## 2022 8th International Conference on Mechatronics and Robotics Engineering (ICMRE 2022)

Munich, Germany 10 – 12 February 2022



IEEE Catalog Number: CISBN: 9'

CFP22W13-POD 978-1-6654-8378-0

## Copyright © 2022 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:
 CFP22W13-POD

 ISBN (Print-On-Demand):
 978-1-6654-8378-0

 ISBN (Online):
 978-1-6654-8377-3

#### 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



# 2022 The 8th International Conference on Mechatronics and Robotics Engineering ICMRE 2022

### **Table of Contents**

Prefacevii	
Conference Committeesvii	i
Chapter I: Thermal Engineering Theory and	
Modelling	
A Predictive Model of Spindle Thermal Error Based on DCGAN	
Junhao Shi	
Research on Brake Thermal Simulation Technology Based on Heat Flux Theory	
Peiyu Wang, Haiyan Shen, Rui Dou, Qu Ye, Miao Yu, Qin Xu	
Quality Prediction of Plasticizing and Molding Process of Single-Based Gun Propellant Based on	
GG-KECA-RVM Multi-Stage Model Fusion	
Mingyi Yang, Zhigang Xu, Junyi Wang, Tingjiang Yu, Shubo Chen	
Chapter II: Dynamics and Power Engineering	
Sample-Efficient Multimodal Dynamics Modeling for Risk-Sensitive Reinforcement Learning 21	
Ryota Yashima, Akihiko Yamaguchi, Koichi Hashimoto	
Comparative Study on Vehicle Dynamics Behavior Using different Types of Controllers in Intersection	
Management Systems	
Mostafa K. Ghaith, Mohamed M. Rehaan, N Shouman, Y Abdalla, Omar M. Shehata	
Autonomous Customized Quadrotor With Vision-Aided Navigation For Indoor Flight Challenges 33	

Wang Yongtian, Toh Yan Jie, Seo Gimin, Leck Bing Yu Kenny and Sutthiphong Srigrarom
Research on Modeling and Simulation Technology of Bidirectional Self Increasing Drum Parking Brake
Based on AMESim
Cuiping Jia, Kai Li, Le Kang, Song Gao, Qin Xu, Wen Wang
Chapter III: General Mechanical Theory and
Control Engineering
Application of Hardware-in-the-Loop Simulation for the Development and Testing of Advanced Control
Systems for Joint Wear Simulators
Kaushikk Iyer, David Keeling, Richard M Hall
Deep Belief Network-based Prediction for Gear Noise
Long Liu, Bin He, Dong Zhang, Hangyu Mao
Design of Haptic Vibrational Feedback Control in Upper Extremity Myoelectric Prostheses
Juan Diego Aguirre Cangalaya, José Antonio Cruz Anchiraico, Sliver Ivan Del Carpio Ramirez,
Sario Angel Chamorro Quijano, Deyby Huamanchahua
Learning and Predicting Center of Mass through Manipulation and Torque Sensing60
Sean McGovern, Jing Xiao
Research on Life Prediction Technology of Friction Plate Based on Public Road Braking Load Theory
67
Cuiping Jia, Rui Dou, Renjie Sun, Jie Liu, Qu Ye, Mingyue Zhou
Predicting the Remaining Life of Lithium-ion Batteries Using a CNN-LSTM Model73
Alireza Rastegarpanah, Yuan Wang, Rustam Stolkin
3D Guidance Navigation and Human-Robot Shared Control for Motor Graders in Field Operation 79
Peng Qi, Liang Gong
Chapter IV: Intelligent Robot Design and
Control
Robot Grasping Based on RGB Object and Grasp Detection Using Deep Learning

Reynaldo Cruz Villagomez, Jhon Ordoñez	
Parameter Identification and Control of a Ball Balancing Robot	91
Mahmoud A. Alyousify, Hossam S. Abbas, Mohamed M. M. Hassan, Mohamed H. Amin	
A Framework for Robotic Path Planning Based on Enhanced Fluid Potential Dynamical Models	98
Hussein M. Fawzy, Hisham M. El-Sherif, Gerd Baumann	
Design of a Haptic Interface Based on Cable Robot and Ultrasonic Transducers Array	106
Liqiang Fan, Aiguo Song, Haochen Zhang	
Open-Source Educational Platform for FPGA Accelerated AI in Robotics	112
Nicolaj Malle, Emad Ebeid	
Control of Redundant Flexible Manipulators with Redundancy Resolution	116
Dipendra Subedi, Ilya Tyapin and Geir Hovland	
Structure Design and Motion Control of a Hybrid Quadruped Robot with Wheels and Legs	122
Haolin Zhang, Zheming Zhuang, Wei Wei, Yuntao Guan, Jinfu Li, Jiansheng Dai	
Distributed Self-organized Collective Motion Control with Layered Structure for Robot Swarm	129
Truong Nhu, Pham Duy Hung, Trung Dung Ngo	
Chapter V: Information Theory and Information Systems	
The Rapidly Exploring Random Tree Funnel Algorithm	136
Ole Petter Orhagen, Marius Thoresen, Kim Mathiassen	
Universal Sinhala Library: Language Specific Encryption Platform for Sinhala Language	144
Dinindu Koliya Harshanath Webadu Wedanage, Samantha Thelijjagoda	
Prediction method of 5G high-load cellular based on BP neural network	148
Beibei Zhao, Tairan Wu, Fang Fang, Lin Wang, Wenzhang Ren, Xu Yang, Zhangjing Ruar	n, Xuejin
Kou	
Evolutionary Optimization of Multi-step Dynamic Systems Learning	152
Edgar Ademir Morales Perez, Hitoshi Iba	
Experimental Evaluation of the Deterministic Wireless Communication System Industrial LTE	157

## **Chapter VI: Image processing and application**

Construction and Analysis of Balance Ability Test Model Based on Multi-modal Parameters 163
Yao Dai, Wei Meng, Nan Xia, Quan Liu, Qingsong Ai
Feature-Based Lane Detection Algorithms for Track Following: A Comparative Study
Ahmed Hashem, Thomas Schlechter
A Web-based Mixed Reality Interface Facilitating Explicit Agent-oriented Interactions for Human-Robot
Collaboration
Joe David, Eeva Järvenpää, Andrei Lobov
A View Planning Method for 3D Reconstruction with Unknown Feature Prediction
Yanzi Kong, Feng Zhu, Haibo Sun, Lin Zhiyuan, Qun Wang, Jianyu Wang
Radioactive Waste Barrel Localization Based on Concentric Circle Detection with Edge
Pre-Classification and Randomized Hough Transform
Zhongjie Yu, Hancheng Yu, Chen Tong, Yuhao Lv
Learning Fruit Class from Short Wave Near Infrared Spectral Features, an Al Approach Towards
Determining Fruit Type
Ayesha Zeb, Waqar S. Qureshi, Abdul Ghafoor, Dympna O' Salivan