

2019 3rd International Conference on Robotics and Automation Sciences (ICRAS 2019)

**Wuhan, China
1 – 3 June 2019**



**IEEE Catalog Number: CFP19L72-POD
ISBN: 978-1-7281-0856-8**

**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:	CFP19L72-POD
ISBN (Print-On-Demand):	978-1-7281-0856-8
ISBN (Online):	978-1-7281-0855-1

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

2019 3rd IEEE International Conference on Robotics and Automation Sciences (ICRAS 2019)

Table of Contents

Preface	vii
Conference Committee	viii

✧ **Robotic Engineering**

Workspace Analysis of Delta Robot Based on Forward Kinematics Solution	1
<i>Cheng Liu, Guo-Hua Cao, Yong-Yin Qu</i>	
LWH-Arm: A Prototype of 8-DoF Lightweight Humanoid Robot Arm	6
<i>Hua Yang, Yuqi Yan, Shilin Su, Zhuqing Dong, Syed Haseeb Ul Hassan</i>	
Design and Optimization of Small Crawling Robot Based on Linkage Mechanism	11
<i>Li Guanglei, Cui Yahui, Wang Lihua, Meng Lei</i>	
A Path Planning Approach Based on Q-learning for Robot Arm.....	15
<i>Mengyu Ji, Long Zhang, Shuquan Wang</i>	
Research on the Development Status of Photovoltaic Panel Cleaning Equipment Based on Patent Analysis	20
<i>Kai Shen, Qiufei Qiu, Qiaoling Wu, Zhijian Lin, Yeqing Wu</i>	
AGV Robot Based on Computer Vision and Deep Learning	28
<i>Chen Chuixin, Cheng Hanxiang</i>	
Study on Wireless Communication System of Robot for Inspecting and Cleaning Subway Ventilation and Smoke Exhaust Metal Ducting	35
<i>HongLei Che, Congling Shi, Hu Hu, WenWei Wang, Jian Li, Xuan Xu</i>	
Strategy and Control for Robotic Detumbling of Space Debris by Using Flexible Brush	41
<i>Wenhua Cheng, Zhi Li, Yingzi He</i>	
Research on Optimized Design of Predictive Controller for Observational Underwater Robot	48
<i>Chunlei Zhu, PengCheng Xu, Qingjun Zeng, Zhiyu Zhu, Xiaoqiang Dai</i>	

Research on Welding Seam Tracking Technology Based on Linear Laser CCD Robot.....	54
<i>Deng Bao-qing, Wang Yu-shu</i>	
✧ Signal Processing	
Research on Laser Positioning System of a Underground Inspection Robot Based on Signal Reflection Principle.....	58
<i>Congling Shi, Honglei Che, Hu Hu, Wenwei Wang, Xuan Xu, Jian Li</i>	
A Deep Learning Approach for High Speed Machining Tool Wear Monitoring.....	63
<i>Hui Zheng, Jiping Lin</i>	
Feature Extraction Method of Indoor Structured Environment Based on Two-Dimensional LiDAR	69
<i>Xin Zhang, Wei Li</i>	
Design of Safety System for Kitchen Based on NB-IOT.....	74
<i>Ke ChangYun, Ai ChangWen</i>	
Modeling Research of Dual Active Bridge DC Converter Based on Double Phase Shift Control.....	79
<i>Kaimin Hao, Jianhua Lu</i>	
Integrated Fault Estimation and Fault-tolerant Control under Multiple Constraints.....	85
<i>Luo Xinhui, Dai Shaowu, Dai Hongde</i>	
✧ Control System	
Cooperative Path Optimization for Multi-UAVs Based on Dynamic Target Positioning and Tracking.....	90
<i>Yu Zhao, Xiaoyi Zhang, Guangyi Liu</i>	
New Anti-windup Scheme for Linear Systems with Actuator Saturation	96
<i>Xiaoqin Mo, Zhengqing Li</i>	
Integrated Navigation Error Analysis Based on Kalman Filter of INS Error Compensation.....	102
<i>Xiaoxi Zhao, Yajing Kang</i>	
Research on Matching Accuracy of Underwater Terrain Matching Algorithm Based on State Augmented Unscented Kalman Filter.....	107
<i>Xiong Lu, Shen Jian, Liu Haitao</i>	
Design and Implementation of Differential Drive AGV Based on Laser Guidance.....	112
<i>Hongfei Xu, Jiqiang Xia, Zhaohui Yuan, Pengyuan Cao</i>	
Research on Automatic Rod Changing Device of Truck-mounted Rig of Coalbed Methane Based on Electro-hydraulic Control.....	118
<i>Zujie Zou</i>	

High Pressure and Large Flow Hydraulic System Powered by Dual Pump and Servo Motor	123
<i>Jun Gao, Yujia Kang, Xuemei Liu, Chun Zhang</i>	
Cooperative Positioning Enhancement Technology Based on Multipath Effect Detection.....	127
<i>Xuehan Xie, Zhihua Li, Yanlin Chen</i>	
Autonomous Launch and Recovery System for Underwater Towed Vehicle Based on USV	132
<i>Tao Song, Rong Zheng</i>	
An Underwater Image Enhancement Method for Simultaneous Localization and Mapping of Autonomous Underwater Vehicle	137
<i>Zhaojie Huang, Lei Wan, Mingwei Sheng, Jing Zou, Jun Song</i>	
Research on Dynamic Balance Analysis of Engine Crankshaft Based on NX.....	143
<i>Qiuyi Ye, Chuanhong Zhou, Xiaotong Wang</i>	
Two-on-one Cooperative Guidance Law Based on Differential Games	148
<i>Jiaqiang Zhang, Xiaolong Liang, Jie Zhu, Wulin Zhu</i>	
Deep Q-Network Based Decision Making for Autonomous Driving.....	154
<i>Max Peter Ronecker, Yuan Zhu</i>	
Development of an Intelligent Monitoring System for Agricultural Machinery	161
<i>Yu Fei, Ying Zhuang, Xiang Liu, Qichun Zhao, Gonglei Liao, Gonglei Liao</i>	
✧ Manufacturing Technology	
On-line Temperature Measurement of Laser Welding with Magnetic Nanoparticles	166
<i>Minyue Wu, Jingjing Cheng, Pu Zhang, Wenzhong Liu</i>	
H_∞ State Estimation of Memristor-based Recurrent Neural Networks with Mixed Delays.....	171
<i>Xiangxiang Wang, Yongbin Yu, Nijing Yang and Haowen Tang, Shouming Zhong, Tashi Nyima</i>	
Shape Optimization Design of Underwater Vehicle Based on Response Surface Model.....	178
<i>Zhang Haiyang, Gu Haitao, Lin Yang</i>	
Large Number of Fast Elevator Safety Assessment Methods Based FaHA	184
<i>Xupeng Zhang</i>	
Smart Meters Fault Prediction Technology Based on Cost-sensitive XGBoost Algorithm for Imbalanced Data	189
<i>Baofeng Li, Shaohua Fan, Xin Gao, Feng Zhai, Kangsheng Li, Yang He</i>	

Fuzzy Controller Optimization of Synchronous Belt Drive System Based on Improved whale Optimization Algorithm	196
<i>Yunyang Zhang, Gong Wang, Bingshan Liu, Wei Wang, Yifei Liu</i>	
5-K-Dimensional Tree for Human Activity Recognition in Smart Home.....	201
<i>Zhoujing Wang, Hongqing Fang</i>	
Solar Panel Recognition of Non-cooperative Spacecraft Based on Deep Learning	206
<i>Bingyu Xu, Shuquan Wang, Liping Zhao</i>	
Optimization of Cutting Parameters Based on Grey Correlation Analysis Method	211
<i>Li Xueguang, Guo Ke, Miao Liqin</i>	
Method for Measuring Levitation Gap of Magnetic Levitation Ball Based on Image Processing.....	215
<i>Chenhao Zhang, Yongzhi Jing, Jie Kong, Tao Peng, Zhenzhen Liao, Jianhua Hao</i>	
Identification of Heterogeneous Identifiers of Objects Based on Support Vector Machine.....	220
<i>Yanru Mu, Lingyun Jiang, Zhengkun Wu</i>	
Semiautomatic Extraction of Belt-like Roads from High Spatial Resolution Remotely Sensed Imagery based on Self-adaptively Variable Width of Template Matching Method.....	227
<i>Junwei Xie, Jialin Cui, Fan Yu</i>	
Design and Development of Remote Controlling System for the Demo Site	233
<i>Pavit Kiartsilapin, Worapong Sawangsri</i>	
Modeling, Simulation and Implementation of a Bird-Inspired Morphing Wing Aircraft	238
<i>Kun Xiao, Yuxin Chen, Wuyao Jiang, Chenyao Wang, Longfei Zhao</i>	
Development of the Machine Vision System for Automated Inspection of Printed Circuit Board Assembly	244
<i>Tanapong Parakontan, Worapong Sawangsri</i>	
Numerical Simulation on Spinning Manufacturing Based on 6061 Aluminum Alloy Conical Part.....	249
<i>Li Xueguang, Wang Yahui, Miao Liqin</i>	
Applications of Artificial Intelligence in Digital Publishing Industry in China.....	254
<i>Yuting Zhao, Kumesh Prabhashini</i>	
Kinematic and Dynamic Analysis of Robot for Carrying Human Body in Proton Medical Gantry	260
<i>Sheng Yan, Yu Xiong, Shanshuang Shi, Yong Cheng, Chen Lu, Hongtao Pan, Changyang Li</i>	

Author Index