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Dwi Pebrianti · Mahfuzah Mustafa
Nor Rul Hasma Abdullah
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Editors

Proceedings of the 10th National Technical Seminar on Underwater System Technology 2018

NUSYS'18

 Springer

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Preface

NUSYS'18 is the 10th National Technical Seminar on Underwater System Technology organized by Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang (UMP) on the September 26–27, 2018 at the UMP Pekan Campus, Pahang, Malaysia with a conference theme “Deeper Discoveries”. NUSYS'18 was jointly organized by the IEEE Oceanic Engineering Society (IEEE OES) Malaysia Chapter, Malaysian Society for Automatic Control Engineers (MACE) IFAC NMO and Institute of Engineer Malaysia (IEM) Marine Engineering and Naval Architecture Technical Division (MNATD).

Despite focusing on a rather specialized area of research concerning underwater technology and marine and electrical and electronics engineering technology, NUSYS'18 has successfully attracted 57 papers locally from 7 universities. This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of refereed papers that were presented during the NUSYS'18 conference. Divided into four parts, the papers had been classified into the following four categories; Underwater Technology and Marine, Applied Electronics and Computer Engineering, Control, Instrumentations and Artificial Intelligent Systems and Sustainable Energy and Power Electronics.

Part I presents the research and development related to underwater system. The main contributions to this part are the design and development of underwater vehicle platforms and controller algorithms. Several autonomous underwater vehicles (AUVs) are presented in this part, such as TUAH and PANTHER AUVs. Most of the AUVs are developed for underwater data collection purposes and other applications such as surface cleaning. A water strider-like is an autonomous surface vehicle (ASV) also developed for underwater data collection. Control algorithm is very important to ensure the underwater vehicles are able to carry out the task. In this part, several control algorithms are proposed such as PID where the controller parameters are optimized using particle swarm optimization (PSO), single-input fuzzy logic controller where the PSO is used to optimize the controller parameters and robust controller algorithm based on integration of back-stepping and integral

sliding mode control strategies. Part II describes the possible control techniques and optimization algorithm approaches for consideration in underwater control system such as interval type-2 fuzzy logic, adaptive fuzzy PID controller, and optimization algorithms such as memory-based SPSA, Barnacles mating optimization, extended bat algorithm (EBA), bat algorithm (BA), and simulated Kalman filter.

The development of an AUV's integrates various engineering disciplines. In Part III, various applied electronics and computer engineering area such as image processing, signal processing, embedded technology, antenna, IoT, and artificial intelligence that can be implemented for underwater imaging system and communication system are presented. Last but not least, the most vital part of the AUV is its power distribution unit (PDU) which provides, coordinates, and distributes energy to the entire onboard electrical system devices. Therefore, in Part IV several papers are identified to be useful in managing the AUV power system. Looking at the aspect of AUV efficiency and stability, a number of papers have provided an overview of the factors to be considered such as the current and voltage analysis. These are among the important parameters in guaranteeing long-lasting battery operation. It is expected that by the information obtained in this book, researchers as well as any interested readers would find the relevant information on research and development of the AUV, which covers a wide range of aspects; technologies, control system and instrumentation, electronics design and application, and power system analysis.

We wish to take the opportunity to thank all individuals and organizations, who have contributed in some way in making NUSYS'18 a success and a memorable gathering. Also, we wish to extend my gratitude to the members of the IEEE OES Malaysia Chapter Committee and Organizing Committee for their tireless effort. Finally, we would like to thank Mr. Ramesh for his support and encouragement in undertaking this publication.

Pekan, Malaysia

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Contents

Part I Underwater Technology and Marine

PSO Fine-Tuned Model-Free PID Controller with Derivative Filter for Depth Control of Hovering Autonomous Underwater Vehicle	3
Mohd Zaidi Mohd Tumari, Amar Faiz Zainal Abidin, Mohamed Saiful Firdaus Hussin, Ahmad Muzaffar Abd Kadir, Mohd Shahrieel Mohd Aras and Mohd Ashraf Ahmad	
Optimization of Single Input Fuzzy Logic Controller Using PSO for Unmanned Underwater Vehicle	15
Mohd Shahrieel Mohd Aras, Shahrums Shah Abdullah, Hazriq Izuan Jaafar, Ahmad Anas Yusof, Mohd Zaidi Mohd Tumari and Ho Gui Yan	
UTeM Autonomous Underwater Vehicle Competition Initiatives: Project TUAH and PANTHER	27
Ahmad Anas Yusof, Mohd Khairi Mohamed Nor, Shamsul Anuar Shamsudin, Mohd Rizal Alkahari, Mohd Shahrieel Mohd Aras, Mohamad Riduwan Md. Nawawi, Mohd Zaidi Mohd Tumari and Mohammad Afif Kasno	
Deep Underwater Image Enhancement Through Integration of Red Color Correction Based on Blue Color Channel and Global Contrast Stretching	35
Kamil Zakwan Mohd Azmi, Ahmad Shahrizan Abdul Ghani, Zulkifli Md Yusof and Zuwairie Ibrahim	
Development of Surface Cleaning Robot for Shallow Water	45
Muhamad Qayyum Dahlan, Herdawatie Abdul Kadir, Khalid Isa, Radzi Ambar, Mohd Rizal Arshad and Maziyah Mat Noh	

Design and Development of an Autonomous Underwater Vehicle for Underwater Target Navigation Mission Module	55
Muhammad Muzakkir Ahmad Roslan, Herdawatie Abdul Kadir, Khalid Isa, Radzi Ambar, Mohd Rizal Arshad, Maziyah Mat Noh and Mohd Helmy Wahab	
Development of an Autonomous Underwater Vehicle for Target Acquisition	65
Leong Wai Lunn Alexander, Khalid Isa, Herdawatie Abdul Kadir and Radzi Ambar	
Robust Controller Design for Autonomous Underwater Glider Using Backstepping Super Twisting Sliding Mode Control Algorithm	79
Maziyah Mat Noh, M. R. Arshad, Rosmiwati Mohd-Mokhtar, Zainah Md Zain, Quadrat Khan and Herdawati Abdul Kadir	
PSpHT-II: A Water Strider-Like Robot with Cylindrical Footpad	99
Vi Vi Gan, Addie Irawan, Niirmel Ranjanendran and Siti Noor Zuliana	
An Accurate Characterization of Different Water Properties Using Resonant Method for Underwater Communication Activity	113
Salwa Awang Akbar, Ahmad Syahiman Mohd Shah, Airul Sharizli Abdullah, Nurhafizah Abu Talip Yusof, Sabira Khatun, Syamimi Mardiah Shaharum and Mohamad Shaiful Abdul Karim	
Statistical Relationship Between Multibeam Backscatter, Sediment Grain Size and Bottom Currents	121
Mohd Azhafiz Abdullah, Razak Zakariya and Rozaimi Che Hasan	
Part II Control, Instrumentation and Artificial Intelligent Systems	
Stabilization of Two-wheeled Wheelchair with Movable Payload Based Interval Type-2 Fuzzy Logic Controller	137
N. F. Jamin, N. M. A. Ghani, Z. Ibrahim, M. F. Masrom and N. A. A. Razali	
Stabilization Control of a Two-Wheeled Triple Link Inverted Pendulum System with Disturbance Rejection	151
M. F. Masrom, N. M. Ghani, N. F. Jamin and N. A. A. Razali	
Integration of PI-Anti-windup and Fuzzy Logic Control with External Derivative Solution for Leg's Robot Angular Joint Precision	161
Wan Mohd Nafis Wan Lezaini, Addie Irawan and Ahmad Nor Kasruddin Nasir	

Backstepping Control of Nonholonomic Car-like Mobile Robot in Chained Form 173
 Norsuryani Zainal Abidin, Nurul Ain Mohamed, Zainah Md. Zain, Maziyah Mat Noh, Norhafizah Md. Zain and Dwi Pebrianti

Analysis of Mobile Robot Path Planning with Artificial Potential Fields 181
 Hamzah Ahmad, Ahmad Nur Fakhruallah Mohamad Pajeri, Nur Aqilah Othman, Mohd Mawardi Saari and Mohd Syakirin Ramli

Data-Driven PID Tuning for Liquid Slosh-Free Motion Using Memory-Based SPSA Algorithm 197
 Nik Mohd Zaitul Akmal Mustapha, Mohd Zaidi Mohd Tumari, Mohd Helmi Suid, Raja Mohd Taufika Raja Ismail and Mohd Ashraf Ahmad

Barnacles Mating Optimizer Algorithm for Optimization 211
 Mohd Herwan Sulaiman, Zuriani Mustaffa, Mohd Mawardi Saari, Hamdan Daniyal, Ahmad Johari Mohamad, Mohd Rizal Othman and Mohd Ruslim Mohamed

Random Search in Energy Management Strategy (EMS) for Hybrid Electric Vehicles 219
 Muhammad Syahmi Ghazali and Muhammad Ikram Mohd Rashid

Extended Bat Algorithm (EBA) as an Improved Searching Optimization Algorithm 229
 Dwi Pebrianti, Nurnajmin Qasrina Ann, Luhur Bayuaji, N. R. Hasma Abdullah, Zainah Md. Zain and Indra Riyanto

Performance Comparison of Perturbation Signals for Time-Varying Water Temperature Modeling Using NARX-Based BPSO 239
 Najidah Hambali, Mohd Nasir Taib, Ahmad Ihsan Mohd Yassin and Mohd Hezri Fazalul Rahiman

Adaptive Fuzzy-PID Controller for Quad-Rotor MAV with Mass Changes 257
 Goh Ming Qian, Dwi Pebrianti, Luhur Bayuaji, Rosdiyana Samad, Mahfuzah Mustafa and Mohammad Syafrullah

Investigating State Covariance Properties During Finite Escape Time in H_∞ Filter SLAM 271
 Hamzah Ahmad, Nur Aqilah Othman, Mawardi Saari and Mohd Syakirin Ramli

Diagonalization of Covariance Matrix in Simultaneous Localization and Mapping of Mobile Robot 285
 Maziatun Mohamad Mazlan, Nur Aqilah Othman and Hamzah Ahmad

Development and Control of Biped Walking Robot Using PI Control	299
K. H. Tan, N. S. M. Nor and M. Z. Md Zain	
Improved Generalized Cross Correlation Phase Transform Algorithm for Time Difference of Arrival Estimation	315
Chee Sheng Tan, Rosmiwati Mohd-Mokhtar and Mohd Rizal Arshad	
Performance Evaluation of PID Controller Parameters Gain Optimization for Wheel Mobile Robot Based on Bat Algorithm and Particle Swarm Optimization	323
Nur Aisyah Syafinaz Suarin, Dwi Pebrianti, Nurnajmin Qasrina Ann, Luhur Bayuaji, Muhammad Syafrullah and Indra Riyanto	
Restoration of Kids Leg Function Using Exoskeleton Robotic Leg (ExRoLEG) Device	335
Mohd Azrul Hisham Mohd Adib, Szeto Yang Han, Prashant Raj Ramani, Low Jian You, Law Ming Yan, Idris Mat Sahat and Nur Hazreen Mohd Hasni	
Simulated Kalman Filter Algorithm with Improved Accuracy	343
Mohd Falfazli Mat Jusof, Ahmad Azwan Abd Razak, Shuhairie Mohammad, Ahmad Nor Kasruddin Nasir, Mohd Helmi Suid, Mohd Ashraf Ahmad and Zuwairie Ibrahim	
Initial Study of Multiple Excitation Source for Electrical Resistance Tomography in Steel Pipe Application	353
Yasmin Abdul Wahab, Syazwani Amanina Syakyeen, Zainah Md. Zain, Normaniha Abd Ghani and Maziyah Mat Noh	
Simultaneous Perturbation Stochastic Approximation Optimization for Energy Management Strategy of HEV	361
Muhammad Fadhlan Afif Nazri and Muhammad Ikram Mohd Rashid	
Part III Applied Electronics and Computer Engineering	
Image Processing-Based Flood Detection	371
Angga Ariawan, Dwi Pebrianti, Ronny, Yudha Maulana Akbar, Lestari Margatama and Luhur Bayuaji	
Enhancement on Stain Detection for Automatic Handwashing Audit Vision System	381
Faradila Naim, Muhammad Aizat Romaino and Rosyati Hamid	
Classification of Transient Facial Wrinkle	391
Rosdiyana Samad, Mohammad Zarif Rosli, Nor Rul Hasma Abdullah, Mahfuzah Mustafa, Dwi Pebrianti and Nurul Hazlina Noordin	

Electromyograph (EMG) Signal Analysis to Predict Muscle Fatigue During Driving 405
 Muhammad Amzar Syazani Mohd Azli, Mahfuzah Mustafa, Rafiuddin Abdubrani, Amran Abdul Hadi, Syarifah Nor Aqida Syed Ahmad and Zarith Liyana Zahari

Time-Frequency Analysis from Earthing Application 421
 Jun Hou Ting, Mahfuzah Mustafa, Zarith Liyana Zahari, Dwi Pebrianti, Zainah Md Zain, Nurul Hazlina Noordin and Rafiuddin Abdubrani

Energy Spectral Density Analysis of Muscle Fatigue 437
 Noor Aisyah Ab Rahman, Mahfuzah Mustafa, Rosdiyana Samad, Nor Rul Hasma Abdullah and Norizam Sulaiman

Modelling Automatic IoT Home Light System (SmartLi) by NODEMCU ESP8266 447
 Muhammad Muttaqin A. Rahim, Nor Shazwanie Ramli, Najwa Raihana Abdul Wahab and Rohana Abdul Karim

Development of Automated Gate Using Automatic License Plate Recognition System 459
 Luai Taha Ahmed Al-Mahbashi, Nurhafizah Abu Talip Yusof, Syamimi Shaharum, Mohamad Shaiful Abdul Karim and Ahmad Afif Mohd Faudzi

Design of T-Shaped UWB Antenna with Dual Band Rejection Using Inverted U- and C-Shaped Slots 467
 Salwa Awang Akbar, Ahmad Syahiman Mohd Shah, Ahmad Afif Mohd Faudzi, Sabira Khatun, Syamimi Mardiah Shaharum, Nurhafizah Abu Talip @ Yusof and Mohamad Shaiful Abdul Karim

Inter Vehicle Communication System for Collision Avoidance 475
 Nurul H. Noordin, Althea C. Y. Hui, Nurulfadzilah Hassan and Rosdiyana Samad

IOT—Eye Drowsiness Detection System by Using Intel Edison with GPS Navigation 485
 Auni Syahirah Abu Bakar, Goh Khai Shan, Gan Lai Ta and Rohana Abdul Karim

Automatic Detection of Diabetic Retinopathy Retinal Images Using Artificial Neural Network 495
 Syamimi Mardiah Shaharum, Nurul Hajar Hashim, Nurhafizah Abu Talip @ Yusof, Mohamad Shaiful Abdul Karim and Ahmad Afif Mohd Faudzi

Regional Assessment of Facial Nerve Paralysis Using Optical Flow Method	505
Wan Syahirah W. Samsudin, Rosdiyana Samad, Kenneth Sundaraj, Mohd Zaki Ahmad and Dwi Pebrianti	
Design of Ultra-Wideband (UWB) Horn Antenna for Non-destructive Fruit Quality Monitoring	515
Nurhafizah Abu Talip @ Yusof, Syamimi Mardiah Shaharum, Ahmad Afif Mohd Faudzi, Sabira Khatun, Mohamad Shaiful Abdul Karim and Siti Fatimah Hazali	
Ionospheric Modeling and Precision Positioning Global Navigation Satellite System	523
Nurul Fazira Abd Rahman, Sabira Khatun, Kamarul Hawari Ghazali, Md. Moslemuddin Fakir, Mamunur Rashid and Bifta Sama Bari	
Enhancing the Integrated Vaccine System (IVS) Using MyKidVAX Mobile Application	531
Mohd Azrul Hisham Mohd Adib, Nur Hazreen Mohd Hasni, Nor Fazlin Zabudin and Muhammad Shahminan Lukman	
Microwave-Assisted Synthesis for Environmentally ZnO Nanoparticle Synthesis	541
Norlin Pauzi, Norashikin Mat Zain and Nurul Amira Ahmad Yusof	
Part IV Power Systems and Sustainable Energy	
Micro-Hydro Energy Estimation for Hydrokinetic Energy Harnessing at Sungai Lembing	549
W. I. Ibrahim, R. M. T. R. Ismail and M. R. Mohamed	
Investigation of Binary Search Algorithm as Maximum Power Point Tracking Technique in Solar PV System	563
Meng Chung Tiong, Hamdan Daniyal, Mohd Herwan Sulaiman and Mohd Shafie Bakar	
Filter Design for a Nine Level Voltage Source Inverter for Renewable Energy Applications	571
Ibrahim Haruna Shanono, Nor Rul Hasma Abdullah and Aisha Muhammad	
Effects of Transformer's Turn Ratio Mismatch Towards the Performance of Dual Active Bridge Converter	587
Suliana Ab Ghani, Hamdan Daniyal, Nur Huda Ramlan and Meng Chung Tiong	
Impact of Overcurrent Protection Coordination on the Location of the Distributed Generation Sources	595
Noor Zaihah Jamal, Mohd Herwan Sulaiman and Omar Aliman	

Investigation of Power Transfer in QAB Converter Via Phase Shift Modulation 603
Suliana Ab Ghani, Hamdan Daniyal, Nur Huda Ramlan and Meng Chung Tiong

Current Measurement of Engine Oils Under Various Voltage Application 611
Benedick Conolius, Norlin Pauzi, Mohd Herwan Sulaiman, Mohd Razali Daud, Kadowaki Kazunori and Amir Izzani Mohamed

Parameter (Voltage, Current) Study of Thermoelectric Cooler (TEC) for Automobile Air-Conditioner 617
Siti Nor Aisyah Burhanudin, Mohd Shawal Jadin and Amir Izzani Mohamed

Optimal Placement of TCSC for Reactive Power Planning Using Grasshopper Optimization Algorithm Considering Line Outage (N-M) 623
Muhamad Amirul Asyraf Juhari, Nor Rul Hasma Abdullah, Ibrahim Haruna Shanono, Mahfuzah Mustafa, Rosdiyana Samad and Dwi Pebrianti