

2025 31st International Conference on Mechatronics and Machine Vision in Practice (M2VIP 2025)

**Taguig, Philippines
27-30 August 2025**



**IEEE Catalog Number: CFP25141-POD
ISBN: 979-8-3315-6945-7**

**Copyright © 2025 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:	CFP25141-POD
ISBN (Print-On-Demand):	979-8-3315-6945-7
ISBN (Online):	979-8-3315-6944-0
ISSN:	2996-4156

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

Title	Authors	Page #
Evaluating Generative Learning Approaches for Cylindrical Battery Thermographic Image Synthesis	Shanling Ji (Southeast University, China), Zhisheng Zhang (Southeast University, China), Jianxiong Zhu (Southeast University, China), Haiying Wen (Southeast University, China), Min Dai (Southeast University, China), Zhijie Xia (Southeast University, China)	1
Object Detection for Facial and Tongue Regions Based on Improved YOLOv10	Xiewei Sun (Southeast University, China), Zhijie Xia (Southeast University, China), Zhisheng Zhang (Southeast University, China), Min Dai (Southeast University, China), Haiying Wen (Southeast University, China), Kenny Jin (Nanjing Zhenhuan Intelligent Equipment Co, Ltd, China)	7
Towards a Robotic in Vitro Testing of Intra-gastric Balloons - Challenges and Opportunities from a Robotics Perspective	Siqi Jiang (University of Auckland, New Zealand), Shahab Kazemi (University of Auckland, New Zealand), Martin Stommel (University of Auckland, New Zealand), Leo Cheng (University of Auckland, New Zealand), Weiliang Xu (The University of Auckland, New Zealand)	14
Simulation and Experimental Investigation of the Ball Motion of a Rotationally-Launched Tennis Ball Serving Machine	Mengquan Liu (Southeast University, China), Han Liang (Southeast University, China)	19
Miniaturized Design of Electromagnetic Acoustic Transducer and Its Application in Defect Detection	Fang Wang (Southeast University, China), Feng Yang (Southeast University, China), Jie Li (Nanjing University of Posts and Telecommunications & College of Automation, China), Chunlei Tu (Special Equipment Safety Supervision Inspection Institute of Jiangsu Province, China), Mengqian Tian (Southeast University, China), Xingsong Wang (Southeast University, China)	25
A Dual-Layer Control System for Three-Vehicle Collaborative Handling Based on MPC	Xin Wang (Southeast University, China), 吕春霖 吕 (东南大学, China), Yuhang Liu (Southeast University, China), Ziyu Yan (Southeast University, China), Chibin Zhang (Southeast University, China)	32
Innovative Digital Pinch Strength Acquisition System Based on Flexible Pressure Sensors for Stroke Patients	Bo Sheng (Shanghai University, China), Shuyang Li (Shanghai University, China), Jingsong Wu (Fujian University of Traditional Chinese Medicine, China), Aiqin Liu (University of Leeds, United Kingdom (Great Britain)), Sheng Quan Xie (University of Leeds, United Kingdom (Great Britain)), Jing Tao (Shanghai University, China)	40

Title	Authors	Page #
Research on Lightweight Semantic Segmentation Method Based on Attention Mechanism	Zihao Zheng (Southeast University, China), Mujiao Ouyang (Southeast University, China), Xiaoguo Zhang (SouthEast University, China)	45
Decoding Continue Trajectory of Hand Circular Motion from EEG Signals	Haizhi Zhao (Southern University of Science and Technology & 南方科技大学, China), Xiaohan Lu (Southern University of Science and Technology, China), Yifeng Chen (Southern University of Science and Technology, China), Mingming Zhang (Southern University of Science and Technology, China)	51
Embedded Bearing Fault Diagnosis Based on SP-WDCNN	Xinyu Zhu (Southeast University, China), Min Dai (Southeast University, China), Zhisheng Zhang (Southeast University, China), Zhijie Xia (Southeast University, China), Haiying Wen (Southeast University, China), Xiewei Sun (Southeast University, China)	59
Age-Related Differences in Gait Strategies Under Dual-Task Conditions: a Pilot Study	Yuxin Huang (Fujian University of Traditional Chinese Medicine, China)	65
A Multiscale Convolutional Fusion Riemannian Manifold Learning Method for EEG Decoding	Chuan Deng (Northeastern University & Shenyang Institute of Automation, Chinese Academy of Sciences, China), Yaqi Chu (Shenyang Institute of Automation, Chinese Academy of Sciences, China), Xuejian Wu (Shenyang Institute of Automation, Chinese Academy of Sciences, China), Yang Luo (Shenyang Institute of Automation, Chinese Academy of Sciences, China), Yiwen Zhao (Shenyang institute of automation Chinese Academy of Sciences, China), Xingang Zhao (Shenyang Institute of Automation, Chinese Academy of Sciences, China)	71
Motion Control of a Variable-Stiffness Slender Robot for Internal Inspection of Special Equipment	Can Liu (Southeast University, China), Linjie Dong (Southeast University, China), Zhiquan Chen (Southeast University, China), Renfei Zhang (Southeast University, China), Mengqian Tian (Southeast University, China), Xingsong Wang (Southeast University, China)	77
Learning Multiple Receptive Fields for Few-Shot Image Classification	Yi Liao (Griffith University & GU, Australia), Nick Nikzad (Griffith University, Australia), Jue Zhang (Griffith University, Australia), Weichuan Zhang (Shaanxi University of Science and Technology, China), Yongsheng Gao (Griffith University, Australia)	85
Fruit Recognition and Localization for Robotic Harvesting Based on an Improved YOLOv11 Model	Jun Nie (Southeast University, China), Mengqian Tian (Southeast University, China), Zhiquan Chen (Southeast University, China), Xingsong Wang (Southeast University, China), Hao Qin (Southeast University, China), Chunkai Cao (Southeast University, China)	93

Title	Authors	Page #
Design and Analysis of Bioinspired Soft Body Morphing Quadcopter	Keyu Wan (California Institute of Technology, USA)	99
Active Compliance Control of Autonomous Excavators Based on Fuzzy Adaptive Impedance Control	Xiaowei Zhang (Southeast University, China), Zhisheng Zhang (Southeast University, China), Yazhou Yao (Southeast University, China), Bo Yang (Southeast University, China), Fang Jia (Southeast University, China), Haiying Wen (Southeast University, China)	105
Designing a Collection of Portable Image Enhancement for Smartphones	Jean Louis Lance Y Cabrera (De La Salle University, Philippines), Kenshin G Fetalvero (De La Salle University, Philippines), Brian P Gabini (De La Salle University, Philippines), Jeremy Cerwin C Wang (De La Salle University, Philippines), Neil Patrick Del Gallego (De La Salle University, Philippines)	112
An Intelligent Approach for Asphalt Pavement Density Measurement Based on Artificial Neural Network and Principal Component Analysis	Muyang Li (Auckland University of Technology, New Zealand), Loulin Huang (Auckland University of Technology, New Zealand)	119
Evaluation of Digital Twin Interface Layout Based on Aesthetics and Analytic Hierarchy Process	Bowen Gu (Southeast University, China), Zhisheng Zhang (Southeast University, China), Wenyu Wu (Southeast University, China), Zhijie Xia (Southeast University, China)	125
Intelligent Action-Based Fraud Detection System for Monitoring Emissions Testing in Motor Vehicle Inspection	Pierre Vincent C Hernandez (De La Salle University, Philippines), Frances Danielle B Solis (De La Salle University, Philippines), Jose Anton S Alonzo (De La Salle University, Philippines), Hiroki M Asaba (De La Salle University, Philippines)	129
Towards a Real-Time Overlapping Multi-Camera Single-Target Tracking System with Feature-Based Camera Selection	Jan Carlo S. Roleda (De La Salle University, Philippines), Airon John Cruz (De La Salle University, Philippines), Michael Robert Geronimo (De La Salle University, Philippines), Joel P Ilao (De La Salle University, Philippines)	137
Novel Discharge Coefficient C_d Model for Venturi Flow Meter Using Refined Kerosene (Jet-A1-Fuel) as the Working Fluid	Zarrar Haider (Brookfield Villages & UCC, Ireland), Umer Niaz (PIEAS, Pakistan), Wasi Hyder (UTM, Malaysia)	145
An Improved Discharge Coefficient Model for Sharp-Edged Orifice Meter: Experimental Validation of Reader-Harris-Gallagher Equation at High Reynolds Numbers	Zarrar Haider (Brookfield Villages & UCC, Ireland), Umer Niaz (PIEAS, Pakistan), Wasi Hyder (UTM, Malaysia)	152

Title	Authors	Page #
Class-Incremental Learning for Myoelectric Locomotion Modes Prediction: Evaluating Replay Strategies Against Catastrophic Forgetting	Hanchun Lin (Southern University of Science and Technology, China), Xiaonan Xu (Southern University of Science and Technology, China), Binbin Luo (Southern University of Science and Technology, China), YiYuan Yuan (Southern University of Science and Technology, China), Yuyang Zhang (Southern University of Science and Technology, China), Yuzhou Lin (Southern University of Science and Technology, China), Mingming Zhang (Southern University of Science and Technology, China)	159
Research on the Aesthetic Perception of Color Temperature in Urban Waterfront Nightscape Lighting Interfaces: a Virtual Reality Experiment Approach	Xiaoxiao Wang (Southeast University, China), Yu Zhang (Southeast University, China), Jing Li (Nanjing Forestry University, China), Ziyi Zhang (Southeast University, China), Ying Luo (Southeast University, China), Chengqi Xue (Southeast University, China)	166
Design and Performance Research of a Miniature Electromagnetic Induction Heating System	Mingxia Wang (Qingdao Etsong Technology Company, China), Shihao Song (Qingdao Yizhong Technology, China), Zonglai Mo (Nanjing University of Science and Technology, China)	174
Maximum Temperature Control of a Ceramic-Alloy Mixed Resistance Heater	Zhen Liu (Qingdao Etsong Technology Company, China), Shihao Song (Qingdao Yizhong Technology, China), Zonglai Mo (Nanjing University of Science and Technology, China)	179
Miniature Electromagnetic Induction Heating System Based on Low-Voltage Lithium Battery	Mingxia Wang (Qingdao Etsong Technology Company, China), Shihao Song (Qingdao Yizhong Technology, China), Zonglai Mo (Nanjing University of Science and Technology, China)	185
Advances and Challenges in Gesture Recognition and Sign Language Recognition: a Comprehensive Review	Yuvi Darmayunata (Universitas Amikom & Universitas Lancang Kuning, Indonesia), Arief Setyanto (Universitas AMIKOM Yogyakarta, Indonesia), Ema Utami (Universitas AMIKOM Yogyakarta, Indonesia), Kusri Kusri (Universitas AMIKOM Yogyakarta, Indonesia)	191
The Role of Auditory eHMI: How Does It Influence Communication Between Highly Automated Vehicles and Pedestrians?	Yu Ding (Southeast University & 东南大学, China), Xiaojun Liu (Southeast University, China)	197
Comparative Analysis of Model-Based and Model-Free Control Strategies for Viscoelastic Dielectric Elastomer Actuator	Jisen Li (Shenzhen Institute of Artificial Intelligence and Robotics for Society & Chinese University of Hong Kong, Shenzhen, China), Anjing Cheng (Chinese University of Hong Kong, Shenzhen & Shenzhen Institute of Artificial Intelligence and Robotics for Society, China), Jian Zhu (Chinese University of Hong Kong, Shenzhen, China)	204

Title	Authors	Page #
Hierarchical Planning for Dual Mechanical Arms Cooperative Fruit Picking	Chunkai Cao (Southeast University, China), Pengyu Wu (Southeast University, China), Jun Nie (Southeast University, China), Xingsong Wang (Southeast University, China), Mengqian Tian (Southeast University, China), Fang Jia (Southeast University, China)	208
Research on Flying Car HUD Display Design Under Complex Environmental Coupling	Yida Li (Southeast University, China), Mo Jingwen (Southeast University, China), Zhao Hua (Southeast University1, China)	214
Navigation Scheme of Tracked Robots Based on LiDAR SLAM and Improved a* Algorithm	Tingqiao Ren (Southeast University, China), Linjie Dong (Southeast University, China), Junfei Wang (Southeast University, China), Mengqian Tian (Southeast University, China), Guoping Zhao (Southeast University, China), Xingsong Wang (Southeast University, China)	219
Flexible Laser-Ablated Electrodes for Slender Robotic Applications: Spinal Cord Signal Acquisition and Neural Interfacing	FeiFei Wang (Southeast University, China), Qing Dong (Southeast University, China), Xiangxin Xie (Southeast University, China), Guoping Zhao (Southeast University, China), Mengqian Tian (Southeast University, China), Xingsong Wang (Southeast University, China)	226
Research on ROS Robot Path Planning by Integrating and Improving a* and DWA* Algorithms	Jiahao Yu (Southeast University, China), Zhisheng Zhang (Southeast University, China), Min Dai (Southeast University, China), Zhijie Xia (Southeast University, China), Haiying Wen (Southeast University, China), Ligu Shuai (Henan Institute of Science and Technology & Southeast University, China)	232
Temporal Deep Learning Anomaly Detection for Pedestrian Accident Detection in Video Surveillance	Gio Philip D. Estrada (De La Salle University, Philippines), Ar Jetherson T. Go (De La Salle University, Philippines), Jose Raphael E. Martinez (De La Salle University, Philippines), Josh Austin Mikhail T. Natividad (De La Salle University, Philippines), Jonathan Cempron (De La Salle University-Manila, Philippines)	238
Research on a Systematic Design Framework Based on Kansei Engineering: an Empirical Study of Laser Levels	Guangyuan Peng (Southeast University, China), Mingrui Li (Southeast University, China), Wenyu Wu (Southeast University, China)	243
The Optimization Method of Digital Twin Interface Based on Kano Model and House of Quality	Chuyi Zhang (Southeast University, China), Xingsong Wang (Southeast University, China), Mengqian Tian (Southeast University, China)	250
Mobile WiFi Time-of-Arrival-Based Localization Using ESP32-S2	Clement Ong (De La Salle University, Philippines), Kyra L Choa (De La Salle University, Philippines)	255

Title	Authors	Page #
Trajectory Tracking of Yoshimura-Origami Continuum Manipulator with LSTM-Attention Network	Jiaqing Qi (Nankai University, China), Jinyu Du (Nankai University, China), Yu Dang (Nankai University, China), Tianyu Jiang (China), Jianda Han (Nankai University, China)	263
A Method for Representing Motion Intentions of Flying Robots Utilizing Light Signals	Ma Ruihong (Southeast University, China), Chunhui Wang (China Astronaut Research and Training Center, China), Zengyuan Yin (China Astronaut Research and Training Center, Hong Kong), Peng Teng (China Astronaut Research and Training Center, China), Xiaozhou Zhou (Southeast University, China), Xiaoqun Yu (Southeast University, China), Xiaoxiao Wang (Southeast University, China), Chengqi Xue (Southeast University, China), Shuqi Xue (China Astronaut Research and Training Center, China)	269
DS-SurgNet: Dense Scale-Aware Surgical Network	Haoqing Wu (Nanjing University of Aeronautics and Astronautics, China), Jiahao LI (Nanjing University of Aeronautics and Astronautics, China), Ke Ye (Nanjing University of Aeronautics and Astronautics, China), Bai Chen (Nanjing University of Aeronautics and Astronautics, China)	275
Algorithmic Perception of Emotion: a Multimodal Study on AI and Human Artistic Expression	Jiaxing Zhou (Southeast University, Nanjing, China), Wenyu Wu (Southeast University, China)	283
Impact of Auditory Takeover Wake-Up Direction on Drivers' Attention Allocation Under Dangerous Scenarios Based on Eye-Tracking	Bojia Zhang (Southeast University, China), Jingxin Zhu (System Design Institute of Hubei Aerospace Technology Research Academy, China), Weichi Huang (Southeast University, China), Yafeng Niu (Southeast University, China)	289
Pop-Up Design and Viewpoint Effects on Perceptual Efficiency and User Preference in Digital Twin Path Planning	Ai Liu (Southeast University, China), Xiaojun Liu (Southeast University, China), Wenyu Wu (Southeast University, China)	296
An Evaluation Method for the Layout of Industrial Digital Twin Monitoring Interfaces Based on Entropy Weight-TOPSIS	Lingyun Bi (Southeast University, China), Xiaojun Liu (Southeast University, China), Wenyu Wu (Southeast University, China)	302
Corrosion Monitoring Technology for Bellows in Petrochemical Pipelines	Zheng Yuhang Zheng, Yh (Southeast University, China), Liguu Shuai (Henan Institute of Science and Technology & Southeast University, China), Yuan Fen (China)	308
Design and Analysis Improvement of Bidirectional Liquid Inlet Non-Circular Gear Hydraulic Motor	Weiwen Liu (Southeast University, China), Juekuan Yang (Southeast University, China)	314

Title	Authors	Page #
Distribution Network Path Planning Combining a * and Ant Colony Optimization Algorithm	Pei Zhi-Gang (State Grid Shaoxing Power Supply Company, China), Zhong Tian-Cheng (State Grid Shaoxing Power Supply Company, China), Wenyu Wu (Southeast University, China), Yu Ding (Southeast University & 东南大学, China), Yingfeng Hu (Southeast University, China), Shang Wei (State Grid Shaoxing Power Supply Company, China), Liang Hao (State Grid Shaoxing Power Supply Company, China), Bian Fei-Ting (State Grid Shaoxing Power Supply Company, China)	321
Multimodal Sensors Integration in Robotic Mastication Simulator for Comprehensive Food Texture Analysis	Runji Zhao (The University of Auckland, New Zealand), Xudong Wang (The University of Auckland, New Zealand), Jaspreet Dhupia (The University of Auckland, New Zealand), Weiliang Xu (The University of Auckland, New Zealand)	327