahmad Amir Solihin Mohd Apandi, Hamdan Daniyal and Mohd Ashraf Ahmad	
<b>Utilization of Filter Harmonic Current Based on Shunt HPF Within the Acceptable IEEE-519 Standard</b> .....	849
Mohamed A. Omran, Izzeldin I. Mohd, Abu Zaharin Ahmad, Mohamad M. Almelian, Fahmi Samsuri, Muhamad Z. Sujod, Walid K. A. Hasan and Mohamed Salem	
<b>Vehicle-to-Grid as Frequency Regulator in a Micro Grid System</b> .....	859
Mohd Redzuan Ahmad and Laylatun Qadrina Amrizal	
<b>Development of PV Module Hotspot Detector</b> .....	875
Mohd Shawal Jadin, Kamil Ashman Bin Zamridin and Ahmad Syahiman Mohd Shah	

**Comparative Analysis for LED Driver with Analog and Digital  
Controllers** ..... 885  
Shaheer Shaida Durrani, Abu Zaharin, Bakri Hassan  
and Ruhaizad Bin Ishak

**Characterization of Positive Porous Electrode Felt for Organic Redox  
Flow Battery Application** ..... 899  
A. C. Khor, K. F. Chong and M. R. Mohamed