2023 2nd International Symposium on Control Engineering and Robotics (ISCER 2023)

Hangzhou, China 17-19 February 2023



IEEE Catalog Number: ISBN:

CFP23BW4-POD 979-8-3503-3641-2

Copyright © 2023 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:
 CFP23BW4-POD

 ISBN (Print-On-Demand):
 979-8-3503-3641-2

 ISBN (Online):
 979-8-3503-3640-5

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



2023 2nd International Symposium on Control Engineering and Robotics (ISCER)

ISCER 2023

Table of Contents

Preface	xiv
Organizing Committee	xv
Intelligent Control and System Detection Technology	
LSEPNet:Joint Prediction of Disparity And Semantics Based On Binocular Vision Yang Yang (South China University of Technology, China), Hongxia Gao (South China University of Technology, China), An Chen (South China University of Technology, China), Jianliang Ma (KUKA Robotics (Guangdong) Co., Ltd, China), Guoheng Liang (Zhaoqing Honghua Electronic Technology Co., Ltd, China), and Jiegeng Liu (South China University of Technology, China)	1
Development of an Magnetic Resonance Compatible Multi-Dots Tactile Stimulation Yutong Wang (Beijing Institute of Technology, China), Zhongyan Shi (Beijing Institute of Technology, China), Siyu Wang (Beijing Institute of Technology, China), Di Luo (Beijing Institute of Technology, China), Jian Zhang (Beijing Institute of Technology, China), and Jinglong Wu (Beijing Institute of Technology, China; Okayama University, Japan)	on System 8
System Design of a Stair Climbing Disinfection Robot based on C-Legged	13
Trajectory Tracking Control of Automatic Guided Soft Target Vehicle Based on M Congcong Zhang (Shanghai University of Electric Power, China) and Maoliang Wu (Shanghai University of Electric Power, China)	IPC 18
An Intelligent Chatbot System with Multi-Expression based on PyQt	22

Research on Fast Shaft Hole Assembly Technology based on 2D Point Cloud Matching Shape Recognition Method by Industrial Robot Xian Wu (Soochow University, China), Lei Lu (Soochow University, China), Chengyun Yang (Soochow University, China), Wenjie Li (Soochow University, China), Yinan Wang (Soochow University, China), Haoran Zhao (Soochow University, China), and Lei Zhang (Soochow University, China)	26
Surgical Robotic System for Endotracheal Intubation Based on Laryngeal Mask	.32
Electromechanical Conversion Reliability Testing Device of Electronic Remote Water Meter	
based on Machine Vision Xiaojie Wu (Zhejiang Institute of Metrology, China), Yan Fang (Zhejiang Institute of Metrology, China), Ningning Zhang (Zhejiang Institute of Metrology, China), Guofu Chen (Zhejiang Institute of Metrology, China), Xia Shou (Zhejiang Institute of Metrology, China), and Hanyan Ying (Zhejiang Institute of Metrology, China)	37
Design of Target Tracking Ball Gear Pan-Tilt System Based on Machine Vision	42
Intelligent Control Method of Robotic Arm Follow-up Based on Reinforcement Learning	48
Robotic Grasp Detection Method Based on Lightweight Feature Fusion Convolutional Neural	
Network Haoyu Yin (Anhui Jianzhu University, China), Chenlei Xie (Anhui Jianzhu University, China), Daqing Wang (University of Science and Technology of China, China), Tiantian Yu (University of Science and Technology of China, China), Yigeng Huang (University of Science and Technology of China, China), and Lifu Gao (University of Science and Technology of China, China)	56
Feedback Control of Cable-Driven Continuum Robot based on Flexible Perception Shuwen Qian (Ningbo Institute of Materials Technology and Engineering Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), Tianjiang Zheng (Ningbo Institute of Materials Technology and Engineering Chinese Academy of Sciences, China; Key Laboratory of Robotics and Intelligent Equipment Technology of Zhejiang Province, China), Wenjun Shen (Ningbo Institute of Materials Technology and Engineering Chinese Academy of Sciences, China; University of Chinese Academy of Sciences, China), and Haotian Bai (Ningbo Institute of Materials Technology and Engineering Chinese Academy of Sciences, China; University of Nottingham, China)	64

Robotic Control Mechanism based on Deep Reinforcement Learning	70
Distributed Finite-Time Event-Triggered Secondary Frequency and Active-Power Control of AC Microgrid	74
Machine Vision and Six-Dimensional Force Recognition for Assembly Hole-Finding Strategies Lu-lu Yin (Xiamen University of Technology, China), Jian-Chun Liu (Xiamen University of Technology, China), Wei Li (Xiamen Aerospace Siert Robotic System Co., Ltd, China), and Zhong-Zhao Ye (Xiamen University of Technology, China)	81
Research on Sliding Mode Control of Micro-Low-Speed Electric Car for Lateral Motion	85
Simulation Study On The Control Method Of Zinc Alloy Slag Picking Robot	89
An End-to-End Network for Multi-Scale Ship Detection in SAR Images Hongwen Dong (Shanghai Radio Equipment Research Institute, China), Feiming Wei (Shanghai Radio Equipment Research Institute, China), Qianqian Xu (Shanghai Radio Equipment Research Institute, China), Xiao Wang (Shanghai Radio Equipment Research Institute, China), and Gao Sun (Shanghai Radio Equipment Research Institute, China)	98
A Point Cloud-Based 3D Object Detection Method for Winter Weather	.02
Detection Refinement using Geometric Features for Robust Robotic Grasping	.07
Design of a New Bio-Inspired Actuator for Biomimetic Robots	.14

Mechanical Design, Manufacturing and Automation

Structure Design and Motion Characteristic Analysis of Variable Structure Inspection Robot	118
Multi-Agent Working Together based on the Improved K-Means Algorithm Feiyu Wang (Guangxi Science and Technology Normal University, China), Tao Luo (Guangxi Science and Technology Normal University, China), Haosen Wang (Guangxi Science and Technology Normal University, China), and Jingjing Wang (Guangxi Science and Technology Normal University, China)	124
Research on Satellite Group Trajectory Planning and Task Scheduling based on Improved Gray Wolf Algorithm Yi Zhang (Hubei University of Technology, China) and Lingyao Lei (Hubei University of Technology, China)	128
Path Planning based on Improved RRT Algorithm Yanguo Huang (Jiangxi University of technology, China) and Chao Jin (Jiangxi University of technology, China)	136
Research on Optimal Distribution of Braking Force of Electric Vehicle Based on Time to Collision Xu Tong (Wuhan University of Technology, China), Yuning Wang (Wuhan University of Technology, China), Yibo Guan (Wuhan University of Technology, China), and Shaopeng Tian (Wuhan University of Technology, China)	141
Design of Electrical Conductivity Measuring Device based on STM32	149
Numerical Solution of the M/NEMS Contact Problem using an Improved Arc-Length Method The Shan (School of Mechatronic Engineering and Automation of Shanghai University, China) and Shuimiao Du (Sino-European School of Technology of Shanghai University, China)	153
Analysis of Key Technologies for Unmanned Surface Vessels (USV) Xiaoyu Dong (Wuhan University of Technology, China), Haibo Gao (Wuhan University of Technology, China), and Lei Shang (Wuhan University of Technology, China)	158
Design and Analysis of a Wall-Climbing Robot for Large Generator Stator Surface Cleaning	165

Q-Learning for Path Planning of a UAV under Energy Consumption Constraints	
Research on Robot Cluster Configuration Generation under Communication Distance Constraint 181 Jiali Cai (Chongqing Telecommunications Polytechnic College, China) and Lijuan Cai (Chongqing Telecommunications Polytechnic College, China)	
An Improved Nonzero Vector Based Common-Mode Voltage Suppression Strategy for Permanent Magnet Synchronous Motors	
Dynamic Analysis of Actuator System with the Coupling of Time-Varying Meshing Stiffness and Backlash	
Design and Analysis of Crawler Robot Mechanism for Cabin Cleaning	
Analysis and Synthesis of Cardioid Crank Guide Bar Mechanism with Approximate Dwell	
NURBS Curve Interpolation Algorithm Based on Improved Adams Method	
UAV Real-Time Path Planning Based on Heuristic Angle Search Strategy in an Unknown Environment	
Optimal Trajectory Planning of Manipulator With Improved Firefly Algorithm	

Design of Automatic Sorting and Transportation System for Fruits and Vegetables Based on Dobot Magician Robotic Arm	229
HaoZhan Li (Tianjin University of Technology, China), Chen Dong (Tianjin University of Technology, China), XiangYu Jia (Tianjin University of Technology, China), ShiHao Xiang (Tianjin University of Technology, China), and ZhanJie Hu (Tianjin University of Technology, China)	
Intelligent Sampling Method for Aluminum Ingot in Electrolytic Cell Yaqi Lei (Changsha University of Science and Technology, China), Shaosheng Fan (Changsha University of Science and Technology, China), and Jiaojiao Wu (Changsha University of Science and Technology, China)	235
Application of Ackermann Steering in Obstacle Crossing Platform of Six-Wheeled Robots Tianchang Xu (Northeastern University, China), Shujun Ma (Northeastern University, China), Hongtao Xu (Northeastern University, China), Shun Mo (Northeastern University, China), and Ying Li (Northeastern University, China) University, China)	239
Artificial Intelligence Technology and Robot Simulation	
Factory Automatic Meter Reading Robot Sheng Li (Hechi University, China), Zhenxuan Li (Hechi University, China), Xiulin Tang (Hechi University, China), Bo Huang (Hechi University, China), and Jijue Wei (Hechi University, China)	244
A New Kind of Bionic Caterpillar Robot	249
Development and Application of Financial Checkout Robot Based on RPA Yingmin Zhang (Chongqing Medical And Pharmaceutical College, China) and Shuqin Hao (Chongqing Medical And Pharmaceutical College, China)	253
Variable Stiffness Intelligent Flexible Robot Joint	257
Simulation of Medical Service Robot based on ROS	262
Research on an Inchworm-Like Soft Robot with Multiple Motion Modes Chunyuan Wang (Nanjing University of Science and Technology, China), Yan Teng (Nanjing University of Science and Technology, China), and Tunxu Tan (Nanjing University of Science and Technology, China)	266
Research on Simulating Application of Artificial Intelligence in Aerospace Field	270

Mobile Robot Relocation Method Based on the Combination of Laser and Vision Wanchao Wang (National Research and Development Center for Information Accessibility, China), Yi Zhang (National Research and Development Center for Information Accessibility, China), Zhihui Zhang (National Research and Development Center for Information Accessibility, China), and Linhao Fan (National Research and Development Center for Information Accessibility, China)	274
Design and Application of Petrochemical Inspection Robot Xin-Bao Li (Hebei University of Technology, China), Ling-Yu Sun (Hebei University of Technology, China), Jin-Kun Li (Hebei University of Technology, China), Wen-Qing Li (Hebei University of Technology, China), Tan Zhang (Hebei University of Technology, China), Yang Li (Hebei University of Technology, China), Ying-Jie Xu (Hebei University of Technology, China), and Jia-Ning Zhang (Hebei University of Technology, China)	280
Existing Status and Prospects of Research on Medical Electromagnetic Field Driven Micro-Robots Wensheng Pan (Guilin University of Electronic Science and Technology, China)	284
Research on Autonomous Obstacle Avoidance for Robot Cluster under Communication Distance Constraint	289
Research on Path Planning of Unmanned Combat Vehicle based on Improved Potential Field Method Chi Zhang (Northwest Mechanical and Electrical Engineering Research Institute, China), Yongliang Yang (Northwest Mechanical and Electrical Engineering Research Institute, China), Chun Zhang (Northwest Mechanical and Electrical Engineering Research Institute, China), and Shaohui Xue (Northwest Mechanical and Electrical Engineering Research Institute, China)	293
Terminal Path Planning of Industrial Robot	300
Research and Application of A Robot Assembly for Gate Rail Checking and Cleaning Wei Meng (Suzhou Nuclear Power Research Institute Co., Ltd, China), Xiaolin Liu (Suzhou Nuclear Power Research Institute Co., Ltd, China), Shuai Wang (Suzhou Nuclear Power Research Institute Co., Ltd, China), Qian Huang (Suzhou Nuclear Power Research Institute Co., Ltd, China), Huihui Tian (Suzhou Nuclear Power Research Institute Co., Ltd, China), Xinyang Zhang (Suzhou Nuclear Power Research Institute Co., Ltd, China), Jifeng Ouyang (Taishan Nuclear Power Joint Venture Co., Ltd, China), Junsheng Zeng (Taishan Nuclear Power Joint Venture Co., Ltd, China), and Gunagyao Wu (Taishan Nuclear Power Joint Venture Co., Ltd, China)	304

Inverse Solution Algorithm of 6-DOF Robot Based on Paden-Kahan Sub-Problem and Numerical
Method
Vision Robotic Manipulator Combined with Neural Radiance Field for Autonomous Real-Time 3D Reconstruction
A Path Planing Algorithm for Mobile Robot Based on Particle Swarm
AGV-Based Transformable Wheel Obstacle-Crossing Robot
AGV Path Planning Based on Improved Genetic Algorithm
A Multi-Target Search Cooperative Obstacle Avoidance Algorithm based on Probability Finite State Machine
Autonomous Obstacle Avoidance Method for Substation Inspection Robot based on Binocular Vision
Long Li (Guangdong Power Grid Corp. Dongguan Power Supply Bureau, China), Zhiqiang Lin (Guangdong Power Grid Corp. Dongguan Power Supply Bureau, China), and Haipeng Zhang (Guangdong Power Grid Corp. Dongguan Power Supply Bureau, China)
Improved Genetic Algorithm-Based Obstacle Avoidance Path Planning Method for Inspection Robots
Unmanned Aerial Vehicles Path Planning Algorithm for Angle of Arrival Localization
Global Path Planning Method based on Improved Beetle Antenna Search Algorithm for Unmanned Surface Vehicle
Design and Implementation of Water Environment Monitoring System Based on Bionic Robot Fish

Author Index	365
--------------	-----