

**2020 10th Institute of Electrical
and Electronics Engineers
International Conference on
Cyber Technology in
Automation, Control, and
Intelligent Systems (CYBER 2020)**

Xi'an, China

10 – 13 October 2020



IEEE Catalog Number: CFP20CYB-POD
ISBN: 978-1-7281-9011-2

**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:	CFP20CYB-POD
ISBN (Print-On-Demand):	978-1-7281-9011-2
ISBN (Online):	978-1-7281-9010-5
ISSN:	2379-7711

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

SuA1: Best Paper Session 1

A Flexible Force Tactile Sensor Array	1
<i>Kai He, Liang Zhao, Peng Yu, Imad H. Elhajj, Ning Xi, Lianqing Liu</i>	
Structure Design and Nonlinear Control of a Precision Rotating Stage	7
<i>Hao Wang, Yuqian liu, Lina Hao, Jiaming Chen</i>	
Contextual and Multi-Scale Feature Fusion Network for Traffic Sign Detection	13
<i>Zhang Wei, Wang Qiang, Fan Huijie, Tang Yandong</i>	
Direct Inverse Hysteresis Compensation of a Pneumatic Artificial Muscles Actuated Delta Mechanism	18
<i>pengxiu geng, Yanding Qin, Liangjian Zhong, Feng Qu, Dongyang Bie, Jianda Han</i>	
Wavelet-Based Electromyographic Feature Selection Method for Real-Time Ankle Movement Recognition	24
<i>Wenzhou Li, Guangzhong Cao, Yulong Wang, Xing Lyu</i>	

SuA2: Robot Control and Planning

Experimental Analysis of the Performance of a Hexapod Robot based on the Dynamic Parameters	31
<i>Muhammad Affan Arif, Aibin Zhu, Han Mao, Pengcheng Zhu, Jiyuan Song, Yao Tu, Huang Shen</i>	
Kinematic Analysis Of Ophthalmic Surgical Robot	37
<i>Ning Wang, Xiaodong Zhang, Hongbing Zhang, Mingyang Li, Xiaojing Feng</i>	
Novel Objects Detection for Robotics Grasp Planning	43
<i>Shengchang Zhang, Zheng Nie, Jindong Tan</i>	
Research on Robust Control Method of Hybrid Energy Storage System under Multiple Index Constraints	49
<i>Shaoyu Feng, Zhimin Feng, Yunfei Shi, Xiaofeng Liu, Longfei Wang</i>	
Design and Experimental Study of Bidirectional Deformable Hexapod Robot	55
<i>Pengcheng Zhu, Aibin Zhu, Muhammad Affan Arif, Han Maori, Zhifu Guo</i>	

SuB1: Best Paper Session 2

Terrain Classification for Bipedal Robots: A Comparative Study	61
<i>Zahraa Awad, Raja Akel, Noel Maalouf, Imad Elhajj</i>	
Research on Intuitive Tele-operation Motion Mapping Algorithm for Omnidirectional Mobile Heterogeneous Slave Arm System *	67
<i>Haiyang Deng, Daoxiong Gong, Jianjun Yu, Guoyu Zuo</i>	
Extended High-gain Observer Based Output Feedback Linearization of Robot Manipulator	73
<i>Gengliang Chen, Lai Wei</i>	
Path Generation Method for Robotic Blades Grinding Based on Predictive Control and Extended Kalman Filter	80
<i>Jiuming Guo, Dan Wu, Ken Chen</i>	
Analysis method of importance degree of hobbing process parameters	86
<i>You Guo, Ping Yan, Dayuan Wu, Han Zhou, Runzhong Yi</i>	

SuB2: Sensing and Recognition

Moving object detection for camera pose estimation in dynamic environments	93
<i>xiaowei zhang, yeping peng, mingbin yang, guangzhong cao, chao wu</i>	
Building 3D Map Based on Monte Carlo Localization and Feature Extraction	99
<i>Zhun Fan, Ying Chen, Chong Li</i>	
A Simultaneous Object Detection and Component Segmentation Approach Based on Mask R-CNN	105
<i>Deshuai Zheng, Jin Yan, Yong Liu, xue tao</i>	

Smart Morphological Change Sensing System using an Automatic Non-destructive Method for Soybean Flower Bud Differentiation	111
<i>Zhiyu Ma, Dailie Wang, Lixue Zhu, Yinghui Mu, Hongyu Wei, Hongli Liu, Xuan Chu</i>	
Analysis of Nerve Excitation for TENS under Point Current Source	120
<i>Zhiming Jiang, Xiaodong Zhang, Teng Zhang, Yi Zhang, Yachun Wang</i>	
SuC1: Bio-inspired Systems	
Electronic skin based on flexible capacitor	124
<i>Yinghan Wang, Qinshu Chen, Yuchen Li, Diansheng Chen, Sitong Lu</i>	
Automatic Annotation Approach for Prohibited Item in X-ray Image based on PANet	130
<i>Bowen Ma, Tong Jia</i>	
Experimental Study of Lower Extremity Exoskeleton Robot	134
<i>Hongyun Jia, Shuopeng Wang, Bohong Zhang, Lina Hao</i>	
Diversity amplification and data generation of Chinese Sign Language based on Generative Adversarial Network	139
<i>Fei WANG, Zhen Zeng, Shizhuo Sun, Yanjun Liu</i>	
Lightweight Design and Modal Analysis of Calf Structure of Hydraulic Biped Robot	146
<i>Jianrui Zhang, Zhaohui Yuan, Weidong Yuan, Sheng Dong</i>	
SuC2: Mechanism Design and Analysis	
A Design of Lower Limb Rehabilitation Robot and its Control for Passive Training	152
<i>Gilbert Masengo, Zhang Xiaodong, Emmanuel Mudaheranwa</i>	
A Subject-Specific Neuromusculoskeletal Model for Muscle Force Estimation Used in Rehabilitation	158
<i>Lili Liu, Qing Tao, Quanbao Lai, Qingfeng Meng, Jinsheng Kang</i>	
Design of a New Soft Robot Hand for Grasping and Sorting Operation	163
<i>Yaxi Wang, Qingsong Xu</i>	
SuPo: Poster Session 1	
Identifying Critical Contingencies Using Search Space Pruning and Random Chemistry Algorithm	169
<i>Songlin Zuo, Yanyan Ni, Huizhou Liu, Ming Wang</i>	
External Joint Calibration of A Novel Multi-Modal Perception System	175
<i>Xiao Han, Hongpeng Wang, Chongshan Fan, YaoJing Li</i>	
Improved Constructive Neural Network Learning with Local Polynomial Estimator	181
<i>Yudong Xie</i>	
Research and Development of the Control System for Leather Cutting Machine	187
<i>Weidi Zheng, Jianqun Liu, Weiqiang Gao</i>	
Efficient Super Greedy Boosting for Classification	192
<i>Min Zhang, Minrun Wu</i>	
Research Progress and Prospect of Assistive Standing Systems	198
<i>Yunjing Lei, Tong Zhang, Yilin Song</i>	
Multi-UAV Mission Planning for Fuel-constrained Persistent Surveillance Problem	203
<i>Jiezhi Xu, Yang Chen, Ling Xiong</i>	
Equipment Condition Monitoring System based on Multi-source Heterogeneous Data	209
<i>Peijie Wang, Yan He, Pengcheng Wu, Chuanpeng Hao, Yufeng Li, Ping Yan</i>	
Optimization of Surface roughness of Grinding Cycloid Profile Based on Neural Network and Genetic Algorithm	214
<i>lanying xu, Fangzheng WU, Qiang WU, Baolan HE, Peng ZHAO</i>	
Experimental Study on the Surface Quality of Bearing Ring by Heating Turning	219
<i>lanying xu, Qiang WU, Baolan HE, Oeng ZHAO</i>	
3D Mapping and Stability Prediction for Autonomous Wheelchairs	225
<i>Aryan Naveen, Haitao Luo, Zhimin Chen, Bing Li</i>	

Robust Large-Angle Attitude Maneuver Strategy Design of UCAV	231
<i>Jiafan He, Aiguo Fei, Qingwei Li, Chao Liu</i>	
Comparison of Forward and Reverse Decoding Methods of Knee Joint Moments based on sEMG	236
<i>Yabin Wang, Xiaodong Zhang, Hanzhe Li, Qinyi Sun</i>	
A Novel Wrist Joint Torque Prediction Method Based on EMG and LSTM	242
<i>Yi Zhang, Xiaodong Zhang, Zhufeng Lu, Zhiming Jiang, Teng Zhang</i>	
MoA1: Human-Machine Interaction	
Dense Points Aided Performance Evaluation Criterion of Human Observation for Image-based 3D Reconstruction	246
<i>Yaojing Li, Hongpeng wang, Xiaoyang Zhang</i>	
Operator Aware Dynamic Bandwidth Management for Teleoperation	252
<i>Haytham Dbouk, Imad Elhaji, Naseem Daher</i>	
Asynchronous Brain Machine Interface System for Autonomous Assembly Robot Based on Facial Expression Paradigm	259
<i>Rui Li, Di Liu, Weiping Fu, Shiqiang Yang, Xiaodong Zhang, Jiangcheng Chen</i>	
A Semi-Asynchronous Real-Time Facial Expression Assisted Brain Control Method: An Extension	265
<i>Zhufeng Lu, Xiaodong Zhang, Hanzhe Li, Teng Zhang, Yi Zhang</i>	
Face Feature Extraction Based on Partition Threshold Model	271
<i>Yuqing Tian, Siyu Wang, Sheng Bi, Ning Xi</i>	
MoA2: Intelligent Diagnosis and Analysis	
Denoising Method for Bearing Vibration Signal Based on EEMD and Wavelet Packet Transform	277
<i>shenglong xie, Weimin Zhang, Yujun Lu, Xin Shao, Dijian Chen, Qing Lu</i>	
A defect detection method of gear end-face based on modified YOLO-V3	283
<i>Yingtao Su, Ping Yan</i>	
Fault diagnosis of rotating machinery based on FA-DSAE	289
<i>Han Zhou, Ping Yan, Jie Pei, Dayuan Wu, You Guo</i>	
Research on Intelligent Fault Diagnosis Method for Rolling Bearing Based on One-Dimensional LeNet-5 Convolutional Neural Network	295
<i>shenglong xie, Yujun Lu, Wenxin Zhang, Junjiang Zhu, Xin Shao, Qing Lu</i>	
Helical Gear Machining Quality Estimation Based on Processing Parameters Importance Analysis	301
<i>Dayuan Wu, Ping Yan, You Guo, Han Zhou, Runzhong Yi</i>	
MoB1: Intelligent Control	
Constrained Predictive Position Control of the Planar Switched Reluctance Motor Using Threshold Function	307
<i>Zhi-Hui Xu, Su-Dan Huang, Guang-Zhong Cao, Jun-Di Sun, Gang Jing, Yan Liu</i>	
Research on the adaptive control method of pre-landing for high voltage transmission line inspection robot based on multi-body transfer matrix method	312
<i>Haiming Shen, Xiaodong Zhang, Ahmad Bala Alhassan, Haibo Xu, Xin Zhang, Wenyu Huang</i>	
Predictive Position Control With Stable Control Parameters of Planar Switched Reluctance Motors	318
<i>Zhi-Yong Hu, Su-Dan Huang, Guang-Zhong Cao, Long Chen, Gang Jing, Yan Liu</i>	
Dimensional surface error prediction of thin-walled parts in five-axis flank milling	322
<i>liping wang, shuyi ge</i>	
 Precise Control Method on Prosthetic Hand Using sEMG Signals *	326
<i>Mostafa Orban, Zhang Xiaodong, Lu Zhufeng, Antonio Marcal, Ahmed Emad, Gilbert Masengo</i>	
MoB2: Human Intention Understanding	
A Fault-Tolerant Algorithm to Enhance Generalization of EMG-based Pattern Recognition for Lower Limb Movement	332
<i>Qinyi Sun, Xiaodong Zhang, Hanzhe Li, Runlin Dong, Yabin Wang, Guangyue Liu</i>	

Multi-joint motor intention recognition of lower limbs based on muscle synergies <i>Guangyue Liu, Xiaodong Zhang, Runlin Dong, Qinyi Sun</i>	338
Deep Learning Based Recognition of Hand Movement Intention EEG in Patients with Spinal Cord Injury <i>Yongyu Jiang, Xiaodong Zhang, Chaoyang Chen, Zhufeng Lu, Yachun Wang</i>	343
RP-based Voluntary Movement Intention Detection of Lower limb using CNN <i>Hanzhe Li, Xiaodong Zhang, Zhufeng Lu, Runlin Dong, Qinyi Sun</i>	349
A Virtual Induction Approach for EEG Signal of Patient Movement Intention with Lower Limb Motion Assisted Robot <i>Runlin Dong, Xiaodong Zhang, Hanzhe Li, Xiaojun Shi</i>	354

MoPo: Poster Session 2

Multiple Object Tracking for Similar, Monotonic Targets <i>Yifei Qian, Hui Shi, Maojin Tian, Runhuai Yang, Yuping Duan</i>	360
Key technologies of data monitoring for coal machinery equipment in the intelligent IOT environment <i>Juanli Li, Menghui Li, Fangyuan Yan, Dong Miao</i>	364
Cyclic Weighted Median Method for L1 Low-Rank with Nonlocal for Single color image denoising <i>Qiong Luo, Jiaxin Liu, Zhi Han, Yong Li, Yandong Tang, Shengchuan Li</i>	370
Relaxed Low Tensor Train Rank Representation with Structural Smoothness for Hyperspectral Image Super-resolution <i>Shengchuan Li, Huidi Jia, Xi'ai Chen, Sun Li, Zhi Han, Yandong Tang, Jiaxin Liu</i>	375
Thermal Characteristic Optimization of a CNC Forming Gear Grinding Machine <i>Xiaojun Shi, Shuxian Li, Xin Yao</i>	381
Multi-Agent Scheduling System in Cloud Manufacturing Environment <i>Xiaoxue Bi, Dong Yu, Jinsong Liu, Yi Hu</i>	385
Measuring method of Radial Run Out of High Speed Railway Wheelset <i>shuang zhang, Hua WANG, Jin-gang GAO, Xiao-feng LIU, Wen-dong CHEN</i>	390
Research on Steering Stability Control of Electric Vehicle Driven by Dual In-Wheel Motor <i>Xiangrong Guo, Yi Chen, Hong Li</i>	394
 The Safety Braking Protection Model of Virtually Coupled Train Platoon in Subway <i>Qiao Zhou, Chun YU Zhang, Feng Bao, Lei Zhang, Xiao Xiao</i>	401
Simulation and Experiment of Motion process base on Pneumatic conveying in flexible materials <i>xiaoyu wang, Hao Li, yan zheng, Kun Zhang, Sijia Gao</i>	407
Binocular Human Body Attitude Distance Localization Recognition Algorithm Based on Dual Convolution <i>Jianming Sun, Wenbo Wang, Zidong Chen</i>	411
PR-RRT*: Motion Planning of 6-DOF Robotic Arm Based on Improved RRT Algorithm <i>Yi Liang, Hengyang Mu, Diansheng Chen, Xiaodong Wei, Min Wang</i>	417
Microgrid Solution of Smart Energy Station Based on HVDC System <i>Hao Tian, Wenjing Wang, Zijie Zhang, Huijuan Shi, Zhongxi Liu</i>	423
The Research on the Influence of Position Errors on the Angular Errors, Straightness Errors and Squareness Errors <i>Huanlao Liu, Miaojing Su, Leilei Zhou, Peiming Peng, Can Liu</i>	427
Optimal Placement of Synchronous Condensers for Voltage Stability of Large-scale Wind Power Transmission via HVDC system <i>Xuetao Dong, Yanhui Qin, Zeyu Cao, Zhichao Yang, Bingtuan Gao</i>	433
An Online Method of Measuring DC Resistance of Transmission Lines Based on Simplified Distributed Parameter Line Model <i>Shun Lan, Siyue Li, Xiaokang Li, Bang Wang, Hanling Mao, Zhenfeng Huang, Xinxin Li</i>	438
A Review on Kinematic, Workspace, Trajectory Planning and Path Planning of Hyper-Redundant Manipulators <i>Zhao Cai Du, Guang Yao Ouyang, Jun Xue, Yan bin Yao</i>	444

