

# **2022 International Conference on Image Processing, Computer Vision and Machine Learning (ICICML 2022)**

**Xi'an, China  
28-30 October 2022**



**IEEE Catalog Number: CFP22DC5-POD  
ISBN: 978-1-6654-6469-7**

**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:	CFP22DC5-POD
ISBN (Print-On-Demand):	978-1-6654-6469-7
ISBN (Online):	978-1-6654-6468-0

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## Table of Contents

<b>Mobile Device Fingerprinting Recognition Using Insensitive Information</b>	1
<i>Dujia Wei, Yawei Du, Ye Gu</i>	
<b>Garbage Image Classification Based on Improved Residual Neural Networks</b>	7
<i>Lingying Zhao, Hongyu Zhao</i>	
<b>Speech-Driven 3D Facial Animation with Mesh Convolution</b>	14
<i>Xuejie Ji, Zewei Su, Lanfang Dong, Guoming Li</i>	
<b>Object Detection in Visible and Infrared Missile Borne Fusion Image</b>	19
<i>Song Xue, Yongfeng Liu, Chao Xu, Jun Li</i>	
<b>Augmented Reality Calibration with Stereo Image Registration for Surgical Navigation</b>	24
<i>Zehua Zhao, Tianyu Fu, Long Shao, Hong Song, Jingfan Fan, Deqiang Xiao, Yucong Lin, Jian Yang</i>	
<b>Momentum Contrast Learning for Aerial Image Segmentation and Precision Agriculture Analysis</b>	31
<i>Meixuan Liu</i>	
<b>Transformer with Convolution for Irregular Image Inpainting</b>	35
<i>Donglin Xie, Lingfeng Wang</i>	
<b>Image Recognition of Marine Organisms Based on Convolutional Neural Networks</b>	39
<i>Yiyang Hu, Taotao Ye, Yening Gu, Xiuhuan Ding</i>	
<b>Multiple Recurrent Attention Convolutional Neural Network For Fine-Grained Image Recognition</b>	44
<i>Xiaotong Zhu, Hengwei Bian</i>	
<b>Oracle Bone Inscriptions Detection Based on Standard Evaluation Metric</b>	49
<i>Peige Zhao, Yongge Liu</i>	
<b>The Application of Square Module Elements in Digital Images from the Sense Of Order</b>	56
<i>Yu Mo, Honghai Zhang</i>	
<b>Image and Lidar Fusion Mapping Method Based on Joint Adjustment</b>	60
<i>Ningbo Bu, Gen Xu, Siyuan Cheng, Jiangjian Xiao</i>	
<b>Study on Ultrasonic Phased Array Detection of Hot Meltbutt Joint of Polyethylene Pipe</b>	65
<i>Daoxiang Wei</i>	
<b>Image Enhancement Method in High-Dust Environment Based on Deep Learning and Atmospheric Scattering Model</b>	69
<i>Kun Yang</i>	
<b>PCB Image Registration Based on Improved SURF Algorithm</b>	76
<i>Xinyang Li, Chuyun Huang, Hua He, Yijian Shi</i>	

<b>Night Pedestrian Detection Using Thermal Image Feature Extraction Enhanced Yolov3 (TIFEEY)</b>	80
<i>Liang Tian, Chite Chin, Chingsiang Cheng, Rongpeng Huang</i>	
<b>Image Encryption and Decryption System with Clock Controlled Destruction</b>	90
<i>Yingqi Wang, Luping Wang, Meixue Dong, Jiahua Tang, Mingze Sun, Ruilin Wang, Manyue Hu, Hang Zhang</i>	
<b>Segmentation of the Germ from Corn Kernel CT Image Based on the Mask-RCNN</b>	94
<i>Zhaohui Zheng, Ben Fan, Liuyang Ren, Hanyu Fu, Lanlan Lv, Deyong Yang</i>	
<b>Omnidirectional Gradient and Its Application in Stylized Edge Extraction of Infrared Image</b>	98
<i>Jun Wu, Xingzhan Wei</i>	
<b>Cross-Camera Vehicle Trajectory Estimation Towards Traffic Flow</b>	103
<i>Baolu Li, Kongjian Qin, Zhichao Cui, Qian Xu, Zhigang Xu</i>	
<b>LCE-Net: Local-Aware and Context Enhancement Based Yolov5 for Object Detection in Remote Sensing Images</b>	107
<i>Xinxiu Yang, Zhiqiang Cui, Feng Wang, Liming Xu, Zhengyong Feng</i>	
<b>Research on Improved K-Means Image Segmentation Algorithm Based on HSV Space</b>	116
<i>Renjie Liang, Lei Han, Panling Liu, Miao Liu</i>	
<b>Image Dehazing Based on Multi-Scale Retinex and Guided Filtering</b>	123
<i>Zhihui Gao, Yishu Zhai</i>	
<b>An Empirical Study Towards Sar Adversarial Examples</b>	127
<i>Zhiwei Zhang, Shuowei Liu, Xunzhang Gao, Yujia Diao</i>	
<b>Cardiac Image Segmentation Based on Improved U-Net</b>	133
<i>Guangxiao Qiao, Jihong Song</i>	
<b>Position Transformer for Image Retrieval</b>	138
<i>Hao Tian, Liufan Wu</i>	
<b>SLAM Mapping of Information Fusion Between Lidar and Depth Camera</b>	142
<i>Zhihao Wang, Weidong Hao, Yiren Huang, Hao Wu</i>	
<b>Innovative and Efficient CNN Structure Works for Chest X-Ray Images Classification</b>	146
<i>Juntao Cui, Bingqi Wen, Demin Huang, Detian Chen, Zhonghan Wang, Teoh Teik Toe</i>	
<b>Synthetic Aperture Radar Image Change Detection Based on an Image Fusion Strategy</b>	151
<i>Zhenhe Zhao, Ziwei Zhu, Gan Chen, Jianming Zhao</i>	
<b>Hybrid Transformer and Convolution for Medical Image Segmentation</b>	156
<i>Fan Wang, Bo Wang</i>	
<b>Mesh Fabric Node Extraction Algorithm Based on Progressive Hough Transform</b>	160
<i>Hongen Wu, Yanzhuang Wang, Hailiang Wei, Pengju Wang</i>	

<b>A Chinese Short Text Classification Method Based on TF-IDF and Gradient Boosting Decision Tree</b>	164
<i>Yanming Cheng, Zhigang Yu, Je Hu, Mingchuan Yang</i>	
<b>Quadratic Approximation of Taylor Series for Dofp Polarization Image Demosaicking</b>	169
<i>Xingyu Xu, Jiajia Chen</i>	
<b>Laboratory Test Research on Dry Density Discrimination of Granite Residual Soil Based on Digital Image Technology</b>	174
<i>Yao Xie, Yanjun Wang, Junlong Hu, Jing Wang, Deyong Wang</i>	
<b>TS-D3D: A Novel Two-Stream Model For Action Recognition</b>	179
<i>Meng Yang, Yuanjun Guo, Feixiang Zhou, Zhile Yang</i>	
<b>Intelligent Video Recognition of Violation Behavior in Substation Site Based on Mask R-CNN</b>	183
<i>Jian Li, Jia Wu, Qi Ren</i>	
<b>JRPM: Joints Relationship Pyramid Mapping for Skeleton-Based Gait Recognition</b>	187
<i>Na Li, Xinbo Zhao</i>	
<b>EEG Emotion Recognition Using Multisource Instance Transfer Learning Framework</b>	192
<i>Run Ren, Yameng Yang, Hailong Ren</i>	
<b>Research on Appearance Quality of Nectarine Based on Machine Vision</b>	197
<i>Du Jin, Yang Yan</i>	
<b>Modality-Specific Adaptive Scaling Method for Cross-Modal Retrieval</b>	202
<i>Baitao Chen, Xiao Ke</i>	
<b>Method for Automatic Mandibular Canal Detection on Improved U-Net</b>	206
<i>Yue Wang, Haiwen Feng</i>	
<b>A Default Prediction Method Using Xgboost and Lightgbm</b>	210
<i>Yuntao Zheng</i>	
<b>Vision Transformer and Its Application in Penguin Classification</b>	214
<i>Luting Pan</i>	
<b>Siamese-Pointnet++: Point Cloud Classification with Siamese Pointnet++</b>	221
<i>Mengbin Rao, Ping Tang, Sen Yuan, Jianjun Ge</i>	
<b>Research on Reliability Model Selection of Computer Network Equipment Based on AIC</b>	225
<i>Jin Sun, Li Meng, Wei Hou, Hongjian Yang, Xingzhuo Weng, Jilin Xu</i>	
<b>DM-Yolov5 for ABUS Detection</b>	229
<i>Yanlei Wang, Houjin Chen, Yanfeng Li</i>	
<b>Accelerated Identification Method Of Industrial Instrument Based on Yolov5</b>	236
<i>Shimao Yu, Chunhe Song, Haiyang Zheng, Pengpei Gao</i>	

<b>A Survey of Vision-Based Object Detection</b>	240
<i>Naiming Ge, Yin Yong</i>	
<b>Real-Time Action Detection Method Based on Multi-Scale Spatiotemporal Feature</b>	245
<i>Xin Miao, Xiao Ke</i>	
<b>Knowledge Alignment Based on Negative Sampling of Potential Topic Similarities</b>	249
<i>Wei Tian, Lei Pan</i>	
<b>Design and Practice Analysis of Video Desensitization for Intelligent Connected Vehicles</b>	254
<b>Desensitization Design and Practice Analysis</b>	
<i>Tonghong Chong, Chao Ma, Yanan Zhang, Tianyu Liu</i>	
<b>Vision Question Answering System Based on Roberta and Vit Model</b>	258
<i>Haiyang Tang</i>	
<b>Visual SLAM Based On YOLOX-S in Dynamic Scenes</b>	262
<i>Yingliang Tian, Gaochao Xu, Jiaxing Li, Yingjie Sun</i>	
<b>Research on Machine Vision Technology Based Detection and Tracking of Objects on Video Image</b>	267
<i>Yihui Wang, Hualiang Zhang</i>	
<b>Multimodal Model Prediction of Pedestrian Trajectories Based on Graph Convolutional Neural Networks</b>	271
<i>Jihong Song, Yang Zhao</i>	
<b>Self-Aware Multi-Inductor Net: Cross Domain Person Re-Identification Based on Global Self-Attention and Multi-Granularity Supervision</b>	276
<i>Yuxuan Zhou, Xiaohua Zhang, Deyang Song, Longfei Li, Daohong Niu</i>	
<b>Skeleton Embedded Views for Non-Rigid 3D Shape Classification and Retrieval</b>	285
<i>Yan Zhou, Liangxi Lin, Yue Luo, Xiangyu Liu, Fanzhi Zeng, Yuexia Zhou</i>	
<b>An Efficient Facial Expression Learning Model with Video</b>	293
<i>Yingying Chen, Zhitao Li</i>	
<b>Multi-Granularity Feature Distillation Learning Network for Fine-Grained Visual Classification</b>	300
<i>Yuhang Cai, Xiao Ke</i>	
<b>Design of Robot Vision Recognition System</b>	304
<i>Binbin Wen, Yifan Wang, Yuming Xue</i>	
<b>MSA-Vnet: Multi-Scale Attention-Based V-Net for DCE-MRI Lesion Segmentation</b>	309
<i>Changyan Xu, Zijiang Sang, Yeqin Shao</i>	
<b>Research on Battery Life Prediction Method Based on Gaussian Process Regression</b>	313
<i>Jianming Shi, Haiwen Feng, Jianming Shi</i>	
<b>Estimator Performance for Shallow and Deep Models</b>	319
<i>Aosen Xiong, Borong Chen, Yanmin Zhou, Linghua Meng, Yudan Kang</i>	

<b>Research on 3D Lean Management Platform of Digital Power Grid Based on Laser Point Cloud</b>	324
<i>Xi Cai, Jian Zhang, Hui Chen, Xiaoqian Meng, Chuntian Ma, Jirong Lian, Yang Wu, Wenjie Guo</i>	
<b>Research on Object Detection Method of Four-Electric Equipment in Rail Transit Based on Yolo</b>	329
<i>Xueping Li, Shusen Wang, Yuhang Li, Sheng Liu, Yuan Yang</i>	
<b>Pollen Grains Image Data Augmentation and Processing Based on Unpaired Translation</b>	335
<i>Zihao Wang, Yuchen Zhang, Yucheng Zhao, Jianqiang Li</i>	
<b>Traffic Flow Statistics Algorithm Based on Improved Yolov5</b>	340
<i>Yao Xu, Zanxia Qiang, Bobo Guo</i>	
<b>Recognition of HRRP Sequence Based on TCN With Attention and Elastic Net Regularization</b>	346
<i>Xiaodan Wang, Peng Wang, Yafei Song, Jingtai Li</i>	
<b>Deep Regression Tracking with Graph Attention</b>	352
<i>Xie Chen, Dawei Zhang, Zhonglong Zheng, Yiran He</i>	
<b>Bitcn Malware Classification Method Based on Multi-Feature Fusion</b>	359
<i>Bona Xuan, Jin Li, Yafei Song</i>	
<b>Low Illumination Image Enhancement Based on Improved Retinexnet Network</b>	365
<i>Zhengliang Li, Taijun Li, Wenyi Liu, Xue Wan</i>	
<b>Quantity Estimation Method of Warehousing Cargo Based on Cswin-Unet and Pixel Position Weight</b>	370
<i>Jiehao Wu, Guangyuan Zhang, Kefeng Li, Peng Wang, Zhikang Li</i>	
<b>Study of CNN and LSTM Based on ASCAD Database with Different Kinds of Noise</b>	375
<i>Yi'ang Li, Lixin Yu, Wei Zhuang, Zhiyong Qin</i>	
<b>Multiple Object Tracking Based on Tracking Compensation for Low-Resolution Scenarios</b>	380
<i>Zhiyan Cui, Na Lu, Qian Wang, Jingjing Guo, Jiaming Yang</i>	
<b>A Facial Sentiment Recognition System Based on Smart Edge Device</b>	385
<i>Weihua Ren, Huaping Zhu, Yafei Geng</i>	
<b>JETAM: A Joint Embedding Method for Research Paper Mutil-Label Classification</b>	390
<i>Yan Wei, Chunying Yang, Yujia He</i>	
<b>Hourglass Dehazing Network Based on Multi-Scale Parallel Fusion</b>	395
<i>Yishu Mao, Xinman Zhang, Xingcehn Song</i>	
<b>Lightweight Multi-Scale Attentional Network for Single Image Dehazing</b>	401
<i>Ping Zong, Zhen Hua, Jinjiang Li</i>	

<b>Research on Urban Space and Value Based on Big Data Analysis of Mobile Communication</b>	406
<i>Xiang Gao, Xiaowang Gao, Zufe Cai, Gaobin Liu</i>	
<b>DCA-Net: A W-Shaped Network For Segmenting COVID-19 Infected Area from Medical Images</b>	410
<i>Chang Meng, Liang Chen, Huiqi Niu, Xinyu Wang, Guoxu Li, Yuetao Wang</i>	
<b>Research on the Application of Generative Adversarial Networks in Aerial Image Generation</b>	416
<i>H. X. Cai, X. Y. Zhu, P. C. Wen, L. T. Bai, R. Q. Li, W. Han</i>	
<b>Sliding Window Detection Algorithm of Grabbing Safety and Grabbing Effect Based on DEM with Applications to Unmanned Bridge Grabbing Work</b>	421
<i>Yifei Zou</i>	
<b>Singular Value Decomposition and Entropy Dimension of Fractals</b>	427
<i>Xiaojing Weng, Altai Perry, Michael Maroun, Luat T. Vuong</i>	
<b>ISA-Predrnn: An Improved Self-Attention Predrnn Network for Spatiotemporal Predictive Learning</b>	432
<i>Dali Wu, Li Wu, Jianqiang Huang, Xiaoying Wang</i>	
<b>Cooperative Vehicle Infrastructure - Roadside Single Camera Perception System</b>	441
<i>Tong Zhang, Tianqi Sun</i>	
<b>Network Security Situation Prediction Based on CCQPSO-Bilstm</b>	445
<i>Junfeng Sun, Chenghai Li, Yafei Song</i>	
<b>Research on Arbitrary Shape Tibetan Text Detection with Graph Network</b>	452
<i>Ze Zhou Xu, Jie Zhu, Yashan Liu, Zehui Xu, Songsi Yan, Chao Wang</i>	
<b>Statistical Learning Based Treatment Effect Calculation for Spurious Classifiers</b>	457
<i>Haipeng Chang, Zhaokai He, Cunye Liu, Siyang Tao, Jaiden Xu, Chengzhe Li, Yijie Zeng</i>	
<b>YOLO-Animal: An Efficient Wildlife Detection Network Based on Improved Yolov5</b>	464
<i>Ding Ma, Jun Yang</i>	
<b>Research on Plant Growth Tracking Based on Point Cloud Segmentation and Registration</b>	469
<i>Shiyu Xiang, Dawei Li</i>	
<b>Study on the Radiation Performance of FY-3D Visible Short Wave Infrared Waveband Based on Reflectivity Basis Method</b>	479
<i>Kaisi Wang, Jun Pan, Hailiang Gao, Lin Chen</i>	
<b>Research on Target Detection Algorithm Based on Improved YOLO</b>	485
<i>Zhigang Chen, Guangxin Liu, Shengwen Fan</i>	
<b>Research on Remote Sensing Recognition of Forest Fire Smoke Based on Machine Learning</b>	490
<i>Kaihua Wang, Jun Pan, Lijun Jiang, Yehan Sun, Kaisi Wang, Yu Cao</i>	



<b>Engineering Applications Based on Industrial Robots and Machine Vision</b>	496
<i>Yiren Huang, Weidong Hao, Zhihao Wang, Hao Wu</i>	
<b>Grasp Detection Algorithm Based on CSP-Resnet</b>	501
<i>Maomao Shan, Jing Zhang, Huilong Zhu, Chenghao Li, Fenglian Tian</i>	
<b>Lidar-Based 3D Object Detection for Autonomous Driving</b>	507
<i>Zirui Li</i>	
<b>A Distributed Multi-Robot Path Planning Algorithm for Searching Multiple Hidden Targets</b>	513
<i>Luxi Zhang, Jie Qi</i>	
<b>Retinal Vascular Segmentation Algorithm Based on Atrous Attention U-Net</b>	517
<i>Yuchen Li, Shenming Gu</i>	
<b>A Deep Learn-Based Algorithm for the Identification of Suspicious Local Blocks in Lung CT Slices</b>	522
<b>Deep Learning Method to Identify Suspicious Lung Edge</b>	522
<i>Sai Qiao, Bin Feng, Xiaorong Zhu, Changli Feng</i>	
<b>A Heterogeneous Learning Resources Recommendation Algorithm Combination of Content-Based and Keyword Vectors Weight</b>	527
<i>Jingke Wan, Yani Zhang, Linbo Su, Lei Qin</i>	
<b>Path Planning for Mobile Robot Based on Deep Reinforcement Learning and Fuzzy Control</b>	533
<i>Chunling Liu, Kaiwen Guo, Jun Xu</i>	
<b>Canonical Correlation Analysis Based Bi-Graph Convolutional Network For Stock Price Movement Prediction</b>	538
<i>Kexin Zhang, Jia Cai</i>	
<b>3D Human Reconstruction Combined with Facial Features</b>	543
<i>Minglan Su, Chaoying Zhang, Mingchuan Yang, Wei Liang, Xinchu Li, Qiaoqiao Liu</i>	
<b>RGB-D Salient Object Detection Via Joint Learning and Multi-Feature Fusion</b>	547
<i>Peng Chen, Benhang Li</i>	
<b>Machine Learning Improvements to the Accuracy of Predicting Specific Language Impairment</b>	553
<i>George Huang, Andrew Cheng, Yujie Gao</i>	
<b>A Novel Dual-Supervised Convolutional Network for Retinal Vessel Segmentation</b>	567
<i>Zizheng Li, Junlin Guan, Huadeng Wang</i>	
<b>Key Node Identification of Satellite Time-Varying Network with Deep Reinforcement Learning</b>	572
<i>Liyang Wang, Yun Li, Ye Ren, Lina Yu</i>	

<b>Virtual Face Animation Generation Based on Conditional Generative Adversarial Networks</b>	580
<i>Jia Zeng, Xiangzhen He, Shuaishuai Li, Lindong Wu, Jiabin Wang</i>	
<b>Research on Automated Container Terminal Assignment Problem Based on Multi-Agent Architecture Reinforcement Learning Algorithm</b>	584
<i>Lu Jiang</i>	
<b>Establishment and Application of Small Batch Material Production Arrangement Model Based on Genetic Algorithm</b>	590
<i>Li Zhao, Xudong Sha, Hui Lv, Ling Hao</i>	
<b>An Optimization Strategy for Deep Neural Networks Training</b>	596
<i>Tingting Wu, Chunhe Song, Peng Zeng</i>	
<b>Exploration of Membership Inference Attack on Convolutional Neural Networks and Its Defenses</b>	604
<i>Yimian Yao</i>	
<b>Optimization of Overprint Error Detection Based on the FCM Algorithm</b>	611
<i>Yuchuan Wang, Yongbin Zhang, Yusheng Qi, Yunfei Du</i>	
<b>Wifi Localization Algorithm Based on Snake Optimization Algorithm to Optimize BP Neural Network</b>	615
<i>Kexiong Cheng, Jiawei Zhang, Shuangwen Tian, Huan Liu, Jiahua Gong, Yuhao Xie</i>	
<b>SAE-Wamd: A Self-Attention Enhanced Convolution Neural Network For Fine-Grained Classification of Wet Age-Related Macular Degeneration Using OCT Images</b>	619
<i>Haihong E, Junpeng Ding, Lifei Yuan</i>	
<b>A Vitdet Based Dual-Source Fusion Object Detection Method of UAV</b>	628
<i>Zhi Fang, Tao Zhang, Xihui Fan</i>	
<b>Bilinear Interpolation Algorithm Based on Gradient-Weighted Optimization</b>	634
<i>Lintong Zhao, Kai Che, Jian Lv, Yun Zhou</i>	
<b>UAV Reaction Detection Based on Multi-Scale Feature Fusion</b>	640
<i>Jianfeng He, Ming Liu, Chuanjiang Yu</i>	
<b>Research on Road Object Detection Algorithm Based on Yolov5+Deepsort</b>	644
<i>Wei Zhong, Yueqiu Jiang, Xin Zhang</i>	
<b>An Adaptive Quasi-Hyperbolic Momentum Method Based on Adagrad+ Strategy</b>	649
<i>Hongxu Wei, Xu Zhang, Zhi Fang</i>	
<b>Author Index</b>	