

# **2022 5th International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2022)**

**Chengdu, China  
19-21 August 2022**

**Pages 1-672**



**IEEE Catalog Number: CFP22AX3-POD  
ISBN: 978-1-6654-9917-0**

**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:	CFP22AX3-POD
ISBN (Print-On-Demand):	978-1-6654-9917-0
ISBN (Online):	978-1-6654-9916-3

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

# **2022 the 5th International Conference on Pattern Recognition and Artificial Intelligence (PRAI 2022)**

## **Table of Contents**

Preface.....	xviii
Conference Committees .....	xix

---

### **❖ Pattern Recognition and Machine Learning**

Application of Massive Parallel Computation Based Q-Learning in System Control .....	1
<i>Demei Huang, Haoyuan Zhu, Xianqi Lin, Li Wang</i>	
Dynamic Policy Programming with Descending Regularization for Efficient Reinforcement Learning Control .....	6
<i>Renxing Li, Zhiwei Shang, Chunhua Zheng, Huiyun Li, Qing Liang, Yunduan Cui</i>	
Multi-attribute Context-Aware Item Recommendation Method Based on Deep Learning.....	12
<i>Shuxin Li, Lijuan Duan, Wenbo Zhang, Wenjian Wang</i>	
GMBLOF: A Machine Learning Algorithm of Novelty Detection Based on Local Outlier Factor.....	20
<i>Xing Yang, Kexin Peng, Le An, Pan Huang, Peng Feng</i>	
Carbon Trading Based on Quadratic Modal Decomposition and Recurrent Neural Network Price Prediction Model .....	26
<i>Hui Pu, Yadong Wu, Caijian Hua, Zhenjin Song, Weihan Zhang, LingLi Zhang, Qikai Chu, Yu Qiu</i>	
Vision Transformer is Required for Hyperspectral Semantic Segmentation .....	36
<i>Yuhan Chen, Qingyun Yan</i>	
Adaptive Gated Spatial-Temporal Network for Traffic Prediction .....	41
<i>Dengkui Zhang, Hongbo Zhang, Jiahao Shi, Zhe Zhao</i>	
Remaining Useful Life Prediction Method Based on the Improved Holt Double Exponential Model.....	47
<i>Chao Zhang, Shuaiyong Li, Jinghui Wen, Shenghao Fu</i>	
GMLN: Global-Local Multi-channel Learning Network for Spatiotemporal Prediction.....	53
<i>Haoran Wang, Zhe Zhao, Hongbo Zhang, Jiahao Shi</i>	
Pedestrian Re-identification after Enhancing Textural Features Based on Parallel Residual Network .....	58
<i>Zhiyu Shen, Tongzhou Zhao, Yang Liu</i>	

Dynamic Gesture Recognition Method Based on Millimeter-Wave Radar.....	63
<i>Qingchuan Li, Linsheng Liu, Shuang Hao, Guangyang Wan</i>	
Training Agent to Play <i>Pac-Man</i> under Authentic Environment Based on Image Recognition .....	68
<i>Jingmin An, Yong Du</i>	
T2V-TransD: A Method of Temporal Knowledge Representation Learning Based on Mapping Matrix .....	76
<i>Zelin Yang, Hongjun Li, Mingzhe Cheng, Shulin Liu, Xiya Luo</i>	
A Multi-factor Prediction Model for Carbon Productivity Based on Stacking Integration Method.....	83
<i>Zhenjin Song, Yadong Wu, Caijian Hua, Hui Pu, Qikai Chu, Lingli Zhang, Yu Qiu, Weihan Zhang</i>	
One-Step Multi-view Clustering Based on Low-Rank Tensor Proximity Learning.....	94
<i>Lin Li, Ying Cao, Xiaojun Zhou, Zhiqiang Lu, Dongxiao Li, Li Song</i>	
CAGSF: Optimization Algorithm for Network Representation Learning Based on the Community Structure .....	101
<i>Zifei Xiao, Jialin He, Dongxu Cui, Weiping Ren, Jiashuai Hu</i>	
Feature Distribution Distillation-Based Few Shot Class Incremental Learning.....	108
<i>Juntao Zhu, Guangle Yao, Wenlong Zhou, Guiyu Zhang, Wang Ping, Wei Zhang</i>	
The Positive Effect of Attention Module in Few-Shot Learning for Plant Disease Recognition .....	114
<i>Hong Lin, Rita Tse, Su-Kit Tang, Zhen-ping Qiang, Giovanni Pau</i>	
A Giant Panda Face Alignment Method Based on an Improved FAN Network.....	121
<i>Peng Luo, Liming Xu, Chunlin He, Pan Wang, Zicheng Ding, Bochuan Zheng</i>	
MMINN: Management-Model Informed Neural Network with Interpretability and Causal Relationship .....	127
<i>Shuang Li, Si-ze Hou, Yutong Yao, Yongqi Sun, Bin Ding</i>	
Improved Adjacency Matrix-Based Graph Convolutional Network Aspect-Level Sentiment Analysis.....	133
<i>Lijiang Liu, Hongying Lu, Yao Wang, Haifeng Li</i>	
A Hierarchical Bayes-Based Evolutionary Ensemble Classification Algorithm .....	138
<i>Lei Zhang, Ziyue Chu, Longfei Liang, Wen-Chi Yang</i>	
Image Recognition Based on the Depth-Wise Separable Convolution and Softpool.....	147
<i>Wang Linlin, Fang Xiaoyu, Hong Tao, Liu Chang, Liu Shilan</i>	
Evaluation of ANN Using Air Quality Tracking in Subtropical Medium-Sized Urban City .....	153
<i>Benedito Chi Man Tam, Su-Kit Tang, Alberto Cardoso</i>	
An Improved Merge-YOLOv5 Algorithm for Infant Monitoring .....	159
<i>Zhen Zhang, Xiantao Lin, Kaihang Yang, Huabin Wang</i>	
An Improved Feature Selection Algorithm with Cyclic Penalty Boundary Interaction Based on MOPSO ....	164
<i>Gan Huang, Fei Han, Qing-Hua Ling</i>	

Improved YOLOv5 Detection Algorithm of Contraband in X-ray Security Inspection Image.....	169
<i>Bo Song, Runqing Li, Xuguang Pan, Xianglan Liu, Yan Xu</i>	
Inverse Kinematics Solution of Manipulator Based on IPSO-BPNN.....	175
<i>Chenjiao Liu, Xiaoyi Wang, Hesong Jiang, Xueyuan Wang, Haiyan Guo</i>	
A Novel Identification Method of Helmet Wearing Based on Human Pose Estimation .....	180
<i>Wangmeng Wang, Dengwen Wang, Zhixin Tie, Yanbing Chen, Lingbing Tao</i>	
REIPIC: New Method for Reshaping the Entropy and the Frequencies Pattern of a Random Variable and Its Performance Evaluation Using SVM .....	186
<i>Manal Shehab, Noha Korany, Nayera Sadek</i>	
Research on Operation Perception of Treasury Centralized Payment Based on Spark.....	193
<i>Yuliang Jiao, Bin Shen, Hongtao He, Yeqing Chen</i>	
Image Classification Method of Longhorn Beetles of Yunnan Based on Bagging and CNN.....	198
<i>Weijie Deng, Quanyuan Xu, Jiang Liu, Ying Lu, Ming Fan, Xiong Liu</i>	
Aerial Object Detection by UAV Based on Improved YOLOV3.....	204
<i>Siling Feng, Bo Zhang, Mengxing Huang, Yuanyuan Wu</i>	
A XGBoost Method Based on Telecom Customer Satisfaction Enhancement Strategy .....	209
<i>Haosong Gou, Ling Su, Gaoyi Zhang, Wei Huang, Yunbo Rao, Yang Yang</i>	
Leveraging Neural-Networks, Boosting and Domain-Knowledge to Discover Physiological Indicators with Minimal Sensitivity to Data Resolution .....	214
<i>Dmitrii Vartanov, Olga Senyukova, Rebecca Miao, Marina Orlova, Zhenyi Yang, Valeriy Gavrishchaka</i>	
A Comparative Analysis of Machine Learning-Based Website Phishing Detection Using URL Information .....	220
<i>Md. Milon Uddin, Kazi Arfatul Islam, Muntasir Mamun, Vivek Kumar Tiwari, Jounsup Park</i>	
Prediction and Analysis of Infectious Diseases Based on M-SIR Model .....	225
<i>Yu Qiu, Qibiao Wang, Yadong Wu, Guijuan Wang, Weihan Zhang, Shuhang Wang, Lingli Zhang, Hui Pu</i>	
A Framework for Cybercrime Prediction on Twitter Tweets Using Text-Based Machine Learning Algorithm .....	235
<i>Sheila Marie M. Matias, Jefferson A. Costales, Christian M. De Los Santos</i>	
Improve on Entity Recognition Method Based on BiLSTM-CRF Model for the Nuclear Technology Knowledge Graph .....	241
<i>Rui Shi, Zhenchuan Wang, Yang Liu, Yunliang Lan, Wei Zhao, Yitang Liu</i>	
Comparison of Deep Learning Methods for Landslide Semantic Segmentation Based on Remote Sensing Images .....	247
<i>Jie Liu, Ying Liu, Yongxiu Zhou, Yiru Wang</i>	

Classification of Crop Disasters Based on DenseNet.....	252
Siling Feng, Zheng Yang, Mengxing Huang, Yuanyuan Wu	
Estimate 6D Object Pose for Robotic Grasping Based on Efficient Channel Attention Mechanism .....	257
Jian Gu, Jinlong Shi, Jun Ni, Zheqing Zhang	
Intelligent Identification of Landslide Based on Deep Semi-supervised Learning .....	264
Dalan Xie, Ronghao Yang, Yichun Qiao, Jinbo Zhang	
MP <sup>2</sup> -Method: A Visual Analysis Method for Material Performance Prediction Supporting Model Selection .....	270
Qikai Chu, Yadong Wu, Lingli Zhang, Pan Li, Zhenjin Song, Hui Pu, Zhouqiao He, Weihan Zhang	
An Efficient Human-Computer Interaction in Battlefield Environment via Multi-stream Learning.....	276
Peizhuo Li, Chen Li, Guanlin Li, Kuo Guo, Jian Yang, Zexiang Liu	
Indicators of Compromise Automatic Identification Model Based on Cyberthreat Intelligence and Deep Learning .....	282
BinHui Tang, Huanran Qiu	
The Small Target Recognition Method of Neural Network Based on Spatial and Temporal Information .....	288
Ning Wang, Pengchao He, Zhong Ma, Meijuan Zhou, Xi Liu	
Supervised Contrastive Attentive Learning for Facial Expression Recognition in the Wild.....	293
Hongyi Li, Sirui Zhao, Yadong Wu, Shiwei Wu, Tong Xu, Enhong Chen	
An Overview of Scientometric Mapping in Planning and Decision-Making for UGV.....	302
Lina Qin, Aihua Yang, Qian Zhang	
A Lightweight Network for Expression Recognition Based on Adaptive Mixed Residual Connections .....	311
Xiuwen Lu, Hongying Zhang, Qi Zhang, Xue Han	
<b>❖ Computer Vision and Robot Vision</b>	
Helmet Wearing Detection Algorithm Based on Improved YOLOX.....	316
Shuang Hao, Jianjun He, Li Luo, Kun Xi	
Stochastic Channel Decorrelation Network and Its Application to Visual Tracking .....	322
Jie Guo, Tingfa Xu, Shenwang Jiang, Ziyi Shen	
Cognitive Visual Inspection Service for LCD Manufacturing Industry .....	329
Yuanyuan Ding, Junchi Yan, Guoqiang Hu, Jun Zhu	
An Accurate Defect Detection Model for Photosensitive Elements Based on Improved YOLOV4 Deep Neural Network .....	337
Mingqi Yu, Hongwei Yue, Chuangquan Chen, Cong Zhou, Yufeng Huang, Dong Wang, Fuqin Deng	

Image Recognition of Wild Birds in Yunnan Based on Improved Mobile Deep Learning.....	346
<i>Yucheng Li, Hua Zhou, Yili Zhao, Huaiyuan Yang</i>	
Investigations of Object Detectors with Deep Learning Methods: A Review.....	351
<i>Aiqing Yang, Mingzhe Liu, Jianping Wang, Qiulin He, Nan Zhang, Jiaru Jia</i>	
A Method for Detection of Steel Coil End Face Defects Based on YX-FR Ensemble Model.....	359
<i>Yunlong Li, Shu Lin, Hanbing Xue</i>	
Heterogeneous Network Building and Embedding for Efficient Skeleton-Based Human Action Recognition .....	364
<i>Qi Yang, Tianlong Wang, Qicong Wang, Yunqi Lei</i>	
Anchor-Free Small Object Detection Algorithm Based on Multi-scale Feature Fusion .....	370
<i>Qi Zhang, Hongying Zhang, Xiuwen Lu, Xue Han</i>	
FA-SSD: A Small Object Detection Algorithm Based on Feature Alignment .....	375
<i>Yanwen Zheng, Yu Wang, Fan Li, Yingmei Zhu</i>	
SWTFace: A Multi-branch Network for Masked Face Detection and Recognition .....	381
<i>Zixun Ye, Hongying Zhang, Qiyang Liu</i>	
Using Improved YOLOX for Underwater Object Recognition .....	388
<i>Jun Zhang, Xiaohong Peng, Gaoyi Zhang</i>	
Global Information Progressive Aggregation Network for Lightweight Salient Object Detection .....	394
<i>Junwen Li, Hongying Zhang, Bin Han, Hanyu Liu</i>	
Multi-Grid Homography Estimation Based on Swin SC-Mixer.....	400
<i>Pengfei Shuai, Peifan Jiang, Fei Deng, Yun Tang</i>	
Surface Defect Detection of Rails Based on Convolutional Neural Network Multi-Scale-Cross FastFlow .....	405
<i>Qin Zhang, Bin Wu, Yanhua Shao, Zixun Ye</i>	
Joint Contextual Transformer and Multi-scale Information Shared Network for Crowd Counting .....	412
<i>Xin Zeng, Shizhe Hu, Huake Wang, Jinna Zhang</i>	
PAHD-YOLOv5: Parallel Attention and Hybrid Dilated Convolution for Autonomous Driving Object Detection .....	418
<i>Yang Zhao, Jinzheng Lu, Qiang Li, Bo Peng, Jiaoqiao Han, Bingsen Huang</i>	
Training a Lightweight CNN Model for Fine-Grained Sewer Pipe Cracks Classification Based on Knowledge Distillation .....	426
<i>Beier Ma, Xin Zuo, Jifeng Shen, Xin Shu, Shucheng Huang, Yuanhao Li</i>	
Spectral Image Recognition Based on Convolution Neural Network.....	432
<i>Wang Li, Wang Wei</i>	

Purification and Multi Temporal Semantic Network for Continuous Sign Language Recognition .....	437
<i>Zekang Chen, Rize Jin, Joon-Young Paik, Tae-Sun Chung</i>	
Multi-object Tracking with Noisy Labels.....	443
<i>Wenqiang Liu, Yang Li, Jiabao Wang, Zhuang Miao, Hangping Qiu</i>	
Binocular Camera Calibration Based on BP Neural Network Optimized by Improved Particle Swarm Optimization .....	450
<i>Yueyi Zhang, Xiaoyi Wang, Hesong Jiang, Xueyuan Wang</i>	
Lightweight CNN-Based Deep Neural Networks Application in Safety Measurement .....	455
<i>Wilbur Kai Heng Lua, Peter Chun Yu Yau, Chee Kiat Seow, Dennis Wong</i>	
Point Clouds Classification and Segmentation Based on Local Fusion Network.....	460
<i>Yuanjun Shu, Yunfeng Sui, Shixuan Zhao, Lijun Zhou, Peng Wang</i>	
A Visual Odometry Algorithm in Dynamic Scenes Based on Object Detection.....	465
<i>Qifan Ye, Chaoyi Dong, Xiaoyang Liu, Liangliang Gao, Kang Zhang, Xiaoyan Chen</i>	
A Deep Learning Ensemble Framework for Off-Nadir Geocentric Pose Prediction .....	471
<i>Christopher Sun, Jai Sharma, Milind Maiti</i>	
Research on Fault Detection System of Vertical Shaft Hoisting Cage Shoes Based on Machine Vision ....	477
<i>Wanying Zhang, Xingrui Wang, Ao Zhu, Xiang Lu</i>	
ACTDet: Augmented Cross Grained Transformer for Industrial PCB Detection .....	483
<i>Jiayu Zou, Jie Qin, Senlin Lin, Xingang Wang</i>	
Estimating 6D Pose Using RANSAC Voting.....	491
<i>Ruoshui She, Jinlong Shi, Jian Gu, Yu Yuan, Jiahui Zhang, Wenrui Zhang</i>	
ReIMOT: Rethinking and Improving Multi-object Tracking Based on JDE Approach .....	498
<i>Haoxiong Hou, Ximing Zhang, Zhonghan Sun, Wei Gao</i>	
A Real-Time Object Tracking Method .....	503
<i>Ahmad Ismail, Sergey Vishnyakov</i>	
TransID: Image Dehazing Based on TransUNet .....	508
<i>Yue Xing, Zhengbin Yan, Tengfei Xiao, Xiaobing Zhang</i>	
DFANet: Dense Feature Augmentation Network for Printed Circuit Board Segmentation .....	513
<i>Jie Qin, Jiayu Zou, Donghui Li, Xingang Wang</i>	
SDAN: Semantic-Driven Dual Attentional Network for Image Generation .....	521
<i>Zhengbin Yan, Yue Xing, Tengfei Xiao, Xiaobing Zhang</i>	
Facial Expression Recognition Based on Genetic Programming Learning CCA Fusion .....	526
<i>Min Wu, Ming Li, Chao He, Hao Chen, Yan Wang, Zhengxiu Li</i>	

Computer-Vision Based Attention Monitoring for Online Meetings .....	533
<i>Tristram Dacayan, Daehan Kwak, Xudong Zhang</i>	
Adaptive Multi-branch Feature Fusion Attention Network for Few-Shot Image Classification .....	539
<i>Weijie Li, Pingjun Wei, Yundong Liu, Zhoufeng Liu, Chunlei Li</i>	
A Method of Depth Prediction Based on PDB-ConvLSTM .....	545
<i>Yang Guanshui, Liu Licheng, Li Xiongzi</i>	
Grasp Pose Estimation for Aerial Manipulator Based on Improved 6-DOF GraspNet .....	550
<i>Zhou Zhiyang, Chu Hongyu, Zhang Xiaoqiang, Shao Yanhua, Chang Zhiyuan, Liang Yin</i>	
DR-Fusion: Dynamic SLAM 3D Reconstruction Method of Production Workshop .....	556
<i>Rongsong Gou, Guangzhu Chen, Xin Pu, Tingyu Zuo</i>	
Enhanced Accurate Segmentation of Bridge Surface Image Defects Based on Multi-scale Feature Fusion .....	562
<i>Hongxia Shi, Huigui Rong, Yupeng Huang, Zhenqian Wang</i>	
Efficient Face Mask Detection Method Using YOLOX: An Approach to Reduce Coronavirus Spread .....	568
<i>Ahmed Endris, Shangming Yang, Yutra Abel Zenebe, Biniyam Gashaw, Juhar Mohammed, Leta Yobsan Bayisa, Ali Ibrahim Abara</i>	
Unified Smoke and Fire Detection in An Evolutionary Framework with Self-Supervised Progressive Data Augment.....	574
<i>Hang Zhang, Su Yang, Hongyong Wang, Jie Li, Hui Liu</i>	
A Lightweight Object Detection Method for Bank Operation and Maintenance Scenarios .....	582
<i>Junmin Xue, Yunbo Rao, Jiangang Wu, Haosong Gou, Yong Liu, Yang Yang</i>	
An Improved YOLOX Based Face Mask Detection Method in Complex Scenes .....	589
<i>Tian-Yu Yang, Yu-Tong Zhou, Jin-Chun Piao</i>	
Semantic Segmentation Algorithm of Landslide Based on Remote Sensing Image and DEM .....	595
<i>Yongxiu Zhou, Honghui Wang, Ronghao Yang, Dalan Xie, Jie Liu</i>	
Research on Deep Neural Networks for Real-Time Detection and Tracking of Highly Dynamic Targets....	600
<i>Xue Hanqing, Wang Xiaotian, Xue Kai, Chen Chao, Zhang HanYi, Jin Na</i>	
Research on Automatic Extraction of Tobacco Plants Based on U <sup>2</sup> -Net of Convolutional Block Attention Module and UAV Visible Images .....	606
<i>Chao Feng, Hui Deng, Wenjiang Zhang, Zhangxi Ye, Houxi Zhang, Wenhao Zhuo</i>	
Monocular Vision Based Distance Measurement of Frontal Obstacles for Unmanned Aerial Vehicle .....	615
<i>Zhongxi Wang, Li Wang, Xupei Zhang, Zhong Ma</i>	

## ❖ Image, Speech, Signal and Video Processing

6D Pose Estimating Using Multimodal Input and Attention Mechanism .....	624
<i>Wenrui Zhang, Jinlong Shi, Jun Ni, Yongjie Gao</i>	
Infrared and Visible Image Fusion Based on Gradientlet Filter and Low-Rank Decomposition.....	631
<i>Yuhang Song, Hairui Lin, Luoxin Xie, Guocheng Yang</i>	
Using Galois Fields for Digital Image and Signal Processing: Evidence for the Importance of Field Specificity .....	637
<i>Yelizaveta S. Vitulyova, Akhat S. Bakirov, Ibragim E. Suleimenov</i>	
Video Anomaly Detection via Successive Image Frame Prediction Leveraging Optical Flows.....	643
<i>Hongyong Wang, Xinjian Zhang, Su Yang, Weishan Zhang, Jie Li, Haiyun Wang</i>	
Attentional Fusion TDNN for Spoof Speech Detection .....	651
<i>Lei Wu, Ye Jiang</i>	
Industrial Character Image Motion Deblurring and Target Region Dynamic Location Method.....	658
<i>Xiao Zhang, Ming Chen, Dongliu Wu</i>	
Research on Asymmetric Controlled Cyclic Joint Remote Quantum State Preparation in Noisy Environment .....	664
<i>Xiaofang Liu, Dongfen Li, Yundan Zhen, Xiaolong Yang, Jie Zhou, Yuqiao Tan, Mingzhe Liu</i>	
Large Margin Training for Long Short-Term Memory Neural Networks in Neural Language Modeling.....	673
<i>Zhizhong Ma, Junbo Ma, Xijuan Liu, Feng Hou</i>	
A Comparative Study on End-to-End Speech Synthetic Units for Amdo-Tibetan Dialect.....	678
<i>Qian Li, Zhengjia Dan, Yue Zhao, Xin Huang, Xubei Zhang, Li Yang</i>	
SLAM Loop Detection Algorithm Based on Improved Bag-of-Words Model .....	683
<i>Kun Xi, Jianjun He, Shuang Hao, Li Luo</i>	
A Majorization-Minimization Approach for Edge-Aware Image Smoothing .....	690
<i>Xue-Man Sun, Xiao-Guang Lv, Guo-Liang Zhu, Biao Fang</i>	
Rotated Object Detection of High Resolution Remote Sensing Image Based on Yolov5 .....	697
<i>Chen Yang, Huang Mengxing, Ye Jinjin, Feng Siling, Wu Yuanyuan</i>	
Plant State Detection Based on Integrated Network .....	703
<i>PeiFan Jiang, YuanXiang Huang, JiangLin Shen, Fei Deng</i>	
Low-Light Image Enhancement Algorithm Based on Multi-scale Concat Convolutional Neural Network ....	709
<i>Weiqiang Liu, Peng Zhao, Xuan Wei, Bo Zhang</i>	
Deep Wavelet Frequency Laplacian Pyramid Network for Vehicle Logo Super-Resolution .....	715
<i>Yue Yu, Kun She, Jian Kang, Jehoiada Jackson, Hayat Shaukat, Yang Li</i>	

De-noising of Gamma-ray Pulse Signal Based on HILBERT-Huang Transform.....	722
<i>Yunliang Lan, Rui Shi, Wei Zhao, Yitang Liu, Zhenchuan Wang</i>	
A Real-Time Smoke and Fire Warning Detection Method Based on an Improved YOLOv5 Model .....	728
<i>Shuyan Liu, Jianbin Feng, Quan Zhang, Bo Peng</i>	
Link of Transformers in CV and NLP: A Brief Survey.....	735
<i>Jiaru Jia, Xin Chen, Aiqing Yang, Qiulin He, Pengyu Dai, Mingzhe Liu</i>	
Parallel Two-Stage Multiple Hypotheses Testing Model of Track-Before-Detect .....	744
<i>Jinming Du, Huanzhang Lu, Luping Zhang, Moufa Hu, Xinglin Shen, Dongyang Li</i>	
Application of Contrast Embedding with Feedback Regulation in GZSL .....	749
<i>Yuan Ma, Chuan Zhao, Yongzhen Zhang, Kun Xi</i>	
Night Target Detection Approach Based on Near Infrared Image Fusion on Vehicles.....	755
<i>Liang Deng, Mingqing Pan, Ruiming Jin, Zhenghua Xie</i>	
Speaker Recognition Based on Ensemble Neural Network .....	760
<i>Yao He, PengFei Shuai, PeiFan Jiang, Gang Tang</i>	
GAN-VAE: Elevate Generative Ineffective Image through Variational Autoencoder .....	765
<i>Jiayi Chen, Wei Song</i>	
Frequency Attention Module for Speaker Recognition .....	771
<i>Yujiao Wu, Zulin Fang, Jianping Dong, Gexiang Zhang</i>	
AO-SF: Alignment Optimization and Sample Fusion for Unsupervised Nighttime Segmentation .....	776
<i>Yongqiang Cheng, Jinzheng Lu, Qiang Li, Bo Peng, Qiyuan Liu, Jiaoqiao Han</i>	
HDC-Based Convolutional Neural Network Image Inpainting .....	783
<i>Shengbo Wang, Xiyou Wang, Huaming Liu, Xuehui Bi</i>	
Global Feature-Guided Real-Time Semantic Segmentation Algorithm.....	792
<i>Hanyu Liu, Hongying Zhang, Junwen Li, Yujun He</i>	
Intelligent Warning System for the Elderly Living Alone Based on OpenPose.....	799
<i>Ruifeng Xu, Yuyuan Mai, Tao Xu, Yujie Yang, Wendong Zhang, Zhen Zhang</i>	
TinyML-Enabled Static Hand Gesture Recognition System Based on an Ultra-Low Resolution Infrared Array Sensor and a Low-Cost AI Chip .....	804
<i>Wenji Dai, Le Zhou</i>	
Debris Flow Infrasound Denoising Based on Improved Wavelet Threshold Algorithm .....	810
<i>Xuelei Du, Xiaopeng Leng, Shanshan Rao, Liangyu Feng</i>	
Improve Semantic Segmentation of High-Resolution Remote Sensing Imagery with RS-TTA.....	817
<i>Juncheng Liu, Guangrui Liu, Yili Zhao</i>	

Concealing Audio Packet Loss Using Frequency-Consistent Generative Adversarial Networks .....	826
<i>Linlin Ou, Yuanping Chen</i>	
A Lightweight Network for Semantic Segmentation of Road Images Based on Improved DeepLabv3+ .....	832
<i>Guo Lili, Zhou Jinzhi</i>	
A Non-extensive Entropy-Based Adaptive Multi-threshold Image Segmentation Algorithm.....	838
<i>Qiaoying Kou, Jing Xiong, Mingjie Sun, Congjie Ou</i>	
A Surface Crack Detection Method of Spillway Tunnel Based on an Improved U-Net Network .....	845
<i>Jing Zhang, Fenglian Tian, Ting Li, Huijuan Lan</i>	
DCNN: Carbon Star Classification Based on Convolutional Neural Network .....	851
<i>Yuling Zhang, Yadong Wu, Xiang Ji, Weihan Zhang, Yi Li, Han Zhang</i>	
Panoramic Stitching of Reactor Core Image .....	857
<i>Xiangdong Li, Hesong Jiang, Xueyuan Wang, Xiaochun He</i>	
Image Recognition Method of Longhorn Beetles of Yunnan Based on Gabor and CNN.....	863
<i>Weijie Deng, Quanyuan Xu, Jiang Liu, Ying Lu, Ming Fan</i>	
Pattern Analysis of Stimuli-Induced and Self-Induced Emotions Based on EEG.....	870
<i>Zebin Li, Ming Li, Chao He, Hao Chen, Yan Wang, Zhengxiu Li</i>	
A Short-Term Load Forecasting Method Based on Fast Periodic Component Extraction.....	875
<i>Qilin Li, Junyi Cai, Ping Yan, Chengxin Li</i>	
End-to-End Video Violence Detection with Transformer.....	880
<i>Li Zhou</i>	
A Garbage Recognition Algorithm Based on YoloX Using in Flood Control System .....	885
<i>Junran Lin, Hanjie Zhan, Yi Lu, Cuimei Yang, Zhengrui Zhang, Xiaoye Wang, Zhen Zhang, Guoming Lai</i>	
An Image Data Augmentation Algorithm Based on YOLOv5s-DA for Pavement Distress Detection .....	891
<i>Zhengji Li, Yuhong Xie, Xi Xiao, Lanju Tao, Jinyuan Liu, Ke Wang</i>	
Supervised Discrete Online Hashing for Large-Scale Cross-Modal Retrieval .....	896
<i>Junjie Liu, Lunke Fei, Shuping Zhao, Jie Wen, Imad Rida, Yuanrong Xu</i>	
Autonomous Scene Matching Navigation Based on Range Optimization of Reference Image by Interframe Matching.....	903
<i>Yulong Hu, Pin Liu, Hao Chen, Sen Li</i>	
Machine Learning Applied to Star–Galaxy–QSO Classification and Data Visualization .....	910
<i>Xiang Ji, Yadong Wu, Yuling Zhang, Han Zhang, Weihan Zhang, Wei Zhang, Yi Li, Liyuan Jiang</i>	
Conversion of CNN to SNN for Aerospace Object Detection Tasks .....	919
<i>Li Shen, Ma Zhong, Yang Chaojie</i>	

Deep Learning-Based Fatigue Detection for Online Learners .....	924
<i>Yaxi Chen, Dinghao Zhao, Guixian He</i>	
WebAR Object Detection Method Based on Lightweight Multiscale Feature Fusion.....	928
<i>Nansha Liu, Wenhao Chen, Fupan Wang, Yongguo Han, Yadong Wu, Hao Jiang</i>	
<b>❖ Document Analysis, Biometrics and Pattern Recognition Applications</b>	
Text-to-Face Generation via Multi-Modal Attention Memory Network with Fine-Grained Feedback .....	940
<i>Senlin Jiang, Yunan Shi, Keyang Cheng</i>	
Integration of Knowledge-Driven and Data-Driven Based Korean Phonetic Transcription .....	948
<i>Dezhi Cao, Licheng Wu, Yue Zhao, Zhenna Lu</i>	
Named Entity Recognition for Medical Dialogue Based on BERT and Adversarial Training.....	955
<i>Mingzhe Cheng, Hongjun Li, Zelin Yang, Wenjie Fan, Yujin Gan</i>	
A Review of Research on Metaverse Defining Taxonomy and Adaptive Architecture.....	960
<i>Tianle Chen, Hua Zhou, Huaiyuan Yang, Siyong Liu</i>	
Data Mining and Network Pharmacology on Tibetan Medicine Prescriptions for the Prevention and Treatment of COVID-19.....	966
<i>Baht Aray, Xubao Zhang, Rao Fu, Mengliao Sun, Zhiyong Li, Xiulan Huang</i>	
Literature Classification Research on Fusion of Pretraining Model and Bidirectional Gated Recurrent Unit .....	973
<i>Shuhang Wang, Qibiao Wang, Yadong Wu, Weihan Zhang, Jing Liao, Yi Li</i>	
PoS Bert: Log Classification via Modified Bert Based on Part-of-Speech Weight .....	979
<i>Jing Zhang, Zezhou Li, Xianbo Zhang, Feng Lin, Chao Wang, Xingye Cai</i>	
SA-Model: Multi-feature fusion Poetic Sentiment Analysis Based on a Hybrid Word Vector Model .....	984
<i>Zhang Lingli, Wu Yadong, Chu Qikai, Li Pan, Wang Guijuan, Zhang Weihan, Qiu Yu, Li Yi</i>	
An Improved EloU-Yolov5 Algorithm for Blood Cell Detection and Counting.....	989
<i>Zhen Zhang, Zijun Deng, Zhipan Wu, Guoming Lai</i>	
Specify the Emotional Intensity Response Generation Model.....	994
<i>Chunyu Wang, Zhiqiang Ma, Wenchao Jia, Biqi Xu, Yutong Zhou</i>	
An Improved Yolov5s Algorithm for Emotion Detection .....	1002
<i>Zhen Zhang, Peibin Lin, Simeng Ma, Tao Xu</i>	
Context-Aware Semantic Matching with Self Attention Mechanism.....	1007
<i>Yanmin Chen, Hao Wang, Ruijun Sun, Enhong Chen</i>	

## ❖ Biomedical Image Analysis and Applications

An Effective Fusion Network for BGA Bubbles Segmentation in X-Ray Image .....	1012
<i>Zihan Cheng, Anping Chen, Qingquan Mao, Weiwei Cao, Guangcai Zhang, Jian Zheng</i>	
3D Reconstruction System for Foot Arch Detecting Based on OpenMVG and OpenMVS .....	1017
<i>Zinuo Li, Shenghong Luo, Weibin Zeng, Shuna Guo, Jincheng Zhuo, Lei Zhou, Zhe Ma, Zhen Zhang</i>	
CapGAN: Medical Image Captioning with Clinical Style and Pathology Preservation Using Conditional Generative Adversarial Nets.....	1023
<i>Lanyu Song, Chunlin He, Liming Xu, Bochuan Zheng</i>	
SGDANet: Gland Instance Segmentation Based on Spatial and Geometric Dual-Path Attention Modules .....	1033
<i>Haikun Zhang, Daguang Jiang, Ruirui Li</i>	
Automated Detection of Tuberculosis Bacilli Using Deep Neural Networks with Sputum Smear Images .....	1040
<i>Le An, Kexin Peng, Xing Yang, Peng Feng, Pan Huang</i>	
Chromosome Image Segmentation Based on OTSU and Region Growing Algorithm .....	1046
<i>Ganghao Liu, Zhifeng Zhang, Xiao Cui, Jinhui Kuang, Jinghan Cai, Xiaohui Ji</i>	
Sparse-View CBCT Reconstruction Using Combined DRUNet and HQS .....	1051
<i>Lan Jiang, Xiaoyi Wang, Hesong Jiang, Xueyuan Wang, Haiyan Guo, Xiaochun He</i>	
Retinal Fundus Image Segmentation Based on Channel-Attention Guided Network .....	1055
<i>Chan-Lu Liao, Chuan-An Chou, Chao-Yu Chen, Yuan-Kai Wang</i>	
Brain Tumor MRI Image Segmentation via Combining Pyramid Convolution and Attention Gate .....	1060
<i>Peng Zequan, Fang Yanhong</i>	
Multi-view Unet for Automated GI Tract Segmentation.....	1067
<i>Huifu Li, Jiayao Liu</i>	
Medical Image Fusion Based on Scale-Aware Structure-Preserving Texture Filter and Multi-scale Decomposition.....	1073
<i>Hairui Lin, Yuhang Song, Luoxin Xie, Guocheng Yang</i>	

## ❖ Artificial Intelligence and Cybersecurity

Feature-Specific Sliding Window-Based Sub-pixel Edge Detection Algorithm .....	1080
<i>Weilin Hu, Haiyan Zhang, Bo Hu, Han Wang, Guozhen Xu</i>	
Toward a More Robust Canny for Edge Detection .....	1086
<i>Zhen Liu, Mingzhe Liu, Xin Huang</i>	

Canny Sub-pixel Edge Detection Method Based on Threshold Segmentation and Markov Field Correction .....	1091
<i>Chenxi Hu, Kun Ding, Da Li, Xuan Wang, Jiangtao Ge</i>	
MOD-NAS: Migration-Based Object Detection Neural Architecture Search .....	1097
<i>Zhenshan Bao, Qian Zhao, Wenbo Zhang, Yilong Ding</i>	
Zernike Sub-pixel Edge Detection Method Based on Ramer-Turkey-Fitzgibbon.....	1103
<i>Guozhen Xu, Kelin Li, Yuchao Yang, Yixuan Song, Haiyan Zhang</i>	
Efficient Object Detection with Deformable Convolution for Optical Remote Sensing Imagery .....	1108
<i>Haonan Kang, Yundong Liu</i>	
Simulation of Manipulator Path Planning Based on Improved RRT* Algorithm .....	1115
<i>XueShen Liu, Lijia Cao</i>	
Evaluating Vulnerability of Rumor Detection Models to Textual Adversarial Samples .....	1121
<i>Fan Yang, Shaomei Li, Yuan Gu</i>	
An Effective Method for Privacy Concerns on Digital Contact Tracing Protocols .....	1125
<i>Dongyue Cui, Zhijun Quan, Yanji Piao</i>	
Context-Related Recommendation Algorithm Based on Graph Embedding .....	1130
<i>Xu Ou, Xingkai Li, Keyi Zhou, Nengbing Hu</i>	
Energy Allocation Strategy of Earthquake Monitoring Wireless Sensor Network Based on Longitude and Latitude Coding and Differential Evolution Algorithm.....	1136
<i>Jimin Liu, Xin Ge, Longri Wen, Huiqi Zhao, Jianye Zhuo, Xueyu Dong</i>	
Research on Quantitative Stock Selection Strategy Based on CNN-LSTM .....	1142
<i>Huishan Zhuang, Rui Zhao, Xi Luo, Chengyu Yang</i>	
Bit-level Malicious Traffic Detection Based on Markov Images and Deep Learning .....	1148
<i>Xin Cao, Qin Luo, JinZhou Liu</i>	
An Automatic Pipeline Parallel Acceleration Framework for Neural Network Models on Heterogeneous Computing Platforms.....	1154
<i>Jing Yang, Xinrong Long, Zhong Ma, Chaojie Yang</i>	
Data Verification Method Based on Graph Attention Network .....	1159
<i>Tianfan Xia, Bin Cheng, Yawen Zhao, Nan Ding</i>	
Research on the Architecture of On-Board Intelligent Computing Platform.....	1165
<i>XiaoKe Wang, YuanDong Han, Chao Li, XinXin Liang, Min Wang, Xi Liu</i>	
IoT Based Cases Management and Analysis for Intelligent Dynamic Discipline Inspection with Supervision .....	1171
<i>Siming Li, Liunai Wang, Weiwei Dong, Na Zhang, QiuJia Wu</i>	

Fuzzy Dynamic Bayesian Network Based Threat Assessment Model for Space Targets .....	1176
<i>Jiaxing Li, Li Yuan, Cong Zhang, Han Yan, Dong Sun</i>	
Investigation and Implementation of Customized Digital Discipline Inspection with Supervision.....	1182
<i>Liunai Wang, Yuting Huang, Jiawei Xu, Gang Ma, Changyan Luo</i>	
A Three-Level Force-Directed Layout Algorithm Based on PageRank and Simulated Annealing.....	1187
<i>Yi Li, Qibiao Wang, Yadong Wu, Jing Liao, Shuhang Wang, Xiang Ji, Lingli Zhang, Liyuan Jiang, Yuling Zhang</i>	
<b>❖ Artificial Intelligence for Wireless Communications and Internet of Things</b>	
Research on Water Quality Monitoring System and Classification Model Based on Internet of Things ....	1195
<i>Ji Zeng, Xue Gang Luo, YueKun Wang, Yong Liu, ZhiSen Zhang</i>	
Short-Term Prediction of SDN Network Traffic Based on CEEMDAN and Mixed Kernel Least Squares Support Vector Machine .....	1201
<i>Xuyuntao Zhang, Shuaiyong Li, Chao Zhang</i>	
An Optimal Network Coverage-Oriented Operators Network Automatic Planning Strategy .....	1207
<i>Haosong Gou, Ling Su, Gaoyi Zhang, Wei Huang, Yang Yang, Yunbo Rao</i>	
The Combination of Blockchain and Internet of Things - Challenges and Solutions to Security Issues ....	1213
<i>Pengyu Dai, Mingzhe Liu, Qiulin He, Cuixu Yuan, Hong Zhang, Chao Chen</i>	
An IoT-Oriented Gesture Recognition System Based on ResNet-Mediapipe Hybrid Model.....	1221
<i>Zhuo Huang, Jian Li, Jiye Liang, Baizhi Zen, Jian Tan</i>	
Novel Prediction in Storm Surge Using Ensemble Machine Learning Algorithms .....	1229
<i>Vai-Kei Ian, Rita Tse, Su-Kit Tang, Giovanni Pau</i>	
<b>❖ Data Modeling and Information Management</b>	
Efficient Method of Parameters Optimization of LSSVM for Large Sample Data .....	1235
<i>Qiang Zhao, Cheng-Long Zhang, Ran Xu, Yu-Fei Cao, Yang Li</i>	
Judgment of Alzheimer's Disease Based on Multifeature Mixed Model .....	1239
<i>Li Haoran, Zeng Wei, Dai Yunqiang, Chuan Chen, Lili Hu, Jinping Yin</i>	
MCC-Vis: Visual Analysis for City Regional Cooccurrence Pattern Based on Traffic Trajectory Data .....	1245
<i>Zhong Wang, Yongguo Han, Guijuan Wang, Weixin Zhao, Jiansong Wang, Yadong Wu</i>	
An Evolutionary Design Method for an Adder with Spiking Neural P Systems .....	1255
<i>Biao Luo, Gexiang Zhang, Dongyang Xiao, Jianping Dong</i>	
Design and Implementation of a Spherical Robot for Radiation Monitoring .....	1261
<i>Jing Lu, Xianguo Tuo, Haolin Liu, Fanrong Shi</i>	

Landslide Displacement Prediction Based on Multi-source Time Series .....	1267
<i>Junfeng Liu, Xing Zhu</i>	
Two-Space Spatial-Temporal Regularized Correlation Filters for UAV-Based Aerial Tracking .....	1275
<i>Jie Guo, Long Zhuang, Cong Xie</i>	
A Fast Heuristic Algorithm for the Steiner Tree Problem with Uniform Edge Weights .....	1281
<i>Xinyu Wu, Yi Zhou</i>	
Application of Data Mining Technology in Optimal Configuration of Enterprise Resource.....	1287
<i>Xiaofeng Yan</i>	
DeFVIS: Visual Analysis of Microscopic Parameters and Macroscopic Properties of Fluoropolymers.....	1292
<i>Xiaokun Tian, Yadong Wu, Haoyu Liu, Zhouqiao He</i>	
A New Quantization Deployment Method of Neural Network Models Integrating LSTM Layers.....	1299
<i>Yue Jiao Wang, Zhong Ma, Zun Ming Yang</i>	
A Machine Learning Approach to Visual Insight Discovery in Multidimensional Hierarchical Data .....	1304
<i>Guijuan Wang, Boyou Tan, Zhong Wang, Jiansong Wang, Hao Guo, Yadong Wu</i>	
A Review of the Research on the Influencing Factors of Internet User Information Dissemination .....	1311
<i>Xiuming Zhao, Hongtao Yu, Shaomei Li, Jianpeng Zhang</i>	
Geo VISER: A Geospatial Data Visualization Platform.....	1318
<i>Bai Yulong, Wu Yadong, Li Qiusheng, Li Guolian, Chen Yuwei, Lu Tianxiu</i>	
A Hybrid Asymmetric Integer-Only Quantization Method of Neural Networks for Efficient Inference.....	1326
<i>Wei Lu, Ma Zhong, Yang Chaojie</i>	
A Short and Long Term Power Load Forecasting Model Based on LSTM.....	1331
<i>Peize Wu, Yanxi Wang, Long Yang, Xin Li</i>	
A Method of Embedded Computer Degradation Trend Prediction.....	1338
<i>Yuanhong Mao, Zhong Ma, Shuda Gao, Ling Li, Bo Yuan, Bo Chai, Pengchao He, Xi Liu</i>	

## **Author Index**