2021 17th International Conference on Computational Intelligence and Security (CIS 2021)

Chengdu, China 19 – 22 November 2021



IEEE Catalog Number: CFP2122B-POD

978-1-6654-9490-8

ISBN:

Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

*** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP2122B-POD

 ISBN (Print-On-Demand):
 978-1-6654-9490-8

 ISBN (Online):
 978-1-6654-9489-2

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



2021 17th International Conference on Computational Intelligence and Security (CIS)

CIS 2021

Table of Contents

refacexix
Organizing Committeexx
rogram Committeexxi
eviewers xxii
Regular Papers
ntelligent Algorithms
A-STDP: Feedback Alignment Learning Algorithm Using Spike Timing Dependent Plasticity 1 Tingyu Ren (Northwest Normal University, China), Xianghong Lin (Northwest Normal University, China), Xiaofei Yang (Northwest Normal University, China), and Xiangwen Wang (Northwest Normal University, China)
Machine Learning Based Fitness Landscape Smoothing for Guiding Evolutionary Optimization . 6 Chao Lyu (Harbin Institute of Technology, China), Lijun Sun (University of Technology Sydney, Australia), and Yuhui Shi (Southern University of Science and Technology, China)
eature Selection Method for Automatic Sleep Staging Based on Genetic Algorithm
Multi-Objective Decomposition Based Evolutionary Algorithm Using Adaptive Searching Method
Xiaofang Guo (Xi'an Technological University, China)
Active Update of Mutation Matrix Adaptation for Variable Metric Evolution Strategy

An Improved Neural Network Algorithm for Intelligent Object Recognition	
The Short-Time Fourier Transform Based WiFi Human Activity Classification Algorithm 30 Yier Lin (University of Electronic Science and Technology of China, China) and Yin Tian (CRRC Corporation Limited, China)	
An Adaptive Exploratory Q-Learning Algorithm for Multiple Target Path Planning	
A Selective Ensemble Classifier Using Multiobjective Optimization Based Extreme Learning Machine Algorithm	
A Novel Projective Nonnegative Matrix Factorization Based on Fisher Discriminant Analysis 45 Zixin Lian (Shenzhen University, China), Wen-Sheng Chen (Shenzhen University, China), and Binbin Pan (Shenzhen University, China)	
Intelligent Computation	
An Improved ACO Algorithm to Vehicle Routing Problem with Time Windows and Uncertainty 50	
Huilin Chen (Guangdong University of Technology, China), Xiaoquan Cai (Guangdong University of Technology, China), Fangqing Gu (Guangdong University of Technology, China), and Shengbing Xu (Guangdong University of Technology, China)	
RNA Tertiary Structure Prediction Algorithm at Atomic Accuracy	
Predicting Methods of Transcription Factor Binding Sites	
(Shandong Jianzhu University, China), Xi Chen (Shandong Jianzhu University, China), Yurong Yang (Shandong Jianzhu University, China), Xinrong Lv (Shandong Jianzhu University, China), Xiaofeng Li (Shandong Jianzhu University, China), and Qiuhuan Shi (Luoyang Branch of Henan Tobacco Company, China)	

Deconvolute Gene Expression Based on Deep Learning in Scrna-Seq	
Transfer Learning and Attention Mechanism for Breast Cancer Classification	
Label Propagation Community Detection Algorithm Based on Density Peak Optimization 80 Yan Ma (Henan University, China) and Guoqiang Chen (Henan University, China)	
Machine Learning and Neural Networks	
RelNet:Relevance-Based Punctuation Prediction Network in Speech	
Dropout Token to Improve Neural Language Model	
Driving Action Recognition Based on 3D Convolution	
Efficient Audio-Visual Speaker Recognition via Deep Multi-Modal Feature Fusion	
An Unified Model by Combining Multiple Methods for Integrating Constituent into Chinese Semantic Role Labeling	
Garbage Classification Method Based on YOLOv3	
Adversarial Training with Gated Convolutional Neural Networks for Robust Speech Recognition	

The Out-of-Vocabulary Spelling Correction Model in A New Domain for End-To-End Automatic Speech Recognition
Peng Zhao (Anhui University, China), Baowei Tang (Anhui University, China; PKU Shenzhen Institute, China), Chen Liao (PKU Shenzhen Institute, China), and Xin Wang (PKU Shenzhen Institute, China)
Class-Based Deep Non-Negative Matrix Factorization Algorithm for Facial Image
Representation
Special Object Detection Based On Mask Rcnn
Building Detection in Remote Sensing Image Based on Improved YOLOV5
Gradient-Based Dynamic Dropout
Human-Machine Collaborative Classification Model for Industrial Product Defect
DenseNet with Orthogonal Kernel for Infrared and Visible Image Fusion
CAGU-Net: Category Attention Guidance U-Net for Retinal Blood Vessel Segmentation
A Recommendation Model Based on Heterogeneous Information Network Interaction
Naive Bayesian Classifier Based Semi-Supervised Learning for Matching Ontologies
Asset Price Prediction via Machine-Learning Method: A Review
Virtual Training Scheme for Practice Education in "New Business" Disciplines

Construction of The Multi-Cooperative Training Model for Skilled Talents — Taking the Guangdong-Hong Kong-Macao Greater Bay Area as an Example	78
Study on MindSpore Deep Learning Framework	33
A Classification Method Based on Multifactor Dimensionality Reduction for Biosafety Threat Defense Capability Evaluation	37
A new Classifier by Remixing Features and Adjusting Logits for Long-Tailed Visual Data 19 Xiyan Deng (Xidian University, China), Yuping Wang (Xidian University, China), and Minqi Li (Xi'an Polytechnic University, China)	}2
Intelligent Systems and Complex Systems	
An Adaptive MPC Trajectory Tracking Algorithm for Autonomous Vehicles	97
Double Auction-Based Dynamic Role Assignment Algorithm)2
An Individual Decision-Making Method with Intuitionistic Fuzzy Preference Relations)7
Research on Control Method of Self-Driving Vehicle Based on Adaptive Fuzzy PID	12
Gesture Recognition Algorithm Based on Lightweight 3DCNN Network 21 Guoping Zhang (Beijing Union University, China), Nan Ma (Beijing University Of Technology, China), Jiahong Li (Beijing Union University, China), Beiyan Jiang (Beijing Union University, China), and Zhixuan Wu (Beijing Union University, China)	17
Fast Convergent Consensus of High-Order Continuous-Time Multi-Agent Systems	22
Solving Complex LR-Trapezoidal Fuzzy Linear Systems	27
A Feature Selection-Based XGBoost Model for Fault Prediction	32

Design of Vehicle Cooperative Localization System Based on Cooperative Communication	
Switching Strategy Jiahong Li (Beijing Union University, China) and Nan Ma (Beijing University Of Technology, China)	. 237
Internal Model Control for Rank Defect Systems Based on PSO Algorithm Beiyan Jiang (Beijing Union University, China) and Nan Ma (Beijing University Of Technology, China)	242
An Immune Algorithm for Network Data Security Detection	247
An Automatic Heterogenous-Based MAX-MIN Ant System with Pheromone Reconstruction Mechanism	. 252
Unsupervised Anomalous Sound Detection for Machine Condition Using Memory-Augmente Deep	ed
Autoencoder	. 257
Asymptotically Stable Fault Tolerant Control for Nonlinear Systems Through Differential Game Theory Hongbing Xia (Beijing Normal University, China; Bengbu University, China), Jinzhou Bao (Beijing Normal University, China), and Ping Guo (Beijing Normal University, China)	. 262
Design and Implementation of Automatic Sleep Staging Based on ECG Signals	. 267
An Unstructured Array Camera System with Scalable Capability Shuo Li (LuDong University, China), Lianshan Yan (Southwest Jiaotong University, China), and Tao Yao (LuDong University, China)	272
Pattern Recognition and Knowledge Discovery	
Hyperspectral Image High-Resolution via Subspace-Based Non-Convex Arctangent-Rank Regularization Manli Niu (Shenzhen University, China), Xiaoli Sun (Shenzhen University, China), and Xiujun Zhang (Shenzhen Polytechnic, China)	. 277
Global Adaptive Optimization Parameters for Robust Pupil Location Yang Wang (Southwest Petroleum University, China), Xiaoyi Lu (Southwest Petroleum University, China), and Wenjun Zhou (Southwest Petroleum University, China)	. 285
Construction of Deterministic Compressed Sensing Matrices in Singular Linear Space	. 290

Application of Improved Landweber Algorithm for ECT Image Reconstruction	294
Salient Object Detection Based on Multi-Layer Cascade and Fine Boundary	. 299
Development and Application of Facial Makeup Transfer	. 304
A Novel Contrast Operator for Robust Object Searching	309
A Novel Assessment Method of Cracks Width Quantitative Model Based on Computer Vision Peng Sun (Northwestern Polytechnical University, China), Ziyan Wu (Northwestern Polytechnical University, China), Yifan Zhang (Northwestern Polytechnical University, China), and Jun Wu (Northwestern Polytechnical University, China)	314
Data Mining and Clustering	
Moving Trajectory Based Traffic Police Gesture Recognition via Time Series Classification	210
Guanying Huang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), Jun Yang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), and Siyuan Jing (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China)	, 318
Guanying Huang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), Jun Yang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), and Siyuan Jing (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department,	
Guanying Huang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), Jun Yang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), and Siyuan Jing (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China) Improved Similarity Based Fuzzy C-Means Clustering Algorithm Nan Gong (Northwest Normal University, China), Zhihe Wang (Northwest Normal University, China), Hui Du (Northwest Normal University,	. 323
Guanying Huang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), Jun Yang (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China), and Siyuan Jing (Leshan Normal University; Key Laboratory of Internet Natural Language Intelligent Processing of Sichuan Provincial Education Department, China) Improved Similarity Based Fuzzy C-Means Clustering Algorithm Nan Gong (Northwest Normal University, China), Zhihe Wang (Northwest Normal University, China), Hui Du (Northwest Normal University, China), and Xiaofen Wei (Northwest Normal University, China) Neural Question Generation Using Question Type Guidance Rui Sun (Leshan Normal University, China), Xingfa Zhou (Sichuan Changhong Electric Appliance Co., Ltd, China), and Fan Fang (Sichuan	. 323

Decoupling of Direction and Length for Cumulative Step Size Adaptation
A Toll-Setting Optimization Approach for Transportation Networks
A Multi-Objective Bilevel Optimization Evolutionary Algorithm with Local Search
Multi-Objective Preference Optimization Method of Permanent Magnet Assisted Reluctance Motor
Optimizing Uncertain Express Delivery Path Planning Problems with Time Window by Ant Colony Optimization
Multi-Objective Optimization of Cloud Resource Scheduling
Cryptography and Cryptanalysis
General 4-GLV Lattice Reduction Algorithms
Strengthening Profiled Side Channel Attacks on AES via Multi-view Information Aggregation 435 Shukun An (Key Laboratory of Electromagnetic Space Information, CAS, University of Science and Technology of China, China), Jianzhao Liu (Key Laboratory of Electromagnetic Space Information, CAS, University of Science and Technology of China, China), Xiaolin Duan (Key Laboratory of Electromagnetic Space Information, CAS, University of Science and Technology of China, China), Mengce Zheng (Key Laboratory of Electromagnetic Space Information, CAS, University of Science and Technology of China, China), and Honggang Hu (Key Laboratory of Electromagnetic Space Information, CAS, University of Science and Technology of China, China)
Masking Scheme on AES Against Power Attack Based on Composite Field

Secure Two-Party Dilithium Signing Protocol
A Short Note on the Girth of Tanner (5,13)-Regular QC-LDPC Codes
A File Encryption System Based on Attribute Based Encryption
Probabilistic Grayscale Visual Cryptography Scheme Using Multi-Pixel Encoding
Information Security and Integrity
An Graph Neural Network and Feature Interaction Based Fraud Detection
Black-box Adversarial Attack by Evolution Strategy with Binary Search
A Fast Method of Anomaly Detection Based on Adaptive Slide Window (ASW) and Wave Vector Classification (WVC)
A Preliminary Method of Abnormal Pattern Recognition (APR) Based on Adaptive Slide Window (ASW) and Template Matching(TM)
Network Security
An Improved LRP-Based Differential Privacy Preserving Deep Learning Framework
Analysis of Attack Effectiveness Evaluation of AD Hoc Networks Based on Rough Set Theory .48 Jiahao Dai (China Electronic Corporation NO.36 Institute, China) and Yongqun Chen (China Electronic Corporation NO.36 Institute, China)

Improved Detection of four Attacks Based on Particle Method	493	
An Intrusion Detection Model Combining Signature-Based Recognition and Two-Round Immune-Based Recognition Caiming Liu (School of Artificial Intelligence; Intelligent Network Security Detection and Evaluation Laboratory; Leshan Normal University, China) and Yan Zhang (School of Artificial Intelligence; Leshan Normal University, China)	497	
Sparsity-Enhanced Convolutional Neural Network for IoT Cyberattacks Detection	. 502	
System Analysis and Modeling		
Team Cooperation Strategies Based on Network Model	508	
Design and Implementation of Multi-Function Table Wiping Control System Based on NBIoT Li-juan Cao (Dongguan University of Technology, China), Jian-hui Li (Dongguan University of Technology, China), Yang-jing Zhou (Dongguan University of Technology, China), Yuan-hong Lian (Dongguan University of Technology, China), Dunhua Zhao (Dongguan University of Technology, China), and Jun-jie Chen (Dongguan University of Technology, China)	. 513	
Remote Monitoring System for Atmospheric Environment	. 519	
Design of Intelligent Analysis and Detection System for Electrical Appliance Based on STM32	. 524	
Yuejin Huang (Guilin University Of Electronic Technology, China), Miao Ye (Guilin University Of Electronic Technology, China), Yue Cai (Guilin University Of Electronic Technology, China), and Linqiang Huang (Guilin University Of Electronic Technology, China)	, 524	
Research on Webshell Detection Based on Semantic Analysis and Text-CNN Kefei Cheng (Chongqing University of Posts and Telecommunications, China), Huidi Wang (Chongqing University of Posts and Telecommunications, China), Guangjun Hu (First Research Institute of The Ministry of Public Security of PRC, China), Liang Zhang (Chongqing University of Posts and Telecommunications, China), Jinghao Chen (Chongqing Public Security Bureau, China), and Wei Luo (Chongqing Public Security Bureau, China)	529	
Stability and Robust Control for Uncertain Stochastic Time-Delay Systems with Two Kinds of Delays	535	
China), and Dehua He (Nanning Normal University, China)		

Analysis of the Factors Influencing the Imbalance of Regional Economic Development in the Pearl River Delta	520
Feari River Della Kong-Yan Chen (Dongguan City College, China), Li-Jun Yang (Dongguan City College, China), and Chao Zhang (Dongguan City College, China)	<i>339</i>
Research on the Identification of Science and Technology Innovation Policies and Its	
Influence in Dongguan Xing Wang (Modern Industrial Innovation Practice Center, Dongguan Polytechnic, China) and Jie Lin (Modern Industrial Innovation Practice Center, Dongguan Polytechnic, China)	544
Incentive Contract Design for Insurance Agents Based on a Multi-Task Principal-Agent Model. Yun Xiao (Dongguan City College, China) and Pei-dong Lai (Dongguan City College, China)	548
Construction and Evaluation of Science and Technology Innovative Cities Empirical	
Analysis Based on Donggguan	552
An Empirical Study on the Impact of Herd Effect of China's Open-Ended Stock Fund on Stock	
Market Volatility Shifen Zhou (Department of Economics and Management, Dongguan Polytechnic, China)	556
The Big Data-Based Innovation of Business Management Model	560
The Analysis of Staff's Belongingness and Life Satisfaction – A Study Based on the	
Research of Dongguan City	565
Analysis of the Causes of Employment Satisfaction of Fresh Graduates from Colleges and Universities — Mediating Variables Based on School Employment Services	570
Research on the Flow of Innovative Talents in the New Energy Automobile Industry from the	
	575
Short Papers	
Intelligent Algorithms	
An Adaptive Parameter for Max-Min Elite Ant System to Solve CVRP Problem	580
Machine Leaning and Neural Networks	
Using ICA as a Pre-Processor for CNNs to Efficiently Process High-Dynamic Videos Mengyuan Guo (Anhui University, China), Chao Zhang (Anhui University, China), and Xiaopei Wu (Anhui University, China)	585

Yi Zhu (Anhui University, China; IMSL Shenzhen Key Lab, PKU-HKUST Shenzhen Hong Kong Institute, China), Zhengzheng Tu (Anhui University, China), Shilei Huang (IMSL Shenzhen Key Lab, PKU-HKUST Shenzhen Hong Kong Institute, China), Wanli Lv (Anhui University, China), and Lin Yao (IMSL Shenzhen Key Lab, PKU-HKUST Shenzhen Hong Kong Institute, China)
Single-Channel Speech Enhancement Based on Multi-Scale Gradients Generative Adversarial Networks
Learning Context-Aware Representation for Event Detection
Multi-view Clustering Analysis via Density Peak Clustering with Novel Co-Training Strategy. 604 Zhenghao Qiu (Shenzhen University, China) and Hong Jia (Shenzhen University, China)
Small Object Detection of Non-Standard THT Solder Joints Based on Improved YOLOv3 608 Jinlai Huang (Hangzhou Dianzi University, China), Mingkai Yang (Hangzhou Dianzi University, China), Haoshi Zhi (Hangzhou Dianzi University, China), Leilei Xiang (Hangzhou Dianzi University, China), Hua Zhang (Hangzhou Dianzi University, China), and Yifan Wu (Hangzhou Dianzi University, China)
Pattern Recognition and Knowledge Discovery
A Framework for Visual Relation Detection Exploiting Global Context
Information Security and Integrity
OS-Independent Malware Detection: Applying Machine Learning and Computer Vision in Memory Forensics
System Analysis and Modeling
Research on the Trade Effect of Tax Coordination on China ASEAN Free Trade Area

Research on Product Pricing Strategy of Two-Level Supply Chain Under Carbon Trading	
Mechanism	625
Shi Lu (China Jiliang University, China) and Yuxiang Yang (China	
Jiliang University, China)	
, 0	
Author Index	629