2022 3rd International Conference on Big Data, Artificial Intelligence and Internet of Things **Engineering (ICBAIE 2022)**

Xi'an, China 15 – 17 July 2022



IEEE Catalog Number: CFP22W92-POD ISBN:

978-1-6654-5161-1

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:
 CFP22W92-POD

 ISBN (Print-On-Demand):
 978-1-6654-5161-1

 ISBN (Online):
 978-1-6654-5160-4

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



Table of Contents

Cluster Analysis of Talent Portraits Based on K-means Algorithm	1
Qingyun Zhou, Jianlong Guo, Yuping Yan, Manhua Wen, Shuang Xia, Weixia Feng	
Simultaneous Multiple Cameras Monitoring and Streaming Based on Auto-layout and	_
Analyzer	5
Jinwei Lin	
Towards Real-Time Visual Tracking in Mobile Robots	9
Lin Li, Guoli Wang, Xuemei Guo	
Research on industrial robot sorting technology based on binocular vision	16
Yuxiang Du, Wenyan Xu, Yunli Cheng	10
Gaussian Noise Removal Method Based on Empirical Wavelet Transform and Hypothesis	
Testing	24
Suge Dong, Chunxiao Dong, Zishuang Li, Mingtao Ge	
Visual localization of underwater obstacles based on Convolutional Neural Network	28
Yuhan Zhang, Weili Ge	26
Research on Trajectory Tracking Control of Wheeled Mobile Robot by ILC	33
Meng Zhang, Zhonghua Miao, Nan Li	33
Multi-label Detection Method of Facial Protection Based on Deep YOLO Network	27
Jin Dai, Xingxing Zhou	37
Microsoft Malware Prediction Using LightGBM Model	41
Zheming Zhang	41
Study on the effect of single tag attachment orientation on contact sensing	4.5
Xuanli Li, Shanshan Wang, Yang Zhao	45
Application of Intelligent Robot Inspection System in Power Transmission Project	40
Xianguo Wang, Chunxi Guan, Shunjie Lin, Hanhua Cao	49
Intelligent Detection Model for Power Grids Based on Graph Neural Networks	
Guoliang Zhang, Yi Zhang, Zexu Du, Xiangquan Zhang, Liping Wang, Zhouqiang He	53
Key technology of intelligent efficient quantitative loading system	58
Yajing Xiao, Hui Wu	
Application of Edge Computing in Smart Grid	62
Ran Liu, Runan Yang, Zhigang Wang, Xiaobo Sun	
Research on COVID-19 document fine-grained classification based on graph neural	66
network	00
Shuai Yang, Jiali Xu, Dongning Jia, Xiaoyi Jia, Zhiqiang Wei	
A New Method to Measure the Distance of Two Evidence Bodies	70
Haiyan Liu, Wu Zhang	
RSSI Indoor Localization Method Base on RAUKF	75
Zhiqiang Chen, Hongxiang Liu, Hao Liu	
Ship trajectory prediction model based on PSO-LSTM	81
Jungang Wang, Baiqing Hu, Jiupeng Zhu, Duanyang Gao	
Design of an Integrated Automatic Test System for Streaming Media Delivery Network	07
System	87
Buhua Chen, Buyang Shen, Chengbin Shen, Ping Yang, Kunlun Li, Huaizhi Yao	
Chinese Medical Word Embedding Based on Transfer Learning	93
Menglin Zhou, Kecun Gong	
Radar signal recognition method based on Random Forest model	98
Letain Tian, Zhaowen Zeng, Zeqin Li, Chenyu Liu	,,
A Deep Neural Network Optimization Strategy based on Roofline Model	103
Meng Wang, Lida Dong, Wen Dong, Zhongmin Lv	103
Research on automatic sorting system based on machine vision	110
Kexin Yuan, Xuebing Guo	110

Research on Underwater Acoustic Target Recognition Method Based on DenseNet	114
Yao Yao, Xiangyang Zeng, Haitao Wang, Jie Liu	
Research on Variational Autoencoders and its Interpretability Based on Gaussian Cloud	119
Model	119
Jin Dai, Qiuyan Guo, Zhifang Zheng, Xiao Liu	
Pedestrian re-identification based on Swin Transformer	123
Zifei Qin, Peishun Liu, Yibei Liu, Haiping Duan, Feifei Li, Han Wang	
Readmission prediction of diabetic patients based on AdaBoost-RandomForest mixed	130
model Visefana Dana Vai Vu. Zhaniian Cui	130
Xiaofeng Dong, Kai Yu, Zhaojian Cui	
Design and implementation of license plate recognition system based on MATLAB	135
Yan Shi, Qingfeng Zhang, Hong Zhu, Jingxin Li	
Study on the effect of substances in passive RFID contactless sensing applications	139
Shanshan Wang, Xuanli Li, Yang Zhao Ontimigation design of unpressed singular model based on EPP material	
Optimization design of unpowered aircraft model based on EPP material	143
Ze Wang, Wei Zhu, Xuemei Liu, Qianji Jiang An integrated road-slippery condition recognition system based on vehicle-Infrastructure	
	147
cooperative Duelin Veng Lu Vieng Zhueren Li De Leng	117
Ruolin Yang, Lu Xiong, Zhuoren Li, Bo Leng RSSI-Based Indoor Localization Using Sparrow Search Algorithm and Backward	
Propagation Neural Network	151
Peiwen Zhang, Zhonghua Liang, Jiaye Hu, Xin He, Wei Li	
Mechanism Design and Gait Analysis of A Hexapod Robot	
Jiaxin Lu, Wei Tao, Shubo Xu, Zijian Chen, Jianxun Zeng, Jiaqi Li	156
Machine Reading Comprehension for Continuous Questions via Multi-Task Learning	1.00
Shanshan Liu, Kaijing Yang, Kun Ding, Liu Liu, Xin Zhang	160
Analyzing the Design of Windows Cleaning Robots	1.77
Ao Zhang, Yefan Yao, Yufan Hu	167
Research on MAC Protocol Based on Terahertz Communication	177
Yingchu Liu, Ning Li	1//
A short-wave reconnaissance equipment scheduling technology based on Hopfield network	181
Hang Zhang, Yang Liu, Fei Wen	101
Improving Mirror Fitness through augmented reality technology	186
Mamoru Ueta	100
Non-contact voltage measurement based on electric field sensing integrated electro-optical	
sensors	195
Xiaojun Ye, Quan Xu, Bo Li, Jinyong Lei, Wenjie Zheng, Zhiyong Yuan, Xingye Deng	
Monitoring and evaluation mechanism of power grid enterprise equipment based on IoT	
physical equipment code	201
Jiaxu Cheng, Wei Zhu, Wenxuan Li	
Research on microwave signal recognition of motor imagination brain activity based on	
support vector machine	205
Qingxiao Tan, Miao Cai, Daoshuang Geng, Daoguo Yang	
Prediction of Defect Occurrence of Substation Equipment Based on Time Series and	• • • •
Neural Network	209
Yijia Wu, Qingke Tan, Jianxun Xia, Bo Li, Yisheng Yu	
Multi-attention mechanism news recommendation model with fused entity features	216
Xin Lv, Zhanbin Che, Chaofan Ma	
Design and Simulation of Dot Matrix Display Based on Proteus	225
Lianyi Zhao, Rubing Huang	
Cluster Analysis of Power User Loads Based on KPCA and K-means++	229
Yan Guan, Xinyi Lu, Xiying Gao, Hang Zhou, Ye Liu, Guiyang Tian	

Distribution Network Reconfiguration Based on Improved Differential Evolution Ant	234
Colony Algorithm Chang Oien, Aiyuan Wang	231
Cheng Qian, Aiyuan Wang Individual Police Equipment Management System Based on The Internet of Things	
Mancheng Liao	241
Design and Research of Intelligent Shared Shopping Cart Based on Internet+	
Jijin Zhang, Zhaizhuo Liu, Chenglu Kang	246
EEG-based tonic cold pain intensity assessment using CNN-LSTM	
<u>.</u> , , , , , , , , , , , , , , , , , , ,	250
Mingxuan Sun, Daoshuang Geng, Daoguo Yang, Qingxiao Tan Paggarah an bandwara aggisted data algorithm for LaT Edga Computing	
Research on hardware assisted data cleaning algorithm for IoT Edge Computing	255
Hui Jin, Tiejun Cao, Yongjie Nie, Jun Shen, Hongfeng Yan, Hongyu Wang	
A Lightweight Backbone Used for Scene Text Recognition	261
Tianxiang Lan, Dong Yin	
Research on network topology structure based on 5G+MESH ad hoc network technology	266
You Xue, Runan Yang, Ran Liu, Siwei Du, Shengbiao Cao	
Application of mobile terminal in ballastless track fine adjustment for high-speed railway	272
Qiuyi Li, Luyao Li	
Learning Search Region Update for Roubst Tracking	278
Kaijun Guo, Lu Gao, Tianxiao Shen, Yang Zhou	
Ambulation Prediction by Fusing Raw IMU Data and Novel sEMG Time-frequency	201
Features	284
Bin Zhou, Hong Wang, Yanzheng Lu, Mohamed Amin Gouda	
YOLOv2-tiny Target Detection System Based on FPGA Platform	289
Hangjian Zhou, Yingxu Xiao, Zhizhong Zheng, Bin Yang	
The Internet of Things(IoT) system for Bolt looseness detection in coal mines	293
Boyan Liu, Xiaohui Yang, Zifeng Chen, Jingping Liao, Huibin Zhao	
Evaluation Metrics for Hierarchical Multi-label Text Classification: Combining Structural	207
and Semantic Features	297
Zhe Liang, Changsheng Liu, Haoran Chen, Zhonglu Shi	
Implementation and Optimization of Distributed Stream Processing System Based on FPGA	303
Honglei Li, Jia You, Xisheng Li, Weiren Song	
Research on Knowledge Graph Modeling Method for Financial Audit of Power Grid	
Enterprises	308
Xi Chen, Rui Xin, Yongjuan Chang, Jiao Peng, Runkun Liu, Xiyue Zhang	
Defect detection method for key components of transmission line based on incremental	
learning	315
Wei Yang, Jingchang Hao, Jinhe Yu	
QuatCNNEx: A Knowledge Graph Embedding Model based on Quaternion	
Convolutional Neural Network	320
Hongyu Su, Wei Xiong, Ye Wu, Luo Chen, Zhinong Zhong	
A Method for Predicting the State of Sensors and Meters Based on Improved Generative	
Adversarial Networks	327
Zhongwei Wang	
An Intrusion Detection System for the Internet of Things Using Machine Learning Models	222
Ge Guo	332
Analysis of Passenger Landside Travel Characteristics of Airport Hub Based on Mobile	
Signaling Data	336
Yi Liu, Tong Liu, Di Wu, Jun Ma	
Traffic prediction of converged network for smart gird based on GNN and LSTM	241
Lijun Zhong, Jinjiang Tang, Chen Xu, Baoping Ren, Bin Du, Zhenyu Huang	341

Research and Application of Electric Power Administrative Exchange Network Based on IMS Technology	349
Tao Su, Jing Li, Hui Wang, Yiliang Xu, Xin Jin	
A GAN-based adaptive embedded digital label information hiding scheme	355
Ge Zhang, Xiao Peng, Tao Zhao, Fei Liang	
EEG Emotion Recognition Based on a Novel 4D Feature Fusion and 3D Convolutional	359
Networks Note: The Control of the C	339
Xinhao Gong, Jin Gu, Tianrui Li	
Research on task offload for edge computing in high-speed railway vehicle ground communication network	363
Yi Shi, Bohong Liu	303
Design and implementation of ship shore power data analysis system based on Doris data	
warehouse	367
Yujuan Zou, Peiyi Tang, Taizhi Lv	
Application of computer virtual simulation technology in tourism industry	371
Lei Zhao, Meizhong Huang	3/1
Research on quality prediction of iron ore green pellets based on optimized neural network	377
Hao Yu, Qiong Liu	311
An Ensemble Learning Approach for COVID-19 Fact Verification	383
Yangming Liu, Yunlai Zhou	303
Monte Carlo Tree Search: A Survey of Theories and Applications	388
Tianxiang Ou, Yanan Lu, Xuesong Wu, Jianwen Cao	200
A Novel Method for Identifying Safety Risk	397
Xuan Zhao, Chengying Zhu, Youwei Wang, Zhao Tian, Guangjun Zai	
Research on China's OFDI Based on Big Data Mining Technology	401
Mingli Wang, Yan Xiong	
Research on Worksite's Video Image Safety Helmet Detection Method Based on Cloud-	405
edge Cooperation	403
Jin Lv, Xiaolong Hao, Min Feng, Zheng Jia	
A Nearest Neighbor Projection Method Based on Z Curve	410
Zhuolin Yang, Sumei Xiao, Feifei Li Real-Time Infrared Target Tracking on Embedded Platform Based on Improved Staple	
Tracker	416
Yurong Huang, Changzhen Qiu	
Entity relationship extraction model based on entity information enhancement	404
Jingqi Zheng, Gang Zhou, Jicang Lu, Zhongkun He	424
PCIe device drivers in Linux	
Design and implementation of a high-speed PCI Express bridge	430
Yili Yang, Chuping Yan	
NB-IoT-based Environmental Monitoring System for Peach Orchard	438
Dongjian Shen, Weikang Chen, Peng Liu, Zhijun Wang	730
Research on temporal and spatial feature extraction and distribution prediction of the	
population in Lujiazui Financial & Trade Zone based on heat map	442
Xianzhou Cheng, Jiasi Lin, Xuezhi Zhao, Shuang Xiao	
Research on gesture recognition based on YOLOv5	447
Wanbo Luo	
Visualization and Scoring Models	
Trending Videos Discovery and Recommendation based on Information Entropy Method	451
and Principal Component Analysis	
Yifei Zhao Cool gangue detection method based on improved VOI Ov5	
Coal gangue detection method based on improved YOLOv5 Qingjun Song, Zhijiang Liu, Haiyan Jiang	466
Zingjan bong, Zinjiang Liu, Haryan Hang	

Oil and Fas Field Heating Device Based on Modularization Analysis of Heat Energy Exchange Resistance Characteristics	470
Xiaoke Ji, Wangming Zhou, Yongchang Dong, Wenjuan Liu Research and practice of big data modeling in asset management institutions Mana Lie Variage V	474
Meng Li, Jiqiang Liu, Yeping Yang Study on cycle-by-cycle variation in a homogeneous charge compression ignition engine fueled with n-butanol/diesel blends	478
Jiantong Song, Nan Wang, Chunhong Zhu, Zeting An An analysis method of industrial data relationship based on business context Yang Liu, Tianshi Zhang	482
Distributed Semi-Supervised Learning with Positive and Unlabeled Data Ying Liu, Chen Zhang	488
MPC-Based Privacy-Preserving Serverless Federated Learning Liangyu Zhong, Lei Zhang, Lin Xu, Lulu Wang Privacy Data Symphyonization Method Based on Floation in Introduct	493
Privacy Data Synchronization Method Based on Election in Intranet Jun Han, Kai Deng, Xiaolei Deng Research on risk analysis method of urban and rural planning driven by data	498 502
Ying Xu A moving target detection method based on Dempster-Shafer Fusion	506
Xueyang Xu, Zhiyong Zhang, Changzhen Qiu, Ziwei Liu Intelligent detection of mask wearing based on cloud-edge collaboration Shihai Zhang	511
Deep application of meter file verification APP based on the flexible platform Jincheng Li, Jianbin Wang, Xiahui Zeng, Yingwu Zhou	515
Sign language recognition based on spatiotemporal convolutional neural network and attention mechanism	519
Yongquan Shao, Guanghua Chen Spatial Line Entity Matching Technology for Spatial Association of Multi-source Vector Data	523
Jingli Jiang, Junfeng Xu, Yilan Lou Digital Inclusion: A Study on Optimizing Emotional UI Design Based on the Characteristics of Older People	528
Chao Zhou, Yujie Lu, Jiaming Ye Improving Classroom Object Detection with Bootstrapped Semi-Supervised Learning Aohua Song, Ziyun Zhao, Qingyun Xiong, Junqi Guo	532
Research on fire detection based on YOLOv5 Wanbo Luo	537
A novel campus fire monitoring system based on YOLOv5 Xianli Zeng, Haoyu Wang, Yaoyao Mo, Xu Wang, Minghui Li, Yujie Li	541
Study on the Influence of Grain Minimum Purchase Price Policy Based on Differences-in-Differences Kexin Zhang	545
Analysis of association rules between serum mass spectrometry data and physical examination data	549
Yu Wang, Jiaxin Han, Manxiang Xu, Yingchao Ji Research on Safety Accident Emergency Plan Evaluation Based on Fuzzy Comprehensive Evaluation Maken Wang Ming Cue	553
Mohan Wang, Ming Guo Construction of Fresh Agricultural Product Supply Chain Traceability Platform Based on Alliance Blockchain Viva Lie Veria Thank Oi Wang Marki Lie	558
Ying Liu, Kexin Zhang, Qi Wang, Manli Liu	

Establishing a Knowledge Base of an Expert System for Criminal Investigation	562
Mancheng Liao	
Maintenance of Shanghai Actual Population Data Based on Data Warehouse	567
Xiangwu Ding, Xiaoying Liu	
A new method of constructing medical Chinese readability corpus based on big data	574
Lining Liu, Yongquan Li	
Deep Cost-sensitive Learning for Wheat Frost Detection	578
Shujian Cao, Lin Cui, Haipeng Liu	
Crypto Profit Forecasting using hybrid Machine Learning method	585
Qi Zhong, Mingda Huo	
Improved arithmetic optimization algorithm based on sigmoid function and Cauchy	589
Gaussian fusion mutation	309
Ran Wang, Qiong Liu	
Discrete Baby Search Algorithm for Combinatorial Optimization Problems	595
Yi Liu, Qibin Zheng, Gengsong Li, Jinhui Zhang, Xiaoguang Ren, Wei Qin	
Gradient Based Formation Algorithm with FOV Constraint	600
Xing Liu, Qinghua Huo, Bing Yang, Jianyi Li	
AUV Path Planning and Image Recognition Based on Convolutional Neural Network	605
Yuhan Zhang, Weili Ge	
Research on YOLOv5 Vehicle Object Detection Algorithm Based on Attention Mechanism	609
Miao Shao, Yong Fang, Linlong Guo, Qian Xue	
Detect Deeply Only Once: Arbitrary-Oriented Object Detection in Remote Sensing Images	610
Based on Improved YOLOv5	613
Songhui Hu, Yun Ge, Yongqiang Fan, Huijie Wu	
A Reinforcement Learning based RRT Algorithm with Value Estimation	619
Dasheng Lin, Jianlei Zhang	
LSTM Molecular Descriptor-Free QSAR Application Research Based on Genetic	<i>(</i> 25
Algorithm Optimization	625
Jianlin Guan, Jing Liu	
A Real-time Path Planner based on Improved Tentacle Algorithm for Autonomous	
Vehicles	629
Zhuoren Li, Bo Leng, Chagen Luo, Liang Shao, Ruoling Yang, Chengen Tu, Arno Eichberger,	
Lu Xiong	
Research on Individual Recognition and Matching of Whale and Dolphin Based on	(25
EfficientNet Model	635
Siwen Wu, Jiale Wang, Yihan Ping, Xuan Zhang	
FusionNet: a New Perspective of CNN for Image Classification	639
Maojia Song	
Super-resolution Reconstruction of Airborne Remote Sensing Images based on Multi-scale	648
Fusion	048
Fengguo Chu, Hu Liu, Ziyu Wang, Zhiyuan Cao	
Research on clustering algorithms in data mining	652
Haoxiang Xu	
Parameter Update Framework based on Unitized Stochastic Gradient Descent Algorithm	656
in Federated Learning	030
Feng Mei, Jiguang Lv, Yang Cao	
Predict the Complexity of Literary Passages Based on Deep Learning	661
Defa Ge	
Stock volatility prediction Using TabNet based deep learning method	665
Yanlin Lv, Shuting Guo, Yiwen Chen, Wenji Li	
Novel Nearest-Neighbor Data Association Algorithm with an Adaptive Threshold	669
Yuan Li, Dinghai Pan, Mengmeng Zhang, Zhi Liu	

Driving Behavior Identification of Operating Vehicles Based on Real-Time Trajectory	<i>C</i> 7 4
Data	674
Xingchuan Wang, Lei Deng	
Image-Attention based User Entity Recognition of Device	679
Yachao Li, Yimo Ren, Wenjun Huang, Hong Li, Weifeng Wang, Dongsheng Zhang	
A GI Tract Image Segmentation Algorithm Via UNet 2.5D Network	684
Xuyang Zhang, Xiao Yue, Tianjing Liu, Siwen Wu	00.
Design of student behavior characteristics analysis platform based on K-means clustering	
algorithm in local universities	688
Kun Xiao, Zhongyi Duan, Mingen Li, Jinkui Yao	
Intelligent Voice Agent: The Impact of Vocal Pitch on Customer Purchase Behavior in	
Voice Shopping	692
Peiyuan Du, Yiran Wang, Qiaoli Tong, Chengcheng Liao, Yixuan Niu	
Infrared and Visible Image Fusion based on CNN and Saliency Detection	697
Chongwu Tang, Xinliang Wu, Changan Dai	097
Time Series Traffic Analysis based on PCA and GMM Algorithm	706
Xing Wan	700
A High Performance JPEG Decoding Algorithm based on OPENCL	711
Shan Hu, Jie Liu	/11
SAR Image Ship Detection Algorithm based on Machine Vision YOLO Model	715
Chao Zheng	/13
Embedded front vehicle detection system based on fusion of machine learning and	
traditional methods	719
Changhong Sun, Chengye Liu, Xiangdong Li, Xingwen Zhao, Jinhuan Xu	
Multilingual Toxic Text Classification Model Based On Deep Learning	726
Wenji Li, Anggeng Li, Tianqi Tang, Yue Wang, Zejian Fang	720
Technology Analysis of Network Anomalous Behavior Detection Based on Machine	
Learning	730
Shuguang Wu, Hongyan Wang, Yu Wang, Nanjiang Yan	
FPGA Based Simulation Study of Wear-Leveling Block Searching Algorithm	720
Hongfeng Yan, Tiejun Cao, Yongjie Nie, Wei Zhong, Hui Jin, Hongyu Wang	738
Fault Diagnosis of Motor based on Knowledge Graph and CNN	7.40
Daoqu Geng, Lei Zhou, Yangchun Zhao, Haiyang Li	742
Blockchain abnormal transaction detection method based on weighted sampling	
neighborhood nodes	746
An Li, Zhongshuai Wang, Minghao Yu, Di Chen	
Research on Electrical Parameter Fault Diagnosis Method of Oil Well Based on TSC-	
DCGAN Deep Learning	753
Tingting Bai, Xiangyu Li, Shihong Ding	
Research on the semantic segmentation algorithm for automatic driving with improved	
HRNet	762
Hang Hu	
Remote sensing image classification based on attention mechanism and multi-scale features	7.00
Yongqiang Lin, Mao-Hsiung Hung, Yinghui Yu	766
Remote sensing building change detection based on improved U-Net	770
Jianhua Huang, Qiang Fu, Xue Wang, Yuanfa Ji	772
Detection of Shoreline Erosion using Satellite Image and Machine Learning	77.
Xuanyu Li	776
Machine learning-based analysis of online course learning experience	701
Wei Yang, Yong Pan	781
in a rang, rong ran	

A Named Entity Recognition Method For Chinese Winter Sports News Based On	
RoBERTa-WWM	785
Pingshan Liu, Yuan Cao	
Author Index	791