2020 International Conference on **Advanced Mechatronic Systems** (ICAMechS 2020)

Hanoi, Vietnam 10-13 December 2020



IEEE Catalog Number: CFP2018R-POD ISBN:

978-1-7281-6531-8

Copyright © 2020 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:
 CFP2018R-POD

 ISBN (Print-On-Demand):
 978-1-7281-6531-8

 ISBN (Online):
 978-1-7281-6530-1

ISSN: 2325-0682

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





2020 International Conference on Advanced Mechatronic Systems

December 10 - 13, 2020 Hanoi, Vietnam



CONTENTS

Design and Control on Robotic Systems | (FriA01)

Comparison of ROS Local Planners with Differential Drive Heavy Robotic System

Isira Naotunna, Theeraphong Wongratanaphisan

1

A Study on Series Elastic Actuator Applied for Human-Interactive Robot

Khanh Dat Truong, Anh Khoa Lanh Luu, Nhut Phuong Tong, Van Tu Duong, Huy Hung Nguyen, Tan Tien Nguyen

7

Balancing Walking Gait for Small Size Humanoid Robot by Using Movable Mass

Xuan Tien Nguyen, Dang Hung Nguyen, Huy Hung Nguyen, Nhut Phuong Tong, Thanh Phuong Nguyen, Tan Tien Nguyen

13

Controlling Center of Mass in Humanoid Robot Using Sliding Mode Control

Xuan Tien Nguyen, Tri Duc Tran, Huy Hung Nguyen, Nhut Phuong Tong, Thanh Phuong Nguyen, Tan Tien Nguyen

17

Design of Series Elastic Actuator Applied for Humanoid

Khanh Dat Truong, Anh Khoa Lanh Luu, Nhut Phuong Tong, Van Tu Duong, Huy Hung Nguyen, Tan Tien Nguyen

23

Design and Control on Robotic Systems II (FriB01)

Kinematic Study on Generated Thrust of Bio-inspired Robotic with Undulating Propulsion

Van Hien Nguyen, Van Tu Duong, Huy Hung Nguyen, Van Dong Nguyen, Van Sy Le, Tan Tien Nguyen

29

Trajectory Planning for Dual Arm Robot System in Consideration of the System Controller

Luu Thi Hue, Duong Minh Duc, Nguyen Pham Thuc Anh

33

Developing Robotic System for Harvesting Pineapples

Nguyen Pham Thuc Anh, Son Hoang, Duong Van Tai, Bui Le Cuong Quoc

39

Comparing the Results of Applying DE, PSO and Proposed Pro DE, Pro PSO Algorithms for Inverse Kinematics Problem of a 5-DOF Scara Robot

Thanh-Trung Nguyen, Van-Huy Nguyen, Xuan-Huong Nguyen

45

Intelligent Control Method of Heating Process including Model Prediction and Climate Compensation

Chen-xi Ju, Ping Jiang, Shi Li

50

Jotaro Suzuki, Masami Iwase

56

Development of Myoelectric Prostheses with Elbow Joint

Yusaku Takada, Shotaro Nakamura, Sakie Morioka, Masami Iwase

0

Development of Powered Wheelchair Expanding Range of Independent Activities of Physically-handicapped Person

Keitaro Kaneta, Masami Iwase, Nobutsuna Endo

65

Near Boundary Control of Automotive Engine Using Machine Learning

Sho Fujiwara, Masami Iwase, Yasuyuki Satoh

69

Development of Powered Wheelchair Expanding Reach of User

Atsushi Suyama, Masami Iwase, Nobutsuna Endo

74

Developments of Novel Methodologies and Technique II (FriB02)

A New Feedback Narrowband Active Noise Control System with Online Secondary-path Modeling Based on Adaptive Notch Filtering

X. Tan, Y. Ma, Y. Xiao, L. Ma, K. Khorasani

78

Noise Reduction Method based on Autocorrelation for Threshold-based Heartbeat Detection

Ziti Fariha Mohd Apandi, Ryojun Ikeura, Soichiro Hayakawa, Shigeyoshi Tsutsumi

83

Assessment of the Design Complexity of Modular Automated Assembly System

Yixiong Feng, Chuan He, Jianrong Tan, Hao Zheng, Yicong Gao

89

Global Stability Criterion of Memristor-based Recurrent Neural Networks with Time Delays

Wudai Liao, Chaochuan Zhang, Jinhuan Chen, Xiaosong Liang, Jun Zhou

94

Design of Anti-glare Device for Freeway with Power Generation Using a Vertical Axis Wind Turbine

Kai Tian, Yanfeng Wu

100

Advanced Mechatronic Systems and Its Applications I (SatA03)

An Improved Error Interpolator of Milling CNC Controller Based on FPGA

Hoang Giang Tran, Khac Sinh Le, Thanh Luan Bui, Huy Hung Nguyen

104

Kinematic Model Reference Adaptive Controller for a Lurking Type Automated Guided Vehicle Using Traction Drive Unit

Van Tu Duong, Huy Hung Nguyen, Tan Tien Nguyen, Trong Trung Nguyen, Van Khoi Vu, Hoang Long Phan

108

Study on Designing and Manufacturing Coaxial Brussless DC Motor

Thien Phuc Tran, Truong Thuan Nguyen, Cong Toai Truong, Tan Tien Nguyen

Discrete-time Quasi Sliding Mode Control of Single-phase T-type Inverters for Residential PV Applications

Bao Binh Pho, Trong Minh Tran, Manh Linh Nguyen, Phuong Vu Hoang

118

A Combination of Distributed Delays Shapers and ADRC for Gantry Crane Control

Trong Hieu Do, Minh Duc Duong, Manh Linh Nguyen, Quy Thinh Dao

124

Advanced Mechatronic Systems and Its Applications II (SatB03)

Collaborative Fault Tolerant Control of Non-Signalized Intersections for Connected and Autonomous Vehicles

Hong Wang

129

Optimizing Linear Generator Design's Parameters for Output Power Using Mix Numerical and Analytical Technique

Huy Diep Do, Van Duc Nguyen, Xuan Quynh Nguyen, The Ba Dang

137

Realization of Autonomous Drive Control of Power-assisted Bicycle

Tatsuya Terashima, Ryo Suzuki, Masami Iwase

143

The Reliability Analysis of Welding Robots Based on Fault Tree

Fen Liang, Qiangsong Zhao

147

The System of Three-phase Electric Parameter Detection Based on the Internet of Things

Yongping Dan, Zhuo Li, Fengge Wang

153

Modeling and Simulation (SatA04)

A Modified Bouc-Wen Model of Pneumatic Artificial Muscles in Antagonistic Configuration

Quy-Thinh Dao, Hai-Trieu Le, Manh-Linh Nguyen, Trong-Hieu Do, Minh-Duc Duong

157

Precision Control of Piezoelectric Actuator Using Modified Bouc-Wen Model

Tran Vu Minh, Tran Thanh Tung, Xinkai Chen

162

Modeling of 3-DOF Micro-hand for One or Two Inputs

Toru Usami, Mingcong Deng

168

Modeling with the Projection Method Considering the Impact State

Takumi Yamato, Masami Iwase, Zini Stefano, Francesco Dal Corso

174

Design and Structure Analysis of Multi-legged Bionic Soft Robot

Junjun Xu, Bo Liu, Kangjie Li, Yixiong Feng, Hao Zheng, Yicong Gao

180

Pattern Recognition and Computer Vision (SatB04)

A Self-adaptive Global Harmony Search Based Extreme Learning Machine for Cassification Problem

Sicheng Li, Zhihong Man, Yuan Chen

186

Hybrid Global Optimization Methods and Iterative Closest Point on Point-based Approach for 3D Registration

Linh Tao, Tinh Nguyen, Trung Nguyen, Tam Bui

102

Development of Engineering Educational Support System for Manufacturing Using Augmented Reality

Yusuke Shiba, Shinichi Imai

198

Deep Learning Based Emotion Recognition IoT System

Kentaro YOKOO, Masahiko ATSUMI, Kei TANAKA, Haoqing WANG, Lin MENG

203

Spatio-temporal Fusion Model of Natural Gas Pipeline Condition Monitoring Based on Convolutional Neural Network and Long Short-term Memory Neural Network

Hailin Zhang, Lu Liu, Juan Dai, Li Ma, Jing Liang, Hao Zhang, Shan Liang

208

Nonlinear Control System Desig (SatA05)

Characteristics of S-curve Motion Profile for All Ranges of Motion Length and Limits

Nguyen Quang Nam

214

Realization of Robust Yo-yo Operation

Akihiro Kumaki, Masami Iwase

221

Experimental Studies on Operator-based Nonlinear Vibration Control of a Flexible Arm Considering Prescribed Performance

Mingcong Deng, Tomoki Koide

226

Control System Design via Neural Networks Using System Structures

Akihiko Katsuta, Masami Iwase

232

Nonlinear Control System Design II (SatB05)

A Predictor Based on a Modified Full-order Observer for Generalized Minimum Variance Control Equivalent to Polynomial Approach

Akira Inoue, Mingcong Deng, Shiro Masuda, Shin-ichi Yoshinaga

234

Development of Operator Based Tracking Controller Design for a Perturbed Peltier Refrigeration System

Shengjun Wen, Ping Liu, Jun Yu

239

Control of Hardening Layer by Pre-stressed Hardening Grinding

Xiaoliang Shi

245

Temperatrue Control of Microwave Heating System by Adaptive Dynamic Programming

Weidong Cheng, Tong Liu, Shan Liang

Intelligent Control in Complex Systems I (SatA06)

Parametric Hull Form Variation-based Genetic Algorithm for Reduced Ship Resistance

Tat-Hien Le, Vu Ngoc Bich, Ngoc Hoa Nguyen Thi, Hai Tran, Van Tao Tran, Duy Anh Nguyen

255

Fault Detection of Tank-system Using ChangeFinder and SVM

Yosuke Furukawa, Mingcong Deng

260

Reinforcement Learning Based Method for Autonomous Navigation of Mobile Robots in Unknown Environments

Roan Van Hoa, Tran Duc Chuyen, Nguyen Tung Lam, Tran Ngoc Son, Nguyen Duc Dien, Vu Thi To Linh

266

Static Analysis of a 3-link Object for Posture Maintenance Control by Nonprehensile Robot without Compensating Friction

Changan Jiang, Kinchong Chu, Satoshi Ueno

270

Intelligent Control in Complex Systems II (SatB06)

Throwing Motion for Yo-yo Forward-pass Operation Based on Wave Propagation

Shunsuke Sakamoto, Masami Iwase

274

Human Gait Analysis Based on OpenSim

Jun Yu, Shuaishuai Zhang, Aihui Wang, Wei Li

278

Adaptive Control of the Rehabilitation Robot with the Model Uncertainty Based on Real Human Gait

Junlan Lu, Wang Aihui, Zhengxiang Ma

282

Lower Limb Rehabilitation Robot Control Based on Human Gait Data and Plantar Reaction Force

Yifei Ge, Yongping Dan, Aihui Wang, Shuaishuai Zhang

286

Signal and Image Processing (SatA07)

Rubbing Character Recognition with Machine Learning

Zelin Meng, Zhiyu Zhang, Zhihong Man, Hiroyuki Tomiyama, Lin Meng

290

Deep Learning Based Ancient Asian Character Recognition

Masahiko ATSUMI, Syunsuke KAWANO, Tomoki MORIOKA, Lin MENG

296

South Indian Character Recognition Using Statistical Feature Extraction and Distance Classifier

Aravinda C.V, Udaya Kumara Reddy K R, Lin Meng, Amar Prabhu G

302

The Research and Design of Smart Mobile Robotic Arm Based on Gesture Controlled

Hongli He, Yongping Dan

308

Optimization Algorithms in Hybrid Systems (SatB07)

Optimal Design of Nonlinear Systems by Using the Low Dimension Associated Output Frequency Response Function (AOFRF)

Yunpeng Zhu, Z Q Lang

313

Quality Control System of Automobile Bearing Production Based on Edge Cloud Collaboration

Yixiong Feng, Chen Yang, Tianyue Wang, Yicong Gao, Wei Fan

319

A Shortest Path Algorithm of Long-period Cyclic Fully Connected Layer Graph Based on Dijkstra Algorithm

Shanghua Mi, Zengwei Ji, Hao Zheng, Yicong Gao

323

A Data-driven MPC Algorithm for Bridge Cranes

HanQiu Bao, Jing An, MengChu Zhou, Qi Kang

328