Lecture Notes in Electrical Engineering 988

Muhammad Amirul Abdullah ·
Ismail Mohd. Khairuddin · Ahmad Fakhri Ab. Nasir ·
Wan Hasbullah Mohd. Isa ·
Mohd. Azraai Mohd. Razman ·
Mohd. Azri Hizami Rasid ·
Sheikh Muhammad Hafiz Fahami Zainal ·
Barry Bentley · Pengcheng Liu Editors

Advances in Intelligent Manufacturing and Mechatronics

Selected Articles from the Innovative Manufacturing, Mechatronics & Materials Forum (iM3F 2022), Pahang

Lecture Notes in Electrical Engineering

Volume 988

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,

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,

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

Yong Li, Hunan University, Changsha, Hunan, China

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 and 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

Luca Oneto, Department of Informatics, BioEngineering, Robotics and Systems Engineering, University of Genova, Genova, Italy

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

Yong Oin, State Key Laboratory of Rail Traffic Control and Safety, Beijing Jiaotong University, Beijing, China Gan Woon Seng, School of Electrical and 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

Walter Zamboni, DIEM—Università degli studi di Salerno, Fisciano, Salerno, Italy

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.

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

China

Jasmine Dou, Editor (jasmine.dou@springer.com)

India, Japan, Rest of Asia

Swati Meherishi, Editorial Director (Swati.Meherishi@springer.com)

Southeast Asia, Australia, New Zealand

Ramesh Nath Premnath, Editor (ramesh.premnath@springernature.com)

USA, Canada

Michael Luby, Senior Editor (michael.luby@springer.com)

All other Countries

Leontina Di Cecco, Senior Editor (leontina.dicecco@springer.com)

** This series is indexed by EI Compendex and Scopus databases. **

Muhammad Amirul Abdullah ·
Ismail Mohd. Khairuddin ·
Ahmad Fakhri Ab. Nasir ·
Wan Hasbullah Mohd. Isa ·
Mohd. Azraai Mohd. Razman ·
Mohd. Azri Hizami Rasid ·
Sheikh Muhammad Hafiz Fahami Zainal ·
Barry Bentley · Pengcheng Liu
Editors

Advances in Intelligent Manufacturing and Mechatronics

Selected Articles from the Innovative Manufacturing, Mechatronics & Materials Forum (iM3F 2022), Pahang, Malaysia



Editors
Muhammad Amirul Abdullah
Faculty of Manufacturing and Mechatronic
Engineering Technology
Universiti Malaysia Pahang
Pekan, Malaysia

Ahmad Fakhri Ab. Nasir Faculty of Computing Universiti Malaysia Pahang Pekan, Malaysia

Mohd. Azraai Mohd. Razman Faculty of Manufacturing and Mechatronic Engineering Technology Universiti Malaysia Pahang Pekan, Malaysia

Sheikh Muhammad Hafiz Fahami Zainal Faculty of Manufacturing and Mechatronic Engineering Technology Universiti Malaysia Pahang Pekan, Malaysia

Pengcheng Liu Department of Computer Science University of York York, UK Ismail Mohd. Khairuddin Faculty of Manufacturing and Mechatronic Engineering Technology Universiti Malaysia Pahang Pekan, Malaysia

Wan Hasbullah Mohd. Isa Faculty of Manufacturing and Mechatronic Engineering Technology Universiti Malaysia Pahang Pekan, Malaysia

Mohd. Azri Hizami Rasid Faculty of Manufacturing and Mechatronic Engineering Technology Universiti Malaysia Pahang Pekan, Malaysia

Barry Bentley Department of Computer Science Cardiff Metropolitan University Cardiff, UK

ISSN 1876-1100 ISSN 1876-1119 (electronic) Lecture Notes in Electrical Engineering ISBN 978-981-19-8702-1 ISBN 978-981-19-8703-8 (eBook) https://doi.org/10.1007/978-981-19-8703-8

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2023

This work is subject to copyright. All rights are solely and exclusively licensed 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

Preface

The third edition forum of The Innovative Manufacturing, Mechatronics & Materials Forum 2022 (iM3F 2022) organized by Universiti Malaysia Pahang through its Faculty of Manufacturing and Mechatronic Engineering Technology was held on 20 July 2022. The main field focuses on manufacturing, mechatronics as well as materials.

More than 141 submissions were received during iM3F 2022 and were reviewed in a single-blind manner, and 30 papers were advocated by the reviewers to be published in this Lecture Notes in Electrical Engineering. The editors would like to express their gratitude to all the authors who submitted their papers. The paper published in this proceeding has been thoroughly reviewed by the appointed technical review committee consists of various experts in the field of mechatronics engineering.

The conference had brought a new outlook on cutting-edge issues shared through keynote speeches by Assoc. Prof. Ir. Dr. Faiz Mohd Turan, Prof. Dr. Hasbullah Idris and Dr. Barry Bentley.

Finally, the editors hope that readers find this volume informative as we thank LNEE for undertaking this volume publication. We also would like to thank the conference organization staff and the International Program Committees' members for their hard work.

Pekan, Pahang, Malaysia November 2022 Muhammad Amirul Abdullah
Ismail Mohd. Khairuddin
Ahmad Fakhri Ab. Nasir
Wan Hasbullah Mohd. Isa
Mohd. Azraai Mohd. Razman
Mohd. Azri Hizami Rasid
Sheikh Muhammad Hafiz Fahami
Zainal
Barry Bentley
Pengcheng Liu

Contents

Filter Optimizer Suhazri Amrin Rahmad, Zuwairie Ibrahim, and Zulkifli Md Yusof	1
A Real-Time Social Distancing and Face Mask Detection System Using Deep Learning Suet Nam Wai, Sew Sun Tiang, Wei Hong Lim, and Koon Meng Ang	13
A Systematic Review for Robotic for Cognitive Speech Therapy for Rehabilitation Patient Junbo Qi, Esyin Chew, and Jiaji Yang	23
An Estimation Steering Feedback Torque in Vehicle Steer by Wire System S. M. H. Fahami, Faiz Mohd Turan, and M. A. Zakaria	39
An Implementation of Sliding Mode Voltage Control Controlled Buck-Boost Converter for Solar Application Nursabrina Athirah Mohd Mustakin, Mohd. Shafie Bakar, and Maziyah Mat Noh	53
An Optimized Deep Learning Model for Automatic Diagnosis of COVID-19 Using Chest X-Ray Images Suhaim Parvez Wadekar, Koon Meng Ang, Nor Ashidi Mat Isa, Sew Sun Tiang, Li Sze Chow, Chin Hong Wong, Meng Choung Chiong, and Wei Hong Lim	61
Automatic Vehicle Location (AVL): Evaluation on the Punctuality Index of City Public Bus Service Haziman Zakaria, Diyana Kamarudin, Faiz Azizul, Mohammad Fitri Idrus, Nor Rokiah Hanum Md Haron, and Norhana Mohd Aripin	75

viii Contents

Bearing Fault Diagnosis Using Extreme Learning Machine Based on Artificial Gorilla Troops Optimizer M. Firdaus Isham, M. S. R. Saufi, M. D. A. Hasan, W. A. A. Saad, M. Salman Leong, M. H. Lim, and Z. A. B. Ahmad	87
Classifying Ethnicity of the Pedestrian Using Skin Colour Palette Syahmi Syahiran Ahmad Ridzuan, Zaid Omar, and Usman Ullah Sheikh	105
Cluster Analysis Based on Image Feature Extraction for Automated OMA Muhammad Danial Bin Abu Hasan, Syahril Ramadhan Saufi, M. Firdaus Isham, Shaharil Mad Saad, W. Aliff A. Saad, Zair Asrar Bin Ahmad, Mohd Salman Leong, Lim Meng Hee, and M. Haffizzi Md. Idris	117
Detection of Lead with IoT Water Monitoring System Using Microstrip Antenna-Based Sensor Abelle Chin Tze Hui, Sew Sun Tiang, Kah Hou Teng, Wei Hong Lim, and Mastaneh Mokayef	127
Emotion Recognition Using Ultra-Short-Term ECG Signals with a Hybrid Convolutional Neural Network and Long Short-Term Memory Network Vui Chee Chang, Jee-Hou Ho, Bee Ting Chan, and Ai Bao Chai	139
Enhancement of Morlet Mother Wavelet in Time–Frequency Domain in Electroencephalogram (EEG) Signals for Driver Fatigue Classification Rafiuddin Abdubrani, Mahfuzah Mustafa, and Zarith Liyana Zahari	151
Fabrication of Aneurysm Biomodel Using 3D Printing Technology Jamil Ahmad Hisam, Muhamad Yusof Salehudin, Muhammad Ismaill Mat Lizah, Muhammad Izzat Ahmad Suhaimi, Muhammad Haqim Muhammad Hisham, Ismayuzri Ishak, and Mohd Jamil Mohamed Mokhtarudin	163
Feature Selection of Medical Dataset Using African Vultures Optimization Algorithm Wy-Liang Cheng, Koon Meng Ang, Sew Sun Tiang, Kah Yung Yap, Li Pan, Chin Hong Wong, Mahmud Iwan Solihin, and Wei Hong Lim	175
Flow Direction Algorithm for Feature Selection Wy-Liang Cheng, Koon Meng Ang, Wei Hong Lim, Sew Sun Tiang, Meng Choung Chiong, Chun Kit Ang, Li Pan, and Chin Hong Wong	187

Fuzzy Logic Controller by Particle Swarm Optimization Discoverer for Semi-Active Suspension System Mat Hussin Ab Talib, Nur Hafiezul Mohd. Rosli, Intan Zaurah Mat Darus, Hanim Mohd. Yatim, Muhamad Sukri Hadi, Mohd. Ibthisham Ardani, Mohd. Syahril Ramadhan Mohd. Saufi, and Ahmad Hafizal Mohd. Yamin	199
Optimized Machine Learning Model with Modified Particle Swarm Optimization for Data Classification Kah Sheng Lim, Koon Meng Ang, Nor Ashidi Mat Isa, Sew Sun Tiang, Hameedur Rahman, Balaji Chandrasekar, Eryana Eiyada Hussin, and Wei Hong Lim	211
Performance Comparison of Kalman Filter and Extended Kalman Filter for Human Tracking and Prediction with Particle Swarm	
Optimisation Abiodun Afis Ajasa and Nawawi Sophan Wahyudi	225
Stability and Bifurcation Analysis of Rössler System in Fractional Order Ibrahim Mohammed Sulaiman, Abiodun Ezekiel Owoyemi, Mohamad Arif Awang Nawi, Sadiya Salisu Muhammad, U. R. Muhammad, Ali Fareed Jameel, and Mohd Kamal Mohd Nawawi	239
SUAS-Based NDVI and RGB Image for Remote Landscape and Environmental Monitoring on University Campus Ahmad Anas Yusof, Mohd Faid Yahya, Mohd Khairi Mohamed Nor, and Muhammad Fahmi Miskon	251
A Mathematical Model of PD Controller-Based DC Motor System Using System Identification Approach Nur Naajihah Ab Rahman and Nafrizuan Mat Yahya	263
The Classification of Wafer Defects: An Evaluation of Different Feature-Based ResNet Transfer Learning Models with Support Vector Machine Lim Shi Xuen, Ismail Mohd Khairuddin, Mohd Azraai Mohd Razman, Jessnor Arif Mat Jizat, Edmund Yuen, Eng Hwa Yap, Andrew Huey Ping Tan, and Anwar P. P. Abdul Majeed	277
The Correlation Between Peltier Module, Solution Volume and Temperature in IoT-Controlled Hydroponic Nutrient Solution Management Hamdan Sulaiman, Ahmad Anas Yusof, and Mohd Khairi Mohamed Nor	285
The Statistical Impact of Artificial Intelligence Towards the Price Change of Financial Instrument Lim Guo Huang, Choong Kah Wei, Nor Aziyatul Izni, Loh Yue Fang, Tan Sher Lyn, and Sarah Atifah Saruchi	293

x Contents

Total Harmonic Distortion Study for Improvement of AC-AC Converter Under Buck-Type Mohd. Shafie Bakar, Nurul Amira Ibrahim, and Abu Zaharin Ahmad	305
Training Feedforward Neural Networks Using Arithmetic Optimization Algorithm for Medical Classification Koon Meng Ang, Wei Hong Lim, Sew Sun Tiang, Hameedur Rahman, Chun Kit Ang, Elango Natarajan, Mohamed Khan Afthab Ahamed Khan, and Li Pan	313
Various Type of Crops and Trees Detection Using Clustering Technique Through Image Processing Mohd Izzat Mohd Rahman, Mohd Azraai Mohd Razman, Ismail Mohd Khairuddin, Anwar P. P. Abdul Majeed, Muhammad Amirul Abdullah, and Wan Hasbullah Mohd Isa	325
Transient Pressure Analysis in Water Hydraulics Machine Using Induced Pressure Effect from the Compression of Different Materials Ahmad Anas Yusof, Suhaimi Misha, Faizil Wasbari, Mohamed Hafiz Bin Md Isa, Mohd Qadafie Ibrahim, and Mohd Shahir Kasim	333
X-Ray Baggage Object Detection Using Neural Networks Approach for Safety Purpose Samuel Ato Gyasi Otabir, Sew Sun Tiang, Wei Hong Lim, Hung Yang Leong, and Bo Sun	341