# 2020 2nd International Conference on Artificial Intelligence and Advanced Manufacture (AIAM 2020)

**Shanghai, China**
**26 December 2020**

**IEEE Catalog Number:** CFP20V44-POD
**ISBN:** 978-1-7281-9987-0

**Copyright © 2020 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: CFP20V44-POD
ISBN (Print-On-Demand): 978-1-7281-9987-0
ISBN (Online): 978-1-7281-9986-3

**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

# 2020 2nd International Conference on Artificial Intelligence and Advanced Manufacture (AIAM)

# AIAM 2020

## Table of Contents

**Conference Committee** ..... **xvi**
**Reviewers** ..... **xviii**

## 2020 2nd International Conference on Artificial Intelligence and Advanced Manufacture (AIAM)

Recognition of Important Korean Text Structure Based on Reinforcement Learning and Self-Attention Mechanism ..... 1
*Feiyang Yang (Yanbian University, China), Yahui Zhao (Yanbian University, China), Xu Cui (Yanbian University, China), and Rongyi Cui (Yanbian University, China)*

Intelligent Base Electricity Consumption Calculation for the Resumption of Work ..... 8
*Yuliang Zhao (Big Data Center of State Grid Corporation of China, China), Zongpeng Li (Big Data Center of State Grid Corporation of China, China), Xia Han (State Grid Shanxi Electric Power Company, China), Peiran Tan (Big Data Center of State Grid Shanxi Marketing Service Center, China), Jian Liu (State Grid Information & Telecommunication Group Co., Ltd., Beijing, China), Kai Wan (Big Data Center of State Grid Corporation of China, China), Min Guo (Big Data Center of State Grid Corporation of China, China), Jiakui Zhao (Big Data Center of State Grid Corporation of China, China), Honggang Wang (Big Data Center of State Grid Corporation of China, China), and Shi Liu (Big Data Center of State Grid Corporation of China, China)*

Research on the Applicability of Benford's Law in Chinese Texts ..... 13
*Junlong Gao (Yanbian University, China), Yahui Zhao (Yanbian University, China), and Rongyi Cui (Yanbian University, China)*

Research on Recommendation System Based on Integrating Semantic Similarity ..... 18
*Yongjun Zhang (Beijing University of Post and Telecommunications, China) and Hongshuai Wen (Beijing University of Post and Telecommunications, China)*

Analysis on Tribological Performance and Leakage Characteristics of Porous Bearings ..... 22
*Rui Chen (Southeast University, China) and Yan Zhang (Southeast University, China)*

Robust Dual Concept Factorization for Data Clustering ..... 28
*Feiyu Zhao (Shanxi University, China) and Liang Du (Shanxi University, China)*

Design of A Trans-Media Aircraft Morphing Wing Structure ..... 33
*Xueqiang Bai (Northwest Institute of Nuclear Technology, China), Xiaoyue Xing (Northwest Institute of Nuclear Technology, China), Liwu Liu (Northwest Institute of Nuclear Technology, China), Jiahui Zhang (Northwest Institute of Nuclear Technology, China), Chen Ling (Northwest Institute of Nuclear Technology, China), and Zhe Li (Northwest Institute of Nuclear Technology, China)*

Design of Curtain Automatic Control System Based on STM32 ..... 38
*Yang Gong (Sichuan University Jinjiang College, China) and Pan Zhang (Sichuan University Jinjiang College, China)*

Distribution Network Equipment Fault Prediction and Maintenance Path Optimization Strategy Based on Deep Learning and Knowledge Map Comprehensive Analysis ..... 42
*Wei Kang (State Grid Zhejiang Electric Power Co., Ltd. Zhoushan Power Supply Company, China), Wujie Jin (State Grid Zhejiang Electric Power Co., Ltd. Zhoushan Power Supply Company, East China Jiaotong University, China), Ping Jiang (State Grid Zhejiang Electric Power Co., Ltd. Zhoushan Power Supply Company, China), and Liqin Shi (Zhejiang University, China)*

A Tracking Control Method for Autonomous Intelligent Park Vehicle Based on Model Predictive Control ..... 50
*Lelong Zhao (Wuhan University of Technology, China), Chufan Ji (Wuhan University of Technology, China), Kefan Zhao (Wuhan University of Technology, China), and Junfan Xie (Wuhan University of Technology, China)*

Indoor Vision Navigation and Target Tracking System for Aerial Robot ..... 57
*Shuai Li (University of Science and Technology of China, China), Jie Zhan (Key Laboratory of Atmospheric Optics Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Science Advanced Laser Technology Laboratory of Anhui Province Hefei, China), Houquan Lian (University of Science and Technology of China, China), Minde Huang (University of Science and Technology of China, China), Xiang Gao (University of Science and Technology of China, China), Zhiyi Lu (University of Science and Technology of China, China), Wenqing Xu (Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Science, China), and Gang Xu (Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Science, China)*

An Improved Image Classification Method for Specific Reality Environments ..... 63
*Jie Yuan (China Mobile Information Security Center, China), Huanmin Xu (Sichuan University, China), Feng Zhang (China Mobile Information Security Center, China), Le Yu (China Mobile Information Security Center, China), and Yongsheng Sang (Sichuan University, China)*

Innovative Design of an Intelligent Wheelchair ..... 69
*Mingyan Luo (Wuhan Polytechnic University, China), Deping Zhang (Wuhan Polytechnic University, China), Qiuyu Hu (Wuhan Polytechnic University, China), Xudong Li (Polytechnic University, China), and Yuxiang Qing (Wuhan Polytechnic University, China)*

Application of Deep Learning in Prediction of Linkage Relationship between Wells ..... 75
*Yahui Bu (Research Institute of Exploration, China)*

The Application of Fuzzy Neural Network Based on Network of Ships in Heterogeneous Network.. 79
*Jing Li (Shanghai Institute of Technology, China) and Yunxiang Liu (Shanghai Institute of Technology, China)*

Study of Multi Ant Colony Genetic Algorithm in Query Optimization of Distributed Database ..... 83
*Zhiyong Ding (Guangdong Polytechinc, China)*

The Research and Implementation of Human Posture Recognition Algorithm Via OpenPose ..... 90
*Zihuan Shu (Yangtze University, China), Peng Wang (Yangtze University, China), and Wei Zhan (Yangtze University, China)*

Face Recognition Based on MTCNN and Integrated Application of FaceNet and LBP Method ..... 95
*Zaiye Yang (Changchun University of Science and Technology, China), Wei Ge (Changchun University of Science and Technology, China), and Zheng Zhang (Changchun University of Science and Technology, China)*

Path Planning Based on Combinaion of Improved A-STAR Algorithm and DWA Algorithm ..... 99
*Xiaoxiao Li (People's Public Security University of China, China), Xiaoguang Hu (People's Public Security University of China, China), Ziqiang Wang (People's Public Security University of China, China), and Zhuoqun Du (People's Public Security University of China, China)*

The Load Portrait Method for Urban Substation Based on Clustering ..... 104
*Shanshan Shi (State Grid Shanghai Electric Power Company, China), Yuheng Zhang (Peking University, China), Yunlei Lu (Peking University, China), and Yingjie Tian (State Grid Shanghai Electric Power Company, China)*

A Tongue Segmentation Algorithm Based on LBP Feature and Cascade Classifier ..... 109
*Yaohui Liu (Xiangnan University, China), Dongping Chen (Xiangnan University, China), Fang Yu (Xiangnan University, China), Gang Ling (Xiangnan University, China), and Zhimei Kang (Xiangnan University, China)*

On the Application of Internet of Things in Smart Agriculture ..... 113
*Mingjuan Liu (Maanshan Teacher's College, China)*

Research on Commodity Image Classification Based on Local Oppugnant Color Vector Angle Pattern ..... 117
*Huadong Sun (Harbin University of Commerce, China), Mingda Zhang (Harbin University of Commerce, China), Xu Zhang (Harbin University of Commerce, China), Xiaowei Han (Harbin University of Commerce, China), and Yang Liu (Harbin University of Commerce, China)*

Research on Named Entity Recognition for Information Extraction ..... 121
*Qi Guo (Northwest Minzu University, China), Shuang Wang (Northwest Minzu University, China), and Fucheng Wan (Northwest Minzu University, China)*

Big Data Processing and Application Research ..... 125
*Penglin Gao (Northwest Minzu University, China), Zhaoming Han (Northwest Minzu University, China), and Fucheng Wan (Northwest Minzu University, China)*

The Common RNN Based Models with Sequence Tagging ..... 129
*Bin Zhang (Northwest Minzu University, China), Jingyao Zhang (Northwest Minzu University, China), and Fucheng Wan (Northwest Minzu University, China)*

False Data Injection Attack Location Detection Based on Classification Method in Smart Grid ..... 133
*Xiao Lu (State Grid Jiangsu Electric Power Company Limited, China), Jiangping Jing (State Grid Jiangsu Electric Power Company Limited, China), and Yi Wu (State Grid Jiangsu Electric Power Company Limited, China)*

Study on Modeling Methods for Magnetic Field Intensity of Submarine Cables Based on WCA-SVM ..... 137
*Pan Songbo (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), Chen Jianping (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), Zheng Hai (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China), and Lin Weiliang (Guangdong Power Grid Limited Liability Company Jiangmen Power Supply Bureau, China)*

Short-Term Power Load Forecasting Model Based on Model Fusion ..... 141
*Xiang Wang (Shenzhen Smart-chip Microelectronics Technology Co., Ltd., China), Zheng Li (Shenzhen Smart-chip Microelectronics Technology Co., Ltd., China), Mingchen Du (China Gridcom Co., Ltd., China), Shanshan Mao (China Gridcom Co., Ltd., China), and Xingpei Wu (Shenzhen Smart-chip Microelectronics Technology Co., Ltd., China)*

Fault Diagnosis Method of Power System Based on Bayesian Network ..... 145
*Zheng Li (Shenzhen Smart-chip Microelectronics Technology Co., Ltd., China), Qingyang Liu (China Gridcom Co., Ltd., China), Chenxing Na (China Gridcom Co., Ltd., China), Yannian Wu (China Gridcom Co., Ltd., China), and Zhiying Tang (Shenzhen Smart-chip Microelectronics Technology Co., Ltd., China)*

Study on the Common Problems of Metrological Verification of Medical Equipment ..... 149
*Kehui Zhang (Dingxi Metrology and Testing Institute, China)*

5G Boosting Smart Cities Development ..... 154
*Huajun Chen (Tongren University, China), Lina Yuan (Tongren University, China), and Gong Jing (Tongren University, China)*

Wireless RF Powered Sensor Networks ..... 158
*Lina Yuan (Tongren University, China), Huajun Chen (Tongren University, China), and Gong Jing (Tongren University, China)*

Intelligent Control and Energy Conservation of Ball Mill ..... 163
*Wanqiang Song (Liaoyang Jiajiapu Iron Mine Co., Ltd., Bengang Group, China)*

Blockchain Bookkeeping Optimization Scheme Based on Threshold Ring Signature ..... 167
*Jicheng Xu (Anhui Zhong-Ao Institute of Technology, China), Ceng Li (Anhui Zhong-Ao Institute of Technology, China), and Liang Li (University of Science and Technology of China, China)*

Robust Mobile Location Estimator with NLOS Mitigation using Reconstruction and Regression .... 176
*Jijun Zou (Northeaster University at Qinhuangdao, China), Wenjia Ren (Northeaster University at Qinhuangdao, China), and Yuling Lan (Northeaster University at Qinhuangdao, China)*

Design of a Cylindrical Conformal Wideband Power Division and Phase Shifter ..... 181
*Pan Huang (Nanjing University of Science and Technology, China) and Wei Tang (Nanjing University of Science and Technology, China)*

Research on the Transfer of Patented Technology in the UAV Field Among Provinces Based on Social Network Analysis ..... 185
*Zhao Shiyu (Beijing University of Technology, China), Liu Yihan (Beijing University of Technology, China), Shi Anjie (Beijing University of Technology, China), and Li Zhenwei (Beijing University of Technology, China)*

An Optimized Rollover Index for Articulated Steering Vehicle on Slopes ..... 191
*Wang Shunjie (Xiamen University, China), Liu Qianjie (Xiamen University, China), Chen Wei (Xiamen University, China), Ye Junjun (Xiamen University, China), and Zhu Qingyuan (Xiamen University, China)*

Digital Twin Technology in Intelligent Manufacturing ..... 195
*Pengzhong Li (Tongji University, China), Hanchen Zhu (Tongji University, China), and Liang Luo (Tongji University, China)*

Damage Tolerance Analysis of Double Hole-Opposite Crack at the Wing-Fuselage Joint of Civil Aircraft ..... 201
*Muran Liu (Jinan Foreign Language School, China)*

Reliability Analysis of Wing Fuselage Docking Structure ..... 206
*Youqiu Zhan (Shanghai Jiao Tong University, China) and Zhe Wu (Nanjing University of Aeronautics and Astronautics, China)*

Multi-Crack Study on Fuselage of Civil Aircraft .....216
*Yikun Wang (La Canada High School, La Canada Flintridge, USA), Yushu Wang (Shenzhen College of International Education, Shenzhen, China), and Yicheng (Frederick) Jiang (Monta Vista High School, Cupertino, USA)*

The Method for Evaluating Rope-Jumping Posture ..... 222
*Danhui Peng (Shanghai Jiaotong University, China) and Haibo Hu (Shanghai Jiaotong University, China)*

Analysis and Numerical Simulation of Fatigue Propagation in Crack Front ..... 227
*Ziyi Peng (Nanjing Foreign Language School, China)*

Cutting Forces Coefficient Calibration ..... 230
*Ziwei Jia (Tongji University, China), Dongdong Li (Tongji University, China), Weimin Zhang (Tongji University, China), and Yuanshi Li (China North Engine Research Institute, China)*

A Novel Prescribed Performance Control Model with ESO to Optimize Trajectory Tracking for Quadrotor UAV ..... 234
*Xinran Wang (University of Electronic Science and Technology of China, China), Huizhu Cheng (University of Electronic Science and Technology of China, China), and Fusheng Li (University of Electronic Science and Technology of China, China)*

Conical Dielectric Lens Loaded Frequency-Diverse Bunching Meta Material Aperture ..... 239
*Xinchen Ren (Xi'an Jiaotong University, China), Huilin Huang (Xi'an Jiaotong University, China), Mengran Zhao (Xi'an Jiaotong University, China), Ningning Zhou (Xi'an Jiaotong University, China), Shitao Zhu (Xi'an Jiaotong University, China), and Anxue Zhang (Xi'an Jiaotong University, China)*

Background Deduction Approach Based on Iterative Adaptive Window-Based Wavelet Transform and Gaussian Convolution Filtering for XRF ..... 243
*Zhiquan Zhang (University of Electronic Science and Technology of China, China), Xinghua He (University of Electronic Science and Technology of China, China), Huizhu Cheng (University of Electronic Science and Technology of China, China), and Fusheng Li (University of Electronic Science and Technology of China, China)*

A Novel Trapezoid Digital Filter Algorithm to Tackle Pulse PileUp Problems for Spectrometer Signal Processing ..... 248
*Rongye Lin (University of Electronic Science and Technology of China, China) and Fusheng Li (University of Electronic Science and Technology of China, China)*

Influence of Charging Power of Cable on Voltage and Reactive Power ..... 253
*Chu Zhou (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), Tao Wang (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), Haiguang Liu (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), Wenna Wang (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), Ying Wang (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), Kan Cao (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China), and Defu Cai (Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd., Wuhan Hubei, China)*

Research on Real-Time Online Mechanical State Monitoring System ..... 257
*Zhuo Chen (Xi'an University of Technology, China), Xiufang Yang (Xi'an University of Technology, China), and Yapeng He (Xi'an University of Technology, China)*

Research on High Accuracy Gearbox Fault Classification Method ..... 261
*Xiufang Yang (Xi'an University of Technology, China) and Zhuo Chen (Xi'an University of Technology, China)*

Research on Intelligent Measurement and Control System of Warehouse Temperature and Humidity ..... 266
*Chi Wang (Xi'an University of Technology, China), Xiufang Yang (Xi'an University of Technology, China), and Yuda Xu (Xi'an University of Technology, China)*

Key Security Challenges for Electric Vehicle Charging System ..... 271
*Chang Liu (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), Jin Wang (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), Jiangpei Xu (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), Xiao Yu (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd. , China), Li Tian (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), Jie Wang (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), Liang Zhou (Electric Power Research Institute of State Grid Hubei Electric Power Co., Ltd., China), and Deng Zhang (China Nuclear Power Operation Technology Corporation, LTD., China)*

SSC-LINAC Control System Based on PLCs ..... 276
*Xiaojun Liu (University of Chinese Academy of Sciences, China), Wei Zhang (Institute of Modern Physics, Chinese Academy of Sciences, China), and Jingrui An (Institute of Modern Physics, Chinese Academy of Sciences, China)*

Multipath Time of Arrival Estimation Algorithm Based on Successive Interference Cancellation in NB-IoT Systems ..... 280
*Dingshun Jiang (Tongji University, China) and Fuqiang Liu (Tongji University, China)*

Technique Support System Design of Electric Dispatching Automation Based on Big Data Technology ..... 288
*Yang Xiaowei (Shenzhen Power Supply Corporation, China), Liu Yan (Shenzhen Power Supply Corporation, China), Hao Jiao (Shenzhen Power Supply Corporation, China), Wu Rui (Nari-tech Nanjing Control Systems Ltd., China), Wu Jie (Shenzhen Power Supply Corporation, China), and Zhao Jingling (Shenzhen Power Supply Corporation, China)*

Research on Automation System Framework and Key Technologies of Regional Integration Dispatching ..... 294
*Huang Yingqi (Shenzhen Power Supply Corporation, China), Deng Bin (Shenzhen Power Supply Corporation, China), Lin Zizhao (Shenzhen Power Supply Corporation, China), Wu Rui (Nari-tech Nanjing Control Systems Ltd., China), Hu Yarong (Shenzhen Power Supply Corporation, China), and Li Yusen (Shenzhen Power Supply Corporation, China)*

Research on the Influence of TBM Construction Parameters on High Pressure Gas Pipeline ..... 300
*Yuzhao Chen (Tianjin University of Science and Technology, China), Ruilong Yu (Tianjin University of Science and Technology, China), and Jingnan Zhao (Tianjin University of Science and Technology, China)*

Study on Preparation of PAA Template Based on 2-D Photonic Crystal Application ..... 304
*Xihan Nie (Tianjin University of Science and Technology, China), Wenfeng Liao (Tianjin University of Science and Technology, China), and Jingnan Zhao (Tianjin University of Science and Technology, China)*

High-Speed Friction Predicted Model of Tread Rubber Based on Experimental ..... 308
*Long Chen (Chongqing Vocational College of Transportation, China)*

Study on Rapid Preparation of Self-Cleaning Superhydrophobic 304 Stainless Steel Surface using Nanosecond Laser ..... 312
*Zeng Yang (Tianjin University of Science and Technology, China), Wenjian Ma (Tianjin University of Science and Technology, China), and Jingnan Zhao (Tianjin University of Science and Technology, China)*

The Research Status and Development of Personal Cooling Systems ..... 316
*Ying Chen (Beijing Institute of Fashion Technology, China), Yan Jiang (Beijing Institute of Fashion Technology, China), and Suqin Chang (Beijing Institute of Fashion Technology, China)*

Collision Attack Framework on RIPEMD-128 ..... 321
*Jingyu Li (PLA Strategic Force Information Engineering University, China), Guang Zeng (PLA Information Engineering University, China), and Yang Yang (Institute of Software, Chinese Academy of Sciences, China)*

Application of High Precision 3D Geological Modeling in Horizontal Well Development of Tight Gas Reservoir ..... 325
*Xueling Liu (Changqing Oilfield Company, CNPC, Xi'an, China), Zhenzhen Qiang (Changqing Oilfield Company, CNPC, Qingcheng Gansu, China), Hua Wang (Changqing Oilfield Company, CNPC, Xi'an, China), Shixiang Fei (Changqing Oilfield Company, CNPC, Xi'an, China), Yuehua Cui (Changqing Oilfield Company, CNPC, Xi'an, China), Jincheng Wang (Changqing Oilfield Company, CNPC, Xi'an, China), Zhengtao Zhang (Changqing Oilfield Company, CNPC, Xi'an, China), and Liangrong You (Changqing Oilfield Company, CNPC, Xi'an, China)*

Structure Optimization of a Piezomagnetic Resistance Sensor Based on Orthogonal Experiment..... 330
*Jiazhen Han (Shandong University, China), Yudong Xie (Shandong University, China), Yanjun Liu (Shandong University, China), Mupeng Bao (Shandong University, China), Zihan Pan (Shandong University, China), and Xinbiao Zhang (Shandong University, China)*

Force Analysis and Improved Design of Piezomagnetic Force Sensor ..... 335
*Zihan Pan (Shandong University, Jinan, China), Yudong Xie (Shandong University, Jinan, China), Yanjun Liu (Shandong University, Jinan, China), Guangchao Zhang (Shandong University, Jinan, China), Jiazhen Han (Shandong University, Jinan, China), and Xinbiao Zhang (Shandong University, Jinan, China)*

Machine Vision Based Segmentation of the Gold-Plate Area from a Flexible Printed Circuit Board ..... 340
*Guanghang Cai (Shanghai Jiao Tong University, China) and Liang Gong (Shanghai Jiao Tong University, China)*

Study on Thermal Effect of LiFePO4/C Battery with Different Capacity Retention Rate in Adiabatic Environment ..... 345
*Fei Gao (China Electric Power Research Institute, China), Dong Hui (China Electric Power Research Institute, China), Kai Yang (China Electric Power Research Institute, China), Fenggang Zhao (Contemporary Amperex Technology Co., Ltd, China), Longfei Yang (Contemporary Amperex Technology Co., Ltd, China), Honggang Yu (Contemporary Amperex Technology Co., Ltd, China), Shuping Wang (State Grid Anhui Electric Power CO. LTD, China), and Minghao Fan (State Grid Anhui Electric Power CO. LTD, China)*

Simulation Study on Consequence of Leakage Accident of Liquid Chlorine Storage Tank ..... 349
*Xiaohua Fan (Chongqing University of Science and Technology, China), Yunchao Ding (Chongqing City Management College, China), and Jiangtao Tang (Chongqing University of Science and Technology, China)*

Compaction Characteristics and Permeability Evolution Characteristics of Broken Coal Body Under Triaxial Stress ..... 355
*Fakai Wang (Guizhou Institute of Technology, China), Zhongguang Sun (Chongqing University, China), Mai Peng (CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China), Bo Cui (Guizhou Institute of Technology, China), and Jianxin Zhang (CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China)*

Research on Uniaxial Stress Compression Mechanical Properties and Uniaxial Stress Failure Mode of Pre-Cracked Rock ..... 359
*Zhongguang Sun (CCTEG Chongqing Research Institute CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China), Fakai Wang (Guizhou Institute of Technology, China), Xuan Wang (CCTEG Chongqing Research Institute CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China), Mai Peng (CCTEG Chongqing Research Institute CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China), and Jian Luo (CCTEG Chongqing Research Institute CCTEG Chongqing Smart City Technology Research Institute Co., Ltd., China)*

Experiment on the Relationship between the Characteristics of Flowback Liquid Ions and the Complexity of Hydraulic Fractures in Shale ..... 364
*Zhian Lei (Chongqing Shale Gas Exploration, China), Hui Xiao (Chongqing University of Science and Technology, China), Tongtong Luo (Chongqing Shale Gas Exploration, China), Haijie Zhang (Chongqing Shale Gas Exploration, China), Yuanping Luo (Chongqing Shale Gas Exploration, China), and Chunbi Xu (Chongqing University of Science and Technology, China)*

Analysis of Sinusoidal Vibration in Mechanical Environment of Satellite Laser Communication Terminal Telescope ..... 369
*Hongyan Zhao (Jilin Engineering Normal University, China), Yuxuan Wang (Jilin Engineering Normal University, China), Yuxuan Ren (Jilin Engineering Normal University, China), Zihao Qu (Jilin Engineering Normal University, China), Jialong Tian (Jilin Engineering Normal University, China), and Meixuan Li (Jilin Engineering Normal University, China)*

Random Vibration Analysis in Mechanical Environment of Satellite Laser Communication Terminal Telescope ..... 373
*Meixuan Li (Electronical Information Changchun University of Science and Technology, China), Meijiao Wang (Electronical Information Changchun University of Science and Technology, China), Xiaoting Kan (Electronical Information Changchun University of Science and Technology, China), Xinting Zhang (Electronical Information Changchun University of Science and Technology, China), and Qi Sun (Electronical Information Changchun University of Science and Technology, China)*

Optimization of Temperature Curve of Reflow Welding Furnace Based on Machine Learning ..... 377
*Ziqi Wang (Qingdao University, China) and Lei Qiu (Institute for the Future of Qingdao University, China)*

Design of Simulation Model and Research on Output Characteristics of Solar Cells Based on Deep Learning ..... 382
*Dong Zhong (Shanwei Polytechnic, China) and Dayong Fan (Guilin University of Technology, China)*

Research on Artificial Intelligence Algorithm and Its Application in Games ..... 386
*Cundong Tang (Northwest University, China), Zhiping Wang (Nanyang Institute of Technology, China), Xiuxiu Sima (Nanyang Institute of Technology, China), and Lingxiao Zhang (Nanyang Institute of Technology, China)*

Research on Ethical Issues of Artificial Intelligence Technology ..... 390
*Zhiping Wang (Nanyang Institute of Technology, China), Cundong Tang (Nanyang Institute of Technology, China: Nanyang Institute of Technology, China), Xiuxiu Sima (Nanyang Institute of Technology, China), and Lingxiao Zhang (Nanyang Institute of Technology, China)*

Research on Nondestructive Testing of Microcracks ..... 395
*Guanni Ji (ZTE Institute of Communication, Xi'an Traffic Enginering Institute, China)*

Numerical Simulation of Process Parameters and Equipment Failure Analysis of Melt Blown Die Head ..... 398
*Jinnan Liu (Jiangyin Polytechnic College, China)*

Research on Mechanical Design and Manufacture Based on Multi-Agent and Its Automation Application ..... 403
*Yu Liang (Garrett–Advancing Motion, China) and Chai Xiangyu (Wuhan International Trade University, China)*

Exploration on Prevention and Maintenance of Common Faults of Hydraulic Machinery Equipment Based on Big Data ..... 408
*Wuyang Zhang (Dalian Polytechnic University, China) and Maojun Zhou (Dalian Polytechnic University, China)*

Design of Separating Structure of Small Satellite with Elastic Metal ..... 412
*Yang Jiandong (China Satellite Maritime Tracking, China), Li Renlong (China Satellite Maritime Tracking, China), You Xiaoguang (China Satellite Maritime Tracking, China), and Zhang Songyang (China Satellite Maritime Tracking, China)*

Design of Maritime Satellite Launch Platform ..... 416
*Yang Jiandong (China Satellite Maritime Tracking, China), Ma Yingliang (China Satellite Maritime Tracking, China), Zhang Tao (China Satellite Maritime Tracking, China), and Jin Dong (China Satellite Maritime Tracking, China)*

Rocket Booster Recovery Analysis ..... 420
*Yang Jiandong (China Satellite Maritime Tracking, China), Wang Qiang (China Satellite Maritime Tracking, China), Cong Bo (China Satellite Maritime Tracking, China), and Zhang Songyang (China Satellite Maritime Tracking, China)*

Research on the 95th Dummy Injury Based on Interior Fittings of Passenger Car ..... 423
*Wu Yongqiang (CATARC Automotive Test Center (Tianjin) Co., Ltd., China) and Yan Deyou (CATARC Automotive Test Center (Tianjin) Co., Ltd., China)*

Design of Fatigue Endurance Experiment Method for Automotive Torsion Beam Based on Rain-Flow Method ..... 428
*Ma Zhuqiao (Nanjing University of Science and Technology Zijin College, China), Ren Zheyu (Nanjing University of Science and Technology Zijin College, China), Gu Tongguang (Nanjing University of Science and Technology Zijin College, China), Yang Zewen (Nanjing University of Science and Technology Zijin College, China), Huang Yijie (Nanjing University of Science and Technology Zijin College, China), and Fei Yeqi (Nanjing University of Science and Technology Zijin College, Nanjing Forestry University, China)*

A Bionic Strategy of Chemical Plume Tracing on Autonomous Underwater Vehicle ..... 433
*Haifeng Jiu (Harbin University of Commerce, China) and Wei Deng (Harbin University of Commerce, China)*

Vibration Analysis of Resonance Fatigue Testing Machine ..... 439
*Siqin Chen (China University of Petroleum, China) and Frank Lim (China University of Petroleum, China)*

Ploughing Test and Analysis of High Speed Flip Plough ..... 444
*Pengfei Zhao (Tarim University, China), Jianfei Xing (Tarim University, China), Can Hu (Tarim University, China), Yaming Liu (Tarim University, China), Mo Chen (Tarim University, China), and Xufeng Wang (Tarim University, China)*

Detection Device of Steel Rope of the Strop ..... 448
*Bairan Wang (China Jiliang University, China), Ying Jin (Zhejiang Academy of Special Equipment Science, China), Qing Li (China Jiliang University, China), Weiliang Jin (Zhejiang Academy of Special Equipment Science, China), Renyuan Tong (China Jiliang University, China), and Zheng Lin (Zhejiang Academy of Special Equipment Science, China)*

Research on Calibration Device of Falling Weight Deflectometer Based on the Absolute Method ..... 451
*Na Miao (Research Institute of Highway Ministry of Transport, China), Gugangwu Dou (Research Institute of Highway Ministry of Transport, China), Lu Peng (Research Institute of Highway Ministry of Transport, China), Chunmei You (Research Institute of Highway Ministry of Transport, China), and Yixu Wang (Research Institute of Highway Ministry of Transport, China)*

Optimal Design of Kinematic Characteristics of Plane Flip Four-Bar Linkage Based on Adams ..... 454
*Xuan Gao (Nanjing University of Science and Technology, China), Longmiao Chen (Nanjing University of Science and Technology, China), and Zhiqun Chen (Nanjing University of Science and Technology, China)*

**Author Index** ..... **459**