# 2019 International Conference on Information Technology and Computer Application (ITCA 2019)

Guangzhou, China 20 – 22 December 2019



IEEE Catalog Number: CFP19W91-POD ISBN: 978-1-7281-6495-3

#### Copyright © 2019 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:
 CFP19W91-POD

 ISBN (Print-On-Demand):
 978-1-7281-6495-3

 ISBN (Online):
 978-1-7281-6494-6

#### **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



### 2019 International Conference on Information Technology and Computer Application (ITCA)

## **ITCA 2019**

#### **Table of Contents**

| Preface xiii<br>Committees xiv<br>Reviewers xv   |  |
|--|--|
| Chapter 1: Communication Network and Signal Processing Technology  |  |
| Time Synchronization Scheme Based on Broadcast Gossip Algorithm for Wireless Sensor Networks .1<br>Lei Liu (Nanjing University) and Weiqi Feng (Northern Arizona<br>University)  |  |
| Finger Vein Recognition Algorithm Based on Improved Weighted Sparse Representation .6  |  |
| Numerical Simulation and Analysis of Bimorph Pressure Hydrophone Based on ANSYS 9  |  |
| Robust Self-Localization System Based on Multi-Sensor Information Fusion in City Environments .14  Zanwu Xia (Central South University) and Si Tang (Central South  University)  |  |
| Based on the Internet of Things Environment Data Aggregation Security Requirements and key Fechnology Research .19   |  |
| An Overview of Antenna Reconfiguration Technologies Overview of Reconfigurable Antenna .25  Shuting Zhang (Nanjing University of Aeronautics and Astronautics),  Qingsheng Zeng (Nanjing University of Aeronautics and Astronautics),  Yuqiu Shang (Nanjing University of Aeronautics and Astronautics), and  Yong Wu (Nanjing University of Aeronautics and Astronautics) |  |
| Application and Research of GIS Intelligent Environmental Protection Internet of Things System  Construction Technology 29   |  |

| Research on Machine Learning Natural Feature Matching Method Based on Statistical Classification 35   |
|---|
| Ruiyang Sun (University of Waterloo)  |
| Design and Usability of the Touch-Based Interface of CNC Presses 39.  Hao Yuan (Jiangsu University), Shi-lei Hu (Jiangsu University), Chao-chao Lao (Jiangsu University), Qing-lin Zhang (Jiangsu Zhongxing Xitian CNC Technology Co. Ltd.), and Bo-ke Liang (Jiangsu Zhongxing Xitian CNC Technology Co. Ltd.)   |
| Graph-Spectrum Analysis on Shape Relations of Spatial Targets .43.  Kongpeng Wei (Panjin Vocational and Technical College), Hongbin Gu (Panjin Vocational and Technical College), Xiaoyong Chen (East China Institute of Technology), and Jun Gong (Jiangxi Institute of Geo-Environment Monitoring)  |
| Characterize the Noise in PMT Based Optical Imaging System .47.  Peter Tianeng Chen (Chino Hills High School)   |
| Estimation and Correction of I/Q Imbalance in Wideband Zero-IF Receiver .50.  Shujie Guan (Anhui University), Delin Cai (Anhui University), and Bin Wu (The 38th Research Institute of China Electronics Technology Group)  |
| Design of Ecological Environment Monitoring Platform for Substituting Small Hydropower for Fuel Area.55   |
| Research on Key Technology of Urban Monitoring Video Dynamic Target Space Calibration Based of 3D Geographic Information System .59   |
| High Dynamic Range Infrared Image Compression and Denoising .65  Yixiong Zeng (University of Electronic Science and Technology of China), Zhiyao Zhang (University of Electronic Science and Technology of China), Xiaojun Zhou (University of Electronic Science and Technology of China), and Yong Liu (University of Electronic Science and Technology of China) |
| Chaos Modulation for Optics Secure Communication Based on Parallel Synchronization .70  |
| Analysis of the Striking Angle of the Towed Linear Array in Torpedo Attack .75  |
| Optimization Method of OFDM Shared Signal Frequency Resource Based on Complexity of Electromagnetic Environment 79  |
| Gradient-Based Interpretation on Convolutional Neural Network for Classification of Pathological  |
| Images .83  Junyi Ji (No.2 High School of East China Normal University)   |

| Sparse Visual Localization in GPS-Denied Indoor Environments .87.  Chengyi Zhang (Tsinghua International School)  |
|---|
| On the Maximum Unambiguous Range of LFMCW Radar .92.  Liu Jing (JinLing Institute of Technology), Zhou Xingang (National  Defense University Military Management School), and Zhu Yanping  (University of Information Science and Technology) |
| Chapter 2: Algorithmic Language and Artificial Intelligence   |
| Deforestation Prediction Using Time Series and LSTM .95.  Shichao Gao (Ludong University)   |
| Mind the Gap: Understanding Gender Inequality in Movie Industry using Social Network Analysis and Machine Learning 100  |
| Quality of Services Multicast Routing Presented by Using Intelligent Algorithm .107   |
| Computer-Aided Pathological Annotation Framework: A Deep Learning-Based Diagnostic Algorithm of Lung Cancer .110  |
| A Secure Dynamic Authorization Model Based on Improved CapBAC .114  |
| The Application of Deep Learning on Fast Skin Cancer Diagnosis .118   |
| Design of Traffic Coordination Control Structure Based on Multi-Agent .124  |
| Research on Application of Neural Network Based on Cloud Computing in Power Load Forecasting.129  |
| A Study on the Dilemma and Countermeasures of Rural Teachers' Information-Based Teaching Ability in Guangxi 134   |

| The Application of Artificial Intelligence in the Internet of Things .141   |
|---|
| Research and Practice of Customer Satisfaction Evaluation of Railway Equipment Manufacturing Enterprises .145   |
| Visual Analysis of Minsu Research in China Using CiteSpaceV .150.  Hongxia Huang (Sichuan University) and Li Cheng (Sichuan University)   |
| Research on Health Management Requirements of Information Communication System Based on SWOT.156  |
| Analysis of Ciliary Beat Frequency in the Mouse Oviduct using Optical Coherence Tomography .162 Shan Liu (Shanghai Jiao Tong University), Huijun Wang (Shanghai Jiao Tong University), Chuanqing Zhou (Shanghai Jiao Tong University), Zhen Huang (Shanghai Jiao Tong University Affiliated the International Peace Maternity & Child Hospital), and Jian Zhang (Shanghai Jiao Tong University Affiliated the International Peace Maternity & Child Hospital) |
| Design and Research of Intelligent Irrigation Things Cloud System .167  |
| Research on the Performance Test Method of Information System Based on the Domestic Software and Hardware Platform .171   |
| A Scheme of Combining Differential Chaos Shift Keying with Multiple-Input Multiple-Output System .175   |
| The Research of Dynamic Encryption & Decryption Methods Based on the Binary Random Hash .180 Guanghui Feng (Zhuhai College of Jilin University), Yujuan Si (Zhuhai College of Jilin University), Liuqi Lang (Zhuhai College of Jilin University), and Kunzhen Wang (Zhuhai College of Jilin University)   |
| Ultraviolet Light Emitting Diode Intelligent Control System .184  |
| Hierarchical Bayesian and E-Bayesian Statistical Inference of Reliability of Geometric Distribution 188 Min Hu (Jiangxi Science and Technology Normal University), Yongjing Liu (Jiangxi University of Science and Technology), and Haiping Ren (Jiangxi University of Science and Technology)  |
| Study on the Application of Intelligent Optimization Algorithm in the Optimization of Passive Positioning Network Layout .192   |

| lesource Allocation Algorithm Based on Multi-Dimensional Resource Description in Complex Optical  Network 197.  |
|---|
| Tian Xiangxuan (Army Armored Forces Academy), Zhao Meng (Army Armored<br>Forces Academy), Wang Xuan (Army Armored Forces Academy), and Shi<br>Zhiqiang (Army Armored Forces Academy)  |
| Operation Command Decision Modeling and Simulation Research Based on Agent Technique .203.  Jinguang Liu (China People's Police University)   |
| Novel Triangular Fuzzy Numbers-Based Efficacy Coefficient Evaluation Method of English Language<br>Feaching 207   |
| etal Heart Baseline Extraction And Classification Based on Deep Learning .211   |
| Optimal Weapon Target Assignment Based on Improved QPSO Algorithm .217  |
| Performance Analysis of Sea Unmanned Ship Routing Protocol Based on Ad Hoc Network .221  Zhang Xu (Jinling Institute of Technology), Sun Liwei (Harbin Jiancheng Group Co Ltd), Zheng Wu (Jinling Institute of Technology),  Xu Xiaoyang (Jinling Institute of Technology), Zhu Jinyu (Jinling Institute of Technology), and Ding Wenjing (Jinling Institute of Technology) |
| Pesign of Filter tow Tension Balance Controller Based on C8051F120 .225.  Yinlong Feng (Henan China Tobacco Industry Co., Ltd), Ping Lu (Henan China Tobacco Industry Co., Ltd), Xiao You Zhang (Henan University of Science and Technology School), and Songbin Zhao (Henan China Tobacco Industry Co., Ltd)   |
| Two-Level Stacking Model for Detecting Abnormal users in Wechat Activities .229   |
| oftware-Oriented Test Capability Evaluation Model Design And Implementation .233  |
| ropose A Novel Scheme of Cooperative Networks Based on the Locations of Relays in the  Network 238  |
| Range Expansion Based Utility Optimization Algorithm for Ultra Dense HetWNets .242  Linyuan Wang (Nanjing Xiaozhuang University), Huilin Jiang (Nanjing Xiaozhuang University), Cuiyun Yang (Nanjing Xiaozhuang University), Xueming Liu (Nanjing Xiaozhuang University), and Senlin Yan (Nanjing Xiaozhuang University)  Xiaozhuang University)                            |

| A Two-Dimensional Material Recognition Image Algorithm Based on Deep Learning .247  |
|---|
| Algorithm of Pre-Judgment NAF Scalar Multiplication on ECC 253  Qingqing Huang (Guangdong Neusoft Institute)  |
| Design and Research of Microservice Application Automation Testing Framework .257   |
| Chapter 3: Information System Management and Information Application  |
| Research on Information Visualization Digital Platform of Coal Mining Area Based on WebGIS Platform 261   |
| Taxi Scheduling Optimization with Incomplete Information .266.  Zeyu Wang (Williston Northampton School)  |
| Architecture of Spacecraft Control Software Based on Component Perception .27.1   |
| Research on the Communication Path of New Media and Traditional Culture Based on Information Technology 275  Di Wang (University of Jinan), Bin Zhang (University of Jinan), Ke Li (University of Jinan), and Xiaofang Ruan (University of Jinan)   |
| Design of Simulation System Based Double 2-Vote-2 Computer-Based Interlocking System .27.9  Lin Yang (China Academy of Railway Sciences Corporation Limited),  Yaping Yao (China Academy of Railway Sciences Corporation Limited),  Junjun Cheng (China Academy of Railway Sciences Corporation Limited),  and Yi Sun (China Academy of Railway Sciences Corporation Limited) |
| Exploring the Cultivation Mechanism of Four Innovations and Innovative Entrepreneurs .285<br>Xi Sun (Beijing University of Agriculture)   |
| Research of the Integration of Humanistic Quality in Education Under the Background of Intelligent Big Data .289.  Cao Xueli (Army Armored Force Academy), Gao Hongna (Shaanxi Normal University), and Kou Guanyu (Army Armored Force Academy)  |
| Research on Network and Information Security in Colleges and Universities .292  |
| Construction of Examination Business Management System Based on Identity Matching .296  Hanhui Lin (Guangdong University of Finance and Economics), Shaoqun  Xie (Guangdong University of Finance and Economics), and Yongxia Luo  (South China Normal University)  |

| Study on the Construction Specifications of Campus Card in Universities Under the New Sitt<br>300   | uation     |
|---|------------|
| Zhang Huilin (Tsinghua University) and Tong Qiuli (Tsinghua<br>University)  |            |
| Development and Research of Privacy Preserving of Data Fusion in WSN .304   |            |
| Feasibility Analysis of Network Security Teaching Platform Based on KVM and GNS3 .310 Shuai Liu (National University of Defense Technology), Jian Liu (National University of Defense Technology), Huimei Wang (National University of Defense Technology), and Ming Xian (National University of Defense Technology) |            |
| The Visual Analysis of Certificate System of Vocational Education Based on CiteSpace .314  Wei Zhang (Foshan Polytechnic), Liling Li (Foshan Polytechnic), Fang  Zhang (Foshan Polytechnic), and Jialiang Liu (Foshan Polytechnic)  |            |
| Application of BlockChain in the Field of Traditional Chinese Medicine .319   |            |
| Multi-Authority Attribute-Based Encryption for Resource-Constrained Users in Edge Compu<br>Kaiqing Huang (South China Normal University)  | ıting .323 |
| mage Encryption Algorithm Based on Piece Wise Linear Chaotic Map Integration With Line<br>Diophantine Equation .327   | ar<br>     |
| Research on the Antecedents of Users' Innovative Use of IT Based on the Work Competence Theory .334   |            |
| Data Management and Application of Surface Seismic Exploration .338   |            |
| Research on the Blended Teaching Model of "Analog Electronic Technology" Course in Institu-<br>Higher Learning Based on WeChat Platform 341   |            |
| Food Transaction Scheme Based on Blockchain Technology .347   |            |
| BIM in the Commercial Real Estate Project Operation and Maintenance Management of Appl<br>Research .352   |            |