

2022 International Conference on Big Data, Information and Computer Network (BDICN 2022)

**Sanya, China
20 – 22 January 2022**



**IEEE Catalog Number: CFP22BW3-POD
ISBN: 978-1-6654-8477-0**

**Copyright © 2022 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:	CFP22BW3-POD
ISBN (Print-On-Demand):	978-1-6654-8477-0
ISBN (Online):	978-1-6654-8476-3

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

CURRAN ASSOCIATES INC.
proceedings
.com

2022 International Conference on Big Data, Information and Computer Network (BDICN) BDICN 2022

Table of Contents

Preface	xx
Organizing Committee	xxi
Reviewers	xxii

Session 1: Big Data Technology Application and Algorithm Model Prediction

Research on Evaluation Index System of Power Grid Investment Benefit Based on Big Data Technology	1
<i>Chaojie Guan (State Grid Henan Electric Power Company, China), Lijun Li (State Grid Henan Electric Power Company, China), Haoyu Yang (State Grid Kaifeng Power Supply Company, China), Mingzhe Gu (State Grid Luoyang Power Supply Company, China), Yongli Wang (North China Electric Power University, China), and Hao Liu (North China Electric Power University, China)</i>	
Improved Ant Colony Algorithm for Solving Multi-Modal Resource Constrained Project Scheduling Problem	6
<i>Jie Chen (Nanjing University of Science and Technology, China), Wenqian Hao (Nanjing University of Science and Technology, China), and Yixi Dong (Washington University in Saint Louis, USA)</i>	
Empirical Research on the Relationship between Logistics and Regional Economy Based on Big Data	12
<i>Jialin Wu (Guilin University of Technology, China), Yuzhuo Chen (Guilin University of Technology, China), and Yuchao Chen (Shanghai University of International Business and Economics, China)</i>	
Tabular Data Anomaly Detection Based on Density Peak Clustering Algorithm	16
<i>Dong Liang (State Grid Jibei Electric Power Co. Ltd., China), Jun Wang (State Grid Jibei Electric Power Co. Ltd., China), Wenping Zhang (Beijing Information Science & Technology University, China), Yuqi Liu (Institute of Software, Chinese Academy of Sciences, China), Lei Wang (Beijing Information Science & Technology University, China), and Xiaoyong Zhao (Beijing Information Science & Technology University, China)</i>	

A Power Control Algorithm Based on Game Theory in Cognitive Radio	22
<i>Xiaojuan Bai (Northwest Normal University, China), Zhijie Jin (Northwest Normal University, China), and Panpan Cao (Northwest Normal University, China)</i>	
Comparative Analysis of Some Typical Encryption Algorithms and Hash Algorithms	27
<i>Jiaxun Li (Harbin Institute of Technology, China)</i>	
Predicting Domain Generation Algorithms with N-Gram Models	31
<i>ZiCheng Mu (Monash University, Australia)</i>	
Short Term Return Prediction of Cryptocurrency Based on XGBoost Algorithm	39
<i>Jie Wu (Harbin University of Science and Technology, China), Xingchen Guo (University of New South Wales, Australia), Mingqi Fang (University of Sydney, China), and JunHao Zhang (Saint Mary's University, Canada)</i>	
Research on the Identification of User Demands and Data Mining Based on Online Reviews	43
<i>Peiyu Shi (Ningbo University, China) and Junhe Yu (Ningbo University, China)</i>	
Botnet Detection Based on Generative Adversarial Network and Efficient Lifelong Learning Algorithm	48
<i>Chunyang Song (Xinjiang University, China), Mairidan Wushouer (Xinjiang University, China), and Gulanbaier Tuerho (Xinjiang University, China)</i>	
Gait Recognition Algorithm Based on Spatial-Temporal Graph Neural Network	55
<i>TianYi Lan (Harbin Engineering University, China), ZongBin Shi (Harbin Engineering University, China), KeJun Wang (Harbin Engineering University, China), and ChaoQun Yin (Harbin Engineering University, China)</i>	
Construction of Intelligent Emergency Response Technology System Based on Big Data Technology	59
<i>Huan Shi (Third Research Institute of Ministry of Public Security, China), Bo Hui (The People's Government of Bayingolian Autonomous Prefecture, China), Biao Hu (The People's Government of Bayingolian Autonomous Prefecture, China), and Rongjie Gu (Third Research Institute of Ministry of Public Security, China)</i>	
Prediction and Analysis of Illegal Accounts on Ethereum Based on Catboost Algorithm	63
<i>Jian Zhou (Beijing University of Posts and Telecommunications, China; Anhui University of Finance and Economics, China), Shi Yan (Anhui University of Finance and Economics, China), and Jie Zhang (Anhui University of Finance and Economics, China)</i>	
Optimization and Analysis of Differential Evolution Algorithm Based on Pareto Sorting in Multi-Objective Problems	68
<i>Zhichao Wu (Shandong Agricultural University, China) and Kai Tian (Shandong Agricultural University, China)</i>	
COVID-19 Pandemic Trend Prediction in America Using ARIMA Model	72
<i>Yunhao Shi (University of Sydney, Australia), Kailiang Wu (University of Liverpool, UK), and Miao Zhang (Chongqing University of Posts and Telecommunications, China)</i>	

Short-Term Traffic Flow Prediction of Expressway Based on CEEMDAN-PE-BiGRU Combined Model Optimized By Attention Mechanism	80
<i>Yiyi Zhu (Zhejiang Gongshang University, China), Kaiyuan Zhang (University of Science and Technology Liaoning, China), and Chunyu Zhao (Southwest University of Science and Technology, China)</i>	
A Helmet Wearing Detection Algorithm Based on Based on Face Localization	88
<i>Pu Yan (Anhui Jianzhu University, China) and Chong Chen (Anhui Jianzhu University, China)</i>	
Wind Speed Prediction Based on Gradient Boosting Decision Tree	93
<i>Yuxiang Fan (Central South University, China) and Weixuan Lei (Woodbridge High School, USA)</i>	
Application of Spatio-Temporal Big Data in Smart City—Taking Kaifeng Idle Land Administration as an Example	98
<i>Qingdong Dong (Henan University, China), Ruiming Zhu (Henan University, China), and Hongtao Zheng (Henan University, China)</i>	
Research on Female Talent Recruitment System Based on Decision Tree Algorithm under the Second-Child Policy	104
<i>Jiayue Zhang (Universiti Teknologi Malaysia, Malaysia) and Rossilah Jamil (Universiti Teknologi Malaysia, Malaysia)</i>	
An Empirical Analysis of the Impact of Carbon Emission Intensity on the Economic Structure of Jiangsu Province	108
<i>Yaqian Song (Nanjing Institute of Technology, China), Shujing Cao (Nanjing Institute of Technology, China), Yisheng Wu (Nanjing Institute of Technology, China), Qingyu Li (Nanjing Institute of Technology, China), and Hongjing Liang (Nanjing Institute of Technology, China)</i>	
Research and Prediction of Ecological Footprint Using Machine Learning: A Case Study of China	112
<i>Peiling Yu (University of Florida, USA)</i>	
An Empirical Analysis of the Factors Influencing Food Waste in Harbin under the Heading One-Person Food and Multi-Person Food with Structural Equation Modeling	117
<i>Yulv Lin (Harbin Institute of Technology, China), Rui Cui (Harbin Institute of Technology, China), Yupeng Wang (Harbin Institute of Technology, China), Jingyu Li (Harbin Institute of Technology, China), and Tonghe Wang (Harbin Institute of Technology, China)</i>	
Construction of Power Network Operation and Maintenance Cost Prediction Model Based on Data Information Mining	124
<i>Xiaoyong Yang (State Grid Zhejiang Power Co., Ltd., China), Min Yu (State Grid Zhejiang Power Co., Ltd., China), and Fuyan Liu (State Grid Zhejiang Power Co., Ltd., China)</i>	
Global COVID-19 Development Trend Forecast Based on Machine Learning	128
<i>Yunyun Cheng (North University of China, China), Yanping Bai (North University of China, China), Ting Xu (North University of China, China), and Hongping Hu (North University of China, China)</i>	
Research on the Construction of Corruption Early Warning Mining Model Based on Big Data ..	132
<i>Qi Cao (Shenzhen Power Supply Bureau Co., Ltd., China) and Yaowen Zhang (Shenzhen Power Supply Bureau Co., Ltd., China)</i>	

Big Data Prediction and Analysis of World Death Patterns	139
<i>Rui Zeng (Shanghai University, China) and Hanbin Zhang (Nanjing University of Posts and Telecommunications, China)</i>	
Preliminary Study on Water Quality Simulation of Hanjiang River Basin—Danjiangkou Reservoir Based on MIKE Numerical Simulation Software	145
<i>Xiping Li (Capital Normal University, China), Jing Zhang (Capital Normal University, China), and Yongyu Song (Capital Normal University, China)</i>	
Data Acquisition System Based on FPGA/SOPC	152
<i>Jihua Bao (Shandong University of Science and Technology, China), Qingzheng Qiao (Shandong University of Science and Technology, China), Chengyuan Song (Shandong University of Science and Technology, China), and Xuezan Shao (Shandong University of Science and Technology Co., Ltd., China)</i>	
Student Ability Portrait Construction Research Based on Big Data	156
<i>Yu Bo (Dalian University of Science and Technology, China), Can Wang (Dalian University of Science and Technology, China), Lin Li (Dalian University of Science and Technology, China), and Xuming Lu (Dalian University of Science and Technology, China)</i>	
Financial Risk Early Warning Model Based on Intelligent Data Monitoring	161
<i>Chenlu Jia (Shenyang Institute of Science and Technology, China), Shuo Sun (Shenyang Institute of Science and Technology, China), and Yue Geng (Shenyang Institute of Science and Technology, China)</i>	
Power Marketing Assistant Decision-Making Method Based on Big Data Mining	165
<i>Guangzhi Zhao (State Grid Gansu Electric Power Co., China), Li Cheng (State Grid Gansu Electric Power Co., China), and Hongxia Hu (State Grid Gansu Electric Power Co., China)</i>	
Application of Flexible Regression Model for Count Data Based on Renewal Processes	169
<i>Yan Yin (Tianjin University of Technology and Education, China) and Xuemin Zi (Tianjin University of Technology and Education, China)</i>	
Research of Big Data Information Mining and Analysis: Technology Based on Hadoop Technology	173
<i>Zhanchi Dong (Melbourne University, Australia)</i>	
Big Data Visualization and Analysis of Various Factors Contributing to Airline Delay in the United States	177
<i>Han Wang (Ohio State University, USA)</i>	
Efficient and Secure Algorithm: The Application and Improvement of ECDSA	182
<i>Yuanbo Shang (University of New South Wales, Australia)</i>	

Comparative Research between Several Lightweight CNN Models for Non-Intrusive Load Monitoring Using Transfer Learning Approach	189
<i>Mingyang Sun (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Bokuan Yang (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Zhe Zheng (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Yuhu Nie (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Wenpeng Cui (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Rui Liu (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), Yingying Chi (Beijing Smart-Chip Microelectronics Technology Co., Ltd., China), and Zhen Jing (State Grid Shandong Electric Power Co., China)</i>	
Research on Analysis and Evaluation of Extreme Weather Based on Dynamic Evaluation Model	196
<i>Ying Gao (Shandong Agricultural University, China), Hongyu Ma (Shandong Agricultural University, China), and Yiyang Wang (Shandong Agricultural University, China)</i>	
Multi-Feature Fusion Model of English Semantic Vocabulary Based on Machine Learning	202
<i>Nanyan Shen (Guangzhou Huali College, China)</i>	
A Novel Bus Scheduling Model Based on Passenger Flow and Bus Travel Time Prediction Using the Improved Cuckoo Search Algorithm	208
<i>Wenli Xiao (Xiamen University of Technology, China) and Huarong Xu (Xiamen University of Technology, China)</i>	
Automatically Predicting Lung Adenocarcinoma Invasiveness	213
<i>Tongmiao Zhang (Sichuan University, China), Nan Chen (Sichuan University, China), Xiuyuan Xu (Sichuan University, China), Zihuai Wang (Sichuan University, China), Jixiang Guo (Sichuan University, China), Haihong Jin (Sichuan University, China), Zhang Yi (Sichuan University, China), and Lunxu Liu (Sichuan University, China)</i>	
Bipartite Graph Recommendation Algorithm Based on Negative Scores and Item Attributes ...	221
<i>Jinping Yu (Jiangxi University of Science and Technology, China) and Wei Wang (Jiangxi University of Science and Technology, China)</i>	
Research on Dynamic Early Warning Algorithm of Ideological Education Based on Genetic Algorithm	227
<i>Pan Gao (Suzhou Vocational University, China)</i>	
Research on Intelligent Transportation Based on "You Only Look at Once at Image" Algorithm: Taking the Crackdown on Prostitutes' Nests as an Example	231
<i>Weilan Guo (China People's Police University, China), Xin Wang (China People's Police University, China), Fengyun Lu (China People's Police University, China), and Haitao Wang (China People's Police University, China)</i>	
Statistical Analysis and Prediction of Employee Turnover Propensity Based on Data Mining	235
<i>Yongkang Duan (Sichuan University, China)</i>	
Application of Big Data Technology in English Smart Teaching	239
<i>Yinglin Li (Changchun Institute of Technology, China)</i>	
Analysis and Research of Internet User Behaviors under the Context of Big Data	243
<i>Dawei Xiang (Hubei University of Police, China) and Yanbo Wu (Hubei University of Police, China)</i>	

Youtube Data Analysis Using Linear Regression and Neural Network	248
<i>Jiali Fan (New York University, USA) and Tingru Lian (Boston University, USA)</i>	
Research on Rural Revitalization and Development Methods from the Perspective of Data Driven	252
<i>Baiwang Qi (Guizhou Vocational Technology College of Electronics & Information, China)</i>	
Comparative Analysis of Different Machine Learning Algorithms in Classification	257
<i>Lincong Wang (University of California Irvine, USA), Weiwen Xu (Zhejiang University of Finance & Economics, China), and Zhenghao Zhu (North China Electric Power University, China)</i>	
Thermal Load Forecasting of an Ultra-Short-Term Integrated Energy System Based on VMD-CNN-LSTM	264
<i>Haoran Zhang (Beijing Institute of Technology, China), Yuanyuan Zhang (Fujian Normal University, China), and Zhengwei Xu (Fujian Polytechnic Normal University, China)</i>	
Research on Power Carbon Emission Prediction Model Based on PSO-BP Model	270
<i>Jiaxu Li (Shenzhen University, China), Jianxuan Ni (Shenzhen University, China), and Shixin Zhou (Shenzhen University, China)</i>	
Cell Carcinosis Prediction Using Linear Regression with Nuclear Statistics	276
<i>Jiaqiao Xu (Hohai University, China) and Dehan Xue (University of California Davis, USA)</i>	
Stock Volatility Prediction Using LightGBM Based Algorithm	283
<i>Zhangqi Liu (University of Wisconsin–Madison, USA)</i>	

Session 2: Artificial Intelligence Internet and Information Processing Technology

Research on Key Technologies of BIM Model Lightweighting Method in Browser/Server Mode	287
<i>Yuhe Yuan (Nanjing Tech University, China), Jing Yang (Nanjing Tech University, China), and Ruping Shao (Nanjing Tech University, China)</i>	
The Policy and Practice of Land Development in Rail Transit Station Area Based on ARCGIS: Take Shanghai Wujiaochang as an Example	292
<i>Wen Liu (Shandong Jianzhu University, China), Yanxia Qiu (Shandong Jianzhu University, China), and Huanyi Lou (Shandong Jianzhu University, China)</i>	
Credit Card Fraud Detection Using Logistic Regression	301
<i>Tianyou Wang (South China University of Technology, China) and Yucheng Zhao (Fudan University, China)</i>	
Self-Supervised Pretraining Isolated Forest for Outlier Detection	306
<i>Dong Liang (State Grid Jibei Electric Power Co. Ltd., China), Jun Wang (State Grid Jibei Electric Power Co. Ltd., China), Xiaoyu Gao (Beijing Information Science & Technology University, China), Jiahui Wang (Beijing Information Science & Technology University, China), Xiaoyong Zhao (Beijing Information Science & Technology University, China), and Lei Wang (Beijing Information Science & Technology University, China)</i>	

Study on the Impact of Digital Inclusive Finance on Rural Land Transfer and Its Mechanism—Empirical Evidence from CFPS and PKU-DFIIC	311
<i>Yongqi Zhang (Sichuan Agricultural University, China) and Tianhui Zhuang (Sichuan Agricultural University, China)</i>	
Risk Factors Analysis and Clinical Decision of COPD Based on Machine Learning	322
<i>RongYuan Chen (Hunan University of Technology and Business, China), Xue Li (Hunan University of Technology and Business, China), ShaoNian Huang (Hunan University of Technology and Business, China), LiZhi Shen (Hunan University of Technology and Business, China), and Milan Wen (First Affiliated Hospital of Gannan Medical University, China)</i>	
Research on Mixed Learning Training Methods Based on Educational Technology	331
<i>Yanwu Liu (King Mongkut's Institute of Technology Ladkrabang, Thailand; Hanshan Normal University, China) and Sitthiworachart Jirarat (King Mongkut's Institute of Technology Ladkrabang, Thailand)</i>	
Towards Accelerated and Robust Reinforcement Learning with Transfer Learning	335
<i>Ruiyong Cao (Northwestern Polytechnical University, China)</i>	
Comparison Experimental Analysis of Different Cryptocurrencies	341
<i>Dengrui Fu (Purdue University, USA), Huiyun Hu (Nanjing University of Posts and Telecommunications, China), Yan Xu (Nanjing University of Posts and Telecommunications, China), and Kun Zheng (Nanjing University of Posts and Telecommunications, China)</i>	
The Bibliometrics and Visualization Analysis on the Research of Maker Education Based on Internet Plus in China	351
<i>Meidong Jin (Huangshan University, China), Haibin Wang (Huangshan University, China), and Ji Tian (Huangshan University, China)</i>	
Application and Exploration of "ABCD" Technology in the Field of Internet Consumer Finance.	356
<i>Lei Yang (Heilongjiang University of Science and Technology, China), Guangxiu Zhou (Harbin Finance University, China), and Lu Sun (Heilongjiang University of Science and Technology, China)</i>	
Reconfigurable Dimensionality Reduction Based on Joint Dictionary Learning and Applications	360
<i>Qiaoya Wang (Lanzhou Jiaotong University, China) and Zhongrong Zhang (Lanzhou Jiaotong University, China)</i>	
Analysis and Comparison of the Main Zero-Knowledge Proof Scheme	366
<i>Yinjie Gong (Queen's University, Canada), Yifei Jin (Chongqing University, China), Yuchan Li (Xidian University, China), Ziyi Liu (Zhejiang University of Finance & Economics, China), and Zhiyi Zhu (Southwest University, China)</i>	
Exploring a Reinforcement Learning Agent with Improved Prioritized Experience Replay for a Confrontation Game	373
<i>Tian Zhao (City University of Hong Kong, China)</i>	
ID3 Decision Tree for the Activity Recognition of the Healthy Elderly	382
<i>Yiqian Dai (University of Connecticut, China), Shiyu Feng (Beijing University of Technology, China), Tian Xia (University of Nottingham Ningbo, China), and Shuning Zhang (Beijing Jiaotong University, China)</i>	
Simple Illustration and Gentle Description of ECC Process	387
<i>Yuhan Wang (Beijing University of Posts and Telecommunications, China)</i>	

Simulation Research on Service Resource Scheduling during Busy Hours of One-Stop Inspection and Detection Platform—Based on the Perspective of Evolutionary Game Theory ..	391
<i>Haorui Wang (Beijing Information Science and Technology University, China), Zijing Zong (Beijing Information Science and Technology University, China), Yu Fan (Beijing Information Science and Technology University, China), and Ying Wang (Beijing Information Science and Technology University, China)</i>	
Towards Larger Receptive Field: Non-Local Reinforcement Learning	398
<i>Changhao Zhao (Chinese University of Hong Kong, China)</i>	
Research on the Attack Strategy to Reduce Network Effectiveness Based on Service Capacity .	403
<i>Daping Bi (National University of Defense Technology, China), Xing Li (National University of Defense Technology, China), Yaqiong Zhang (Research and Design Institute of Sichuan Agricultural Machinery, China), Yalin Fang (China Energy Engineering Group Anhui Electric Power Design Institute Co., Ltd., China), and Yingke Lei (National University of Defense Technology, China)</i>	
Analysis on the Development of Urban Online Car-Hailing Operation Based on System Dynamics..	407
<i>Zhiheng Wang (Henan University of Science and Technology, China), Yi Zhang (Henan University of Science and Technology, China), Hang Jiang (Henan University of Science and Technology, China), Jinhui Li (Henan University of Science and Technology, China), Song Sun (Henan University of Science and Technology, China), Guang Yang (Henan University of Science and Technology, China), and Yatao Zhang (Henan University of Science and Technology, China)</i>	
SCP Analysis of Traditional Taxi Industry Based on the External Impact of On-Line Car Hailing under the Background of Sharing Economy	412
<i>Xiangnan Song (Henan University of Technology, China), Xianghong Li (Henan University of Technology, China), and Lanlan Zheng (Henan University of Technology, China)</i>	
Research on the Construction of Public Sports Service Intelligence Platform Based on Big Data Analysis	419
<i>Chuanli Wei (Harbin University of Commerce, China) and Guangqi Xu (Harbin University of Commerce, China)</i>	
An Empirical Study on the Tax Burden of Internet of Things Listed Companies Based on Lasso Method	423
<i>Zhengyu Wang (Harbin University of Commerce, China), Xin Gao (Harbin University of Commerce, China), and Defa Cai (Harbin University of Commerce, China)</i>	
Analysis on the Application of BIM Technology in the Interior Decoration Design of Public Buildings	428
<i>WenTao Chai (Changchun Institute of Technology, China), Cui Zhang (Changchun Institute of Technology, China), and Zai Wang (Changchun Institute of Technology, China)</i>	
Suppressing Forest Fires in Global Climate Change through Artificial Intelligence: A Case Study on British Columbia	432
<i>Timothy Ziqi Lin (Lord Byng Secondary School, Canada)</i>	

Research on Distributed Energy Trading Strategy Based on Game Theory	439
<i>Lin Cong (State Grid Integrated Energy Service Group Co., Ltd., China), Xichao Zhou (State Grid Integrated Energy Service Group Co., Ltd., China), Na Li (State Grid Integrated Energy Service Group Co., Ltd., China), Haifeng Zhu (State Grid Integrated Energy Service Group Co., Ltd., China), Ying Fan (State Grid Integrated Energy Service Group Co., Ltd., China), and Lingxi Bu (State Grid Integrated Energy Service Group Co., Ltd., China)</i>	
A Ceramic Artwork Retrieval System via HSH-SIFT Feature	447
<i>Yongkang Peng (Jingdezhen Ceramic University, China), Wenfang Cheng (Jingdezhen Ceramic University, China), Jinjing Ma (Jingdezhen Ceramic University, China), Yu Nie (Jingdezhen Ceramic University, China), and Fanchang Zeng (Jingdezhen Ceramic University, China)</i>	
Research on the Relationship between Carbon Emission, Energy Consumption and Economic Growth in Liaoning Province Based on Tapio Decoupling Analysis	453
<i>Sen Li (Shenyang Jianzhu University, China; Institute of Applied Ecology, Chinese Academy of Sciences, China), Hongyuan Liang (Shenyang Jianzhu University, China), Haiying He (Shenyang Jianzhu University, China), and Qingshuang Meng (Shenyang Jianzhu University, China)</i>	
Tobacco Smoking: Making Progress Against the Revealing Devastating Effects Using Machine Learning and Data Visualization	458
<i>Yuchen Guo (University of Miami, USA)</i>	
Research on Data Access Management Based on Blockchain Engine	465
<i>Chenlu Jia (Shenyang Institute of Science and Technology, China), Yue Geng (Shenyang Institute of Science and Technology, China), and Shuo Sun (Shenyang Institute of Science and Technology, China)</i>	
ECopy-Paste: An Effective Data Augmentation Method for Object Detection of UAV	469
<i>Lili Zhang (Beijing Information Science and Technology University, China), Xiulei Liu (Beijing Information Science and Technology University, China), and Qiang Tong (Beijing Information Science and Technology University, China)</i>	
Analysis and Implementation of the Enigma Machine	475
<i>Zhichen Hu (College of Mount Saint Vincent, USA), Bowen Liu (Chongqing University of Posts and Telecommunications, China), Xufan Ren (Chongqing Metropolitan College of Science and Technology, China), and Yuhe Tang (University of Bristol, UK)</i>	
Research and Construction of D2D Communication Technology Based on Energy Acquisition and Wireless Charging Network	481
<i>Siyuan Duan (Yantai Institute of Technology, China)</i>	
A Diabetes Prediction System Based on Federated Learning	486
<i>Junzhe Liu (Tongji University, China), Xi Lu (South China University of Technology, China), Haolin Yang (Jinan University, China), and Lianzhi Zhuang (Hangzhou Dianzi University, China)</i>	
Ensemble Learning for Assessing Degree of Humor	492
<i>Jianfan Chen (Shanghai Electric Group Enterprise Business Service Co., Ltd.), Zekai Li (National University of Singapore, Singapore), and Shaoheng Qin (Chinese Academy of Sciences, China)</i>	

Research on the Characteristics of Temporal and Spatial Evolution of the Vernacular-Ecological Space in Qinling-Daba Mountains—Taking Ankang City as an Example ..	499
<i>Xuesong Zhao (Xi'an Chan-Ba Ecological District Management Committee, China), Xiuyuan Li (Xi'an International Studies University, China), and Mengchao Liu (Xi'an International Studies University, China)</i>	
An End-to-End Flow Control Method Based on DQN	504
<i>Guichao Gao (Zhejiang Gongshang University, China) and Rong Jin (Zhejiang Gongshang University, China)</i>	
Mutual Deep Deterministic Policy Gradient Learning	508
<i>Zhou Sun (HongWen School Qingdao, China)</i>	
Applying Reinforcement Learning for Shortest Path Problem	514
<i>Zhixuan Sun (University College London, UK)</i>	
Cloud Security Analysis Based on Virtualization Technology	519
<i>Jiaxing Zhang (Beijing University of Posts and Telecommunications, China)</i>	
Research on Hybrid Game on Heterogeneous Networks	523
<i>Dongwei Guo (Jilin University, China), Liming Lan (Jilin University, China), and Lili He (Jilin University, China)</i>	
Research on the Application Method of NLP Technology Based on AutoPrompt	531
<i>Yuzhi Chen (Northeast Normal University, China) and Zhiyong Liu (Northeast Normal University, China)</i>	
High-Accuracy Object Detection Based on YOLOv3 under Different Weather Conditions	535
<i>Runxun Wu (Beijing University of Posts and Telecommunications, China), Bingyuan Wang (Peking University, China), and Xingchen Guo (Qingdao University, China)</i>	
Private Car Ownership and City Development: A Method Combining Machine Learning and Time Series	540
<i>Quanjiang Li (National University of Defense Technology, China), Shuofan Zou (Beijing Normal University at Zhuhai, China), and Yihang Fu (Beijing Technology and Business University, China)</i>	
EqNet-L: A New Representation Learning Method for Mathematical Expression	547
<i>Jiaxin Liu (University of Electronic Science and Technology of China, China)</i>	
Personality Type Prediction Using Decision Tree, GBDT, and Cat Boost	552
<i>Yuchen Wang (Oregon State University, USA)</i>	
Research on Intelligent Elderly Care System Based on Neural Network	559
<i>Yue Geng (Shenyang Institute of Science and Technology, China), Chenlu Jia (Shenyang Institute of Science and Technology, China), and Shuo Sun (Shenyang Institute of Science and Technology, China)</i>	
FPGA-Based High-Performance Data Compression Deep Neural Network Accelerator	563
<i>Hanze Wang (North China University of Technology, China), Yingxun Fu (North China University of Technology, China), and Li Ma (North China University of Technology, China)</i>	
The Evaluation and Extension of Saihanba Ecological Protection Model Based on Entropy Weight Method and Cluster Analysis	570
<i>Yuxin Jiang (Hohai University, China), Jiangxu Gu (Hohai University, China), and Shaopu Zhang (Hohai University, China)</i>	

Multi-Objective Optimization of Energy and Daylighting Performance of Township Street House in Western Guangdong, China	575
<i>Chun Wu (South China University of Technology, China), Hanyu Wei (South China University of Technology, China), and Guoguang Wang (South China University of Technology, China)</i>	
Comparison Analysis and Prediction of Modern Wi-Fi Standards	581
<i>Shiru Fan (Dalian University, China), Yutong Ge (Xi'an Jiaotong-Liverpool University, China), and Xiang Yu (Dongguan University of Technology, China)</i>	
Design of Intelligent Epidemic Prevention Robot Control System Based on Single-Chip Microcomputer	586
<i>Zeye Lv (Changchun Institute of Technology, China), Shaokang Song (Dalian Polytechnic University, China), and Haonan Yin (Nanjing University of Aeronautics and Astronautics, China)</i>	
A Housing Price Prediction Method Based on Neural Network	592
<i>Yuchen Ni (Medicine Peking University, China)</i>	
Design and Implementation of Digital Exhibition Hall Based on Virtual Reality Technology	596
<i>Nana Zhang (Shanghai Sipo Polytechnic, China)</i>	

Session 3: Computer Network Applications and Image Signal Recognition

Building Remote Sensing Image Determination Based on Precision Analysis	602
<i>Wenjing Zhang (Earthquake Administration of Liaoning Province, China), Yang Hui (Earthquake Administration of Liaoning Province, China), Yan Guo (Earthquake Administration of Liaoning Province, China), Ying Li (Earthquake Administration of Liaoning Province, China), and Miao Xiu (Earthquake Administration of Liaoning Province, China)</i>	
Application of Multicategory Handwritten Letters, Numbers and Symbols Recognition Based on Convolutional Neural Networks	606
<i>Ke Hong (University of Cincinnati, USA), Sizhe Li (King's College London, UK), Yajing Wang (Australian National University, Australia), and Xuan Zhang (Guangdong Ocean University, China)</i>	
Image Infringement Judgement with CNN-Based Face Recognition	610
<i>Jiawei Li (Shanghai University, China)</i>	
Cycle-GAN Based Face Aging Method	616
<i>Jingyao Kang (Beijing University of Technology, China), Chen Sun (Macau University of Science and Technology, China), and Caijia Zhu (Southwestern University of Finance and Economics, China)</i>	
SAR Target Recognition Method of MSTAR Data Set Based on Multi-Feature Fusion	626
<i>Ji Shi (Second Research Institute of China Aerospace Science and Industry Corp., China)</i>	

Fuzzy Comprehensive Evaluation of Satisfaction of Network Teaching Platform	633
<i>Jiahong Gu (Guangxi University of Science and Technology, China; Lyceum of the Philippines University, Philippines), Baiqing He (Lyceum of the Philippines University, Philippines; Nanchang Institute of Technology, China), Shiyun Cao (Guangxi University of Science and Technology, China), and Zhiqi Ying (Guangxi University of Science and Technology, China)</i>	
Stock Price Prediction Based on Generative Adversarial Network	637
<i>Yajie Li (Shandong Technology and Business University, China), Dapeng Cheng (Shandong Technology and Business University, China), Xingdan Huang (Shandong Technology and Business University, China), and Chengnuo Li (Shandong Technology and Business University, China)</i>	
Research on Capture Algorithm of BeiDou-3 B1C Signal Based on FPGA	642
<i>Bowen Ding (Shandong University, China), Fan Sun (Shandong University, China), Jisheng Bi (Unit 32023, China), Yonghong Chen (Public Passenger Transport Management Service Centre, China), Shujuan Liu (Shandong University, China), and Jianping Xing (Shandong University, China)</i>	
Research on Flower Image Recognition Algorithm	646
<i>DeShu Lin (Guangdong Songshan Polytechnic, China) and CaiFeng Cheng (Guangdong Songshan Polytechnic, China)</i>	
Fault Identification of Rolling Bearings Based on Improved EMD Decomposition Method and BP Neural Network	650
<i>Lingyu Wang (Lanzhou University, China), Chengpeng Wu (Lanzhou University, China), and Peilin Li (Lanzhou University, China)</i>	
Forage Grass Image Segmentation Based on LUV-L Component and Grab-Cut	656
<i>Nan Zhang (Inner Mongolia Agricultural University, China), Xiaoling Luo (Inner Mongolia Agricultural University, China), Xin Pan (Inner Mongolia Agricultural University, China), and Weihong Yan (Chinese Academy of Agricultural Sciences, China)</i>	
DRDN: A Method for Low-Resolution Medical Image Denoising	660
<i>Kailong Lu (Foshan University, China), Ziwen Ren (University of Science and Technology in Beijing, China), and Haoran Zhao (Harbin Institute of Information Technology, China)</i>	
Research on Renewal Prediction of Life Insurance Policy Based on Back Propagation (BP) Neural Network	664
<i>Dayong Liu (Sinounited Investment Group Corp. Ltd. Postdoctoral Programme, China), Xu He (Macau University of Science and Technology, China), Yan Xiao (Chongqing University of Technology, China), and Xujin Wang (Beijing Technology and Business University, China)</i>	
An Unsupervised Facial Expression Recognition Method Based on CycleGAN	669
<i>Yating Yu (Tianjin University of Science and Technology, China), Yiliu Sun (Nanjing University of Science and Technology, China), and Zejia Yang (Hebei College of Science and Technology, China)</i>	
Single Image Dehazing Based on the Fusion of Multi-Branch and Attention Mechanism	675
<i>Xiaohang Yu (Institute of Disaster Prevention, China) and Huikang Yu (Henan University Minsheng College, China)</i>	

Analysis and Research of WSN Reliable Routing Protocol	680
<i>Hao Chen (China University of Labor Relations, China)</i>	
Design of a Spread Spectrum Communication System Based on LabVIEW	684
<i>Yuan Tang (Chengdu University of Technology, China)</i>	
Research and Design of the Scenic Spot Photo Sharing System Based on Face Detection Technology	688
<i>Liqin Ji (Anhui Xinhua University, China) and Rongzhong Ji (Anhui Xinhua University, China)</i>	
Image Classification Based on CNN: Models and Modules	693
<i>Haoran Tang (Chongqing Biacademy, China)</i>	
Design and Implementation of Multi-Rate Digital Signal Processing Software Based on FPGA ..	697
<i>Xiaoyao Yin (Rose-Human Institute of Technology, USA), Yingchi Lin (South China Agricultural University, China), Shiqi Zheng (University of North Carolina at Chapel Hill, USA), and Yuankui Wang (Guangxi University, China)</i>	
Design Method of Frequency-Agile Radar Frequency Hopping Sequence Based on CNN Network and Chaotic Sequence	702
<i>Pengfei An (Second Research Institute of China Aerospace Science and Industry Corp., China), Zhengguo Shang (Second Research Institute of China Aerospace Science and Industry Corp., China), Shi Yan (Beijing Institute of Environment Features, China), and Dehao Wang (Beijing Institute of Environment Features, China)</i>	
A Design of Optimized Colour Image Interpolation Algorithm Based on Edge Gradient	708
<i>Runchan Ge (Harbin Institute of Technology, China)</i>	
Facial Recognition for CASIA-Face V5 in Virtue of Convolutional Neural Networks	713
<i>Xinyi Ma (University of Illinois at Urbana-Champaign, USA)</i>	
Convolutional Neural Networks for Pneumonia Diagnosis Based on Chest X-Ray Images	717
<i>Qian Li (University of Pennsylvania, USA)</i>	
Learning from Face Recognition under Occlusion	721
<i>Pengfei Cheng (Xi'an University of Science and Technology, China) and Siche Pan (Dalian University of Science and Technology, China)</i>	
Detection System for Construction Image Classification Based on Deep Learning Models	728
<i>Jiajie Dai (Michigan State University, China), Ruijun Liu (University of Illinois at Urbana-Champaign, China), Ouwen Luo (Beijing University of Technology, China), and Zhiyuan Ning (Sun Yat-sen University, China)</i>	
A Dual Regression Scheme to Improve GAN in Low-Dose CT Scan Restoration	732
<i>Xiaoliang Zhang (Boston University, USA)</i>	
Classification of Damage of House Images Based on CNN Model	738
<i>Yunlang Li (Chongqing No. 8 Secondary School, China)</i>	
Design and Implementation of MIPS Experiment Platform Based on FPGA Device	742
<i>Xiang Ji (Beijing Language and Culture University, China) and Lin Chen (Beijing Language and Culture University, China)</i>	
A Survey of Convolutional Neural Networks for Image Classification: Models and Datasets	746
<i>Tiancan Deng (Chongqing No. 1 Secondary School, China)</i>	

Convolutional Neural Network for Computer-Aided Identification: Detection of Lung CT Images Using CNN for COVID-19 Identification	750
<i>Junhan Qin (Minzu University of China, China), Jianing Hu (Shenzhen New Channel-Zengcheng Experimental Middle School, China), Junwen Li (Centennial Collegiate, Canada), and Peiyu Yan (Tianjin Yinghua International School, China)</i>	
An Embedded Automatic Focusing System for Tracking Small Flying Targets	754
<i>Fan Fan (Anhui University, China; Hefei Institutes of Physical Science, Chinese Academy of Sciences, China), Yuman Nie (Hefei Institutes of Physical Science, Chinese Academy of Sciences, China), Jianqun Chen (Shanghai Focus Vision Security Technology Co. Ltd., China), Yaoxiong Wang (Hefei Institutes of Physical Science, Chinese Academy of Sciences, China), Pingguo Cao (Hefei Institutes of Physical Science, Chinese Academy of Sciences, China), Zhannan Xu (Hefei Institutes of Physical Science, Chinese Academy of Sciences, China), and Ming Ye (Hefei Institutes of Physical Science, Chinese Academy of Sciences, China)</i>	
Hybrid Improved Models Combined SR3 Module for Animal Recognition in Electric Car's Actual Vision	758
<i>Yingxi Tang (Beijing No. 35 High School, China)</i>	
Real-Time Face Recognition Using SVM, MLP and CNN	762
<i>Guannan He (Jilin University, China) and Yize Jiang (Nanyang Technological University, Singapore)</i>	
Auto Encoder Based = Abnormal Fluctuations Monitoring Method	768
<i>Liuluofeng Jin (Beijing University of Posts and Telecommunications, China), Zishuo Liu (Hong Kong Baptist University, China), and Yifan Tang (Capital University of Economics and Business, China)</i>	
Transmission Line Fault Detection Based on Multi-Layer Perceptron	778
<i>Hengyu Yang (Chongqing University of Technology, China)</i>	
Research on Sustainable Development of Traditional Villages Based on Computer Technology—A Case of Shenjiang Village	782
<i>Rongbin Yang (Dali University, China), Xiaoqi Li (Dali University, China), Jiixin Chen (Dali University, China), Haoyang Sun (Dali University, China), Gaojie Fu (Dali University, China), and Hualin Shi (Dali University, China)</i>	
Application of Blue and White Image Style Transfer in Ceramic Products	786
<i>Yu Nie (Jingdezhen Ceramic University, China), Linyun Luo (Jiangxi Vocational and Technical College of Information Application, China), Yüewen Xiang (Jiangxi Earthquake Agency, China), Yilai Zhang (Jingdezhen Ceramic University, China), Yongkang Peng (Jingdezhen Ceramic University, China), Chenyang Liao (Jingdezhen Ceramic University, China), and Guanghua Song (Jingdezhen Ceramic University, China)</i>	

Research on Application of Image Search for Ceramics	796
<i>Yu Nie (Jingdezhen Ceramic University, China), Xiangqing Zhou (Jiangxi Vocational and Technical College of Information Application, China), Jiapeng Li (Jingdezhen Ceramic University, China), Yilai Zhang (Jingdezhen Ceramic University, China), Yongkang Peng (Jingdezhen Ceramic University, China), Chao Li (Jingdezhen Ceramic University, China), and Chengyang Dai (Jingdezhen Ceramic University, China)</i>	
Research on Theory and Application of Solving Central Node in Complex Networks	802
<i>Keer Lu (Central South University, China)</i>	
Analysis and Illustration of the Enigma Machine	807
<i>Jiaxin Guo (Guangdong University of Technology, China), Yichen Hu (Lynbrook High School, USA), and Yixuan Wang (Ningbo Hanvos Kent School, China)</i>	
Weather Prediction Using Cloud's Images	820
<i>Yingyue Cao (University of Alberta, Canada) and Hanpeng Yang (Xi'an University of Posts and Telecommunications, China)</i>	
Design and Implementation of Cigarette Retail Terminal Evaluation System Based on Image Recognition	824
<i>TaiCheng Wei (China Tobacco Guangxi Industrial Co., Ltd., China), YouSong Zhu (Chinese Academy of Sciences, China), LiZhong Wang (Shandong Tai 'an Tobacco Co., Ltd., China), and YanBing Liu (China Tobacco Guangxi Industrial Co., Ltd., China)</i>	
Botnet Detection via Machine Learning Techniques	831
<i>Haofan Wang (University of Pittsburgh, USA)</i>	
Target Detection and Recognition of Radar Spectrum Image Based on Yolov5 Algorithm	837
<i>Yujie Mei (Air Force Early Warning Academy, China), Siqi Yang (Chongqing University of Technology, China), Xin Chen (Air Force Early Warning Academy, China), Xiao Tang (Air Force Early Warning Academy, China), Hao Lu (Air Force Early Warning Academy, China), Ling He (Air Force Early Warning Academy, China), and Song He (Air Force Early Warning Academy, China)</i>	
Author Index	843