

2019 IEEE 4th International Conference on Advanced Robotics and Mechatronics (ICARM 2019)

**Toyonaka, Japan
3 – 5 July 2019**

Pages 1-509



**IEEE Catalog Number: CFP19G46-POD
ISBN: 978-1-7281-0065-4**

**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:	CFP19G46-POD
ISBN (Print-On-Demand):	978-1-7281-0065-4
ISBN (Online):	978-1-7281-0064-7

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

Table of Contents

Wednesday, July 3, 2019

Regular Session (Actuators 1)

WeSM1T2: 11:00 - 13:00 **Osaka University, Seminar Room**

Chairs: Guibin Bian, Institute of Automation, Chinese Academy of Sciences, China

Xinyu Li, Huazhong University of Science and Technology, China

Tracking Control of Shape Memory Alloy Flexible Actuators Using Dynamic Surface Controller with Approximate Duhem Model, Rui Li, Ying Feng, Zedong Hu, Ganantu Lal Chakma l and Yueyue.....	1
Increasing Variable Stiffness Actuator-Response Using an Electromagnetic Spring, Han-Ping Yang, Chau-Shin Jang, and Herman van der Kooij.....	7
Nonlinear Disturbance Observer Based T-S Fuzzy Logic Control of Pneumatic Artificial Muscles, Cheng Chen, Jian Huang, Dongrui Wu.....	12
Control of Compliant Joint Based on Magneto-rheological Fluid Coupling Transmission, Wei Wei, Shibo Cai, Guibin Bian, Guanjun Bao, Jianjun Yu, Dongling Yang, Libin Zhang.....	18
Design and Simulation of Intelligent Lifting System Based on Digital Hydraulic Cylinder, Lin Wang, Shengxiao Guan, Zhenfang Wu , Kai Wang , Yongqi Li , Xiaoming Li	24
Guaranteeing Preselected Tracking Control of Loaded Piezoelectric-actuated Micro-Positioning Platform, Zedong Hu, Ying Feng, Junjie Feng and Yuxia Yuan.....	30
Parameter Identification Based on PSO Algorithm for Piezoelectric Actuating System with Rate-dependent Prandtl-Ishlinskii Hysteresis Modeling Method, Ying Li, Ying Feng, Junjie Feng and Yueyue Liu.....	36
Position Control of Hydraulic Series Elastic Actuator with Parameter Self-Optimization, Haoran Zhong, Xinyu Li, Liang Gao, and Haozhen Dong.....	42

Wednesday, July 3, 2019

Regular Session (Award 1)

WeSH2T1: 14:00 - 16:00 **Osaka University, Sigma Hall**

Chairs: Jia Pan, University of Hong Kong, China

Long Chen, Sun Yat-sen University, China

A General Robotic Framework for Automated Cloth Assembly, Peigen Sun Zhe Hu Jia Pan	47
Semantic Segmentation via Structured Refined Prediction and Dual Global Priors, Long Chen, Wujing Zhan, Jiajie Liu, Wei Tian and Dongpu Cao.....	53

ColCOS_: A Multiple Pheromone Communication System for Swarm Robotics and Social Insects Research, Xuelong Sun, Tian Liu, Cheng Hu, Qinbing Fu and Shigang Yue.....	59
Evolving Humanoid Robot Motions Based on Gene Regulatory Network, Naoyuki Kawabata and Hitoshi Iba.....	67
Highly flexible pneumatic actuators, L. Fracczak, M. Nowak.....	75
A Wearable Robotic Glove based on Optical FMG Driven Controller, Julio Fajardo, Antonio Ribas Neto, Willian Silva, Matheus Gomes, Eric Fujiwara and Eric Rohmer.....	81
Model Predictive Control for Motion Planning of Quadrupedal Locomotion, Yapeng Shi, Pengfei Wang, Mantian Li, Xin Wang, Zhenyu Jiang and Zhibin Li.....	87
Intention and Engagement Recognition for Personalized Human-Robot Interaction, an integrated and Deep Learning approach, Suraj Prakash Pattar, Enrique Coronado, Liz Rincon Ardila, Gentiane Venture.....	93

Wednesday, July 3, 2019

Regular Session (Brain Interface)

WeSH2T2: 14:00 - 16:00 Osaka University, Seminar Room

Chairs: Chi Zhu, Maebashi Institute of Technology, Japan

Feng Duan, Nankai University, China

Development of A Non-Power Waist Assist Device and IEMG-Based Evaluation of Assist Effect, Zefeng Yan, Ansi Peng, Yong He, Xunju Ma, Can Wang and Xinyu Wu.....	99
A Multi-Gestures Recognition System Based on Less sEMG Sensors, Yikang Yang, Feng Duan, Member, Jia Ren, Zhenqiang Liu, Chi Zhu, Yewguan Soo, and Kyungryoul Mun	105
Role Adaptation and Force, Impedance Learning For Physical Human-Robot Interaction, Wei Bi, Xiaoyu Wu, Yueyue Liu and Zhijun Li.....	111
A Method for Arm Motions Classi_cation and A Lower-limb Exoskeleton Control Based on sEMG signals, Lu-Feng Zhang, Yue Ma, Can Wang, Zefeng Yan, Xinyu Wu.....	118
A Novel EEG Sleep Staging Method for Wearable Devices Based on Amplitude-time Mapping, Panfeng An, Weixin Si, Sirui Ding, Guotong Xue, Zhiyong Yuan.....	124
Wrist Motion Recognition by Using Electromyographic Signals, Jing Luo, Chenguang Yang, Chao Liu, Yuxia Yuan, Zhijun Li.....	130
FNIRS based brain-computer interface to determine whether motion task to achieve the ultimate goal, Qi Zhao , Chunguang Li, Jiacheng Xu and Hedian Jin.....	136
Control of the Robotic Leg Prostheses Based on a Neuromuscular Model, Ming Pi, Yuxia Yuan and Zhijun Li.....	141

Wednesday, July 3, 2019

Regular Session (Algorithm 1)

WeSH2T3: 14:00 - 16:00 Osaka University, G417

Chairs: Qinghua Huang, Northwestern Polytechnical University, China

Jian Huang, Huazhong University of Science and Technology, China

Bi-Phase evolutionary biclustering algorithm with the NSGA-II algorithm*	
Zhoufan Kong, Qinghua Huang, and Xuelong Li,.....	146
Research on Network Traffic Anomaly Detection Based on StreamCharacteristics in Unsaturated Link,	
Jun Han, Jia You, Shufang Zhang ,Qingzhao Li.....	150
Design and Performance Evaluation of a Particle Filter-based Algorithm for Smoke Plume Path Tracking	
Xinxing Chen, Jian Huang.....	156
An Approximation Algorithm for Relay Node Placement in Singled-Tiered Wireless Sensor Networks*	
Gang Liu, Kezhong Lu, and Jianqiang Li.....	162
Adaptive Gravitational Search Algorithm-based Compensator for Control Valve Stiction,	
Sami El-Ferik, Muideen Adegoke, Mustafa Al-Naser and Yokogawa Saudi Arabia.....	168

Wednesday, July 3, 2019

Regular Session (Control 1)

WeSH2T4: 14:00 - 16:00 Osaka University, G419

Chairs: Zhaojie Ju, the University of Portsmouth, UK

Yu Liu, South China University of Technology, China

Broad Fuzzy Neural Control Using Impedance Learning	
Haohui Huang, Chenguang Yang, Zhaojie Ju, Yuxia Yuan and Zhijun Li.....	173
LMI-based Global Sliding Mode Control Scheme for Time-delayed Chaotic Systems with Input Nonlinearity	
Saleh Mobayen, Afef Fekih, Mona Afshari.....	179
Adaptive Output Feedback Control of a Belt System,	
Gang He, Fang Guo and Yu Liu.....	185
Anti-windup control of a flexible string system,	
Jianing Zhang, Yonghao Ma, Zhijia Zhao and Fujie Wang.....	191
Adaptive Backstepping-Based Terminal Sliding Mode Control for Hydro-Turbine Governor Control Design	
Considering Energy Losses Minimization,	
Yu-Chen Lin†, Wen-Hui Chen, Jian-Zhang Peng.....	196

Wednesday, July 3, 2019

Regular Session (Grasp and Manipulation 1)

WeSH3T1: 16:30 - 18:30 **Osaka University, Sigma Hall**

Chairs: Ribas Neto, Department of Comp. Eng. and Industrial Autom, UNICAMP (BR)

Hayato Hagiwara, Meisei University, Japan

Visually Guided Extrinsic Manipulation for Assembly Tasks

Mohamed Raessa, Damien Petit, Weiwei Wan¹, and Kensuke Harada¹202

Monitoring and Control of Position and Attitude of Flexible Manipulator with Three Degrees of Freedom,

Bangchu Yang, Wenbiao Wang, Hailiang Meng, Weiwei Wan, and Guanjin Bao208

Identification of objects using convolutional neural network by a manipulator for a disaster rescue robot in unstable environment ,

H. Hagiwara, and Y. Yamazaki214

Tracking Control of Two DOF Manipulator Based on LADRC,

Wenchao Zheng, Mou Chen, Ronggang Zhu and Rong Mei 220

An Intelligent Trajectory Optimization System and Application in Car-door Welding Line,

Jinjun Rao, Yaxing Wang, Longkun Dai, Liqing Wang, Dong Gu226

Robust Control for a Planar Parallel (3-PPR) Manipulator based on Udwadia-Kalaba Theory,

Yuanjie Xian, Kang Huang, Shengchao Zhen and Hao Sun232

A Three-Dimensional Quasi-static Ultrasound Strain Imaging System Using A 6-DoF Robotic Arm,

Jianan Yao, Qinghua Huang*, Xuelong Li238

A Hybrid Control Strategy for Tendon-actuated Robotic Glove and Functional Electrical Stimulation – A Preliminary Study,

Antonio Ribas Neto, Julio Fajardo, Victor Ferman, Eric Fujiwara and Eric Rohmer244

Wednesday, July 3, 2019

Regular Session (Actuators 2 & Parallel Robots)

WeSH3T2: 16:30 - 18:30 **Osaka University, Seminar Room**

Chairs: Shengchao Zhen, Hefei University of Technology, China

Onur Ersoy, Ozyegin University, Istanbul

Robust Precision Motion Control of Linear Motors with Dynamic Uncertain Compensation

Xiaoli Liu, Chuanyang Li, Han Zhao, Shengchao Zhen, and Hao Sun250

A Fluid-Actuated Driving Mechanism for Rolling Robots, Seyed Amir Tafrishi, Esmaei Esmaeilzadeh Mikhail Svinin and Motoji Yamamoto.....	256
Dynamic Modeling and Verification of Continuum Robot Based on Cable Drive * Jie Zhang, Haijun Peng, Wenya Zhou, Jinzhao Yang, Zhigang Wu.....	262
A Novel Smart Fault-Diagnosis Method with Procedures of Feature Productions and Extractions Shih-Yu Li, IEEE Member, Kai-Ren Gu, Chin-Sheng Chen*.....	268
Design and Kinematics of a 5-DOF Parallel Robot for Beating Heart Surgery Onur Ersoy, Mehmet C. Yildirim, Awais Ahmad, Osman D. Yirmibesoglu, Nazli Koroglu, and Ozkan Bebek	274
Auto-Calibration and Online-Adjustment of the Kinematic Uncertainties for Redundantly Actuated Cable- Driven Parallel Robots, Bin Zhang, Feng Zhou, Weiwei Shang and Shuang Cong.....	280
Dynamic Modeling and Simulation of Underwater Parallel Robot* Deng Fei, Wang Yuhao, Dong Haijun, Liu Wei, Xiong Wei, Zhou Jianglei.....	286
Redundant reconfigurable Delta-type parallel robot Albert L. Balmaceda-Santamar'ia and Ariel E. Chavez-Toru~no.....	292

Wednesday, July 3, 2019

Regular Session (Rehability)

WeSH3T3: 16:30 - 18:30 **Osaka University, G417**

Chairs: Hieyong Jeong, Osaka University, Japan

Grantham K.H. Pang, The University of Hong Kong, China

Application of the Udwadia-Kalaba approach to tracking control of lower limb rehabilitation robot, Feifei Qin, Han Zhao, and Shengchao Zhen.....	298
Development of Four-Bar Linkage Mechanism on Chair System for Assisting Sit-to-Stand Movement Hieyong Jeong, An Guo, Tianyi Wang, Myoungjae Jun, Yuko Ohno.....	303
Robust Finite-Time Convergence Control for a Knee Rehabilitation Robot, Renyu Yang, Jie Zhou, Qianqian Yang, and Rong Song.....	309
Bionic chair system with pressure sensing and adjustment, Grantham K.H. Pang, Bingjing Wang, and Enid Kwong.....	313
Plugging Brake System as a Hill Descend Control for Electric Powered Wheelchair: Experimental Analysis	

S.M. Asyraf, P.M Heerwan, I.M. Zulhilmi, and I.M. Izhar.....	319
--	-----

Wednesday, July 3, 2019

Regular Session (Mobile Robots 1)

WeSH3T4: 16:30 - 18:30 Osaka University, G419

Chairs: Jianjun Yuan, Shanghai University, China

Junjun Wu, Foshan University, China

Real-Time Multi-Modal People Detection and Tracking of Mobile Robots with A RGB-D Sensor *	
Wenchao Huang, Bo Zhou, Kun Qian, Fang Fang, Xudong Ma.....	325
Experimental study and analysis of the wheel's stiffness characteristics for China's Mars exploration rovers, Baofeng Yuan, Zhengyin Wang, Fengtian Lv, Huaiguang Yang, Liang Ding, Haibo Gao, and Xingguo Song	331
Design and Implementation of an Unmanned Express Delivery Vehicle	
Zhaohan Yuan, Jianjun Yuan, Bingjie Yang, Hanyue Lei.....	336
Robust Loop-Closure Detection with a Learned Illumination Invariant Representation for Robot vSLAM, Shilang Chen, Junjun Wu, Yanran Wang, Lin Zhou, Qinghua Lu, Yunzhi Zhang.....	342
Motion Control of Non-Holonomic Constrained Mobile Robot Using Deep Reinforcement Learning	
Rui Gao, Xueshan Gao, Peng Liang, Feng Han, Bingqing Lan, Jingye Li, Jian Li, and Simin Li.....	348
Optimal Control of a Mobile Robot Describing Minimum-Length Paths with Forward and Backward Motion	
Luis Velasco Mellado, Antonio Morán Cárdenas, Francisco Cuellar Córdova.....	354

Thursday, July 4, 2019

Regular Session (Human Robot Interaction 1)

ThSM1T2: 11:00 - 13:00 Osaka University, Seminar Room

Chairs: Gentiane Venture, Tokyo University of Agriculture and Technology

Chenguang Yang, University of the West of England

Robots Meet Children, Development of Semi-Autonomous Control Systems for Children-Robot Interaction in the Wild, Enrique Coronado, Xela Indurkha, Gentiane Venture.....	360
A Gesture approach of Interaction with Mechatronic Systems, Apostolos Tsagaris.....	366
An Incremental Feature Set Refinement in a Programming by Demonstration Scenario	

Hoai Luu-Duc and Jun Miura.....	372
DEVI: Open-source Human-Robot Interface for Interactive Receptionist Systems Ramesha Karunasena ¹ , Piumi Sandarenu, Madushi Pinto, Achala Athukorala, Ranga Rodrigo and Peshala Jayasekara.....	378
Robot Teleoperation System Based on Mixed Reality Congyuan Liang, Chao Liu, Xiaofeng Liu, Long Cheng, Chenguang Yang.....	384
Dynamic Gesture Recognition Using Inertial Sensors-based Data Gloves Bin Fang, Qin Lv, Jianhua Shan, Fuchun Sun, Huaping Liu, Di Guo, Yize Zhao.....	390

Thursday, July 4, 2019

Regular Session (Award 2)

ThSH2T1: 14:00 - 16:00 Osaka University, Sigma Hall

Chairs: Xiangui Xu, Wuhan University of Technology, China

Zhihao Shen, Japan Advanced Institute of Science and Technology, Japan

Study on human ankle joint biomechanical dynamics during upright standing 'Sandbag-disturbance' push-recovery, Xiangui Xu, Renjie Xiong, Biwei Tang, Shenpei Zhou and Muye Pang.....	396
Nonverbal Behavior Cue for Recognizing Human Personality Traits in Human-Robot Social Interaction Zhihao Shen, Armagan Elibol, and Nak Young Chong.....	402
A Predictive Control for Pneumatic Muscle Actuators based Exoskeleton by Using MIMO Echo State Network, Yu Cao, Jian Huang_, Xikai Tu.....	408
Whole-body Control of Non-holonomic Mobile Manipulator Based on Hierarchical Quadratic Programming and Continuous Task Transition, Sanghyun Kim, Keunwoo Jang, Suhan Park, Yisoo Lee, Sang Yup Lee, and Jaeheung Park.....	414
Development of A Parallel-elastic Robot Leg for Loaded Jumping Zewen He, Fei Meng, Xuxiao Fan, Ru Kang, Shengkai Liu, Huaxin Liu, Zhangguo Yu, Mingyue Qin, Aiguo Ming and Qiang Huang.....	420
The Design and Development of an Anthropomorphic Worm-Gear Driven Robotic Hand: BIT-JOCKO, Changjin Wang and Yao Sun, Jiafeng Xu, Xingdong Liu, Xinbing Zhou, Xiaopeng Chen.....	426
Hybrid-Disturbance-Observer-Based Nonlinear Control for Characteristic Model with Applications to Bionic Pneumatic Actuator System Yuan Yuan, Lei Cheng and Zidong Wang.....	432
Experimental testing on blade load mitigation of wind turbines with individual blade pitch control under wind shear, Hiroki Suemoto, Naoyuki Hara, Yasunori Nihei and Keiji Konishi.....	438

Thursday, July 4, 2019

Regular Session (Human Robot Interaction 2 & Exoskeleton 1)

ThSH2T2: 14:00 - 16:00 Osaka University, Seminar Room

Chairs: Shijie Guo, Hebei University of Technology, China

Rui Song, Shandong University, China

Passivity-Based Stable Human-Robot Cooperation with Variable Admittance Control Pengfei Cao, Yahui Gan, Jinjun Duan and Xianzhong Dai.....	446
Path Planning of Robot-assisted Osteotomy in Orthognathic Surgery Lijuan Wang, Qianqian Li, He Zhao, Hongxiang Yuan, Rui Song*.....	452
Array-less touch position identification based on a flexible capacitive tactile sensor for human-robot interactions, Jixiao Liu, Na Liu, Peng Wang, Manfei Wang, Shijie Guo.....	458
Auto Cable Pretension Method for Soft Exosuit Based on Gait Trajectory Prediction Network Kai Fang ¹ , Xinyu Wu ¹ , Chunjie Chen, Yida Liu.....	463
Human Cooperative Control of Lower-limb Robotic Exoskeleton Based on Region Function Kuankuan Zhao, Yuxia Yuan and Zhijun Li.....	469
The Prosthetic Arm: A Dramatic Improvement For The Limb Amputation From The Humerus Guoxin Li, Yueyue Liu, and Zhijun Li.....	475
Research on Trajectory Tracking Control of Lower Extremity Exoskeleton Robot, Pengfei Zhang, Yifeng Guo, Jian Li, Xueshan Gao, Simin Li, Dingji Luo, Mingda Miao and Peichao Cong.....	481

Thursday, July 4, 2019

Regular Session (Algorithm 2)

ThSH2T3: 14:00 - 16:00 Osaka University, G417

Chairs: Hui Cao, Xi'an Jiaotong University, China

Mou Chen, Nanjing University of Aeronautics and Astronautics, China

Dynamic Analysis of Access Control Based on Partially Observable Markov Decision Process for Media Distribution Network, Jun Han, Jia You, ShuFang Zhang, Qingzhao Li.....	486
Data Fusion of Air Combat Based on Reinforcement Learning Tongle Zhou, Mou Chen and Jie Zou.....	492

Unsupervised classification of high-dimension and low-sample data with variational autoencoder based dimensionality reduction Mohammad Sultan Mahmud and Xianghua Fu.....	498
A Gas Analysis Model with Uninformative Variable Elimination Using Nonlinearity Compensation by RBFNN, Panpan Zhang, Yanbin Zhang, Hui Cao_, Zonglin Ye, Dapeng Yan, Shuangsi Xue.....	504

Thursday, July 4, 2019

Regular Session (Control 2)

ThSH2T4: 14:00 - 16:00 Osaka University, G419

**Chairs: Zhengxiong Liu, Northwestern Polytechnical University, China
Yongchun Fang, Nankai University, China**

A Robust Control Approach for Double-Pendulum Overhead Cranes With Unknown Disturbances Yiming Wu, Ning Sun, Xiao Liang, Yongchun Fang, and Xin Xin.....	510
Study on Prediction of Power Allocation for the Double-Wheel Trench Cutter Control System Based on Extreme Learning Machine Method, Haiyan Qiang, Wanli Li, Guanyuan Li, Yuchen Hu and Yougang Sun.....	516
An optimal Bezier transition algorithm for high-speed machining of linear tool paths Tzyy-Chyang Lu and Shyh-Leh Chen.....	521
Modeling and Forecasting of Time Delay about the Space Robot Teleoperation System Haifei Chen, Panfeng Huang, Zhengxiong Liu.....	529

Thursday, July 4, 2019

Regular Session (Grasp and Manipulation 2)

ThSH3T1: 16:30 - 18:30 Osaka University, Sigma Hall

**Chairs: Ying Feng, South China University of Technology, China
Sihang Zhang , University of Science and Technology of China, China**

Design and Analysis of Multiple Independent Outputs Time-sharing Driving System for a Flexible Robot Arm Chao Luo, Wenzeng Zhang.....	535
Adaptive control of manipulators by a contraction analysis approach* Sihang Zhang, Haibo Ji and Yu Wang.....	540
The Optimal Solution for Base Frame Installation of Dual-arm Robot Jinjun Duan, Yahui Gan_, Pengfei Cao and Xianzhong Dai.....	546

Biomechtronic Design of a Supernumerary Robotic Limbs for Industrial Assembly Cuichao Xu, Yueyue Liu and Zhijun Li.....	553
Mechanisms and Design of a Humanoid Robot for Two-handed Manipulation Yueyue Liu, Junliang Huang, Ying Feng, and Zhijun Li.....	559
Adaptive Robust Stabilization of a Flexible Timoshenko Manipulator Jianing Zhang, Yongjian Liao, Runcheng Zhang, Yiming Liu, Yonghao Ma and Zhijia Zhao.....	565

Thursday, July 4, 2019

Regular Session (Exoskeleton 2)

ThSH3T2: 16:30 - 18:30 Osaka University, Seminar Room

Chairs: Ao Peng, Xiamen University, China

Kui Xiang ,Wuhan University of Technology, China

Human-in-the-loop optimization control for the ankle exoskeleton during walking based on iterative learning and particle swarm optimization algorithm He Yan, Biwei Tang, Kui Xiang and Muye Pang.....	570
Adaptive Human-Robot Interaction Control of the Lower Extremity Robotic Exoskeleton with Magnetorheological Actuators* Jiajun Xu, Linsen Xu, Jinfu Liu, Shouqi Chen, Chanchan Xu, Yang Liu, Jian Chen.....	575
A Novel Control Method of A Soft Exosuit with Plantar Pressure Sensors Hongyue Hu, Kai Fang, Huanyi Guan, Xinyu Wu, Chunjie Chen.....	581
Attitude Tracking based on Sequential Geomagnetic Observations Ye Tian, Wen Fu, Ao Peng*	587
The compensatory strategies among lower limb muscles and its effect on metabolic cost when hip assisted by passive elastic exotendon Tongtong Wei, Wenbin Chen*, Shuang Wu, Tiancheng Zhou, and Caihua Xiong.....	593
Design and Development of A Wearable Lower Limb Exoskeleton Robot* Ling Luo, Yuxia Yuan and Zhijun Li.....	599

Thursday, July 4, 2019

Regular Session (Drone)

ThSH3T3: 16:30 - 18:30 Osaka University, G417

Chairs: Yimin Zhou, Shenzhen Institutes of Advanced Technology,Chinese Academy of Sciences, China

Wei He, University of Science and Technology Beijing, China

Relative Pose Neural Network Control of Autonomous Space Proximity Missions*	
Liang Sun, Yuanji Liu, and Wei He.....	605
Pose Estimation for Multicopters Based on Off-Board Multiple Cameras	
Qiang Fu, Xinxing Mu, Wei He.....	611
An anti-occlusion tracking system for UAV imagery based on Discriminative Scale Space Tracker and Optical Flow	
Yimin Zhou and Qingtian Wu.....	616
A GAN-based Active Terrain Mapping for Collaborative Air-Ground Robotic System	
Jie Chen, Zhuangzhuang Chen, Min Fang, Jianqiang Li, Zhong Ming and Shulan Wang.....	622
Dynamics Modeling and Analysis for Unmanned Quadrotor Transportation Systems with Double-Pendulum Swing Effects	
Xiao Liang, He Lin, Yongchun Fang, Peng Zhang, Chenping Li, Xingang Zhao.....	628

Thursday, July 4, 2019

Regular Session (Application)

ThSH3T4: 16:30 - 18:30 Osaka University, G419

Chairs: Jun Wang, Hefei University, China

Liang DU, Ritsumeikan University, Japan

Control Strategy of Energy-Saving Lamp for Rural Area Applications in Indonesia	
B. Halimi, Member, IEEE, A. Purwadi, C. Firmansyah, and A. S. Sampeallo.....	634
Running State Prediction and Evaluation of Power Transformers	
Lingming Kong, Le Luan, Kai Zhou, Chao Chen, Jinmei Chen, Zhuzhu Wang.....	639
A teleoperated robotic hot stick platform for the overhead live powerline maintenance tasks	
Liang Du, Weijun Zhang.....	643
Visually Interpretable Profile Extraction with an Autoencoder for Health Monitoring of Industrial Systems	
Miguel Mart´inez-Garc´ıa, Yu Zhang, Jiafu Wan and Jason McGinty.....	649
Research & Implementation of Multitasking Lego Robots*	
Jun Wang, Xiaodong Du, and Hao Wang.....	655

Friday, July 5, 2019

Regular Session(Grasp and Manipulation 4)

FrSM1T2: 11:00- 13:00 Osaka University, Seminar Room

Chairs: Rongxin Cui, Northwestern Polytechnical University, China

Mingxing Lin, Shandong University, China

Global Neural Learning Finite-time Control of Robot Manipulators with Guaranteed Transient Tracking Performance Lepeng Chen, Rongxin Cui*, Chenguang Yang, Weisheng Yan.....	660
Research on 6R Industrial Robot Intersection Curve Welding Control and 3D Simulation Technology Xiao-Bin Song Xin-Cheng Tian.....	666
Boundary Vibration Control of a Flexible Manipulator with External Disturbances Xiaohui Zheng, Gang He and Yu Liu.....	672
Adaptive Inverse Kinematics of a 9-DOF Surgical Robot for Effective Manipulation Begum Sunal, Erhan Oztop, and Ozkan Bebek.....	678
Design of An Articulated-tracked Mobile Robot with Two Swing Arms Xu Han, Mingxing Lin*, Xiaojian Wu, Junyu Yang.....	684
Sampling of 3DOF Robot Manipulator Joint-Limits for Haptic Feedback Kevin Huang, Yun-Hsuan Su, Mahmoud Khalil, Daniel Melesse, Rahul Mitra.....	690
A One-Stage Control Strategy for Planar Underactuated Manipulators Jundong Wu, Yawu Wang and Wenjun Ye.....	697

Friday, July 5, 2019

Regular Session (Grasp and Manipulation 3)

FrSH2T1: 14:00 - 16:00 Osaka University, Sigma Hall

Chairs: Satoshi Makita, Sasebo College, Japan

Dihui Deng, Shenzhen University, China

Electromyograph Classification of Six Hand-Actions for Twisting Manipulation, Satoshi Makita and Hironobu Hashiguchi.....	702
Design and Analysis of a Parallel and Self-adaptive Finger with Pin-array Structure Hong Fu, Wenzeng Zhang.....	708
A Three-joint Coupled, Parallel and Self-adaptive Robot Hand Siyun Liu and Wenzeng Zhang.....	714
Model based Reinforcement Learning for Robot Grasping Trajectory Generation Hongxiang Xue, Shuhuan Wen, Chao Yang, Huaping Liu.....	720
CSB-II Hand: A Universal Griper with Circular Sliding Bars Bo Liang and Wenzeng Zhang.....	727
A Novel Coupled and Self-adaptive Anthropomorphic Robot Finger with a Dual-oblique-Belt Mechanism Yinkai Dong and Wenzeng Zhang.....	732

Research on Virtual Reality Arm Motion Capture and Recognition Shubin Cai, Dihui Deng, Jianqiang Li, Jinchun Wen, Chaoqin Chen, and Zhong Ming.....	738
--	-----

Research of human-robot handshakes under variable stiffness conditions Kejia Dai, Yage Liu, Manabu Okui, Rie Nishihama, Taro Nakamura.....	744
---	-----

Friday, July 5, 2019

Regular Session (Biomimetics & Multileg Robots)

FrSH2T2: 14:00 - 16:00 Osaka University, Seminar Room

**Chairs: Huaping Liu, Tsinghua University, China
Huayan Pu, Shanghai University, China**

path tracking of snake-like robot based on neural network identifier* Jun Wang, Xiaolu Qiu, Zhongzhen Liu, Zhiqin Cai, Zhigang Wu and Ying Feng.....	750
Design and Modeling an Elongatable Robotic Snake towards Augmented Serpentine Gait, Piaopiao Li, Yi Sun, Yang Yang, Chuanguo Li, Huayan Pu, Jun Luo, Shaorong Xie.....	756
Stable Motion Control Scheme Based on Foot-Force Distribution for a Large-Scale Hexapod Robot Chen Chen, Wei Guo, Penglong Zheng, Fusheng Zha, Xin Wang, Zhenyu Jiang.....	763
Fast gait study of hexapod robot based on SimMechanics* Gang Liu, Jun Wang.....	769
Analysis of Joint Torque under Single Movement Cycle of Underwater Legged Robot Guanyu Wang, Kunpeng Wang, Liang Ding, Haibo Gao, Haitao Yu, Zongquan Deng.....	773
Towards Foot-Drop Correction using a Simulation of Bio-inspired Robotic Legs* Omer Eldirdiry, Riadh Zaier, Issam Bahadur, Amur Al-Yahmedi, Ammar Boudaka.....	780
Online Multi-modal Imitation Learning via Lifelong Intention Encoding Songhao Piao, Yue Huang, Huaping Liu.....	786

Friday, July 5, 2019

Regular Session (Control 3)

FrSH2T3: 14:00 - 16:00 Osaka University, G417

Chairs: Jinjun Rao, Shanghai University, China

Shouxu Zhang, Northwestern Polytechnical University, China

On the Stability of Maxwell Model based Impedance Control and Cartesian Admittance Control Implementation Le Fu, Rui Wu and Jie Zhao.....	793
Observer-Based Distributed Time-Varying Group Formation Control for Heterogeneous Linear Systems under Directed Topology	

Chongjian Zhou, Man Li, Weiming Fu, Yu Kang and Jiahu Qin.....	799
Tuning Method for Electro-hydraulic Servo System's PID Controller Based on Fibonacci-search Algorithm Jinjun Rao, Longkun Dai, Yaxing Wang.....	805
A control method of CSPA system without considering delay time Hao Tang, Li Quan, Fei Dai.....	810
Self-Triggered Tracking Control for Continuous-Time MIMO Nonlinear Systems Weisheng Yan, Xinxin Guo, Shouxu Zhang and Peng Cui.....	816
A Compositionality Assembled Model for Learning and Recognizing Emotion from Bodily Expression Junpei Zhong and Chenguang Yang.....	821

Friday, July 5, 2019

Regular Session (Vision)

FrSH2T4: 14:00 - 16:00 Osaka University, G419

Chairs: Linhua Jiang, Shanghai for Science and Technology, China

Qinghua Huang, Northwestern Polytechnical University, China

Multi-object Detection Method based on YOLO and ResNet Hybrid Networks Zhenyu Lu, Jia Lu, Quanbo Ge and Tianming Zhan.....	827
Dog face recognition algorithm based on DC-Attention-SSD neural network Peng Wang, Quanbo Ge, Zhenyu Lu and Tianming Zhan.....	833
Attention-based Visual-Audio Fusion for Video Caption Generation Ningning Guo, Huaping Liu and Linhua Jiang.....	839
Classification of liver tumors with CEUS based on 3D-CNN* Fengxin Pan, Qinghua Huang*, Xuelong Li.....	845
Robust Vehicle Detection in Aerial Images Based on Image Spatial Pyramid Detection Model Xianghui Li and Xinde Li.....	850
A Detection and Recognition Method of Encircled Coded Targets on External Stores Model Lei Ren, XiuCheng Dong*, Yu Zeng and Fan Zhang.....	856

Friday, July 5, 2019

Regular Session (Humanoids)

FrSH3T1: 16:30 - 18:30 Osaka University, Sigma Hall

Chairs: Wentao Sheng, Harbin Institute of Technology, China

Gui-Bin Bian, Institute of Automation, Chinese Academy of Sciences, China

An Improved Rocker-based Inverted Pendulum Walk Model for Human Gait* Qian Xiang, Kazunobu Hashimoto**, Lei Sun, Jianjun Zhang, and Shijie Guo.....	862
The step length able-bodied human tend to choose during stable straight forward level walking	

Shiyin Qiu, Wei Guo, yFusheng Zha, Jing Deng, yXin Wang, and Feng Xu.....	868
Path planning method of a humanoid robot based on a home Network Jiayuan Yu1, Lei Zhang, Gui-Bin Bian, Chenxi Liu.....	875
RPBP: Rapid-Prototyped Remote-Brain BiPed with 3D Perception Marsette Vona* and Dimitrios Kanoulas*.....	881
Target Location and Gait Planning for Humanoid Robot Climbing Stairs Huayan Zhang, Lei Zhang, Fei Yuan, Gui-Bin Bian, Shan Xin.....	888
Comparison of two Models Used to Describe the Ankle Torque in Response to Functional Electrical Stimulation Yingqi Li, Manxu Zheng, Qianqian Yang, and Rong Song.....	894
The Effectiveness of Gait Event Detection Based on Absolute Shank Angular Velocity in Turning Wentao Sheng, Wei Guo, Fusheng Zha, Zhenyu Jiang, Xin Wang and Huaidong Zhang.....	899

Friday, July 5, 2019

Regular Regular Session (Vehicles)

FrSH3T2: 16:30 - 18:30 Osaka University, Seminar Room

Chairs: Hongbo Gao, University of Science and Technology of China, China

Ming Yue, Dalian University of Technology, China

Learning driving behavior for autonomous vehicles using deep learning based methods * Zhenyu Wu, Member, IEEE, Chuanyi Li, Jiaying Chen, and Hongbo Gao.....	905
Integrated navigation approaches of vehicle aided by the strapdown celestial angles* Hongmei Chen, Huijuan Zhang, and Hongbo Gao.....	911
Safety Oriented State Transitions in Level 3 Automated Driving Systems: A General Framework Chao Huang, Yahui Liu, Liang Li, Zheng Chen.....	918
Fast Trajectory Planning for Off-Road Autonomous Driving with a Spatiotemporal Tunnel and Numerical Optimal Control Approach * Bai Li, and Youmin Zhang.....	924
Driver-automation cooperative steering control system in avoiding obstacle for road vehicles* Hongzhi Zhang, Ming Yue, Lu Yang.....	930
Real-time Robust Multi-lane Detection and Tracking in Challenging Urban Scenarios Hui Zhou, Handuo Zhang, Karunasekera Hasith and Han Wang.....	936
Learning From Actor-Critic Algorithm With Application to Asymmetric Tailored Performance Tracking Control of Underactuated Surface Xg lerg Ruiqi Mao, Shouxu Zhang, Yintao Wang... (00000000).....	942

Friday, July 5, 2019

Regular Session (Mobile Robots 2 & Multi-Robot Cooperation)

FrSH3T3: 16:30 - 18:30 **Osaka University, G417**

Chairs: Zhi-Hong Guan, Huazhong University of Science and Technology, China
Zhong-Hua Pang, North China University of Technology, China

Effects of Wheel Grouser Angle of Attack on Simulated Robot Wheel Performance on Soft Sand with High Slip Condition Ahmad Najmuddin Ibrahim, Siti Suhaila Sabarudin, and Yasuhiro Fukuoka.....	948
Topology Graph Pruning for Optical Mapping Methods using Edge Betweenness Centrality Armagan Elibol and Nak-Young Chong.....	954
Amphibious Wheels with a Passive Slip Mechanism for Transformation* Aditya Vijayachandra, Chandykunju Alex, Michael Mathews and Afsal A. Sathar.....	960
The Research on Fluid Properties with Spanwise- Wall Oscillation by LES WALE Model Haijun Dong, Yongtian Zhang, Fei Deng, Wei Liu.....	966
Formation Tracking of Heterogeneous UGV-UAV Systems with Switching Directed Topologies* Jiao-Lin Shi, Bin Hu, Long Chen, Ding-Xue Zhang, Ding-Xin He, Jian Huang, and Zhi-Hong Guan.....	970
Observer-Based Cooperative Output Tracking Control of Linear Multi-Agent Systems Zhong-Hua Pang and Wencheng Luo.....	976
Fixed-time consensus for leader-follower nonlinear multi-agent systems with disturbance Ya Liu, Panfeng Huang, Fan Zhang.....	981

Friday, July 5, 2019

Regular Session (Control 4)

FrSH3T4: 16:30 - 18:30 **Osaka University, G419**

Chairs: Yu Liu, South China University of Technology, China

Mingming Qiu, Hefei University of Technology, China

Multi-region System Modelling by using Genetic Programming to Extract Rule Consequent Functions in a TSK Fuzzy System Yu Zhang, Miguel Martínez-García, José R. Serrano-Cruz and Anthony Latimer.....	987
Vibration abatement design of an Euler-Bernoulli beam via boundary iterative learning control Qiongyao Zhang, Gang He and Yu Liu.....	993
Fifth order trajectory planning for reducing residual vibration* Yi Fang, Jie Hu, Quanquan Shao and Jin Qi.....	999
Robust Control of PMSM Speed Synchronization Based on Lyapunov Approach Yan Zhang, Han Zhao, Mingming Qiu and Feifei Qin.....	1005
Adaptive Control of a Class of Nonlinear Systems with Unknown Prandtl-Ishlinskii Hysteresis Wenjun Ye, Farhad Aghili and Jundong Wu.....	1010
Simultaneous Localization and Mapping for Mobile Robots Using Stereo Vision Camera Junliang Huang, Yueyue Liu, Yuxia Yuan and Zhijun Li.....	1016