2024 3rd International Conference on Artificial Intelligence, Human-Computer Interaction and Robotics (AIHCIR 2024)

Hong Kong, China
15-17 November 2024

IEEE Catalog Number: CFP24UU9-POD
ISBN: 979-8-3315-3404-2

Copyright © 2024 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: CFP24UU9-POD
ISBN (Print-On-Demand): 979-8-3315-3404-2
ISBN (Online): 979-8-3315-3403-5

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

2024 3rd International Conference on Artificial Intelligence, Human-Computer Interaction and Robotics (AIHCIR)

AIHCIR 2024

Table of Contents

Preface ..... **xiii**
Organizing Committee ..... **xiv**

2024 3rd International Conference on Artificial Intelligence, Human-Computer Interaction and Robotics

Research on Bi-Directional Collaborative Multi-Step Ant Colony Optimization for Path Planning 1
Xufei Chen (Anhui Normal University, China), Yaowei Hu (Anhui Normal University, China), Junhao Li (Anhui Normal University, China), Pingping Tang (Anhui Normal University, China), Hongzhu Xi (Anhui Huadong Photoelectric Technology Research Institute Co., Ltd., China), Xiaoming Liu (Anhui Normal University, China), and Linyun Yang (Anhui Normal University, China)

Effects of Hazard Perception Training on Driving Behavior: An fNIRS-Based Assessment 7
Xiaochuan Zou (Shenzhen Technology University, China), Peijiang Zhang (Shenzhen Technology University, China), Tao Cheng (Shenzhen Technology University, China), and Jingxuan Fan (Shenzhen Technology University, China)

FCTTS : A Lightweight TTS Model with Faster Decoder and Conditional Flow Matching 14
Kai Zhang (Yunnan University, China), Jian Yang (Yunnan University, China), and Rui Zou (Yunnan University, China)

Applied Research on VR-Based Immersive Interactive Environment for Supporting Warehouse Management 19
Tianlun Yang (NingboTech University, China), Anhai Yao (Zhejiang Sci-Tech University, China), Jiequn Guo (Ningbo China Institute for Supply Chain Innovation, China), Georgios Kapogiannis (AFG with The University of Aberdeen, Qatar), Byung-Gyoo Kang (University of Nottingham Ningbo China, China), and Zuyao Wang (NingboTech University, China)

Research on Multi-PLC Node Collaborative Programming Technology 25
Xiaowang Guo (Intelligence Technology Of CEC Co., LTD., China), Dezheng Zhao (Intelligence Technology Of CEC Co., LTD., China), and Qiwei Zhao (Intelligence Technology Of CEC Co., LTD., China)

Improvement on Oversampling Method for Imbalanced Data 31
Xinyue Wang (Beijing University of Technology, China)

Vision-and-Language Navigation Generative Pretrained Transformer 38
Shijie Guo (Hubei University, China), Ming Zhu (Hubei University, China), Jiawei Zhang (Hubei University, China), Hang Min (Hubei University, China), and Wei Zhu (Hubei University, China)

A Lip-Reading Recognition Method that Integrates a 3D Dual-Stream Convolutional Neural Network 43
Zheng Xing Huang (Xinjiang University, China), Mutellip Mamut (Xinjiang University, China), Ghalip Ibrahim (Xinjiang University, China), Nurbiya Yadikar (Xinjiang University, China), and Kurban Ubul (Xinjiang University, China)

Integrated Approach for Cross-Modal Brain Activity Classification Through Manual Feature Extraction 49
Peijiang Zhang (Chang'an University, China) and Xiaochuan Zou (Shenzhen Technology University, China)

Research on Human-Computer Interaction Assistance Technology Based on the Fusion of Eye Movement and Mouse 56
Jing Fang (China Institute of Marine Technology and Economy, China; National Key Laboratory of Human Factors Engineering, China), Guofang Wang (China Institute of Marine Technology and Economy, China; National Key Laboratory of Human Factors Engineering, China), Lulu Jiang (China Institute of Marine Human Factors Engineering, China; National Key Laboratory of Human Factors Engineering, China), QianFei Chen (China Institute of Marine Technology and Economy, China; National Key Laboratory of Human Factors Engineering, China), Ning Li (China Institute of Marine Technology and Economy, China; National Key Laboratory of Human Factors Engineering, China), and Eryang Gao (China Institute of Marine Technology and Economy, China; National Key Laboratory of Human Factors Engineering, China)

Facial Emotion Detection Research Based on an Improved Multi-Modal LLM 61
Bilu Li (China Academy of Information and Communications Technology, China), Mandi Luo (China Academy of Information and Communications Technology, China), and Dakun Zhang (China Academy of Information and Communications Technology, China)

An Offline Handwritten Uyghur Dataset for Document Image Recognition and Retrieval 67
Aixun Liu (Xinjiang University, China), Xuebin Xu (Xinjiang University, China), Nurbiya Yadikar (Xinjiang University, China), and Kurban Ubul (Xinjiang University, China)

Research on Safety Status Recognition Model of Commercial Vehicle Driving Behavior 73
Yunshuang Zheng (China Auto Information Technology (Tianjin) Co., Ltd., China), Huajun Wang (China Auto Information Technology (Tianjin) Co., Ltd., China), Bin Wang (China Auto Information Technology (Tianjin) Co., Ltd., China), and Pengfei Yuan (China Transport InfoJet Technologies Co., Ltd, China)

A Two-Stage 3D Human Pose Estimation Model Based on Transformer 78
Ningfei Zhang (Inner Mongolia University of Science and Technology, China), Jianjun Li (Inner Mongolia University of Science and Technology, China), and Xiaojian Pan (Inner Mongolia University of Science and Technology, China)

Efficient Tensorial Multi-View Clustering Based on Matrix Factorization 83
Tao Zhang (Yangzhou University, China), Yan Qin (Yangzhou University, China), Enze Zhang (Yangzhou University, China), and Chao Yang (Yangzhou University, China)

Multimodal Non-Local Means with Adaptive Regularizer 89
Jie Chen (Library of Liaocheng University, China) and Hongyan Han (Liaocheng University, China)

H∞ Tracking Control Design of Networked Mobile Robot with Transmission Delay 94
Zhiyue Zhou (Guangdong University of Technology, China), Suiwu Zheng (Chinese Academy of Sciences, China), Shanlin Zuo (Sichuan University of Science and Engineering, China), and Jie Wang (University of Science and Technology Beijing, China)

Ankle Gestures Recognition with Wearable A-Mode Ultrasound 100
Jun Wu (Fuzhou University, China), Zhisong Fan (Fuzhou University, China), Xiaolin Zhu (Fuzhou University, China), and Zongxing Lu (Fuzhou University, China)

Path Planning for Robot with a Parallel Sampling RRT Algorithm and Trajectory Optimization 105
Yaowei Hu (Anhui Normal University, China), Xufei Chen (Anhui Normal University, China), Xiao Wang (Anhui Normal University, China), Pingping Tang (Anhui Normal University, China), Hongzhu Xi (Anhui Huadong Photoelectric Technology Research Institute Co., Ltd., China), Youhong Feng (Anhui Normal University, China), and Guoqing Dong (Anhui Normal University, China)

AECodec : High Fidelity Neural Audio Codec Based on Speech and Electroglottograph 111
Lingfeng Zhang (Beihang University, China), Lijiang Chen (Beihang University, China), Yuye Su (Beihang University, China), Chunfeng Cui (Beihang University, China), and Qi Zhao (Beihang University, China)

Design and Development of Multi Source 3D Data Visualization and Acceptance Platform for Power Engineering Based on Cesium 116
Hui Wu (Fujian Yili Construction Engineering Co., Ltd., China), Jianglin Lu (Fujian Yili Construction Engineering Co., Ltd., China), Fei He (Fujian Yili Construction Engineering Co., Ltd., China), Huang Zhou (Fujian Yili Construction Engineering Co., Ltd., China), Yujie Tang (Fujian Yili Construction Engineering Co., Ltd., China), and Lanyi Peng (Fujian Yili Construction Engineering Co., Ltd., China)

Research on the Mechanism and Impact Effect of Intelligent Pressure Control Dry Powder Fire Extinguishing Based on Intelligent Fire Fighting Devices 121
Shengli Chu (Ministry of Emergency Management, P. R. China), Siyang Wang (College of Safety and Ocean Engineering University of China University of Petroleum, Beijing; Ministry of Emergency Management, P. R. China), Shuli Jin (Ministry of Emergency Management, P. R. China), Linsen Xiong (Ministry of Emergency Management, P. R. China), Yixin Liu (College of Safety and Ocean Engineering University of China University of Petroleum, Beijing; Ministry of Emergency Management, P. R. China), Yifan Gan (Ministry of Emergency Management, P. R. China), and Wenpei Zheng (College of Safety and Ocean Engineering University of China University of Petroleum, Beijing; Ministry of Emergency Management, P. R. China)

Elevating Perception: Blobs-Based Dehazing with Image Enhancement using Mask-Guided Fully Convolutional Networks and Multi-Scale Label Smoothing 128
Zhiqiang Wang (Tianjin University of Technology and Education, China), Aryan Joshi (Tianjin University of Technology and Education, China), Tianfu Guo (Kyushu University, Japan), Wenjia Ren (Tianjin University of Technology and Education, China), and Kaining Zhang (Tianjin University of Technology and Education, China)

Hardware Acceleration for Transposed Convolution Based on NVDLA 133
Hanxi Tian (Beijing University of Posts and Telecommunications, China) and Xuehong Lin (Beijing University of Posts and Telecommunications, China)

Axial Attention-Infused U-Net for Document-Level Relation Extraction 138
Hua Yang (Wuhan Polytechnic University, China), Jie Xiao (Wuhan Polytechnic University, China), Hao Shen (Wuhan Baijuncheng Technology Co., Ltd, China), Qi Wang (Wuhan Polytechnic University, China), ShenYang Sheng (Wuhan Polytechnic University, China), ChengWu Peng (Wuhan Polytechnic University, China), Sha Li (Wuhan Polytechnic University, China), LiHao Yu (Wuhan Polytechnic University, China), ZhaoQi Meng (Wuhan Polytechnic University, China), Yue Huang (Wuhan Polytechnic University, China), and Rou Fu (Wuhan Polytechnic University, China)

Variable Length Motif Mining Method Based on Suffix Array Index 144
Jimin Wang (Hohai University, China), Ying Zhu (Hohai University, China), and Jiahao Sun (Hohai University, China)

One-Shot Font Generation with Masked Diffusion Transformers 152
Xijia Wang (Jiangxi Normal University, China), Yefei Wang (Jiangxi Normal University, China), Chen Ai (Jiangxi Normal University, China), and Jinshan Zeng (Jiangxi Normal University, China)

Multifaceted Sentiment Analysis of Public Opinion Based on LLM Prompt Engineering 160
Shiyu Ma (Jinan University, China), Tianfang Zhao (Jinan University, China), Baoyuan Wei (Jinan University, China), and Yu Wang (Jinan University, China)

An Improved Grey Wolf Optimization Algorithm for Planting Structure Optimization in North China Mountainous Area 166
Yutong Gao (Nanjing University of Science and Technology, China) and Taohong Zhang (University of Science and Technology Beijing, China)

Sentiment Analysis of User Opinions in the Automotive Industry Based on an Enhanced Nlp Model 172
Junfang Liu (Xi'an Siyuan University, China), Fei Ren (Nanjing Super Kong Electronic Technology Co., Ltd., China), Yiheng Zhang (Xi'an Siyuan University, China), Weiqing Diao (Xi'an Siyuan University, China), and Qin Wang (Xi'an Siyuan University, China; Mapua University, Philippines)

Model Pruning Based on Large-Scale Multiobjective Evolution 176
Bin Cao (Hebei University of Technology, China), Rui Du (Hebei University of Technology, China), Yiming Hao (Hebei University of Technology, China), and Weixuan Liu (National University of Singapore, Singapore)

Dance Video Analysis System Based on YOLO Pose and CNN+LSTM Deep Learning Models .. 182
Qian Zhou (Shandong Institute of Commerce and Technology, China), Jing Sun (Lidong Garden Kindergarten, China), and Li Wang (Shandong Institute of Commerce and Technology, China)

Human Computer Interaction Design of Distributed Energy Storage System 187
Lingfeng Wei (China Electric Power Research Institute Co., Ltd, China), Guanjun Li (China Electric Power Research Institute Co., Ltd, China), Yibin Tao (China Electric Power Research Institute Co., Ltd, China), Guowei Chen (China Electric Power Research Institute Co., Ltd, China), Haoyuan Li (China Electric Power Research Institute Co., Ltd, China), and Daquan Tao (China Electric Power Research Institute Co., Ltd, China)

Ground Penetrating Radar UXO Image Detection Method Based on CG-YOLOv5 191
Feiyang Lin (Beijing Information Science & Technology University, China) and Xu Zhao (Beijing Information Science & Technology University, China)

Road Information Recognition and Decision Making Based on YOLO Algorithm 197
Nan Ma (Beijing University of Technology, China), Tiancong Han (Beijing University of Technology, China), Qin Xia (Intelligent Connected Technology of CAERI Co., Ltd., China), and Yiheng Han (Beijing University of Technology, China)

A Real-Time Vehicle Detection and Tracking System Based on an Improved YOLOv5 with Lightweight Convolutions and Multi-Scale Fusion Combined with BYTETrack 203
Nan Ma (Beijing University of Technology, China), Jiahui Wang (Beijing University of Technology, China), Kongjian Qin (China Automotive Technology and Research and Center Co., Ltd., China), and Yiheng Han (Beijing University of Technology, China)

Construction and Performance Evaluation of a Comprehensive Multi-Scenario Road Vehicle and Pedestrian Detection Dataset 210
Nan Ma (Beijing University of Technology, China), Weien Suo (Beijing University of Technology, China), Qin Xia (Intelligent Connected Technology of CAERI Co., Ltd., China), and Yiheng Han (Beijing University of Technology, China)

Multi-Level Decoupling and Interaction Network for Oriented Object Detection in Aerial Imagery 216
Shuo Zhuang (Hefei University of Technology, China), Zhenyang Lin (Hefei University of Technology, China), Yu Liu (Xidian University, China), Gang Wang (CETC Key Laboratory of Aerospace Information Applications, China), and Yongxing Hou (Hefei University of Technology, China)

Research on Improved Method of Compound Harmonic Elimination Device Based on IHPO-DBN 222
Dong Tan (State Grid Changji Electric Power Supply Company, China), Yongming Zhu (State Grid Changji Electric Power Supply Company, China), and Long He (State Grid Changji Electric Power Supply Company, China)

Lite-ODNet: A Lightweight Object Detection Network 229
Wenbang Peng (Hangzhou Dianzi University, China), Li Zhang (Hangzhou Dianzi University, China), Liaoying Zhao (Hangzhou Dianzi University, China), and Xiaorun Li (Zhejiang University, China)

Automatic Taxonomy Generation Based on Large Language Models in the Automotive Domain ... 237
Yue Zhao (China Unicom Smart Connection Technology Ltd., China), Tailu Guan (China Unicom Smart Connection Technology Ltd., China), Xiaokang Liu (China Auto Information Technology (Tianjin) Co., Ltd., China), and Huajun Wang (China Auto Information Technology (Tianjin) Co., Ltd., China)

Data-Driven AI for Topology Optimization: A Comparative Study of CNN and Self-Attention Enhanced Architectures in Data-Constrained Scenarios 243
Xiao Jing (Georgia Institute of Technology, USA) and Moyi Guo (Georgia Institute of Technology, USA)

Knowledge Generation from Large Language Models in the Automotive Field 249
Haomin Dong (China FAW Group Co., Ltd., China), Wenbin Wang (China FAW Group Co., Ltd., China), Yibo Hu (China FAW Group Co., Ltd., China), Ziyi Kang (China FAW Group Co., Ltd., China), Tiancong Yu (China FAW Group Co., Ltd., China), and Xiaokang Liu (China Auto Information Technology (Tianjin) Co., Ltd., China)

TWE-C3D: Time Weighted 3D Convolutional Neural Network Based on ε-Pareto Dominance NSGA-III 255
Bin Cao (Hebei University of Technology, China), Shanshan Zhao (Hebei University of Technology, China), Yiming Hao (Hebei University of Technology, China), and Weixuan Liu (National University of Singapore, Singapore)

Lightweight Object Detection for Traffic Signal Recognition Based on Improved YOLOv8n 261
Beilei Zhang (Information Engineering University, China), Zhihua Lin (Asia Pacific University of Technology & Innovation, Malaysia), Yiping Han (Nanjing Military Representative Bureau, China), and Hailong Ma (Information Engineering University, China)

MG-SRN: Multi-Granularity Similarity Reasoning Network for Remote Sensing Image Retrieval ... 267
Yuan Liu (Shanghai Jiao Tong University, China) and Genke Yang (Shanghai Jiao Tong University, China)

A Study on ECG Classification Based on IIVYA-SE-CNN-BiLSTM 274
Dawei Wang (Shanxi Normal University, China), Bo Ao (Shanxi Normal University, China), Xinyi Gao (Shanxi Normal University, China), and Yuxin Xie (Shanxi Normal University, China)

Data-Efficient Fine-Tuning for Pre-Trained Language Model 279
Linlin Zhang (Automotive Data of China (Tianjin) Co., Ltd, China), Yang Liu (Automotive Data of China (Tianjin) Co., Ltd, China), Qingliang Shang (Automotive Data of China (Tianjin) Co., Ltd, China), Zhiqiang Yan (Automotive Data of China (Tianjin) Co., Ltd, China), Yue Zhou (Automotive Data of China (Tianjin) Co., Ltd, China), Yuwen Men (Automotive Data of China (Tianjin) Co., Ltd, China), Yunfeng Li (Automotive Data of China (Tianjin) Co., Ltd, China), and Weixing Ren (Automotive Data of China (Tianjin) Co., Ltd, China)

Lightweight Text Page Spotter for Chinese Handwriting Document 285
Qi-yan Zhao (Inner Mongolia University of Science & Technology, China), Jiuze Li (University of Manchester, United Kingdom), Lanying Liang (Inner Mongolia University of Science & Technology, China), Yuefeng Liu (Inner Mongolia University of Science & Technology, China), Zheng Li (Inner Mongolia University of Science & Technology, China), and Hongyu Shen (Inner Mongolia University of Science & Technology, China)

LayoutKAG: Enhancing Layout Generation in Large Language Models through Knowledge-Augmented Generation 292
Hongbo Tang (Beijing University of Posts and Telecommunications, China), Shuai Zhao (Beijing University of Posts and Telecommunications, China), Jing Luo (Beijing University of Posts and Telecommunications, China), Yihang Su (Beijing University of Posts and Telecommunications, China), and Jinjian Yang (Beijing University of Posts and Telecommunications, China)

Improved Multi-Objective Quantum Genetic Algorithm for Solving Environmental Economic Dispatch Optimization Problems in Power Systems 300
Shengzhou Ding (National University of Defense Technology, China), Miaomiao Tian (Wuling power Co., Ltd., China), Hongqi Yu (National University of Defense Technology, China), and Dan Xu (SunYat-Sen University, China)

Video Anomaly Detection Based on a Motion Pseudo-Sample Synthesizer 306
Yan Cheng (Bohai University, China), Shifeng Li (Bohai University, China), Xi Luo (Bohai University, China), and Shuai Guo (Bohai University, China)

Anomaly Detection via Reconstructed Discriminant Networks Leveraging Generative Adversarial Frameworks 312
Xiaoru Liu (Bohai University, China), Shifeng Li (Bohai University, China), Yan Cheng (Bohai University, China), and Xi Luo (Bohai University, China)

Accurate Re-Localization Algorithm for Mobile Robots using Geometry and Topological Features 318
ShaoFang Wu (Guangzhou Maritime University, China) and Jiamin Chen (Guangzhou Maritime University, China)

Gait Phase Detection and Prediction with Machine Learning Models Based on sEMG 324
Youping Sun (Shandong University, China), Jiachen Wang (Shandong University, China), Zixian Wang (Shandong University, China), Jiasen Li (Shandong University, China), Yibin Li (Shandong University, China), Rui Song (Shandong University, China), and Huanghe Zhang (Shandong University, China)

Research on 3D Reconstruction Measurement System of Heterogeneous Parts Based on Monocular Structured Light 331
Guiying Zhang (Tianjin University of Technology and Education, China), Tianfu Guo (Kyushu University, Japan), Wenqing Yang (Tianjin University of Technology and Education, China), Dashan Cheng (Tianjin University of Technology and Education, China), Xiaoqian Chu (Tianjin University of Technology and Education, China), and Kaining Zhang (Tianjin University of Technology and Education, China)

Multi-Feature Fusion Movie Recommendation Model using Deep Learning 337
Zouxi Wang (Huaibei Normal University, China), Minglan Fu (Huaibei Normal University, China), and Zhijie Zhang (Huaibei Normal University, China)

Using Machine Learning Algorithms to Predict Second Primary Thyroid Cancer: A Study Based on the SEER Database 344
Sihan Xia (Huaibei Normal University, China), Qi Fan (Huaibei Normal University, China), and Fanyi Meng (Huaibei Normal University, China)

Application of Map Reconstruction and Path Planning Based on Data Features in Multi-Beam Survey 352
Li Chen (Changsha Normal University, China), Qing Lin (Changsha Normal University, China), Qian Zhang (Changsha Normal University, China), and Kaian Ji (Changsha Normal University, China)

A Novel Vortex Based Non-Contact Mobile Inspection Tool Design for ROV in Low Visibility Water 358
Renjie Lu (Zhejiang University, China), Lianjie Zhang (CNNC Xi'an Nuclear Instrument Co., Ltd., China), Cong Wang (Zhejiang University, China), Liang Yu (CNNC Xi'an Nuclear Instrument Co., Ltd., China), Weicong Chen (CNNC Xi'an Nuclear Instrument Co., Ltd., China), and Yong Lei (Zhejiang University, China)

A Method for Zero-Label 3D Stem-Leaf Segmentation of Tomato Plants Based on Point Cloud Optimization 364
Wenli Zhang (Beijing University of Technology, China), Chenhuizi Wang (Beijing University of Technology, China), Ting Jiang (The University of Tokyo, Japan), and Wei Guo (The University of Tokyo, Japan)

Robot Arm Grasping Based on Multi-Threaded PPO Reinforcement Learning Algorithm 369
Aiqing Bi (Jiangsu University of Science and Technology) and ChenXu Zhang (Fuzhou Normal University)

An Efficient Multi-Scale Adaptive Joint Calibration Algorithm for Multiple LiDARs 374
Wenxing Chen (Jiangsu XCMG National Key Laboratory Technology Co., Ltd., China; Shanghai Xugong Intelligent Technology Co., Ltd., China) and Songyu Chen (Dalian University of Technology, China)

Using Deep Learning for Predictive Modelling in Fluid Dynamics 380
Saadaldeen Rashid Ahmed (Bayan University, Iraq; Al-Ayen University, Iraq), Ari Taha Guron (Bayan University, Iraq), Duaa A. Majeed (Baghdad University, Iraq), Mohammed Abdul Malek Al Saadi (Bayan University, Iraq), Wameedh Abduladheem (Al-Ma'moon University College, Iraq), Zainab T. Al-Sharify (Al Hikma University College, Iraq; Birmingham University, UK), Al-Lbraheemi Fuqdan (University of Al-Ameed, Iraq), Taj-Aldeen Naser Abdali (Misan University, Iraq), and Rafad Imad Kadhim (University of hilla, Iraq)

CAFPN : A Network for Offline Text Line Recognition with Attention-Based Multi-Stage Feature Fusion and Context Parser 389
Rui Hou (Xinjiang University, China), Elham Eli (Xinjiang University, China), Ghalip Ibrahim (Xinjiang University, China), Xuebin Xu (Xinjiang University, China), and Kurban Ubul (Xinjiang University, China)

Research and Application of Laser Rust Removal Robot for Steel Storage Tank Wall 395
Yifan Gan (Ministry of Emergency Management, P. R. China), Shengli Chu (Ministry of Emergency Management, P. R. China), Longhai Wang (Ministry of Emergency Management, P. R. China), Linsen Xiong (Ministry of Emergency Management, P. R. China), Siyang Wang (College of Safety and Ocean Engineering University of China University of Petroleum, Beijing; Ministry of Emergency Management, P. R. China), and Man Tian (Shenyang Zhenghe Machinery Manufacturing Co., Ltd, P. R. China)

Author Index **401**