

**2019 IEEE International Conference
on Cybernetics and Intelligent
Systems (CIS 2019) and IEEE
Conference on Robotics, Automation
and Mechatronics (RAM 2019)**

**Bangkok, Thailand
18 – 20 November 2019**



**IEEE Catalog Number: CFP19835-POD
ISBN: 978-1-7281-3459-8**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

| | |
|-------------------------|-------------------|
| IEEE Catalog Number: | CFP19835-POD |
| ISBN (Print-On-Demand): | 978-1-7281-3459-8 |
| ISBN (Online): | 978-1-7281-3458-1 |
| ISSN: | 2326-8123 |

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
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Proceedings of the
**9th IEEE International Conference on
 Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

Technical Programme

| | |
|------------------|--|
| Session | MoA1: Exoskeleton and Rehab Robots |
| Date/Time | November 18, 2019 (Monday) / 10:45 – 12:30 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Haoyong Yu / Mingming Zhang |

- 10:45 **Dynamics Compensation Strategy for Control of Lower Extremity Exoskeleton**
 Pei Pei, Zhiyong Tang, Zhongcai Pei, Weihai Chen and Han Gu...1
- 11:00 **Development of a Parameter Adaptation Robot for Lower Limb Rehabilitation**
 Weida Li, Juan Li, Xiang Li and Haojie Zhang...7
- 11:15 **Fuzzy Sliding Mode Control of An Upper-Limb Exoskeleton Robot**
 Long Teng and Shaoping Bai...12

| | |
|------------------|---|
| Session | MoA2: Image Processing and Deep Learning |
| Date/Time | November 18, 2019 (Monday) / 10:45 – 12:30 hrs |
| Venue | Silom |
| Chair(s) | Haoyong Yu / Mingming Zhang |

- 10:45 **A Novel Procedure for Font Recognition through Deep Learning**
 Saeedeh Zia and Jonathan Pan...18
- 11:00 **Subsampling-based HOG for Multi-scale real-time Pedestrian Detection**
 Peng-Lei Song, Yan Zhu, Jian-Dong Zhang and Zhen Zhang...24
- 11:15 **Robust Visual Tracking Based on Complementary Diverse Information**
 Yuzhe Xing, Wei Guo, Wanjun Liu and Haicheng Qu...30
- 11:30 **Color Texture Classification Combining LBP Images and Fractal Features**
 Jan-Iliuță-Romeo Cojocaru, Dan Popescu and Loretta Ichim...35
- 11:45 **Model Transferring for Unsupervised Object Localization**
 Renjie Lin, Shiping Wang and Wenzhong Guo...41
- 12:00 **3D Reconstruction from a Single Image**
 Guiju Ping and Han Wang...47
- 12:15 **Unknown Input Observer for Discrete-Time Fuzzy Bilinear Systems**
 Jun Yoneyama...53

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|--|
| Session | MoA3: Neural Networks and Applications |
| Date/Time | November 18, 2019 (Monday) / 10:45 – 12:30 hrs |
| Venue | Sala Daeng |
| Chair(s) | Domenico Campolo / Xiao Han |

| | |
|-------|---|
| 10:45 | Vehicle Rollover Detection using Recurrent Neural Networks Christian Dengler, Kailerk Treetipsounthorn, Sunhapos Chantranuwathana, Gridsada Phanomchoeng, Boris Lohmann and Setha Pannungum...59 |
| 11:00 | Implementation of Multilayer Perceptron Neural Network on Quality Assessment of Tomato Puree in Aerobic Storage using Electronic Nose Ronnie S. Concepcion II, Edwin Sybingco, Sandy C. Lauguico and Elmer P. Dadios...65 |
| 11:15 | Automatic Trash Classification using Convolutional Neural Network Machine Learning Patipol Tiyajamorn, Pollakrit Lorprasertkul, Rawin Assabumrungrat, Warin Poomarin and Ratchatin Chancharoen...71 |
| 11:30 | Large Scale MTConnect Data Collection Yesheng Cui, Sami Kara and Ka C. Chan...77 |
| 11:45 | Incorporating Stereo with Convolutional Neural Networks for Real-Time Fish Detection and Classification Zong-Yao Wu, Shih-Lun Tseng, Huei-Yung Lin, Hsin-Yi Chen and Tran Van Luan...83 |
| 12:00 | TV Guidance Simulation Platform Based on Deep Learning Zhaowei Yu, Wanchun Chen, Zhongyuan Chen and Xiaoming Liu...89 |
| 12:15 | Interpreting Collectively Compressed Multi-Layered Neural Networks Ryotaro Kamimura...95 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|--|
| Session | MoB1: Path Planning and Neural Network |
| Date/Time | November 18, 2019 (Monday) / 13:30 – 15:15 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Jun Ishikawa / Marcelo H. Ang Jr. |

- 13:30 **Design and Gait Realization of Power-assisted Lower Limbs Exoskeleton**
 Shizhao Zhou, Zheng Chen, Wei Song, Shiqiang Zhu, Lai Jin and Jason Gu...101
- 14:00 **Robot-Sensor Calibration for a 3D Vision Assisted Drawing Robot**
 Sreekanth Kana, Srinivasan Lakshminarayanan, Dhanya Menoth Mohan and Domenico Campolo...107

| | |
|------------------|--|
| Session | MoB2: Control Systems and Applications |
| Date/Time | November 18, 2019 (Monday) / 13:30 – 15:15 hrs |
| Venue | Silom |
| Chair(s) | Spot Srigrarom / Wei Lin |

- 13:30 **Improved Hydraulic Cylinder Model for the Virtual Decomposition Control Approach**
 Santeri Lampinen, Janne Koivumäki and Jouni Mattila...113
- 13:45 **CDM based Controller design for Stabilizing the Altitude and Heading of an Aircraft**
 Ekachai Asa and Yoshio Yamamoto...119
- 14:00 **Parameter Identification for Improved Performance of Model-Based Control of Hydraulic Manipulators**
 Lionel Hulttinen, Janne Koivumäki and Jouni Mattila...124
- 14:15 **An LQR-based Flight Control for Tiltrotor**
 Yap Thian Hong and Sutthiphong Srigrarom...N/A
- 14:30 **A Compliance Control Strategy for Adapting to Body Movements during a Percutaneous Surgery**
 Chenhao Fang, Ziwei Wan, Yangfeng Qiu and Chunlin Zhou...136

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|--|
| Session | MoB3: Optimisation |
| Date/Time | November 18, 2019 (Monday) / 13:30 – 15:15 hrs |
| Venue | Sala Daeng |
| Chair(s) | Shaohui Foong / Yufeng Yue |

| | |
|-------|--|
| 13:30 | 3D Model-Based Non-interference Assembly Sequence Generation for Products with a Large Number of Parts Kento Tariki, Takuya Kiyokawa, Tomoki Nagatani, Jun Takamatsu and Tsukasa Ogasawara...142 |
| 13:45 | Optimization of Extracted Features from an Explosive-Detecting Electronic Nose Using Genetic Algorithm Jason L. Española, Argel A. Bandala, Ryan Rhay P. Vicerra and Elmer P. Dadios...148 |
| 14:00 | GA\SQP Optimization for Design of a Serial Robotic Arm Used as a Spatial Pointing Mechanism Xiaocong Wu, Guanyang Liu, Ge Yu, Xiao Li, Chen Guan, Haowei Wang and Chao Huang...153 |
| 14:15 | A Line Extraction Process Based on Noise Elimination and a Novel Benchmark in Jensen-Shannon Divergence Peidong Zhang, Sizhe Chen and Jingshi Yao...159 |
| 14:30 | A Discrete Particle Swarm Optimization Algorithm for Solving TSP under Dynamic Topology Shuo Wang, Xiao Yu, Jian-Dong Zhang and Zhen Zhang...165 |
| 14:45 | Blanket Jamming Targets Assignment Based on Adaptive Genetic Algorithm Lin Zhang, Guoqing Shi and Xiutang Geng...171 |
| 15:00 | Cluster-First, Route-Second Heuristic for EV Scheduling in On-Demand Public Transit Thilina Perera, Alok Prakash, Deshya Wijesundera, Thambipillai Srikanthan and Chathura Nagoda Gamage...176 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuA1: Mobile Robots |
| Date/Time | November 19, 2019 (Tuesday) / 11:00 – 12:45 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Toyomi Fujita / Marcelo H. Ang Jr. |

| | |
|-------|--|
| 11:00 | Characteristics of Regions of Interest in Observing Selective Motion of Mobile Robot Toyomi Fujita...182 |
| 11:15 | Target-driven Model Learning for Collision-aware Planar Object Pushing Zehui Meng, Mattheus E. W. Lee, Hao Sun, and Marcelo H. Ang Jr....187 |
| 11:30 | Socially-Acceptable Walking Parameters for Wheelchair Automation Sean Wong Jun Zhong, Lee Wai Leong and Marcelo H. Ang Jr...193 |
| 11:45 | Design of a Control Platform for Mobile Robot with SSVEP-BCI System Yang Liu, Xinyang Li and Chenguang Yang...198 |
| 12:00 | Development of an In-pipe Mobile Robot for Inspecting Clefts of Pipes Bin Zhang, Mzain Abdulaziz, Kouhei Mikoshi and Hunok Lim...204 |
| 12:15 | Development of a Mobile Robot for Inspection of Analog Gauges in Industrial Plants Using Computer Vision Javier Hilario, Christian Penaloza, David Hernandez-Carmona, Jose Balbuena, Diego Quiroz, Jorge Ramirez and Francisco Cuellar...209 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuA2: Systems Modelling and Control |
| Date/Time | November 19, 2019 (Tuesday) / 11:00 – 12:45 hrs |
| Venue | Silom |
| Chair(s) | Teng Long / Haoyong Yu |

| | |
|-------|--|
| 11:00 | Domain Heuristics for Evolutionary Scheduling of No-Wait Flow Shops Tsung-Su Yeh and Tsung-Che Chiang...215 |
| 11:15 | Design and Analysis of a Gripper with Interchangeable Soft Fingers for Ungrounded Mobile Robots Loong Yi Lee, Surya G. Nurzaman and Chee Pin Tan...221 |
| 11:30 | On an SIR Epidemic Model with Vaccination in a Patchy Environment M. De la Sen, R. Nistal, S. Alonso-Quesada and A. Ibeas...227 |
| 11:45 | Design of Hardware-in-the-loop Simulation System based on RTX and FlightSim TM Peng Wang, Zhongyuan Chen, Wanchun Chen and Xiaoming Liu...233 |
| 12:00 | Lyapunov Function based Nonlinear Control of EGR-VVT Dual Loop in IC Engines Haoyun Shi, Weihai Jiang and Tielong Shen...239 |
| 12:15 | Research on Fast Calculation Technology of Air-to-Air Missile Impact Area Yijie Zhang, Yong Wu, Yi Zhang and Longfei Yue...245 |
| 12:30 | Exploring the Best Environmental Conditions for the Growth of Butterhead Lettuce in a Closed System Narenrit Tepkasetkul, Muhammad Saadi, Thanachai Kittichokwattana, Alongkorn Pimpin, Nanath Rattanaeang and Gridsada Phanomchoeng...251 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuA3: Sensors and Actuators |
| Date/Time | November 19, 2019 (Tuesday) / 11:00 – 12:45 hrs |
| Venue | Sala Daeng |
| Chair(s) | Guanjun Bao / Han Xiao |

- 11:00 **Gaussian Mixture Marginal Distributions for Modelling Remaining Metallic Pipe Wall Thickness**
 Linh Nguyen, Jaime Valls Miro, Lei Shi and Teresa Vidal-Calleja...257
- 11:15 **Design and Characterization of a Novel Vacuum Bending Actuator and a Bimorph: for Preliminary Use in a Continuum Robot Arm**
 Sajeewa D. Katugampala, Rancimal B. Arumathanthri, Kasun M.S. Arachchi, Asitha L. Kulasekera, Suresh Asanka and Nirosch D. Jayaweera...263
- 11:30 **Development of a Clutchable Series Elastic Actuator for Robotic Hip Exoskeleton**
 Ting Zhang and Jing Xia...269
- 11:45 **3-D Printed Strain Sensor for Structural Health Monitoring**
 Nuwan Munasinghe, Matthew Woods, Lewis Miles and Gavin Paul...275
- 12:00 **Sensor and Communication Considerations in UAV-WSN Based System for Precision Agriculture**
 Emilian Vlasceanu, Marius Dima, Loretta Ichim and Dan Popescu...281
- 12:15 **Capacitive Sensor Based 2D Subsurface Imaging Technology for Non-destructive Evaluation of Building Surfaces**
 Lasitha Piyathilaka, Basuru Sooriyaarachchi, Sarath Kodagoda and Karthick Thiyagarajan...287

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuB1: Kinematics and Control |
| Date/Time | November 19, 2019 (Tuesday) / 13:30 – 15:15 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Gangqi Dong / Domenico Campolo |

| | |
|-------|---|
| 13:30 | Inverse Kinematics Solution of Manipulator Based on PSO-ELM Fan Wu, GuoQing Shi and ShengQiang Wang...293 |
| 13:45 | Implementation of Inverse Kinematics for Crop-Harvesting Robotic Arm in Vertical Farming Sandy C. Lauguico, Ronnie S. Concepcion II, Dailyne D. Macasaet, Jonnel D. Alejandrino, Argel A. Bandala and Elmer P. Dadios...298 |
| 14:00 | A Two-stage Optimal Controller For Hydraulic Loading System With Mechanical Compensation Jingren Zhang, Qingfeng Wang and Tao Wang...304 |
| 14:15 | Temperature Control for Hydrogel Bio-Printing Setthibhak Suthithanakom, Sakolpoo Juemjutitam, Navaporn Arunwattanamongkol, Tepparit Wongpakham, Alongkorn Pimpin and Ratchatin Chancharoen...310 |
| 14:45 | Fractional-order Sliding Mode Based Variable Stiffness and Damping Impedance Control with Disturbance Observer Zhiqiang Ma and Gangqi Dong...316 |
| 15:00 | Development of Powered Knee Prosthesis with Small-Scale, Light-Weight, and Affordable Series-Elastic Actuator, and its Preliminary Walking Test Ken Endo, Hirozumi Takeshima and Tetsuo Tawara...321 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuB2: Sensing and Sensor Fusion |
| Date/Time | November 19, 2019 (Tuesday) / 13:30 – 15:15 hrs |
| Venue | Silom |
| Chair(s) | Shaohui Foong / Spot Srigrarom |

- 13:30 **Combined Opto-Acoustic and Inertial 3D Object Localization in Assembly**
 Dominik Esslinger, Philipp Rapp, Samuel Wiertz, Martin Oberdorfer, Oliver Sawodny and Cristina Tarín...326
- 14:00 **Visual Assistance Method for Teleoperation Systems with {6,3} Tessellation**
 Miyahara Keizo...332
- 14:15 **Hierarchical Controller for Autonomous Tracking of Buried Oil and Gas Pipelines and Geotagging of Buried Pipeline Structure**
 Vidya Sudevan, Amit Shukla and Hamad Karki...338
- 14:30 **Augmented-Reality-Based Visualization of Navigation Data of Mobile Robots on the Microsoft Hololens - Possibilities and Limitations**
 Linh Kästner and Jens Lambrecht...344
- 14:45 **BWatch: A Non-invasive Blood Leakage Detection Device using Robust Reflectance-based Sensing**
 Chee How Tan, Jien-Yi Khaw, Ying Ching Wong, Chang Yin Chionh and Shaohui Foong...350
- 15:00 **Tomato Fruit Image Dataset for Deep Transfer Learning-based Defect Detection**
 Robert G. de Luna, Elmer P. Dadios, Argel A. Bandala and Ryan Rhay P. Vicerra...356

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | TuB3: Motion Tracking and Localisation |
| Date/Time | November 19, 2019 (Tuesday) / 13:30 – 15:15 hrs |
| Venue | Sala Daeng |
| Chair(s) | Guoqiang Hu / Marcelo H. Ang Jr. |

| | |
|-------|---|
| 13:30 | A Saliency-Fusion-Based Framework for Co-localization Jiawei Chen and Shiping Wang...362 |
| 13:45 | M-Estimator Application in Real-Time Sensor Fusion for Smooth Position Feedback of Heavy-Duty Field Robots Henri Liikanen, Mohammad M. Aref and Jouni Mattila...368 |
| 14:00 | Fusing Lidar, Radar, and Camera Using Extended Kalman Filter for Estimating the Forward Position of Vehicles Taek-Lim Kim, Jae-Seol Lee and Tae-Hyoung Park...374 |
| 14:15 | Trajectory-Tracking Control of Robotic System via Proximal Policy Optimization Shansi Zhang, Yipeng Pang and Guoqiang Hu...380 |
| 14:30 | Trajectory-Tracking Control of Robotic Systems via Deep Reinforcement Learning Shansi Zhang, Chao Sun, Zhi Feng and Guoqiang Hu...386 |
| 14:45 | IMRL: An Improved Inertial-Aided KLT Feature Tracker Meixiang Quan, Beipeng Mu and Zheng Chai...392 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | WeA1: Motion Control and Path Planning |
| Date/Time | November 20, 2019 (Wednesday) / 08:30 – 10:15 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Wanjun Liu / Han Wang |

| | |
|-------|--|
| 08:30 | FORMI: A Fast Holonomic Path Planning and Obstacle Representation Method Based on Interval Analysis Pekka Mäenpää, Mohammad M. Aref and Jouni Mattila...398 |
| 08:45 | Planning Method of Near-Minimum-Time Task Tour for Industrial Point-to-Point Robot Kosuke Nemoto and Yasumichi Aiyama...404 |
| 09:00 | Jerk-limited Holonomic Robot Motion Planning Using Barrier Functions Abdul Hanif Zaini and Lihua Xie...410 |
| 09:15 | Oscillation Suppression Control of Tethered Space Robot based on Nonhomogeneous Observer Fan Zhang and Chen Wang...416 |
| 09:30 | Mechatronics Manufacturing Line with Integrated Autonomous Robots and Visual Servoing Systems Adrian Filipescu, Eugenia Minca and Adriana Filipescu...422 |
| 09:45 | Investigating Modular Relative Jacobian Control for Bipedal Robot Rodrigo S. Jamisola Jr., Olebogeng Mbedzi, Tlameo Makati and Rodney G. Roberts...428 |
| 10:00 | Formal Validation of Probabilistic Collision Risk Estimation for Autonomous Driving Philippe Ledent, Anshul Paigwar, Alessandro Renzaglia, Radu Mateescu and Christian Laugier...433 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|--|
| Session | WeA2: Multi-Agent and Human-Machine Systems |
| Date/Time | November 20, 2019 (Wednesday) / 08:30 – 10:15 hrs |
| Venue | Silom |
| Chair(s) | Stefano Tortora / Shaohui Foong |

| | |
|-------|--|
| 08:30 | Position Synchronization Control of a 3DoF Dual Arm Robotic Manipulator System using Integral Sliding Mode Sumi Phukan and Chitralkha Mahanta...439 |
| 08:45 | The Use of Blockchain Technology for Private Data Handling for Mobile Agents in Human-Technology Interaction Thomas Kirks, Tim Uhlott and Jana Jost...445 |
| 09:00 | Leader-follower Tracking Control of Mobile Robot with Unknown Leader's Constant Velocities Xu Zhang, Xiao Yu and Weidong Chen...451 |
| 09:15 | Fast Human Motion Prediction for Human-Robot Collaboration with Wearable Interface Stefano Tortora, Stefano Michieletto, Francesca Stival and Emanuele Menegatti...457 |
| 09:30 | EEG-based Control of a 3D Game Using 14-channel Emotiv EPOC+ Thabo N. Maletle, Kabo Moruti, Tsaone Swaabow Thapelo and Rodrigo S. Jamisola Jr....463 |
| 09:45 | Formal Synthesis of Warehouse Robotic Systems with Temporal Logic Specifications Yuanjiang Yang, Jiawei Zhao, Xiang Yin and Shaoyuan Li...469 |
| 10:00 | Energy Harvesting in Soft Robot Locomotion with Complex Dynamics Shiv A. Katiyar, Fumiya Iida and Surya G. Nurzaman...475 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | WeA3: Identification and Prediction |
| Date/Time | November 20, 2019 (Wednesday) / 08:30 – 10:15 hrs |
| Venue | Sala Daeng |
| Chair(s) | Yonghong Tan / Han Xiao |

| | |
|-------|--|
| 08:30 | Predictive Identification of Electromagnetic Micro-mirrors Qingmei Cao, Yonghong Tan, Ruili Dong and Qingyuan Tan...481 |
| 08:45 | Gender Classification from Gait Silhouette using Observation Angle-based GEIs Kotcharat Kitchat, Nirattaya Khamsemanan and Cholwich Nattee...485 |
| 09:00 | Quality Assessment of Mangoes using Convolutional Neural Network John Carlo V. Puno, Elmer P. Dadios, Robert Kerwin D. Billones, Edwin J. Calilung, Argel A. Bandala and Arlene C. Joaquin...491 |
| 09:15 | From Technical Analysis to Text Analytics: Stock and Index Prediction with GRU Teoh T.-T., Lim W. T., Koh K. W., Soh J. J. Tan T., Liu S.Y. and Nguwi Y.-Y. ...496 |
| 09:30 | Machine Learning-based Corporate Social Responsibility Prediction T.-T. Teoh, Q. K. Heng, J. J. Chia, J. M. Shie, S. W. Liaw, M. Yang and Y.-Y. Nguwi...501 |
| 09:45 | Heuristic Detection of Recovery Progress using Robotic Data Yujun Lai, Sheila Sutjipto, Marc Carmichael and Gavin Paul...506 |
| 10:00 | Command Generation of a High Degree of Freedom Robot Manipulator on a Moving Platform Yu-Chen, Lin and Chao-Chung Peng...512 |

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|--|
| Session | WeB1: Autonomous Vehicles and Robot Mapping |
| Date/Time | November 20, 2019 (Wednesday) / 10:45 – 12:00 hrs |
| Venue | Crowne 4 & 5 |
| Chair(s) | Haoyong Yu / Yufeng Yue |

- 10:45 **Magnetic-Assisted Initialization for Infrastructure-free Mobile Robot Localization**
 Zhenyu Wu, Mingxing Wen, Guohao Peng, Xiaoyu Tang and Danwei Wang...518
- 11:00 **Driving Behavior Assessment and Anomaly Detection for Intelligent Vehicles**
 Chule Yang, Alessandro Renzaglia, Anshul Paigwar, Christian Laugier and Danwei Wang...524
- 11:15 **Place Recognition Using Line-Junction-Lines in Urban Environments**
 Xiaoyu Tang, Wenhao Fu, Muyun Jiang, Guohao Peng, Zhenyu Wu,
 Yufeng Yue and Danwei Wang...530
- 11:30 **Multi-Robot Map Fusion Framework using Heterogeneous Sensors**
 Yufeng Yue, Chule Yang, Yuanzhe Wang, Jun Zhang, Mingxing Wen,
 Xiaoyu Tang, Haoyuan Zhang and Danwei Wang...536
- 11:45 **Probabilistic 3D Semantic Map Fusion Based on Bayesian Rule**
 Yufeng Yue, Ruilin Li, Chunyang Zhao, Chule Yang, Jun Zhang,
 Mingxing Wen Guohao Peng, Zhenyu Wu and Danwei Wang...542

Proceedings of the
 9th IEEE International Conference on
**Cybernetics and Intelligent Systems (CIS) and
 Robotics, Automation and Mechatronics (RAM)**

18 - 20 November 2019
 Bangkok, Thailand

| | |
|------------------|---|
| Session | WeB2: Flexible Joints and Manipulators |
| Date/Time | November 20, 2019 (Wednesday) / 10:45 – 12:00 hrs |
| Venue | Silom |
| Chair(s) | Guoqiang Hu / Han Wang |

| | |
|-------|---|
| 10:45 | Impedance Control of Flexible Joint Robots Based on Singular Perturbation Method Zhao-Hui Jiang and Libo Jiang...548 |
| 11:00 | Design and Control of a Flexible Joint as a Hydraulic Series Elastic Actuator For Manipulation Applications Xuepeng Cao, Mohammad M. Aref and Jouni Mattila...553 |
| 11:15 | Application of Simultaneous Localization and Mapping for Large-scale Manipulators in Unknown Environments Petri Mäkinen, Mohammad M. Aref, Jouni Mattila and Sirpa Launis...559 |
| 11:30 | Nonlinear Model Predictive Control of a Heavy-Duty Hydraulic Bulldozer Blade Teemu Mononen, Mohammad M. Aref and Jouni Mattila...565 |
| 11:45 | An Actuated Spherical Joint for Humanoid Robotics Applications Michele Folgheraiter, Sharafatdin Yessirkepov and Alikhan Yessaly...571 |