2021 5th International Conference on Vision, Image and Signal **Processing (ICVISP 2021)**

Kuala Lumpur, Malaysia **18 – 20 December 2021**



IEEE Catalog Number: CFP21M46-POD **ISBN:**

978-1-6654-0835-6

Copyright © 2021 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:	CFP21M46-POD
ISBN (Print-On-Demand):	978-1-6654-0835-6
ISBN (Online):	978-1-6654-0770-0

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



2021 5th International Conference on Vision, Image and Signal Processing (ICVISP) ICVISP 2021

Table of Contents

Message from the General Chair	xiii
Message from the Program Chair	xiv
Organizing Committee	xv
Program Committee	
Steering Committee	xvii
Reviewers	xviii

Autonomous Vehicles

Ascertaining Factors Affecting Autonomous Driving in New Zealand - A Framework for HMI Design	1
Utilization and Potentials of Unmanned Aerial Vehicles (UAVs) in the Field of Automated Driving: A Survey Laurent Kloeker (RWTH Aachen University, Germany), Tobias Moers (fka GmbH, Germany), Lennart Vater (RWTH Aachen University, Germany), Adrian Zlocki (fka GmbH, Germany), and Lutz Eckstein (RWTH Aachen University, Germany)	9
Digital Identification of Vehicles not only for Investigative and Forensic Purpose	8
 Model Predictive Control for Reliable Path Following with Application to the Autonomous Vehicle and Considering Different Vehicle Models	7

 Scenario Based Simulation Testing of Autonomous Vehicle Using Malaysian Road
Mindful People's Preference for Different Services of Autonomous Vehicles in China
Route Planning Based on Street Criteria for Autonomous Driving Vehicles
 DRSTNet: A Robust Spatio-Temporal Network with Dilated Residual Convolutions for Lane Detection
Application of PREEvision Software to Realize Vehicle Functional Safety Development

Intelligent Transportation

Parameters Influencing the Subjective Evaluation of Traffic Stream by Drivers J. Kuklova (CTU in Prague, Czech Republic) and M. Matowicki (CTU in Prague, Czech Republic)	61
Identifying Factors to Improve the Coach Design and Service of the New-Type EMU Sleeper Train: Findings from Passenger Satisfaction Survey	66
Ze-Rui Xiang (Southwest Jiaotong University, China), Jin-Yi Zhi	00
(Southwest Jiaotong University, China), Jun-Hui Huang (CRRC Co., Ltd.,	
China), Ran Li (Southwest Jiaotong University, China), and Yong-Meng	
Wu (Southwest Jiaotong University, China)	
The Impact of Weather Conditions on Urban Bus Ridership Haibo Yu (Shanghai Jiao Tong University, China) and Hui Xu (Harbin Institute of Technology, China)	77
Analysis of Influencing Factors of Pilot Fatigue Based on Structural Equation Model Sun Ruishan (Civil Aviation University of China, China) and Xingchen Yan (Civil Aviation University of China, China)	82

Robotics

Self-Positioning for Mobile Robot Indoor Navigation Based on Wheel Odometry, Inertia
Measurement Unit and Ultra Wideband
Shuliang Zhang (University of Chinese Academy of Science, Space Robot Engineering Center Changchun Institute of Optics Fine Mechanics and Physics Chinese Academy of Science, China), Xiangquan Tan (Space Robot Engineering Center CAS Key Laboratory of On-orbit Manufacturing and Integration for Space Optics Systems, Changchun Institute of Optics Fine Mechanics and Physics Chinese Academy of Sciences, China), and Qingwen Wu (University of Chinese Academy of Science, Space Robot Engineering Center CAS Key Laboratory of On-orbit Manufacturing and Integration for Space Optics Systems, Changchun Institute of Optics Fine Mechanics and Physics Chinese Academy of Science, Space Robot Engineering Center CAS Key Laboratory of On-orbit Manufacturing and Integration for Space Optics Systems, Changchun Institute of Optics Fine Mechanics and Physics Chinese Academy of Sciences, China)
Research on Omnidirectional Indoor Mobile Robot System Based on Multi-Sensor Fusion
Comparison of Wake Oscillator Models with Different Damping Terms

Marine Transportation

Research on Transient Noise Analysis Method of Ship Based on AR Model	131
Zhang Hao (Dalian Scientific Test and Control Technology Institute,	
China), Wang Sande (Dalian Scientific Test and Control Technology	
Institute, China), Yu Tongkui (Dalian Scientific Test and Control	
Technology Institute, China), Zhang Bo (Dalian Scientific Test and	
Control Technology Institute, China), Lin Jin (Dalian Scientific Test	
and Control Technology Institute, China), and Liu Yanqiong (Dalian	
Scientific Test and Control Technology Institute, China)	
A Digital Twin Based Design of the Semi-Physical Marine Engine Room Simulator for Remote	100
Maintenance Assistance	. 137
Yanghui Tan (Tianjin University of Technology, China), Chunyang Niu (Rajijua Instituta of Sustam Engineering, China), Huj Tian (Dalisu	
(Beijing Institute of System Engineering, China), Hui Tian (Dalian Maritime Inizoratity, China), and Inndone Zhang (Dalian Maritime	
Maritime University, China), and Jundong Zhang (Dalian Maritime University, China)	
Anomaly Detection in Maritime Domain Based on Spatio-Temporal Analysis of AIS Data Using	140
Graph Neural Networks	142
Lubna Eljabu (Dalhousie University, Canada), Mohammad Etemad	
(Dalhousie University, Canada), and Stan Matwin (Dalhousie University,	
Canada)	

Monitoring Activities of Daily Living

Carbon-Dioxide Mitigation of Prefabricated Residential Buildings in China: an Urbanization-Based Estimation Jiali Bei (Central University of Finance and Economics, China), Zhiye Huang (Central University of Finance and Economics, China), and Yuan Chang (Central University of Finance and Economics, China)	148
The Relationship Between the Space Corridor and Pedestrian-Level Wind Environment Hongwei Zhang (Zhejiang University, China)	154
A Multi-Factor Comprehensive Model of Human Thermal Sensation in Free-Running Built Environment in Summer in Xi'an, China Wuxing Zheng (Northwestern Polytechnical University, China), Teng Shao (Northwestern Polytechnical University, China), and Yingluo Wang (Northwestern Polytechnical University, China)	158
Design and Implementation of Industrial γ Photon Detector for PET Application Yao Min (Nanjing University of Aeronautics and Astronautics, China), Gao Chaoyu (Nanjing University of Aeronautics and Astronautics, China), Zhao Min (Nanjing University of Aeronautics and Astronautics, China), and Liu Jian (Nanjing University of Aeronautics and Astronautics, China)	163
Front-end Electronics Design for Micro-Pattern Gas Detectors Based on VA140 Qibin Zheng (University of Shanghai for Science and Technology, China), Dongxue Zhao (University of Shanghai for Science and Technology, China), Jie Deng (University of Shanghai for Science and Technology, China), Xiaoli Xu (University of Shanghai for Science and Technology, China), and Ziyang Ou (University of Shanghai for Science and Technology, China)	.167

Development of a Droplet-Based Microfluidics Platform Toward Single-Cell Analysis
The Study of Methods to Improve the Accuracy of Glycemic Control Based on Statistical Methods
Arina Terenteva (Bauman Moscow State Technical University, Russia) and Maria Limorenko (Bauman Moscow State Technical University, Russia)
Environmental Monitoring
Sustainable Smart City Business Model Framework
Damage Identification Methods for Structural Health Monitoring of Super High-Rise
Buildings 188 Han Hu (Shaoguan University, China; Guangzhou Institute of Building Science Co., Ltd., China; South China University of Technology, China), Mengxiong Tang (Guangzhou Institute of Building Science Co., Ltd., China), Liejun Li (South China University of Technology, China), Hesong Hu (Guangzhou Institute of Building Science Co., Ltd., China), Hang Chen (Guangzhou Institute of Building Science Co., Ltd., China), Hang Chen (Guangzhou Institute of Building Science Co., Ltd., China), Zhuo Yang (Guangzhou Institute of Building Science Co., Ltd., China), and Xuan Ji (Guangzhou Institute of Building Science Co., Ltd., China) Reserve Co., Ltd., China)
Research on the Algorithmic Layout Optimization of Prefabricated Building's Exterior Wall Panels 193 Ge Song (Northwestern Polytechnical University, China), Yucheng Luo 193 (Northwestern Polytechnical University, China), Jialu Deng 190 (Northwestern Polytechnical University, China), Shan Su (Northwestern Polytechnical University, China), and Kun Zhang (Northwestern Polytechnical University, China) Polytechnical University, China)
Numerical Simulation of Winter Microclimate and Thermal Comfort of an Asymmetric Canyon in the Urban Square Area
Unified Physical Threat Monitoring System Aided by Virtual Building Simulation

Motion Analysis & Object Tracking

Cooperative Navigation and Autonomous Formation Flight for a Swarm of Unmanned Aerial	
Vehicle	212
Boudjit Kamel (University of Sciences & Technology Houari Boumediene,	
Algeria) and Ammi Oussama (University of Sciences & Technology Houari	
Boumediene, Algeria)	

Observability and Performance Analysis of Spacecraft Autonomous Navigation Using Stellar Aberration Observation 21 Li Muzi (Shanghai Aerospace Control Technology Institute, China), Sun 21 Jun (Shanghai Aerospace Control Technology Institute, China), Peng 21 Yang (Shanghai Aerospace Control Technology Institute, China), Peng 21 Jingxi (Shanghai Aerospace Control Technology Institute, China), Peng 21 Jingxi (Shanghai Aerospace Control Technology Institute, China), and Liu 21	18
Γ-Induced-Paired Dominating Graphs of Paths	24
The Measuring Method of Obtaining Dynamic Geometric Parameters of Precision Moving Parts 22 Sun Haiyang (Beijing Institute of Space Mechanics&Electricity, China), Zhai Fujun (Beijing Institute of Space Mechanics&Electricity, China), Zhang Ning (Beijing Institute of Space Mechanics&Electricity, China), Bi Jingjian (Beijing Institute of Space Mechanics&Electricity, China), and Han Zhijiun (Beijing Institute of Space Mechanics&Electricity, China), China)	29
 A Review of Metal Powder-CO2 Propulsion Technology	34
Multi-Scale Spatial-Temporal Transformer for 3D Human Pose Estimation	42

3-D and Surface Reconstruction

 Slope Deformation Analysis and Research Based on 3D Laser Scanning Technology Xiaofang Xue (Chongqing Jiaotong University, China), Jieming Guo (Chongqing Jiaotong University, China), Chunli Ying (Chongqing Smart City and Sustainable Development Academy, China), Yanhui Liu (Southwest Jiaotong University, China), Tong Guo (Southeast University, China), Qian Meng (OsloMet, Norway), Yupeng Yang (Fifth Engineering Company, China), and Daguang Han (OsloMet, Norway) 	. 248
Study on the Application of 3-D Laser Scanning BIM Technology in Optimization and	
Adjustment of Factory Pipeline System	. 253
Fan Chen (Chongqing Jiaotong University, Chongqing, China), Kaixin Hu	
(Chongqing Jiaotong University, Chongqing, China), Yupeng Yang (The	
Fifth Engineering Company of China Railway 16th Bureau, China), Chunli	
Ying (Chongqing Smart City and Sustainable Development Academy,	
China), Yanhui Liu (School of Civil Engineering, Southwest Jiaotong	
University, China), Tong Guo (School of Civil Engineering, Southeast	
University, China), Qian Meng (TKD, OsloMet, Norway), and Daguang Han	
(School of Technology & Art and Design, OsloMet, Norway)	
Complete Graphs and Bipartite Graphs in a Random Graph Lijin Feng (University College London, United Kingdom) and Jackson Barr (University College London, United Kingdom)	259

A Three-Coordinate Measuring Method for the Surface Shape and Geometric Parameters of
Aspheric Mirrors
Luo Xiaokui (Beijing Institute of Space Mechanics & Electricity, China), Sun Haiyang (Beijing Institute of Space Mechanics & Electricity, China), Zhang Ning (Beijing Institute of Space Mechanics & Electricity, China), Han Zhijun (Beijing Institute of Space Mechanics & Electricity, China), and Bi Jingjian (Beijing Institute of Space Mechanics & Electricity, China)
Research on Multi-Background Camouflage Pattern Design Method Based on Feature Fusion 274 Haibo Fang (Harbin Engineering University, China), Ruihui Peng (Harbin Engineering University, China), Xianggang Sha (Harbin Engineering University, China), and Yongsheng Lv (Harbin Engineering University, China)
Vein Visualization Based on Deep Learning with a Smartphone

Signal Processing Algorithms

Evaluation of Mutations and Their Various Combinations with Crossing Operators in Genetic Algorithms <i>M V Andreiashchenko (Bauman Moscow State Technical University,</i> <i>Russia), O V Zudina (Bauman Moscow State Technical University,</i> <i>Russia), and D E Sheronov (Bauman Moscow State Technical University,</i> <i>Russia)</i>	. 292
Visual Analytics for the International Trade Haowen Jiang (Shenzhen College of International Education), Jiadong Shen (Wlsa Shanghai Academy), Qiujie Chou (Stockholm School of Economics), Ziling Dong (Xi'an Jiaotong-liverpool University), and Shenghui Cheng (Westlake University)	296
 Numerical Simulation of Fracture Propagation in Bedded Shale Based on Cohesive Zone Model Zhitao Yan (Shengli Oilfield Dongsheng Jinggong Petroleum Development Group Co., Ltd., China), Qiang Wang (Southwest Petroleum University, China), Haining Liu (Shengli Oilfield Dongsheng Jinggong Petroleum Development Group Co., Ltd., China), Shouxing Kang (Shengli Oilfield Dongsheng Jinggong Petroleum Development Group Co., Ltd., China), Liping Zhang (Shengli Oilfield Dongsheng Jinggong Petroleum Development Group Co., Ltd., China), and Haiyang Sun (Shengli Oilfield Dongsheng Jinggong Petroleum Development Group Co., Ltd., China) 	302

 An Effective Contrast Enhancement Approach for Wide Dynamic Range Image	307
Design of 320×256-30um DI Medium and Short Wave Two-Color IRFPA Readout Circuit Qi Liu (Southeast University, China), WeiFeng Sun (Southeast University, China), and SiYang Liu (Southeast University, China)	313
 Hang Li (Automotive Data of China Co., Ltd., China Automotive Technology and Research Center, China), Di Xiong (Automotive Data of China Co., Ltd., China Automotive Technology and Research Center, China), Yan Wang (Automotive Data of China Co., Ltd., China Automotive Technology and Research Center, China), Xin Ma (Automotive Data of China Co., Ltd., China Automotive Technology and Research Center, China Co., Ltd., China Automotive Technology and Research Center, China Co., Ltd., China Automotive Technology and Research Center, China), and Qianqian Zhu (Automotive Data of China Co., Ltd., China Automotive Technology and Research Center, China) Stress Assessment Using Facial Image Imprint 	318 324
Kan Hong (Jiangxi University of Finance and Economics, China)	

Author Index	
--------------	--