

# **2021 International Conference on Intelligent Computing, Automation and Applications (ICAA 2021)**

**Nanjing, China  
25-27 June 2021**

**Pages 1-509**



**IEEE Catalog Number: CFP21AZ8-POD  
ISBN: 978-1-6654-3731-8**

**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:	CFP21AZ8-POD
ISBN (Print-On-Demand):	978-1-6654-3731-8
ISBN (Online):	978-1-6654-3730-1

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2021 International Conference on Intelligent Computing, Automation and Applications (ICAA) **ICAA 2021**

## Table of Contents

Preface .....	xxvi
ICAA 2021 Committee .....	xxvii
Keynotes .....	xxix

### Topic 1: Intelligent Computation and Applications

Feature Detection Method of Assembly Position Based on Machine Vision .....	1
<i>Shaojie Sheng (Shanghai University, China), Qijie Zhao (Shanghai University, China; Shanghai Key Laboratory of Intelligent Manufacturing and Robotics, China), and Kai Xu (Shanghai University, China)</i>	
On Hamiltonian Properties of Grid Graph .....	5
<i>Yingtai Xie (Chengdu University, P.R.C)</i>	
Image Segmentation Based on Watershed Algorithm .....	10
<i>Jun Zhou (Chongqing Business Vocational College, China), Yue Yin (Chongqing Business Vocational College, China), and Shuai Wang (Basic Laboratory Center of Basic Department of Army Service College Chongqing, China)</i>	
Target Tracking Based on Particle Filter and Mean Shift .....	14
<i>Pengpeng Zhao (Naval Research Institute, China), Jun Luo (Naval Research Institute, China), Xun Li (Naval Research Institute, China), Shuzhong Li (Naval Research Institute, China), and Kai Chang (Northern Institute of Electronic Equipment, China)</i>	
Comparative Analysis of Machine Learning Models for Recidivism Prediction Based on Chi-Square Test .....	21
<i>Zhihao Zhang (East China Jiaotong University, China), Zhaohua Huang (East China Jiaotong University, China), Zhongbao Wan (East China Jiaotong University, China), and Lingci Meng (East China Jiaotong University, China)</i>	
Similarity Calculation Method of Siamese-CNN Judgment Document Based on TinyBERT .....	27
<i>Zhongbao Wan (East China Jiaotong University, China) and Niting Ye (East China Jiaotong University, China)</i>	

GrabCut Algorithm Fusion of Extreme Point Features .....	33
<i>Chao Li (Hebei University of Architecture, China), Xiaozhen Zhao (Hebei University of Architecture, China), and Huiying Ru (Hebei University of Architecture, China)</i>	
Survey on Virtualization of High Performance Computing .....	39
<i>Mingtian Shao (National University of Defense Technology, China), Kai Lu (National University of Defense Technology, China), and Wenzhe Zhang (National University of Defense Technology, China)</i>	
Equipment Fault Detection Based on Fusion Algorithm LSTM-CNN-GAP .....	42
<i>Hong Qiu (Chongqing Chuanyi Automation Co., Ltd., China), Luxia Yang (Chongqing Chuanyi Automation Co., Ltd., China), Xiaoruo Hu (Chongqing Chuanyi Automation Co., Ltd., China), and Jie Yao (Chongqing Chuanyi Automation Co., Ltd., China)</i>	
Application of Differential Evolution Algorithm to Power System Economic Dispatch Problem .....	47
<i>Yaming Ren (Guilin University of Technology, China) and Meimei Liao (Guilin University of Technology, China)</i>	
Research on Automatic Polarization Adjustment Technology of Satellite Antenna .....	53
<i>Lili Zhao (NO.12 Fan Gongting south street, China), Pengpeng Yu (NO.12 Fan Gongting south street, China), Qicai Dong (NO.12 Fan Gongting south street, China), Xianglei Meng (NO.12 Fan Gongting south street, China), Xiangyang Huang (NO.12 Fan Gongting south street, China), and Jing Liu (NO.12 Fan Gongting south street, China)</i>	
Design and Application of Two-in-one Device for Carton Deliver .....	58
<i>Haibin Yao (China Tobacco Zhejiang Industrial Co., Ltd., China), Xue Shen (China Tobacco Zhejiang Industrial Co., Ltd., China), and Jie Li (China Tobacco Zhejiang Industrial Co., Ltd., China)</i>	
Statistical Analysis and Regular Research on Chongqing Coal Mine Accidents .....	64
<i>Yunqi Chen (China Coal Technology Engineering Group Chongqing Research Institute, China), Jin Xu (China Coal Technology Engineering Group Chongqing Research Institute, China), Kai Tan (China Coal Technology Engineering Group Chongqing Research Institute, China), and Yi Gou (China Coal Technology Engineering Group Chongqing Research Institute, China)</i>	
The Calibration for Camera and Correction of Image .....	71
<i>Jun Tian (University of Jinan, China), Jun Wei (University of Jinan, China), and Yongting Zhang (University of Jinan, China)</i>	
The Threshold Characteristics of the Poverty Reduction Effect of Educational Financial Expenditure — Analysis of Panel Data in Chongqing, China from 2009 to 2018 .....	76
<i>Zhenzhen Hu (Saint Louis University, Philippines) and Yuanpeng Duan (Saint Louis University, Philippines)</i>	
Research on Target Ranging Method Based on Binocular Stereo Vision .....	81
<i>Qingsheng Mu (University of Jinan, China), Jun Wei (University of Jinan, China), Zhugang Yuan (University of Jinan, China), and Yuheng Yin (University of Jinan, China)</i>	

FDI Attack Detection Scheme Based on Nonlinear Prediction and Deep Learning .....	86
<i>Aidong Xu (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China), Peng Zhang (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Qing Li (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Hong Wen (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Juan Guo (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Yixin Jiang (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China), and Yunan Zhang (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China)</i>	
The Optimization of Microgrid Distribution Based on PSO .....	92
<i>Aidong Xu (Electric Power Research Institute, China Southern Power Grid Co., China), Runhui Zhao (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Zhongqi Mao (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Hong Wen (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Yixin Jiang (Electric Power Research Institute, China Southern Power Grid Co., China), Lingzhi Fei (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), Peiyao Wang (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center, UESTC), and Yunan Zhang (Electric Power Research Institute, China Southern Power Grid Co., China)</i>	
Design and Research of UAV Intelligent Anti-Crash Device .....	98
<i>Anxu Lei (Jiangnan University, China), Zhiheng Chen (Jiangnan University, China), Yunyuan Dong (Jiangnan University, China), Bo Guan (Jiangnan University, China), Yangyang Li (Jiangnan University, China), and Xiaobo Hu (Jiangnan University, China)</i>	
Fish Swarm Algorithm and Its Application in Power System Economic Dispatch .....	106
<i>Yaming Ren (Guilin University of Technology, China)</i>	
Research on SQL Injection Detection Model Based on CNN .....	111
<i>Ruhua Lu (Xiangnan University, China), Shuangwei Wang (ChenZhou Radio And Television University, China), and Yalan Li (Xiangnan University, China)</i>	
Intra-and-Inter Sentence Attention Model for Enhanced Question Answering System .....	115
<i>Yunyi Liu (Case Western Reserve University, USA) and Beixi Hao (Indiana State University, USA; LifeFoundry Inc., USA)</i>	

Target Tracking Algorithm of Similarity Detection Based on Correlation Filtering .....	122
<i>Cheng Li (Shenzhen University, China) and Anmin Zhu (Shenzhen University, China)</i>	
Control and Optimization for Intelligent Unmanned Surface Vehicles (USVs): A Survey and Suggested Approaches .....	130
<i>Yifang Wang (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Xiao He (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Donghang Liu (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Kang Si (Beijing Jiaotong University, China), and Peng Li (Beijing Jiaotong University, China)</i>	
Terminal Security Protection Anomaly Detection Based on Combined Algorithm .....	135
<i>Dong Liu (Institute of Computer Application, Chinese Academy of Engineering Physics, China), Chunrui Zhang (Institute of Computer Application, Chinese Academy of Engineering Physics, China), and Fang Lou (Institute of Computer Application, Chinese Academy of Engineering Physics, China)</i>	
Design of Vector Quantization Code Book Based on Clone Selection Algorithm and its Application .....	140
<i>Mengling Zhao (Xi'an University of Science and Technology, China), Meng Zhao (Xi'an University of Science and Technology, China), and Xinlu Yang (Xi'an University of Science and Technology, China)</i>	
Improved Loop Detection Method Based on ICP and NDT Registration Algorithm .....	145
<i>Xue Bao (Southeast University) and Yingzi Tan (Southeast University)</i>	
An Accurate and Fast Algorithm of Pitch Estimation Based on Relationship with Overtones .....	151
<i>Juan Ren (Beijing center for physical and chemical analysis), Qingjun Liu (Beijing Academy of Science and Technology), and Ting Chen (Beijing center for physical and chemical analysis)</i>	
Consensus Problem of Leader-Following Second-Order Multi-agent Systems with Time-Delay Under Directed Topology .....	160
<i>Qiang Han (Southwest University of Science and Technology, China; Sichuan University of Science &amp; Engineering, China), Xianguo Tuo (Southwest University of Science and Technology, China), Yongshuai Zhou (Sichuan University of Science &amp; Engineering, China), and Yuxin Tang (Sichuan University of Science &amp; Engineering, China)</i>	
Two Stages for Visual Object Tracking .....	165
<i>Fei Chen (National University of Defense Technology, China), Fuhan Zhang (National University of Defense Technology, China), and Xiaodong Wang (National University of Defense Technology, China)</i>	
Robot Path Planning Based on Fusion Improved Ant Colony Algorithm .....	171
<i>Huan Liang (Nanjing University of Aeronautics and Astronautics), Xinhua Wang (Nanjing University of Aeronautics and Astronautics), Zhe Hu (China Ship Development and Design Center), Kai Zhang (China Ship Development and Design Center), and Hao Wang (Nanjing University of Aeronautics and Astronautics)</i>	

Research on UAV Smooth Path Planning Method Based on Improved Ant Lion Algorithm .....	180
<i>Hao Wang (Nanjing University of Aeronautics and Astronautics), Huajun Gong (Nanjing University of Aeronautics and Astronautics), Xinhua Wang (Nanjing University of Aeronautics and Astronautics), and Huan Liang (Nanjing University of Aeronautics and Astronautics)</i>	
Multi-Preference Social Recommendation of Users Based on Graph Neural Network .....	190
<i>Yong Niu (Bohai University, China), Xing Xing (Bohai University, China), Mindong Xin (Bohai University, China), Qiuyang Han (Bohai University, China), and Zhichun Jia (Bohai University, China)</i>	

## Topic 2: Artificial Intelligence

Research on Intelligent Recommendation System Based on Knowledge Management .....	195
<i>Hanqing Hu (Beijing Information Science and Technology University, China), Xiangyu Ma (Beijing Information Science and Technology University, China), Hengxing Pan (Beijing Information Science and Technology University, China), Hongxi Zhang (Guizhou Minzu University, China), and Fan Gu (Beijing Information Science and Technology University, China)</i>	
Research on the Construction Path of Smart Hotel in the Era of Artificial Intelligence .....	199
<i>Ranran Guo (Shandong Xiehe University, China) and Yinghui Wu (Shandong Xiehe University, China)</i>	
The Application Research of Artificial Intelligence in Logistics Field .....	203
<i>Bo Yang (Jiangxi University of Finance and Economics, China) and Zongfang Huang (Jiangxi University of Finance and Economics, China)</i>	
Recommender Systems in e-Commerce .....	209
<i>You Lyu (Xiamen University, China)</i>	
A Study on Post-Editing Strategies in the Translation of Multimodal Texts Under the Background of Artificial Intelligence: With Examples from Children's Picture Books .....	213
<i>Xiaoying Zhao (Nanchang Institute of Technology, China)</i>	
Educational Artificial Intelligence (EAI) Connotation, Key Technology and Application Trend: Interpretation and Analysis of the two Reports Entitled "Preparing for the Future of Artificial Intelligence" and "The National Artificial Intelligence Research and Development Strategic Plan" .....	219
<i>Xi Gong (Nanchang Institute of Technology, China)</i>	
A Deep Supervised Hashing Algorithm for Image Retrieval .....	224
<i>Yalan Li (Xiangnan University, China), Min Yao (Xiangnan University, China), Jiangquan Huan (Xiangnan University, China), Fuming Deng (Xiangnan University, China), and Ruhua Lu (Xiangnan University, China)</i>	
Man-Machine Collaborative Welding Time Prediction Based on Simulated Annealing Algorithm ..	229
<i>Luxia Yang (Chongqing Chuanyi Software Co., Ltd., China), Hong Qiu (Chongqing Chuanyi Software Co., Ltd., China), and Xiaoruo Hu (Chongqing Chuanyi Software Co., Ltd., China)</i>	
Research on Recognition Method of Interface Elements Based on Machine Learning .....	233
<i>Jing Cheng (Xi'an Technological University, China), Junxian Li (Northwestern Polytechnical University, China), and Jingyi Chen (Northwestern Polytechnical University, China)</i>	

Text Sequence Recognition in Natural Scenes Based on Deep Recurrent Neural Networks .....	237
<i>Miao Chen (Xiangnan University, China), Min Yao (Xiangnan University, China), Xiaoqin Zhang (Xiangnan University, China), and Yalan Li (Xiangnan University, China)</i>	
Gesture Recognition for Human-Computer Interaction Based on CNN Model .....	241
<i>Jing Cheng (Xi'an Technological University, China) and Zhulin Li (Northwestern Polytechnical University, China)</i>	
Mobile Application GUI Similarity Comparison Based on Perceptual Hash for Automated Robot Testing .....	245
<i>Jing Cheng (Xi'an Technological University, China) and Wei Wang (Northwestern Polytechnical University, China)</i>	
An Overview of Adversarial Sample Attacks and Defenses for Graph Neural Networks .....	252
<i>Chuan Guo (PLA Unit No.92538, China)</i>	
Research on Face Recognition Algorithm Based on D-S Evidence Theory and Local Domain Pattern .....	261
<i>Xuyang Wang (Lanzhou University of Technology, China) and Tongyan Wang (Lanzhou University of Technology, China)</i>	
Research on Functional Safety of Battery Management System (BMS) for Electric Vehicles .....	267
<i>Bo Li (Auto Standardization Research Institute, China Automotive Technology and Research Center Co., Ltd), Yue Fu (Auto Standardization Research Institute, China Automotive Technology and Research Center Co., Ltd), Shiliang Shang (Pan Asia Technical Automotive Center Co., Ltd.), Zhenzhen Li (Pan Asia Technical Automotive Center Co., Ltd.), Jinfu Zhao (ECARX), and Bin Wang (Auto Standardization Research Institute, China Automotive Technology and Research Center Co., Ltd)</i>	
Construction of Text Emotion Classification Model Based on Convolutional Neural Network .....	271
<i>Ruhua Lu (Xiangnan University, Chenzhou, China), Yalan Li (Xiangnan University, Chenzhou, China), and Yanwen Yan (Xiangnan University, Chenzhou, China)</i>	
The Object Recognition Research Based on Convolution Neural Network .....	275
<i>Ruhua Lu (Xiangnan University, China), Yalan Li (Xiangnan University, China), Yanwen Yan (Xiangnan University, China), and Weiqiao Yao (Xiangnan University, China)</i>	
Text Similarity Based on Post-Training BERT .....	279
<i>Yongping Xing (Beijing Leadsec Technology Co., Ltd., China; BUPT, China) and Chaoyi Bian (Beijing Venustech Co., Ltd, China)</i>	
A Framework for Robo-Advisor Based on Knowledge Fusion .....	283
<i>Xiaoqing Luo (Peking University, Beijing, China), Ke Feng (Peking University, Beijing, China), and Xiaoli Fang (Sichuan Vocational and Technical College of Communication, China)</i>	
Template Attacks Based on Two-Dimensional Convolutional Neural Networks .....	287
<i>Yuchen Tu (Chengdu University of Information Technology, China), Zhen Wu (Chengdu University of Information Technology, China), Yi Wang (Southern Power Grid Science Research Institute Co., Ltd, China), Min Wang (Southern Power Grid Science Research Institute Co., Ltd, China), and Xi Wei (Southern Power Grid Science Research Institute Co., Ltd, China)</i>	



UAV Lateral-Directional Control Based on Multi-Input Multi-Output L1 Adaptive Theory .....	294
<i>Yongshun Wang (Xiamen University), Yue Feng (Xiamen University), Zonghua Sun (Xiamen University), Liaoni Wu (Xiamen University), and Bin Xi (Xiamen University)</i>	
Optimal Estimation for Continuous-Time Markov Jump Systems with Multiplicative Noise .....	301
<i>Meng Su (University of Jinan, China)</i>	
Terminal Security Reinforcement Method Based on Graph and Potential Function .....	307
<i>Aidong Xu (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China), Lingzhi Fei (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center), Qianru Wang (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center), Hong Wen (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center), Sihui Wu (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center), Peiyao Wang (University of Electronic Science and Technology of China (UESTC), China; Sichuan intelligent IoT Communication Technology Engineering Research Center), Yunan Zhang (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China), and Yixin Jiang (Electric Power Research Institute, China Southern Power Grid Co., Ltd., China)</i>	
Encryption Chip Template Attack Based on ResNet Convolutional Neural Network .....	314
<i>Yi Zhou (Chengdu University of Information Technology, China), Yi Wang (Chengdu University of Information Technology, China), Min Wang (Chengdu University of Information Technology, China), Zhen Wu (Chengdu University of Information Technology, China), Zhibo Du (Chengdu University of Information Technology, China), and Wei Xi (Southern Power Grid Science Research Institute Co., Ltd, China)</i>	
Construction of Mobile Service Platform in University Library .....	320
<i>Feng Li (Huazhong Agricultural University, China) and Kai Liao (Huazhong Agricultural University, China)</i>	
Design and Implementation of Safety Box Management System Based on Human Detection and Face Recognition .....	325
<i>Jing Huang (Guangzhou College of Commerce, China), Bidong Chen (Guangzhou College of Commerce, China), Baoyu Li (Guangdong Agriculture Industry Business (AIB) Polytechnic, China), and Shiyang Ma (Guangzhou College of Commerce, China)</i>	
Smart Region System Architecture and Technologies .....	329
<i>Hua Wang (Tianchen Information Technology and System Engineering Institute, China), Zhiyuan Chen (Tianchen Information Technology and System Engineering Institute, China), Bo Hu (Tianchen Information Technology and System Engineering Institute, China), Chao Guo (Tianchen Information Technology and System Engineering Institute, China), and Feng Yue (Tianchen Information Technology and System Engineering Institute, China)</i>	

Design of Speech Recognition System Based on Linear Microphone Array .....	333
<i>Fanchang Zeng (Jiangsu Automation Research Institute, China) and Xiangying Kong (Jiangsu Automation Research Institute, China)</i>	
Point2Token: A Multi-tagging Answer Retrieval Framework for Question Answering .....	339
<i>Yi Liu (Royal Melbourne Institute of Technology, Australia) and Puning Yu (South China University of Technology, China)</i>	
Roberta-Based Encoder-Decoder Model for Question Answering System .....	344
<i>Puning Yu (South China University of Technology, China) and Yunyi Liu (Case Western Reserve University, USA)</i>	
Enhanced Medical Dialogue Diagnosis with Intra-Inter Window Attention Encoder .....	350
<i>Beixi Hao (Indiana State University, USA; LifeFoundry Inc., USA), Yi Liu (Faculty of Science, Royal Melbourne Institute of Technology (RMIT), Australia), and Jacob Henry Hao (Indiana State University, USA)</i>	
Research on Gait Evaluation Method Based on Machine Vision .....	357
<i>Xiaobo Peng (Shenzhen University, China), Yiwen Zhang (Shenzhen University, China), and Lin Song (Shenzhen University, China)</i>	
Chinese Named Entity Recognition for a Power Customer Service Intelligent Q&A System .....	363
<i>Ning Wu (State Grid Jiangsu Marketing Service Center (Metrology Center), P.R.China), Hongying Zhao (State Grid Jiangsu Marketing Service Center (Metrology Center), P.R.China), Youlang Ji (State Grid Jiangsu Marketing Service Center (Metrology Center), P.R.China), and Shaochen Sun (State Grid Jiangsu Marketing Service Center (Metrology Center), P.R.China)</i>	
Research on Beyond Visual Range Air Combat Interception Guidance Law Interception Guidance Law .....	369
<i>Dongmu Mei (Shenyang Aircraft Design and Research Institute, China) and Lifeng Wang (Beihang University, China)</i>	
Diagnosis of Esophagitis Based on Deep Learning .....	374
<i>Yuling Hou (Beijing University of Technology, China), Luhong Diao (Beijing University of Technology, China), Na Lu (Beijing University of Technology, China), Ying Li (Jinan Central Hospital Affiliated to Shandong University, China), and Yong Qiao (Uniontech Co. Ltd, China)</i>	
Improved Far-Field Speaker Recognition Method Based Geometry Acoustic Simulation and SpecAugment .....	380
<i>Yingzi Lian (Inner Mongolia University of Technology, China; Inner Mongolia Key Laboratory of Statistical Analysis Theory for Life Data and Neural Network Modeling, Inner Mongolia University of Technology, China) and Jing Pang (Inner Mongolia University of Technology, China; Inner Mongolia Key Laboratory of Statistical Analysis Theory for Life Data and Neural Network Modeling, Inner Mongolia University of Technology, China)</i>	
Medical Text Classification System Based on Deep Learning .....	388
<i>Bo Zhou (Southwest University, P.R. China), Dingling Su (Southwest University, P.R. China), and Zehui Qu (Southwest University, P.R. China)</i>	

Short-term Heating Load Prediction of Heat Exchange Station Based on DAIGA-LSTM Neural Network .....	393
<i>Qingwu Fan (Beijing University of Technology, China), Guanghuang Chen (Beijing Wanji Technology Co., Ltd., China), and Shuo Li (Beijing University of Technology, China)</i>	
Linked Lists Storage for JSON Data .....	402
<i>Teng Lv (Anhui Xinhua University, China), Ping Yan (Anhui Agricultural University, China), Hongwu Yuan (Anhui Xinhua University, China), and Weimin He (University of Wisconsin-Stevens Point, USA)</i>	
Unsupervised Learning Neural-Network Method for Resource Allocation in Multi-cell Cellular Networks .....	406
<i>Ming Sun (Qiqihar University, China), Liangjin Hu (Qiqihar University, China), Wei Cao (Qiqihar University, China), Hui Zhang (Qiqihar University, China), and Shumei Wang (Qiqihar University, China)</i>	
Outdoor Autonomous Wheeled Robot .....	412
<i>Dechao Liu (Guilin University of Technology, China) and Jianzhi Deng (Guilin University of Technology, China)</i>	
A Study of Feeding Robot Based on RFID and Ultrasonic Obstacle Avoidance .....	421
<i>Yanbin Wei (Xi'an University of technology, China), Peng Liu (Xi'an University of technology, China.), and Liming Wang (Xi'an University of technology, China)</i>	
Improved Net Power Delivery Using a Directional Coupler .....	426
<i>Jinyuan Li (National Institute of Metrology (NIM), China)</i>	
Similarity Calculation of Environmental Complaint Events Based on Improved FOA .....	432
<i>Qingwu Fan (Beijing University of Technology, China; Engineering Research Center of Digital Community, Ministry of Education, Beijing University of Technology, China; Beijing Key Laboratory of Urban Rail Transit, Beijing University of Technology, China), Guang Chen (Beijing University of Technology, China; Engineering Research Center of Digital Community, Ministry of Education, Beijing University of Technology, China; Beijing Key Laboratory of Urban Rail Transit, Beijing University of Technology, China), and Kai Yang (Beijing University of Technology, China; Engineering Research Center of Digital Community, Ministry of Education, Beijing University of Technology, China; Beijing Key Laboratory of Urban Rail Transit, Beijing University of Technology, China)</i>	
Dynamic Graph Attention Recurrent Neural Networks for Fact Verification .....	444
<i>Zhijuan Zhan (Chinese Aeronautical Radio Electronics Research Institute, China), Chonghao Chen (Science and Technology on Information Systems Engineering Laboratory, National University of Defense Technology, China), Chengyu Song (Science and Technology on Information Systems Engineering Laboratory, National University of Defense Technology, China), Aimin Luo (Science and Technology on Information Systems Engineering Laboratory, National University of Defense Technology, China), and Fei Cai (Science and Technology on Information Systems Engineering Laboratory, National University of Defense Technology, China)</i>	

A Digitigrade Wheeled Bipedal Robot and Its Obstacle Avoidance Actions Library .....	451
<i>Ziyu Wang (Beijing Institute of Technology, China), Fangxing Li (Beijing Institute of Technology, China), Weimin Zhang (Beijing Institute of Technology, China), and Qiang Huang (Beijing Institute of Technology, China)</i>	
Design and Implementation of a Chatbot System Integrated with Facial Expression Recognition .....	468
<i>Sijing Hu (Wuhan Business University, China) and Chengzhang Qu (Wuhan Business University, China)</i>	

### Topic 3: Big Data Technology and Applications

Cloud Computing-Based Smart Grid Power Big Data Analysis Technology .....	474
<i>Ning Tang (NARI Group Corporation / State Grid Electric Power Research Institute, China; NARI Information Communication Science and Technology Co. Ltd., China), Jiayu Fu (NARI Group Corporation / State Grid Electric Power Research Institute, China; NARI Information Communication Science and Technology Co. Ltd., China), Lihe Tang (NARI Group Corporation / State Grid Electric Power Research Institute, China; NARI Information Communication Science and Technology Co. Ltd., China), Jun Zhou (NARI Group Corporation / State Grid Electric Power Research Institute, China; NARI Information Communication Science and Technology Co. Ltd., China), and Chongyan Li (NARI Group Corporation / State Grid Electric Power Research Institute, China; NARI Information Communication Science and Technology Co. Ltd., China)</i>	
Authenticity Discrimination and Analysis of Urban Air Pollution Data .....	478
<i>Zongting Xie (Zhuhai College of Jilin University, China), Zefeng Li (Zhuhai College of Jilin University, China), Jingwei Huang (Zhuhai College of Jilin University, China), and Lidong Wang (Zhuhai College of Jilin University, China)</i>	
Study of Canopy and K-Means Clustering Algorithm Based on Mahout for E-Commerce Product Quality Analysis .....	484
<i>Peizhang Xie (Nanjing Institute of Product Quality Inspection, China), Minming Mao (Nanjing Institute of Product Quality Inspection, China), Xuguang Jin (Nanjing Institute of Product Quality Inspection, China), Dong Chen (Nanjing Institute of Product Quality Inspection, China), and Mengyi Guo (Nanjing Institute of Product Quality Inspection, China)</i>	
Discussion on Big Data Network Public Opinion in Colleges and Universities .....	489
<i>Binrui Xue (Shaanxi Normal University, China)</i>	
Ship Target Classification Technology Fused With Domain Knowledge .....	492
<i>Zijuan Luo (Science and Technology on Information Systems Engineering Laboratory), Zhou Fang (Science and Technology on Information Systems Engineering Laboratory), and Shuai Ding (Nanjing Research Institute of Electronic Engineering)</i>	
A Bottom-up Saliency Detection Method .....	496
<i>Xiaosong Zhou (Wuhan polytechnic, China) and Ping Zeng (Wuhan polytechnic, China)</i>	

Research on Feature Fusion Method of AD Image Based on Structured and Sparse Canonical Correlation Analysis .....	505
<i>Yu Jiang (East China Jiaotong University, China), Liyue Liu (East China Jiaotong University, China), and Xiangyu Liu (East China Jiaotong University, China)</i>	
Analysis of Epidemic Data Based on SciPy .....	510
<i>Chenlin Hu (Jiangnan University, P.R.China), Yifan Hu (Jiangnan University, P.R.China), Zhihao He (Jiangnan University, P.R.China), Lin Hu (Jiangnan University, P.R.China), Yi Huang (Jiangnan University, P.R.China), and Ping Xu (Jiangnan University, P.R.China)</i>	
Dense and Low-rise Residential Areas Detection by Shadow Data Mining in Urban High-Resolution Images .....	514
<i>Hongya Zhang (Changjiang River Scientific Research Institute of Changjiang Water Resources Commission, China; Research Center on Mountain Torrent and Geologic Disaster Prevention of Ministry of Water Resources, China), Wentao Xu (Changjiang River Scientific Research Institute of Changjiang Water Resources Commission, China; Research Center on Mountain Torrent and Geologic Disaster Prevention of Ministry of Water Resources, China), Hongyu Ren (Changjiang River Scientific Research Institute of Changjiang Water Resources Commission, China; Research Center on Mountain Torrent and Geologic Disaster Prevention of Ministry of Water Resources, China), Linyao Dong (Changjiang River Scientific Research Institute of Changjiang Water Resources Commission, China; Research Center on Mountain Torrent and Geologic Disaster Prevention of Ministry of Water Resources, China), and Zhongjie Fan (Changjiang River Scientific Research Institute of Changjiang Water Resources Commission, China; Research Center on Mountain Torrent and Geologic Disaster Prevention of Ministry of Water Resources, China)</i>	
Multi-period Multi-commodity Sourcing and Storage with Quantity Discounts .....	520
<i>Lan Ma (Henan University of Science and Technology, China), Xiaoshen Li (Henan University of Science and Technology, China), and Youlin Shang (Henan University of Science and Technology, China)</i>	
Multi-Label Text Classification and Text Adversarial Attack .....	532
<i>Yingxin Song (Beijing Institute of Technology), Zhenyan Liu (Beijing Institute of Technology), and Chunxia Zhang (Beijing Institute of Technology)</i>	
Crop Disease Recognition Method Based on Improved Channel Attention Mechanism .....	537
<i>Ronghua Gao (Beijing Research Center for Information Technology in Agriculture, China; National Engineering Research Center for Information Technology in Agriculture, China), Huarui Wu (Beijing Research Center for Information Technology in Agriculture, China; National Engineering Research Center for Information Technology in Agriculture, China), Xiang Sun (Beijing Research Center for Information Technology in Agriculture, China; National Engineering Research Center for Information Technology in Agriculture, China), and Jingqiu Gu (Beijing Research Center for Information Technology in Agriculture, China; National Engineering Research Center for Information Technology in Agriculture, China)</i>	

An Improved Yolov3 Object Detection Algorithm for UAV Aerial Images .....	542
<i>Zhihong Zhang (Nanjing University of Aeronautics and Astronautics), Huajun Gong (Nanjing University of Aeronautics and Astronautics), Xinhua Wang (Nanjing University of Aeronautics and Astronautics), Yadong Feng (Nanjing University of Aeronautics and Astronautics), and Minjie Xu (Nanjing University of Aeronautics and Astronautics)</i>	
Research on Spatial-Temporal Differentiation and Driving Forces of Green Economic Efficiency in the Yangtze River Economic Belt Based on Geographic Detectors .....	551
<i>Shuguang Liu (Ocean University of China, China), Lei Song (Ocean University of China, China), and Yue Huang (Ocean University of China, China)</i>	
A Method of Applying Big Data in Electricity to Inclusive Finance .....	561
<i>Siyao Wang (Beijing Guodiantong Network Technology Co., Ltd.), Caixia Lu (Beijing Guodiantong Network Technology Co., Ltd.), Yuan Liu (Beijing Guodiantong Network Technology Co., Ltd.), and Jia He (Beijing Guodiantong Network Technology Co., Ltd.)</i>	
NIPGM(1,1,α) Grey Model of COVID-19 Population Prediction Based on Slime Mold Algorithm ..	565
<i>Wenyao Guo (Xi'an University of Technology, China), Hanzhe Feng (Xi'an University of Technology, China), Xiao Chen (Xi'an University of Technology, China), Haiyan Qiao (Xi'an University of Technology, China), and Yufei An (Xi'an University of Technology, China)</i>	
Research on Fault Prediction Based on Elevator Life Cycle Big Data .....	572
<i>Jun Qiu (Shanghai Institute of Special Equipment Inspection and Technical Research, China), Leijing Yang (Henan Special Equipment Safety Testing Institute, China), and Chen Wang (Shanghai Institute of Special Equipment Inspection and Technical Research, China)</i>	
Research on Command and Control of Maritime Emergency Rescue Based on Big Data .....	576
<i>Lihong Qu (System Engineering Research Institute of China State Shipbuilding Corporation, China), Ruolin Xing (System Engineering Research Institute of China State Shipbuilding Corporation, China), and Jiajun Hou (Department of the Second System Integration of CEC Great Wall ShengFeiFan Information System Co., Ltd, China)</i>	

## **Topic 4: Blockchain Technology and Application**

Research on the Application of Blockchain Technology — From the Perspective of Audit .....	581
<i>Fenghua Zhou (State Grid Jiangsu Electric Power Co. Ltd., China), Xiulian Wang (State Grid Jiangsu Electric Power Co. Ltd., China), Liang Yin (State Grid Jiangsu Electric Power Co. Ltd., China), Lei Tao (State Grid Jiangsu Electric Power Co. Ltd., China), and Danping Chen (State Grid Jiangsu Electric Power Co. Ltd., China)</i>	
A Blockchain Electronic Bidding Scheme Based on Homomorphic Encryption .....	585
<i>Bangguo Lv (Jilin JLU Communication Design Institute Co., Ltd., China), Xinxue Tian (China Unicom Research Institute, China), and Tao Yu (Jilin JLU Communication Design Institute Co., Ltd., China)</i>	
Overview of the Basic Principles of Blockchain .....	588
<i>Buquan Liu (Research Institute of Innovation, Kylin Software Company Limited)</i>	

Blockchain Based Train-Ground Communication of CBTC System .....	594
<i>Hongli Zhao (Beijing Jiaotong University, China) and Li Zhu (Beijing Jiaotong University, China)</i>	
A Review of Blockchain Consensus .....	598
<i>Chunyang Su (Nankai University, PR China) and Xudong Li (Nankai University, PR China)</i>	
Blockchain Plus Finance: Application, Dilemma and Solution .....	605
<i>Haoqi Yu (Wuhan Textile University, China), Jian Pan (Wuhan Textile University, China), and Jinjian Yang (Wuhan Textile University, China)</i>	
Design and Implementation of Voting System Based on Ethereum .....	610
<i>Dongqing Yin (Key Laboratory for Network and Information Security of the PAP, Engineering University of the PAP, China), Mingshu Zhang (Key Laboratory for Network and Information Security of the PAP, Engineering University of the PAP, China), Bin Wei (Key Laboratory for Network and Information Security of the PAP, Engineering University of the PAP, China), and Wenbing Lin (Key Laboratory for Network and Information Security of the PAP, Engineering University of the PAP, China)</i>	
Realization Model of Personal Data Rights Based on Blockchain Technology .....	618
<i>Jinlan Guo (Shanghai University of Political Science and Law, China)</i>	
Research on Optimization of Financial System of SMEs Based on Blockchain Technology .....	623
<i>Jinjian Yang (Wuhan Textile University, China), Haoqi Yu (Wuhan Textile University, China), and Jian Pan (Wuhan Textile University, China)</i>	

## Topic 5: Cloud Computing

Calculation and Analysis of Transformer No Load over Excitation Current Based on Magnetic Circuit-Circuit Coupling Model .....	628
<i>Ziqiang Tian (Central South Electric Power Test Research Institute, China Datang Corporation Science and Technology Research Institute Co., Ltd., China)</i>	
Research on Defence Method of Blackmail Virus Based on Trusted Computing .....	636
<i>Yuan Tao (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China), Yuxiang Zhang (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China), Wei Hu (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China), and Moyan Li (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China)</i>	
Computing Task Scheduling Strategy Based on ICS Algorithm .....	640
<i>Zongfeng Zou (Shanghai University, China) and Chen Liu (Shanghai University, China)</i>	

Research on the Method of Identifying Students' Online Emotion Based on ALBERT .....	646
<i>Yongmei Ren (Chongqing Telecommunication Polytechnic College, China)</i> <i>and Xiaoyong Tan (Chongqing Jiaotong University, China)</i>	
Workflow Scheduling for Remote Sense Application Using Data Transformation Graph in Inter-Cloud .....	651
<i>Zhuojing Tian (Beijing Union University, China), Zhenchun Huang</i> <i>(Tsinghua University, China; National Supercomputing Center in Wuxi,</i> <i>China; Beijing National Research Center for Information Science and</i> <i>Technology, China), and Yinong Zhang (Beijing Union University, China)</i>	
Analysing Errors of Experimental Measurement and Theoretical Simulation of the Sun's Visual Shape .....	661
<i>Yuanxiu Wang (University of California at Berkeley, USA)</i>	
Processing Approximate KNN Query Based on Data Source Selection .....	672
<i>Liang Zhu (Hebei University, Baoding, China), Peng Li (Hebei</i> <i>University, Baoding, China), Yonggang Wei (Hebei University, Baoding,</i> <i>China), Xin Song (Hebei University, Baoding, China), and Yu Wang</i> <i>(Hebei University, Baoding, China)</i>	
Design and Construction of Code Hosting Platform Based on Cloud Computing .....	677
<i>Xinxi Lu (Beihang University, China), Nan Li (Beihang University,</i> <i>China), Yikun Chen (Beihang University, China), and Zhihuan Xing</i> <i>(Beihang University, China)</i>	

## Topic 6: Communications Networks and Systems

The Design of a Signal Switching and Conversion Module .....	682
<i>Erlei Li (Jiangsu Automation Research Institute, China), Shilin Zhang</i> <i>(Jiangsu Automation Research Institute, China), and Guoliang Zhou</i> <i>(Jiangsu Automation Research Institute, China)</i>	
Research on Key Technologies of Multi-Resolution Modeling Simulation .....	687
<i>Jie Chen (Science and Technology on Information Systems Engineering</i> <i>Laboratory, China) and Xiaoyu Li (The 28th Research Institute of China</i> <i>Electronics Technology Group Corporation, China)</i>	
Security Analysis of University Web Log Based on Elk .....	694
<i>Jinhong Gong (East China Jiaotong University Nanchang City) and</i> <i>Shiyong Ling (East China Jiaotong University Nanchang City)</i>	
Human Pose Detection Based on Multi-Scale and Multi-Stage Structure Network .....	700
<i>Yalan Li (Xiangnan University, China), Jiangquan Huan (Xiangnan</i> <i>University, China), Xiaoqin Zhang (Xiangnan University, China), and</i> <i>Min Yao (Xiangnan University, China)</i>	
Research on the Application of Exchange Mode in Data Communication Technology .....	705
<i>Chengcheng Cai (Weifang Engineering Vocational College, China)</i>	
Channel Characteristics Modeling Based on Measurement .....	708
<i>Yihuai Yang (Kunming University, China) and Sunyan Hong (Kunming</i> <i>University, China)</i>	
Research on the Secure Routing Mechanism for Software Defined Internet of Things Based on IPv6 .....	714
<i>Xiangzhi Sun (Lanzhou University of Technology, China)</i>	



Architecting Sensor Networks Applications: A Publish/ Subscribe-Based Approach .....	719
<i>Biao Dong (Nanjing Vocational University of Industry Technology, China)</i>	
Control of UAV Swarm Formation with Variable Communication Time Delay Based on Virtual Agent .....	724
<i>Yadong Feng (Nanjing University of Aeronautics and Astronautics), Xinhua Wang (Nanjing University of Aeronautics and Astronautics), Zhihong Zhang (Nanjing University of Aeronautics and Astronautics), and Minjie Xu (Nanjing University of Aeronautics and Astronautics)</i>	

## Topic 7: Computer Science and Applications

The Compactness of the Hyperspace 2X with the Locally Finite Topology .....	730
<i>Meili Zhang (Dalian Naval Academy, China), Hongmei Pei (Dalian Naval Academy, China), Weili Liu (Dalian Naval Academy, China), and Yue Yang (Dalian Naval Academy, China)</i>	
Teacher-Student Learning Community Based on WeChat .....	735
<i>Lijun Yi (Nanchang Institute of Technology)</i>	
Research on Language Landscape of Virtual Space .....	739
<i>Jing Zhang (Nanchang Institute of technology)</i>	
A Survey of Operating System Microkernel .....	743
<i>Buquan Liu (Research Institute of Innovation, Kylin Software Company Limited), Chunguang Wu (Research Institute of Innovation, Kylin Software Company Limited), and Hao Guo (Research Institute of Innovation, Kylin Software Company Limited)</i>	
Root Canal Therapy Evaluation Based on Rule Embedded Neural Networks .....	749
<i>Yang Zhou (Chengdu University of Information Technology, China) and Haoxi Zhang (Chengdu University of Information Technology, China)</i>	
A Dipole Imaging Method Based on Azimuthal Equidistant Projection .....	755
<i>Mingai Li (Beijing University of Technology, China), Bin Liu (Beijing University of Technology, China), and Ziwei Ruan (Beijing University of Technology, China)</i>	
Discuss on Functions and Design of Virtual Travel Communities for Seniors .....	761
<i>Arong Gaowa (Rikkyo University, Japan; Inner Mongolia University for Nationalities) and Meiling Bai (Tong Liao Vocational College)</i>	
Research on the Application of Information Technology in Equestrian Competition .....	766
<i>Gang Yu (Wuhan Business University, China) and Yunjian Xia (Wuhan Business University, China)</i>	
Simultaneous Image Compression and Encryption Via KPCA and CS .....	770
<i>Jinli Cheng (Henan University, P.R. China) and Xiangjun Wu (Henan University, P.R. China)</i>	
Industrial Investment Database: Concept, Characteristics and Practical Application .....	776
<i>Li Zhou (Zhaoqing University, China), Wenjun Xie (City University of Hong Kong, China), and Tao Huang (Zhaoqing University, China)</i>	

Research on Performance Evaluation of University Event Volunteers Under the Background of Mobile Internet .....	780
<i>Gang Yu (Wuhan Business University, China), Zhenyu Li (Wuhan Business University, China), and Yunjian Xia (Wuhan Business University, China)</i>	
Research on Construction Method of Protein-Protein Interaction Network Cluster Based on Hadoop .....	785
<i>Yunyuan Dong (Jiangnan University, P.R.China), Wei Guo (Jiangnan University, P.R.China), and Hai Han (Jiangnan University, P.R.China)</i>	
Discussion on Improving Information Security Literacy of University Teachers .....	791
<i>Xinge Luo (South China Univ. of Technology, China) and Fang Fang (South China Univ. of Technology, China)</i>	
Summary of Resource Elasticity Trends .....	795
<i>Yushuqing Zhang (National University of Defense Technology, China), Kai Lu (National University of Defense Technology, China), and Wenzhe Zhang (National University of Defense Technology, China)</i>	
Experiment Research on Spam Filter Classifier Based on Naive Bayesian Algorithm .....	798
<i>Teng Lv (Anhui Xinhua University, China), Ping Yan (Anhui Agricultural University, China), Hongwu Yuan (Anhui Xinhua University, China), and Weimin He (University of Wisconsin-Stevens Point, USA)</i>	
Realization of Visualization of Character Relationship Based on Relationship Graph .....	802
<i>Xingda Sun (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), Caixia Lu (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), Jia He (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), Yuan Liu (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), Yuanyuan Zhao (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), Yimeng Wang (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District), and Ye Du (Beijing Guodiantong Network Technology Co., Ltd., Block A, Dongxu International Center, Fengtai District)</i>	
Design and Implementation of a Voice Controlled Music Player System Based on iFLYTEK Open Platform .....	807
<i>Yufei Xia (Wuhan Business University, China) and Chengzhang Qu (Wuhan Business University, China)</i>	
A New Fractional Nonlinear Grey Bernoulli Model Based on Artificial Ecological Optimization Algorithm Was Used to Predict the Number of COVID-19 Infections .....	813
<i>Wenyan Guo (Xi'an University of Technology, China), Haiyan Qiao (Xi'an University of Technology, China), Yufei An (Xi'an University of Technology, China), Hanzhe Feng (Xi'an University of Technology, China), and Xiao Chen (Xi'an University of Technology, China)</i>	
Fungal Decomposition Model .....	820
<i>Qi An (Dalian University, China), Jiao Xu (Dalian University, China), Xuanfu Hu (Dalian University, China), and Xubin Gao (Dalian University, China)</i>	

## Topic 8: Control Theory and Application

Fault Identification of Transmission Line Shockproof Hammer Based on Improved YOLO V4 .....	826
<i>Jia Guo (State Grid Jibei Economic Research Institute, China; Beijing Jingyan Electric Power Engineering Design Co. Ltd., China), Jinghai Xie (State Grid Jibei Economic Research Institute, China; Beijing Jingyan Electric Power Engineering Design Co. Ltd., China), Jingzhong Yuan (State Grid Jibei Economic Research Institute, China; Beijing Jingyan Electric Power Engineering Design Co. Ltd., China), Yu Jiang (State Grid Jibei Economic Research Institute, China; Beijing Jingyan Electric Power Engineering Design Co. Ltd., China), and Shihua Lu (State Grid Jibei Economic Research Institute, China; Beijing Jingyan Electric Power Engineering Design Co. Ltd., China)</i>	
Passability Simulation Analysis of Modular Unmanned Platform .....	834
<i>Youshan Hou (China north vehicle research institute, China), Yufeng Wu (China north vehicle research institute, China), Zhongtian Xie (China north vehicle research institute, China), and Tao Xue (China north vehicle research institute, China)</i>	
Application of Model Predictive Control Algorithm Used in Path Planning of the Unmanned Tractor .....	839
<i>Yan Ren (Henan Forestry Vocational College, China) and Bin Liu (Henan Forestry Vocational College, China)</i>	
Design Method of Information Structure of Task-Oriented Command and Control Organization ...	844
<i>Yu Sun (Science and Technology on Information Systems Engineering Laboratory, China), Shaojie Mao (Science and Technology on Information Systems Engineering Laboratory, China), Songhua Huang (Science and Technology on Information Systems Engineering Laboratory, China), and Xiaobin Mao (Science and Technology on Information Systems Engineering Laboratory, China)</i>	
Construction of Integrated Protection System for Industrial Control System Based on Trusted Computing .....	850
<i>Yuan Tao (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China), Wei Hu (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China), and Sheng Li (The Third Research Institute of Ministry of Public Security, China; National Engineering Laboratory for Key Technology of Classified Information Security Protection, China)</i>	
Research on the Application of Catastrophe Theory in Seeker Performance Evaluation .....	854
<i>Duo Wang (Army 92941, Hu Ludao and Liao Ning)</i>	
Research on Construction Technology for Typical Infrared Scene of Ship-to-Air Missile .....	859
<i>Huafeng Luo (Army 92941, Hu Ludao, Liao Ning, China) and Duo Wang (Army 92941, Hu Ludao, Liao Ning, China)</i>	
The Application of STPA in the Development of Autonomous Vehicle Functional Safety .....	863
<i>Bo Li (Auto Standardization Research Institute, China Automotive Technology and Research Center Co., Ltd, China), Shiliang Shang (Pan Asia Technical Automotive Center Co., Ltd, China), and Yue Fu (China Automotive Technology and Research Center Co., Ltd, China)</i>	

Discussion on the Importance of Realizing Two Balances in Double-Channel Cigarette Machine....	869
<i>Ming Chen (China Tobacco Zhejiang Industrial Co., Ltd.), Miaojie Shen (China Tobacco Zhejiang Industrial Co., Ltd.), Zida Chen (China Tobacco Zhejiang Industrial Co., Ltd.), Shunkai Sun (China Tobacco Zhejiang Industrial Co., Ltd.), Di Xu (China Tobacco Zhejiang Industrial Co., Ltd.), Jin Jin (China Tobacco Zhejiang Industrial Co., Ltd.), Min Chen (China Tobacco Zhejiang Industrial Co., Ltd.), Zanzan Chen (China Tobacco Zhejiang Industrial Co., Ltd.), and Qianqian Sha (China Tobacco Zhejiang Industrial Co., Ltd.)</i>	
Research of Adaptive Control Wind Wire Feeding System Based on Fuzzy Control .....	876
<i>Haihua Lu (China Tobacco Zhejiang Industrial Co., Ltd., China), Weilin Cao (China Tobacco Zhejiang Industrial Co., Ltd., China), Jie Li (China Tobacco Zhejiang Industrial Co., Ltd., China), Sixiao Chen (China Tobacco Zhejiang Industrial Co., Ltd., China), and Shunkai Sun (China Tobacco Zhejiang Industrial Co., Ltd., China)</i>	
Output Synchronization for Networked Strict-Feedback Systems in the Presence of Uncertainties .....	884
<i>Ming Lu (Zhejiang University, P. R. China), Miao Yu (Zhejiang University, P. R. China), Zhijun Qiao (CRRC Supercapacitor Energy Storage and Conservation Technology R&amp;D center, Ningbo CRRC New Energy Technology CO., LTD., P. R. China), Duanshuai Li (Hunan University of Technology, P. R. China), and Junmin Peng (Hunan University of Technology, P. R. China)</i>	
Research on Active Intervention Technology of Aircraft Wake Dissipation .....	891
<i>Hao Wang (Civil Aviation Flight University of China, China), Weijun Pan (Civil Aviation Flight University of China, China), Yuming Luo (Civil Aviation Flight University of China, China), and Sirui Zheng (Civil Aviation Flight University of China, China)</i>	
UAV Taxiing Control Based on Linear Active Disturbance Rejection Control .....	895
<i>Kun Xie (Xiamen University), Liaoni Wu (Xiamen University), and Chengchan He (Xiamen University)</i>	
Active Disturbance Rejection Control of SVG Reactive Power Compensation System and Current Loop in Wind Farm .....	901
<i>Yannan Yu (Guilin University of Technology; Heilongjiang University of Science and Technology), Xueliang Fu (Guilin University of Technology), Jichi Yan (Guilin University of Technology), and Yunbo Niu (Heilongjiang University of Science and Technology)</i>	
Buckling of a Toroidal Shell with Varying Wall Thickness Under Uniform External Pressure .....	906
<i>Xin Wang (Jiangsu University of Science and Technology, China), Jian Zhang (Jiangsu University of Science and Technology, China; Shanghai Ocean University, China), Tan Zhao (State Key Laboratory of Metal Material for Marine Equipment and Application, China), and Chenyang Di (Jiangsu University of Science and Technology, China)</i>	

States Estimation for Unmanned Surface Vehicles (USVs) Using Dual Unscented Kalman Filters....	911
<i>Yifang Wang (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Xiao He (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Donghang Liu (Systems Engineering Research Institute, China State Shipbuilding Corporation (CSSC), China), Jiankai Qin (Beijing Jiaotong University, China), and Peng Li (Beijing Jiaotong University, China)</i>	
Analysis and Modeling of Electromagnetic Radiation Characteristics During Switch Operation of Electrical Isolation .....	917
<i>Jiahua Su (State Grid Changzhou Power Supply Company, China)</i>	
Research on User Cross-Domain Access Control Model Based on Feedback .....	922
<i>Hua Zhang (Institute of Computer Applications, China Academy of Engineering Physics, China), Hao Wang (Institute of Computer Applications, China Academy of Engineering Physics, China), Dong Liu (Institute of Computer Applications, China Academy of Engineering Physics, China), Chunru Zhou (Institute of Computer Applications, China Academy of Engineering Physics, China), and Fang Lou (Institute of Computer Applications, China Academy of Engineering Physics, China)</i>	
Deep Reinforcement Learning for Carrier-Borne Aircraft Support Operation Scheduling .....	929
<i>Haifeng Feng (Huazhong University of Science and Technology, China) and Wei Zeng (Huazhong University of Science and Technology, China)</i>	
A Subtraction Operation Converter with Multiple Outputs and Its Control Strategy .....	936
<i>Zhe Wang (Central South Electric Power Test Research Institute, China Datang Corporation Science and Technology Research Institute Co., Ltd., China), Haiqi Zhang (China Construction Seventh Engineering Division Real Estate Group Co., Ltd., China), Jie Chen (Shaoguan Power Supply Bureau, Guangdong Power Supply Co., Ltd., China), Zhanwei Li (Central South Electric Power Test Research Institute, China Datang Corporation Science and Technology Research Institute Co., Ltd., China), and Yusheng Zheng (Central South Electric Power Test Research Institute, China Datang Corporation Science and Technology Research Institute Co., Ltd., China)</i>	
Recognition of Weld Seam of Large Spherical Tank Based on Improved ROI Algorithm .....	942
<i>Zhipeng Yu (Southeast University), Ting Jin (Southeast University), Pinxuan Zhang (Southeast University), Zihang Xu (Southeast University), and Mengmeng Liu (Southeast University)</i>	
Unmanned Warehouse Access System for Express Delivery Based on Edge Computing Framework ....	948
<i>Xinjing Qin (Anhui Polytechnic University, China), Ping Zhang (Anhui Polytechnic University, China), Wenquan Qin (Anhui Polytechnic University, China), Fei Cheng (Anhui Polytechnic University, China), Xianglin Bao (Anhui Polytechnic University, China), and Tao Liu (Anhui Polytechnic University, China)</i>	

## Topic 9: Data Analysis and Modeling

Classification of Judicial Documents Based on Improved Bert Model .....	954
<i>Lingci Meng (East China Jiaotong University, China), Zhongbao Wan (East China Jiaotong University, China), Zhaohua Huang (East China Jiaotong University, China), Zhihao Zhang (East China Jiaotong University, China), and Qian Hu (East China Jiaotong University, China)</i>	
Prediction of Conductor Icing Thickness Based on Random Forest and WRF Models .....	959
<i>Qi Wang (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), Shaohui Zhou (Nanjing University of Information Science and Technology, China), Hourong Zhang (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), Haohui Su (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), and Wenjian Zheng (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China)</i>	
On the Local Meteorological Causes of Severe Conductor Icing by Using Numerical Computation Models and In-situ Observations .....	963
<i>Haohui Su (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), Hao Chai (Nanjing University of Information Science and Technology, China), Qi Wang (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), Hourong Zhang (Maintenance &amp; Test Center of CSG EHV Power Transmission Company, China), and Zhengqi Lu (Nanjing University of Information Science and Technology, China)</i>	
The Criteria for Nonsingular H-Tensors and its Applications .....	968
<i>Junli Zhang (Inner Mongolia University for Nationalities, China) and Guichun Han (Inner Mongolia University for Nationalities, China)</i>	
Risk Grade Evaluation of Debris Flow Based on GIS – Take Qu Shui County as an Example .....	974
<i>Juan Li (Officer College of Chinese Armed Police \ china) and Dong Xiao (Officer College of Chinese Armed Police \ china)</i>	
A Sparse 3D Model Reconstruction Algorithm Integrating Improved DAISY and MLESAC-A .....	980
<i>Yalan Li (Xiangnan University, China), Min Yao (Xiangnan University, China), Xiang Li (Xiangnan University, China), Xiaoqin Zhang (Xiangnan University, China), Shuangwei Wang (ChenZhou Radio and Television University, China), and Ruhua Lu (Xiangnan University, China)</i>	
Application of the Random Forest Kernel in Nonparametric Regression Model with Spherical Variables .....	986
<i>Huiqun Gao (University of Electronic Science and Technology of China, China) and Xu Qin (University of Electronic Science and Technology of China, China)</i>	
Research on Optimized the Configuration of Remote Tower Air Traffic Controllers .....	992
<i>Weijun Pan (Civil Aviation Flight University of China), Shuai Han (Civil Aviation Flight University of China), Yuming Luo (Civil Aviation Flight University of China), Qinghai Zuo (Civil Aviation Flight University of China), and Linfeng Zhong (Civil Aviation Flight University of China)</i>	
A Classified Question and Answer System Based on SpringBoot Integrated Neo4j Graph Database .....	1001
<i>Kaijian Li (Wuhan Business University, China) and Chengzhang Qu (Wuhan Business University, China)</i>	

Solving LR-Trapezoidal Fuzzy Linear Systems .....	1007
<i>Tingting Peng (Northwest Normal University, China) and Xiaobin Guo (Northwest Normal University, China)</i>	
Modeling and Simulation of VSC-HVDC System .....	1013
<i>Seyha Song (Central South University, China), Miaoping Sun (Central South University, China), and Musaddiq Shehu Musa (Central South University, China)</i>	

**Author Index**