

ICCRT 2019

2019 2nd International Conference on Control and Robot Technology

December 12-14, 2019 | Jeju Island, Korea

Proceedings of

2019 2nd International Conference on Control and Robot Technology (ICCRT 2019)

December 12-14, 2019 | Jeju Island, Korea

ISBN: 978-1-4503-7252-7



The Association for Computing Machinery 1601 Broadway, 10th Floor New York New York 10019-7434



ACM ISBN: 978-1-4503-7252-7

ACM COPYRIGHT NOTICE. Copyright © 2020 by the Association for Computing Machinery, Inc. Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Publications Dept., ACM, Inc., fax +1 (212) 869-0481, or permissions@acm.org.

For other copying of articles that carry a code at the bottom of the first or last page, copying is permitted provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, +1-978-750-8400, +1-978-750-4470 (fax).

2019 2nd International Conference on Control and Robot Technology (ICCRT 2019)

Table of Contents

Preface	VI
Conference Committees	VII
Chapter 1- Intelligent robot design and control	
Design and Development of a Six-legged Mobile Manipulator for Education and Research (SiMMER) Kondalarao Bhavanibhatla, Sulthan Suresh-Fazeela, Sambaran Ghosal, Dilip Kumar Pratihar	1
Design and Research of Position Controller for Power Line Inspection Robot Flight Mode Based on ROS Haibo Xu, Wenyu Huang, Xing Fan, Yufeng Lin	6
Structural innovation of driving mechanism of transmission line inspection robot based on substance-field conflict joint iterative solution model Aibin Zhu, Weihao ZHENG, Yao TU, Huang SHEN	12
The Design of Sliding Mode Controller for Knee Joints of the Humanoid Robots Peixuan Ding, Lin Li, Yufeng Zhang, Jianlin Hao	18
Design on Control System of Bionic Crawling Inspection Robot Jian Guo, Xiaodong Zhang, Haiming Shen, Haibo Xu and Liangliang Li	24
Research on Elderly Fall Prediction for Walking Posture of Elderly-Assistant Robot Liangliang Li, Xiaodong Zhang, Xiaoqi Mu, Haipeng Xu	30
Design on Bionic Grasping Mechanism for Flight Inspection Robot landing on High-voltage Transmission Line Xin Zhang, Xiaodong Zhang, Haiming Shen, Haibo Xu	35
Multi-robot routing and scheduling with temporal logic and synchronization constraint Alessio Mosca, Cristian-loan Vasile, Calin Belta, Davide Martino	40

Omnidirectional Three Module Robot Design and Simulation Kartik Suryavanshi, Rama Vadapalli, Praharsha Budharaja, Abhishek Sarkar, Madhava Krishna	46
Chapter 2- Control Science and Automation	
An Adaptive Neural Network Control Method for Hypersonic Vehicle Qing Lu, Min Rui Jiang	51
A New Covariance Analysis Method for BTT Missile Attitude Control System Ruimin Jiang, Bin Zhao	57
Observer-Based Packet Drop Mitigation for String Stable CACC Andres Mauricio Villamil Sanchez, Arturo Gonzale, Norman Franchi, Gerhard Fettweis	62
Research on Peak Current Mode Control Method of Battery Discharge Regulator Yan Zheng, Wen-jie Zhao, Yong-gang Chen, Guo-shuai Zhang, Cheng-an Wan	68
A Simulation Study for a Space Fuel Cell Power System Based on Maximum Power and State Machine Control Jian Liu, Wen-jie Zhao, Yong-gang Chen, Liang Ren, Shuai Guo	74
Multicopter PID Attitude Controller Gain Auto-tuning through Reinforcement Learning Neural Networks Daewon Park, Hyona Yu, Nguyen Xuan Mung, Junyong Lee, SungKyung Hong	80
Convex Optimization-based Motion Planner for Linear Variable Stiffness Actuators Sergei Savin, Svyatoslav Golousov	85
Automated Braking System of Autonomous Trajectory Tracking Vehicle Aaron Ryan Valdez Manuel, Nicolette Ann Arriola, Manuel Ramos	92
An Engineering Re-entry Guidance Method for Fixed-trim Vehicles with Terminal Constraints Min Zhou, Lu Qing	98
A Prototype of an Intelligent Ground Vehicle for constrained environment: Design and Development Apoorv Singhal, Vibhakar Mohta, Yash Khandelwal, Adarsh Patnaik, Manthan Patel, Jaydee Godbole	103

Passive Sole Constraining Method to Stabilize 3D Passive Dynamic Walking Naoto Mizoguchi, Sadayoshi Mikami, Kazuyuki Hyodo	108
Chapter 3- Computer vision and image processing	
Enabling an EO-Sensor-Based Capability to Detect and Track Multiple Moving Threats Onboard sUAS Operating in Cluttered Environments Wee Kiong Ang, Wei Shun Teo, Oleg Yakimenko	115
Human Pose Estimation using Articulated ICP Seongmin Baek, Younhee Gil	125
GazeCamera: A Novel Gaze-Controlled UAV Camera Pavan Kumar B N, Adithya Balasubramanyam, Ashok Kumar Patil, Chethana B, Young Ho Chai	130
Design on Image-based Visual Servo Controllers for Uncalibrated Target Tracking of Quadrotor Shaonan Fu, Xiaodong Zhang, Xin Zhang, Ling Yuan	136
Long-Sighted Imitation Learning for Partially Observable Control Bo Xiong, Fangshi Wang, Chao Yu, Fei Qiao, Yi Yang, Qi Wei, Xin-Jun Liu	140
An approach for accurate pattern recognition of four hand gestures based on sEMG signals Mostafa Essam Lotfy Hussain Orban, Xiaodong Zhang, Zhufeng Lu, Yi Zhang, Hanzhe Li	145
Author Index	151

Preface

This volume contains papers presented at 2019 2nd International Conference on Control and Robot

Technology (ICCRT 2019) which were held during December 12-14, 2019 in Jeju Island, Korea.

This year we received over 50 paper submissions from 13 countries around the world, and 26

high-quality papers were accepted as oral or poster presentations. Each contributed paper was rigorously

peer-reviewed by reviewers who were drawn from a large pool of technical committee members as well

as other international reviewers in related fields.

The success of ICCRT 2019 depends on the contributions of many individuals and organizations. With

that in mind, we thank all authors who submitted work to the conference. The quality of submissions this

year remains high and we are satisfied with the quality of the results procedure. The organizing

committee also thanked the members of the Technical Planning Committee and the chairman of the

meeting for their strong support. The organizing committee is responsible for reviewers, who voluntarily

sacrifice valuable time to evaluate the manuscript and provide authors with useful feedback.

Finally, no conference will succeed without the strong support of its participants. We would like to

thank all the authors and attendees for participating in the conference. We wish you have a stimulating

and fruitful time at the conference, and memorable experience in Jeju Island.

ICCRT Conference Committee

December 12-14, 2019

۷I

Conference Committees

International Advisory Committee

Derong Liu, University of Illinois at Chicago, USA / Guangdong University of Technology, China

General Chairs

Andrew Ragai Henry Rigit, Universiti Malaysia Sarawak, Malaysia Ning Xiong, Mälardalen University, Sweden

Program Chairs

Youmin Zhang, Concordia University, Canada Christos Spitas, Nazarbayev University, Kazakhstan

Technical Committees

M. Chadli, University of Paris Saclay, France

Piotr Kulczycki, Polish Academy of Sciences, Poland

Justin DAUWELS, Nanyang Technological University, Singapore

Gheorghe-Daniel Andreescu, University Politehnica Timisoara, Romania

Eduardo Manuel Godinho Rodrigues, Management and Production Technologies Northern Aveiro, Portugal

Syuan-Yi Chen, National Taiwan Normal University, Taiwan

Lei Meng, Nanyang Technological University, Singapore

Ibrahim Sultan, Federation University, Australia

Ankur Singh Bist, KIET, Ghaziabad, India

Ying-Hao Yu, National Chung Cheng University, Taiwan

Muhammad M. A. S. Mahmoud, Baku Higher Oil School, Azerbaijan

Chia Kim Seng, Universiti Tun Hussien Onn Malaysia, Malaysia

Muhamad Mat Noor, University Malaysia Pahang, Malaysia

Mohamed Arezki MELLAL, M"Hamed Bougara University (UMBB), Boumerdès, Algeria

Juan Manuel Corchado Rodríguez, University of Salamanca, Spain

Yas Alsultanny, Arabian Gulf University, Bahrain

Ashraf Darwish, Helwan University, Egyp

Muhammad Abdullah Adnan, Bangladesh University of Engineering and Technology, Bangladesh

Nopparat Seemuang, King Mongkut's University of Technology North Bangkok, Thailand