

# **2020 7th International Conference on Dependable Systems and Their Applications (DSA 2020)**

**Xi'an, China  
28 – 29 November 2020**



**IEEE Catalog Number: CFP20M61-POD  
ISBN: 978-1-6654-1953-6**

**Copyright © 2020 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:	CFP20M61-POD
ISBN (Print-On-Demand):	978-1-6654-1953-6
ISBN (Online):	978-0-7381-2422-3

**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)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# 2020 7th International Conference on Dependable Systems and Their Applications (DSA) **DSA 2020**

## Table of Contents

<b>Message from the Steering Committee Chair, General Chairs, and Program Chairs</b> .....	<b>xv</b>
<b>Organizing Committee</b> .....	<b>xvi</b>
<b>Steering Committee</b> .....	<b>xvii</b>
<b>Keynotes</b> .....	<b>xviii</b>
Architecture of Security Protection Technology for Aviation Cyberspace .....	21
<i>Wang Zhong-hua (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China), Ma Jian-feng (Xidian University, China), Niu Wen-sheng (AVICAS Generic Technology CO., LTD, China), and Li Ya-hui (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China)</i>	
A Coverage-Based Effective Data Augmentation Framework .....	25
<i>Shuting Kang (Institute of Software Chinese Academy of Sciences, Beijing, China; University of Chinese Academy of Sciences, Beijing, China), Tong Wang (Beijing Institute of System Engineering, Beijing, China), PengQi Wang (Institute of Software Chinese Academy of Sciences, Beijing, China), Feng Wang (Beijing Institute of System Engineering, Beijing, China), Qian Dong (Institute of Software Chinese Academy of Sciences, Beijing, China), Guang Yang (Institute of Software Chinese Academy of Sciences, Beijing, China), LingZhong Meng (Institute of Software Chinese Academy of Sciences, Beijing, China), and YunZhi Xue (Institute of Software Chinese Academy of Sciences, Beijing, China)</i>	
A Formal Verification Method for Smart Contract .....	31
<i>Xiaobing Wang (Xidian University, China), Xiaoyu Yang (Xidian University, China), and Chunyi Li (Xidian University, China)</i>	
A Malware Identification Approach Based on Improved SVM in Network Traffic .....	37
<i>Songling Qin (Jiangsu University, China), Jinfu Chen (Jiangsu University, China), Zufu Zhang (Jiangsu University, China), Yisong Liu (Jiangsu University, China), Lingling Zhao (Jiangsu University, China), Bo Liu (Jiangsu University, China), and Jingyi Chen (Jiangsu University, China)</i>	

A Middle Layer Abstraction-Based Open Platform for V2X Safety and Application Study .....	41
<i>Jin Yang (Futurewei Technologies), Baoling Sheen (Futurewei Technologies), and Jua Roa (Futurewei Technologies)</i>	
A Model Based Program Comparison Test Method .....	47
<i>Shan-ling Li (Army Engineering University of PLA) and Zhan-wei Hui (Academy of Military Science)</i>	
A Rapid Test Method for Autonomous Ability of Unmanned Control Strategy in Dangerous Situations .....	49
<i>LingZhong Meng (Institute of Software Chinese Academy of Sciences, Beijing, China), Yang Bao (Beijing Institute of System Engineering, Beijing, China), ShuTing Kang (Institute of Software Chinese Academy of Sciences, Beijing, China), DongBo Zhao (Beijing Institute of System Engineering, Beijing, China), Guang Yang (Institute of Software Chinese Academy of Sciences, Beijing, China), Yuan Shi (Institute of Software Chinese Academy of Sciences, Beijing, China), PengQi Wang (Institute of Software Chinese Academy of Sciences, Beijing, China), Qian Dong (Institute of Software Chinese Academy of Sciences, Beijing, China), and YunZhi Xue (Institute of Software Chinese Academy of Sciences, Beijing, China)</i>	
A Real-Time Information Exchange Strategy for Big Data Volume Systems Based on Internet of Things .....	58
<i>Limin Zhang (Xi'an International Studies University), Giap Weng Ng (Universiti Malaysia Sabah, Malaysia), and Yu-Beng Leau (Universiti Malaysia Sabah, Malaysia)</i>	
A Smart Meter-Reading Framework with Secret Key Sharing and Support Vector Machine Algorithms .....	64
<i>Zhou Yang (Guangxi Power Grid Co., Ltd.) and Jueyu Chen (Guangxi Power Grid Co., Ltd.)</i>	
A Survey of NFC Mobile Payment: Challenges and Solutions using Blockchain and Cryptocurrencies .....	69
<i>Dongcheng Li (University of Texas at Dallas, USA), W. Eric Wong (University of Texas at Dallas, USA), Matthew Chau (University of Texas at Dallas, USA), Sean Pan (RFCyber Corporation, USA), and Liang Seng Koh (RFCyber Corporation, USA)</i>	
AdaBoost-Based Refused Bequest Code Smell Detection with Synthetic Instances .....	78
<i>Hao Chen (Dalian University of Technology, China), Zhilei Ren (Dalian University of Technology, China), Lei Qiao (Beijing Institute of Control Engineering, China), Zhide Zhou (Dalian University of Technology, China), Guojun Gao (Dalian University of Technology, China), Yue Ma (Taiyuan University of Technology, China), and He Jiang (Dalian University of Technology, China)</i>	
Aging-Related Bugs Prediction via Convolutional Neural Network .....	90
<i>Qinchen Liu (Wuhan University of Technology, China), Jianwen Xiang (Wuhan University of Technology, China), Bin Xu (Wuhan University of Technology, China), Dongdong Zhao (Wuhan University of Technology, China), Wenhua Hu (Wuhan University of Technology, China), and Jian Wang (Wuhan University of Technology, China)</i>	

An Efficient Approach Based on Parameter Optimization for Network Traffic Classification Using Machine Learning .....	99
<i>James Msughter Adeke (Jiangsu University, China), Jinfu Chen (Jiangsu University, China), Lei Zhang (China Information Technology Security Evaluation Center, China), Richard N. K. Mensah (Jiangsu University, China), and Kun Tong (Jiangsu University, China)</i>	
An Empirical Study of Counterexample-Guided Fuzzing for Neural Networks Verification .....	108
<i>Gaolei Yi (Beihang University, China), Xinyi Wang (Beihang University, China), and Yichen Wang (Beihang University, China)</i>	
An Empirical Study of Exploring Relevant Metrics to Assess Software Product Quality .....	114
<i>Zekun Song (Beihang University, China), Yichen Wang (Beihang University, China), Wentao Wang (CETC29, China), and Jing Zhang (CETC29, China)</i>	
An Empirical Study of Law Articles Prediction on Transportation Legal Cases .....	125
<i>Yifei Yang (State Grid Jiangsu Electric Power Company, China), Wei Yuan (Nanjing University, China), Yansong Li (State Grid Jiangsu Electric Power Company, China), Desheng Wang (State Grid Jiangsu Electric Power Company, China), Jia Liu (Nanjing University, China), and Tieke He (Nanjing University, China)</i>	
An Empirical Study on the Impact of the Interaction between Feature Selection and Sampling in Defect Prediction .....	131
<i>Shuyue Fan (Henan University), Chun Liu (Henan University), and Zheng Li (Henan University)</i>	
An Evolutionary Perspective: A Study of Anubis Android Banking Trojan .....	141
<i>Baodi Ning (University of Technology Sydney, Australia), Guanqin Zhang (University of Technology Sydney, Australia), and Zexin Zhong (University of Technology Sydney, Australia)</i>	
An Intelligent Combination Algorithm for Traffic Flow Prediction .....	151
<i>Cheng Li (Qiqihar University, China), Liang Kou (Hangzhou Dianzi University, China), and Xu Zhang (Hangzhou Dianzi University, China)</i>	
An Intrusion Detection Method for Industrial Control System against Stealthy Attack .....	157
<i>Qi Ao (Sichuan Innovation Center of Industrial Cyber Security CO., LTD, China)</i>	
Analysis on Adversarial Robustness of Deep Learning Model LeNet-5 Based on Data Perturbation .....	162
<i>Yudi Liu (Beihang University, China), Minyan Lu (Beihang University, China), Di Peng (China Institute of Marine Technology &amp; Economy, China), Jie Wang (Beihang University, China), and Jun Ai (Beihang University, China)</i>	
Applications of LSTM Model for Aeroengine Forecasting .....	168
<i>Peng Li (Northwestern Polytechnical University, China) and Wei Niu (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China)</i>	
Artemis: An Improved Smart Contract Verification Tool for Vulnerability Detection .....	173
<i>Anqi Wang (Beihang University, China), Hao Wang (Beihang University, China), Bo Jiang (Beihang University, China), and W. K. Chan (City University of Hong Kong, Hong Kong)</i>	

Correlation Analysis between Software Structure Measures and Error Execution Path Deviation .....	182
<i>Shiyi Kong (Beihang University, China), Minyan Lu (Beihang University, China), Chao Tang (Shanghai Radio Equipment Research Institute, China), and Shuguang Wang (Beihang University, China)</i>	
Data Link Network Technology of UAV System .....	188
<i>Zhe Li (China Academy of Launch Vehicle Technology, China) and Zhijun Deng (China Academy of Launch Vehicle Technology, China)</i>	
Deep Learning-Based Automatic Safety Detection System for Crack Detection .....	190
<i>Quan Chen (Nanjing University of Posts and Telecommunications, China), Xi-Xi Zhang (Nanjing University of Posts and Telecommunications, China), Yu Chen (Chongqing University of Education, China), Wei Jiang (Nanjing University of Posts and Telecommunications, China), Guan Gui (Nanjing University of Posts and Telecommunications, China), and Hikmet Sari (Nanjing University of Posts and Telecommunications, China)</i>	
Design and Implementation of Protocol Processing Model Based on Responsibility Chain and Reflection Mechanism .....	195
<i>Xiangfei Gao (The 27Th Research Institute of CETC) and Feng Gao (The 27Th Research Institute of CETC)</i>	
Design of a Center of Gravity Control Law with Unbalanced Fuel in Aircraft Wing Tanks .....	201
<i>Zhao Ying (National University of Defense Technology), Wang Zhongwei (National University of Defense Technology), Li Zhenghong (Shenyang Aircraft Design &amp; Research Institute), Xu Rui (Shenyang Aircraft Design &amp; Research Institute), and Ding Enliang (Shenyang Aircraft Design &amp; Research Institute)</i>	
Design of Multi-Unmanned Platform Collaborative Demonstration Environment .....	206
<i>Jiang Wu (Beihang University, China), Yipeng Liu (Beihang University, China), Xin Gao (Beihang University, China), Lin Deng (Beihang University, China), Lei Guo (Beijing Institute of Space Long March Vehicle, China), and Xinyu Zhang (Beijing Institute of Space Long March Vehicle, China)</i>	
Detecting Out-of-Bounds Array Access Errors in Aerospace Embedded Software .....	213
<i>Rui Chen (Beijing Sunwise Information Technology Ltd, Beijing, China; Beijing Institute of Control Engineering, Beijing, China), Tingting Yu (Beijing Sunwise Information Technology Ltd, Beijing, China; Beijing Institute of Control Engineering, Beijing, China), Yunsong Jiang (Beijing Sunwise Information Technology Ltd, Beijing, China; Beijing Institute of Control Engineering, Beijing, China), Chunpeng Jia (Beijing Sunwise Information Technology Ltd, Beijing, China), Chao Li (Beijing Sunwise Information Technology Ltd, Beijing, China; Beijing Institute of Control Engineering, Beijing, China), Dongdong Gao (Beijing Sunwise Information Technology Ltd, Beijing, China; Beijing Institute of Control Engineering, Beijing, China), and Mengfei Yang (China Academy of Space Technology, Beijing, China)</i>	
Developing Deep LSTM Model for Real-Time Path Planning in Unknown Environments .....	219
<i>Haonan Yao (Beihang University, China), Yang Liu (Beihang University, China), and Xiaoyi Zhang (National Institute of Informatics, Japan)</i>	

Distilling Knowledge in Adversarial Attack .....	226
<i>Zeqian Dong (Xidian University, China), Long Tang (Xidian University, China), and Cong Tian (Xidian University, China)</i>	
DSR: A Deep Learning Framework Towards Modulation Signal Retrieval .....	234
<i>Xueli Jie (Harbin Engineering University) and Yun Lin (Harbin Engineering University)</i>	
EFSM Test Data Generation Based on Fault Propagation and Multi-Population Genetic Algorithm .....	240
<i>Zhiqin Cao (Beihang University, China), Yichen Wang (Beihang University), Peng Guo (Industry Computing Institute, China), and Bo Tian (Beihang University, China)</i>	
Embedded Virtualization Computing Platform Security Architecture Based on Trusted Computing .....	246
<i>Zhang Shuang (Xi'an Aeronautics Computing Technique Research Institute, Northwestern Polytechnical University), Wan Xinyu (Xi'an Aeronautics Computing Technique Research Institute), Kong Deqi (Xi'an Aeronautics Computing Technique Research Institute), and Guo Yangming (Northwestern Polytechnical University)</i>	
Evaluation of Adversarial Attacks Based on DL in Communication Networks .....	251
<i>Zhida Bao (Harbin Engineering University, China) and Haojun Zhao (Harbin Engineering University, China)</i>	
Face Determination Based on Multi-Template and Convolution .....	253
<i>Danmei Wang (Chengde Medical University, China)</i>	
Fast Test Method of Intelligent Image Recognition System Based on Antagonistic Samples .....	258
<i>Lilei Zhang (Beihang University), Jinyong Yao (Beihang University), and Kai Wang (China Academy of Launch Vehicle Technology)</i>	
Fault Diagnosis for Open Source Software Based on Dynamic Tracking .....	263
<i>Xuliang Chen (Tongji University, China), Jianhui Jiang (Tongji University, China), Wei Zhang (Tongji University, China), and Xuzei Xia (Tongji University, China)</i>	
Fault Diagnosis Method of Equipotential Planet Map Based on Fusion Features .....	269
<i>Rui Wang (Shanghai Dianji University, China), Jingchao Li (Shanghai Dianji University, China), Bo Deng (Shanghai Dianji University, China), and Bin Zhang (Kanagawa University, Japan)</i>	
FIG-QEMU: A Fault Inject Platform Supporting Full System Simulation .....	275
<i>Jianfeng An (Northwestern Polytechnical University, China), Hongjun You (Shanghai Academy of Spaceflight Technology, China), Fengqing Xie (Northwestern Polytechnical University, China), Yuanlin Yang (Northwestern Polytechnical University, China), and Jinhua Sun (Northwestern Polytechnical University, China)</i>	
FPGA Physical Automation Verification Technology Based on VCD Waveform .....	279
<i>Xu Shou-quan (Jiangsu Automation Research Institute)</i>	
Generating Adversarial Examples in Limited Queries with Image Encoding and Noise Decoding ..	285
<i>Long Tang (Xidian University, China) and Bin Yu (Xidian University, China)</i>	

Heart Disease Prediction Algorithm Based on Ensemble Learning .....	293
<i>Ke Yuan (Henan University), Longwei Yang (Henan University), Yabing Huang (Henan University), and Zheng Li (Henan University)</i>	
Implementation of Mesh Flying Ad-hoc Network for Emergency Communication Systems .....	299
<i>Yuzhi Zhou (Nanjing University of Posts and Telecommunications, China), Xi-Xi Zhang (Nanjing University of Posts and Telecommunications, China), Jinlong Sun (Nanjing University of Posts and Telecommunications, China), Jie Yang (Nanjing University of Posts and Telecommunications, China), and Guan Gui (Nanjing University of Posts and Telecommunications, China)</i>	
Intelligent Detumbling Control for a Micro-Satellite with Bounded Inputs .....	305
<i>Yucheng Cui (Beihang University, China) and Zhiyu Xi (Beihang University, China)</i>	
Interference Signal Recognition Based on Multi-Modal Deep Learning .....	311
<i>Xiao Zhang (Harbin Engineering University, China) and Xiaoling Liu (Wuhan Maritime Communication Research Institute)</i>	
KBAA: An Adversarial Example Generation Method for KBQA Task .....	313
<i>Shudi Guo (Beihang University, China), Bin Liu (Beihang University, China), Shihai Wang (Beihang University, China), and Tengfei Shi (Beihang University, China)</i>	
Knowledge-Based Defect Prediction and Test Case Generation for Radar Software Fault Prevention .....	319
<i>Chengfeng Li (Nanjing Research Institute of Electronics Technology, China), Xi Liu (Nanjing Research Institute of Electronics Technology, China), Hui Wu (Nanjing Research Institute of Electronics Technology, China), and Haifeng Li (Beihang University, China)</i>	
Lightweight Convolutional Neural Network-Based Method for Crane Safety Inspection .....	324
<i>Wei Jiang (NJUPT, China), Quan Chen (NJUPT, China), Xixi Zhang (NJUPT, China), Tianliang Liu (NJUPT, China), and Guan Gui (NJUPT, China)</i>	
Load Balancing Evaluation of Multi-Core Processors Based on BMP Architecture .....	330
<i>Yueyao Niu (AVIC Xi'an Aeronautic Computing Technique Research Institute, China), Wei Han (AVIC Xi'an Aeronautic Computing Technique Research Institute, China), and Xiaodi Dai (AVIC Xi'an Aeronautic Computing Technique Research Institute, China)</i>	
Metamorphic Robustness Testing for Recommender Systems: A Case Study .....	331
<i>Chengying Mao (Jiangxi University of Finance and Economics, China), Xiaorong Yi (Jiangxi University of Finance and Economics, China), and Tsong Yueh Chen (Swinburne University of Technology, Australia)</i>	
Multimodal Feature Fusion Recognition of Modulated Signals Based on Image and Waveform Domain .....	337
<i>Hou Changbo (Harbin Engineering University, China), Liu Guowei (Harbin Engineering University, China), Hua Lijie (Harbin Engineering University, China), and Lin Yun (Harbin Engineering University, China)</i>	



Nonon-Convex Low-Rank Minimization for Sparse-View CT Reconstruction via Nonlocal-Group Dictionary Learning .....	343
<i>Li Liu (Nanjing University of Posts and Telecommunications, China), Peipei Yang (Nanjing University of Posts and Telecommunications, China), Tian Zhou (Nanjing University of Posts and Telecommunications, China), Yunyi Li (Nanjing University of Posts and Telecommunications, China), Wenmei Li (Nanjing University of Posts and Telecommunications, China), and Guan Gui (Nanjing University of Posts and Telecommunications, China)</i>	
On Test Sequence Generation of Time-Triggered Ethernet Using Genetic Algorithm .....	349
<i>Yongfeng Yin (Beihang University, China), Xuefeng Wang (Beihang University, China), and Qingran Su (Beihang University, China)</i>	
On Vulnerability Analysis of Nodes against Cross-Domain Cascading Failures Propagation in Active Distribution Network Cyber-Physical System .....	355
<i>Pengpeng Sun (Northwestern Polytechnical University, China) and Yunwei Dong (Northwestern Polytechnical University, China)</i>	
Parametric Software Defect Patterns Based on Test Perspective .....	364
<i>Gu Bin-Bing (91404 Army), Li Yin (Southeast University; Jiangsu Automation Research Institute), and Jiang Ting-Ting (Jiangsu Automation Research Institute)</i>	
Performance Optimisation Method of PBFT Consensus for Supply Chain Integration SVM .....	371
<i>Na Du (Southwest Forestry University, China), Zhihong Liang (Southwest Forestry University, China), Yuxiang Huang (Southwest Forestry University, China), Zhichang Guo (Southwest Forestry University, China), Hongji Yang (Leicester University, Leicester, England), and SaSa Wang (Southwest Forestry University, China)</i>	
Problem Kit System for Expression Ability Evaluation .....	378
<i>Desheng Wang (State Grid Jiangsu Electric Power Company, China), Yubo Qian (Nanjing University, China), Yu Xing (Nanjing University, China), Yansong Li (State Grid Jiangsu Electric Power Company, China), Yifei Yang (State Grid Jiangsu Electric Power Company, China), Qing Wu (Nanjing University, China), and Tieke He (Nanjing University, China)</i>	
Radar Signal Separation and Recognition Based on Semantic Segmentation .....	385
<i>Hou Changbo (Harbin Engineering University, China), Hua Lijie (Harbin Engineering University, China), Liu Guowei (Harbin Engineering University, China), and Lin Yun (Harbin Engineering University, China)</i>	
Reasearch on Similar Flight Numbers of LD Algorithm .....	391
<i>Chaohui Feng (Civil Aviation University of China, China), Zhe Cui (Civil Aviation University of China, China), GuangXiang Yang (Civil Aviation University of China, China), ZhiSen Wang (Civil Aviation University of China, China), and XianXi Yang (Civil Aviation University of China, China)</i>	
Reconstruction of Smart Learning Space Based on Digital Twin (DT) Technology .....	398
<i>Lei Song (King Mongkut's Institute of Technology), Zhongxi Lu (University of Leicester, United Kingdom), and Sirirat Petsangsri (King Mongkut's Institute of Technology, Thailand)</i>	

Reliable and Robust Weakly Supervised Attention Networks for Surface Defect Detection .....	407
<i>Zijian Zhang (Tianjin Institute of Navigation Instrument, China), Chaozhang Lv (Tianjin University, China), Meijun Sun (Tianjin University, China), and Zheng Wang (Tianjin University, China)</i>	
Reliable Multiview Learning for Spectral Clustering .....	415
<i>Jiajia Chen (Harbin University of Science and Technology, China), Ying Wang (Harbin University of Science and Technology, China), Ao Li (Harbin University of Science and Technology, China), and Kezheng Lin (Harbin University of Science and Technology, China)</i>	
Research and Implementation of an Automatic Simulation Tool .....	423
<i>Liu Tang (Beijing Sunwise Information Technology Ltd., China), You Li (Beijing Sunwise Information Technology Ltd., China), Hongwei Wang (Beijing Sunwise Information Technology Ltd., China), Huan Zhao (Beijing Sunwise Information Technology Ltd., China), Luze Ma (Beijing Sunwise Information Technology Ltd., China), and Yuming Sun (Beijing Sunwise Information Technology Ltd., China)</i>	
Research on Characteristics of Aircraft Traffic Flow in Airport Surface .....	429
<i>Zhe Cui (Civil Aviation University of China), XianXi Yang (Civil Aviation University of China), ChaoHui Feng (Civil Aviation University of China), and GuangXiang Yang (Civil Aviation University of China)</i>	
Research on Fault Diagnosis of Rolling Bearings Based on Fractal Dimension .....	441
<i>Zhe Shen (Shanghai Dianji University Shanghai, China), Jingchao Li (Shanghai Dianji University Shanghai, China), Jialan Shen (Shanghai Dianji University Shanghai, China), and Bin Zhang (Kanagawa University Yokohama, Japan)</i>	
Software Refactoring Scheme Based on NSGA-II Algorithm .....	447
<i>Defei Hou (Southeast University), Yongfeng Yin (Beihang University), Qingran Su (Beihang University), and Lijun Liu (Beihang University)</i>	
Research on the Knowledge Ontology Model of Attribute-Oriented Airworthiness Review Compliance Activities .....	453
<i>Zhu Yu-Ping (COMAC Shanghai Aviation Industrial (Group)Co. Ltd; Shanghai Aircraft Airworthiness Certification Center of CAAC, China), Shao Jun (Shanghai Aircraft Airworthiness Certification Center of CAAC, China), Cai Yong (Shanghai Aircraft Airworthiness Certification Center of CAAC, China), and Shen Yue (COMAC Shanghai Aircraft Design &amp; Research Institute, China)</i>	
Safety Argument Pattern Language of Safety-Critical Software .....	459
<i>Shuanqi Wang (Information Center of NORINCO Group, China), Zhibo Li (Information Center of NORINCO Group, China), Xin He (Information Center of NORINCO Group, China), Ke Sheng (Information Center of NORINCO Group, China), Jingxuan Zhou (Information Center of NORINCO Group, China), and Wei Wu (Information Center of NORINCO Group, China)</i>	
Security Testing of Unmanned Flight System .....	468
<i>Xiao-Ting Meng (Guangzhou GRG Metrology &amp; Test Co., Ltd) and Li-Li Yu (Guangzhou GRG Metrology &amp; Test Co., Ltd)</i>	

Simulation Verification Technology of Virtual-Real-Integration Avionics System .....	472
<i>Xining Cui (AVIC Xi'an Aeronautic Computing Technique Research Institute, China), Yukai Hao (AVIC Xi'an Aeronautic Computing Technique Research Institute, China), and Xiaodi Dai (AVIC Xi'an Aeronautic Computing Technique Research Institute, China)</i>	
Software Defect Classification Approach Based on the Modified Latent Dirichlet Allocation Topic Model Considering the Domain Characters .....	478
<i>Sun Junruo (Nanjing Research Institute of Electronics Technology, China), Su Huancheng (Nanjing Research Institute of Electronics Technology, China), Li Haifeng (Institute of Reliability Engineering of Beihang University, China), Liu Chang (Institute of Reliability Engineering of Beihang University, China), Chen Jiabin (Nanjing Research Institute of Electronics Technology, China), and Liu Xi (Nanjing Research Institute of Electronics Technology, China)</i>	
Software Quality Measurement Combining Autonomy Evaluation for Intelligent Early-Warning Information System .....	483
<i>Xinlei Zheng (Nanjing Research Institute of Electronics Technology) and Xi Liu (Nanjing Research Institute of Electronics Technology)</i>	
Sonar Cross Section Recovery Method Based on Pole Features of Underwater Target .....	489
<i>Ziqi Zhou (Harbin Engineering University, China), Yang Li (Beijing Great Wall Electronic Equipment Co., Ltd., China), Bowang Jiang (Harbin Engineering University, China), Kaiyang Liu (Harbin Engineering University, China), Yingzi Wu (Harbin Engineering University, China), and Yanni Wu (Xi'an University, China)</i>	
Summary of Tools in FPGA Static Timing Analysis .....	491
<i>Xubing Wang (Beijing Sunwise Information Technology Ltd.) and Jing You (Beijing Sunwise Information Technology Ltd.)</i>	
System Vulnerability Oriented to Strategies .....	493
<i>Yu Xin (Beihang University, China) and Xiaohong Bao (Beihang University, China)</i>	
Task-Driven Image Preprocessing Algorithm Evaluation Strategy .....	500
<i>Pengqi Wang (Institute of Software Chinese Academy of Sciences, China), Lin Geng (Beijing Institute of System Engineering, China), Dongbo Zhao (Beijing Institute of System Engineering, China), Shuting Kang (Institute of Software Chinese Academy of Sciences, China), Qian Dong (Institute of Software Chinese Academy of Sciences, China), Guang Yang (Institute of Software Chinese Academy of Sciences, China), Yuan Shi (Institute of Software Chinese Academy of Sciences, China), Lingzhong Meng (Institute of Software Chinese Academy of Sciences, China), and Yunzhi Xue (Institute of Software Chinese Academy of Sciences, China)</i>	
Test Suite Generation for Software Reliability Testing Based on Hybrid Musa and Markov Method .....	509
<i>Li Yin (Southeast University; Jiangsu Automation Research Institute)</i>	
Testing DNN-Based Path Planning Algorithms by Metamorphic Testing .....	515
<i>Shuxiao Lv (Beihang University, China) and Beibei Yin (Beihang University, China)</i>	

The Airborne Information Processing System Development Research .....	527
<i>Xie Jianchun (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China), Li Yahui (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China), Wang Zhonghua (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China), and Bai Linting (Xi'an Aeronautics Computing Technique Research Institute, AVIC, China)</i>	
The Design and Implementation of Test System for Expression Ability Evaluation .....	532
<i>Yansong Li (State Grid Jiangsu Electric Power Company, China), Yu Xing (Nanjing University, China), Yubo Qian (Nanjing University, China), Desheng Wang (State Grid Jiangsu Electric Power Company, China), Yifei Yang (State Grid Jiangsu Electric Power Company, China), Qing Wu (Nanjing University, China), and Tieke He (Nanjing University, China)</i>	
The Evaluation Method of Speech Interference Effect Based on Deep Learning .....	538
<i>Hengfeng Fu (Harbin Engineering University, China) and Sen Wang (Harbin Engineering University, China)</i>	
The Quantitative Relationship between Adversarial Training and Robustness of CNN Model .....	543
<i>Jie Wang (Beihang University, China), Minyan Lu (Beihang University, China), Jun Ai (Beihang University, China), and Xueyuan Sun (Beihang University, China)</i>	
The Test Process Date Based Quality Defect Detection Strategy for Spacecraft Components .....	550
<i>Taichun Qin (Beijing Institute of Spacecraft Environment Engineering, China), Shouwen Liu (Beijing Institute of Spacecraft Environment Engineering, China), Shouqing Huang (Beijing Institute of Spacecraft Environment Engineering, China), and Yuege Zhou (Beijing Institute of Spacecraft Environment Engineering, China)</i>	
VSFBS: Vulnerability Search in Firmware Based on String .....	555
<i>Zhibin Zhang (Wuhan University of Technology, China), Dian Zhou (Wuhan University of Technology, China), Jiqing Rao (Wuhan University of Technology, China), Dongdong Zhao (Wuhan University of Technology, China), Wenhua Hu (Wuhan University of Technology, China), Jianwen Xiang (Wuhan University of Technology, China), Zhongjin Liu (Response Technical Team/Coordination Center of China), and Yanzhen Xing (Response Technical Team/Coordination Center of China)</i>	
<b>Author Index</b> .....	<b>565</b>