

**2020 7th IEEE International  
Conference on Cyber Security  
and Cloud Computing  
(CSCloud 2020)/2020 6th IEEE  
International Conference on  
Edge Computing and Scalable  
Cloud (EdgeCom 2020)**

**New York, New York, USA  
1 – 3 August 2020**



**IEEE Catalog Number: CFP20C21-POD  
ISBN: 978-1-7281-6551-6**

**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:	CFP20C21-POD
ISBN (Print-On-Demand):	978-1-7281-6551-6
ISBN (Online):	978-1-7281-6550-9

**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 IEEE International Conference on Cyber Security and Cloud Computing (CSCloud)/2020 6th IEEE International Conference on Edge Computing and Scalable Cloud (EdgeCom) **CSCloud-EdgeCom 2020**

## Table of Contents

Message from the General Chair .....	xi
Message from the Program Chairs (CSCloud) .....	xii
Message from the Committee Members (CSCloud) .....	xiii
Message from the Program Chairs (EdgeCom) .....	xv
Message from the Committee Members (EdgeCom) .....	xvi

### CSCloud 1: Cloud Computing 1

Deep Learning, Cloud Computing for Credit/Debit Industry Analysis of Consumer Behavior .....	1
<i>Yohn Jairo Parra Bautista (Florida A&amp;M University), Richard Aló (Florida A&amp;M University), and NingNing Wang (Jackson State University)</i>	
Cyber Security and Artificial Intelligence for Cloud-Based Internet of Transportation Systems .....	8
<i>Bhavani Thuraisingham (The University of Texas at Dallas)</i>	
Research on Text Classification Method of Distribution Network Equipment Fault Based on Deep Learning .....	11
<i>Wei Liu (China Electric Power Research Institute), Jian Su (China Electric Power Research Institute), Zhenyu Mao (Peking University), Peipei Jin (Peking University), Yu Huang (Peking University), Chengfeng Dou (Peking University), Limei Zhou (China Electric Power Research Institute), and Yuwei Shang (China Electric Power Research Institute)</i>	
Autonomous Driving and Control: Case Studies with Self-Driving Platforms .....	17
<i>Pei-heng Hong (Texas A&amp;M University-Commerce), Meikang Qiu (Texas A&amp;M University-Commerce), and Yuehua Wang (Texas A&amp;M University-Commerce)</i>	

## CSCloud 2: IoT and Edge Computing

Attribute-Based Weighted Keyword Search Scheme Supporting Multi-Search Mechanism in Fog Computing .23.....	
<i>Shulan Wang (Shenzhen University), Yuan Li (Shenzhen University), Haiyan Wang (Shenzhen University), Xi Zhang (Shenzhen University), and Jianyong Chen (Shenzhen University)</i>	
Derepo: A Distributed Privacy-Preserving Data Repository with Decentralized Access Control for Smart Health .29.....	
<i>Yepeng Ding (The University of Tokyo) and Hiroyuki Sato (The University of Tokyo)</i>	
Minimizing Data Breach by a Malicious Fog Node within a Fog Federation .36.....	
<i>Mohammed Alshehri (University of Arkansas) and Brajendra Panda (University of Arkansas)</i>	
Digital Forensic Analysis of Fitbit Wearable Technology: An Investigator's Guide .44.....	
<i>Atheer Almogbil (Johns Hopkins University), Abdullah Alghofaili (Johns Hopkins University), Chelsea Deane (Johns Hopkins University), Timothy Leschke (Johns Hopkins University), Atheer Almogbil (King AbdulAziz City for Science &amp; Technology), and Abdullah Alghofaili (King Saud University)</i>	

## CSCloud 3: Cyber Security 1

Kernel-Level Rootkits Features to Train Learning Models Against Namespace Attacks on Containers .50.....	
<i>Wonjun Lee (Yeshiva University) and Mohammad Nadim (University of Texas at San Antonio)</i>	
Empirical Evaluation of the Ensemble Framework for Feature Selection in DDoS Attack .56.....	
<i>Saikat Das (The University of Memphis), Deepak Venugopal (The University of Memphis), Sajjan Shiva (The University of Memphis), and Frederick T. Sheldon (University of Idaho)</i>	
LSTM-Based Network Attack Detection: Performance Comparison by Hyper-Parameter Values Tuning .62.....	
<i>Delwar Hossain (Nara Institute of Science and Technology), Hideya Ochiai (The University of Tokyo), Doudou Fall (Nara Institute of Science and Technology), and Youki Kadobayashi (Nara Institute of Science and Technology)</i>	
DeepfakeStack: A Deep Ensemble-Based Learning Technique for Deepfake Detection .70.....	
<i>Shohel Rana (The University of Southern Mississippi) and Andrew H. Sung (The University of Southern Mississippi)</i>	

## CSCloud 4: Cyber Security 2

Trustworthy When Human and Bots Are Mingled .76.....	
<i>Zhixiong Chen (Mercy College), Zhihui Lu (Fudan University), Abhishek Sane (Mercy College), and Anthony Bhimsain (Mercy College)</i>	

Detection and Blocking of DGA-Based Bot Infected Computers by Monitoring NXDOMAIN Responses .82.....	82
<i>Yuki Iuchi (Hokkaido Univ.), Yong Jin (Tokyo Inst. Tech.), Hikaru Ichise (Tokyo Inst. Tech.), Katsuyoshi Iida (Hokkaido Univ.), and Yoshiaki Takai (Hokkaido Univ.)</i>	
G-Model: A Novel Approach to Privacy-Preserving 1:M Microdata Publication .88.....	88
<i>Khalid Albulayhi (University of Idaho), Predrag T. Tošić (Whitworth University, Washington State University), and Frederick T. Sheldon (University of Idaho)</i>	
Blockchain-Based Architecture for Secured Cyber-Attack Features Exchange .100.....	100
<i>Oluwaseyi Ajayi (City University of New York) and Tarek Saadawi (City University of New York)</i>	
Research on Aviation Man-Made Error Detection and its Impact on Flight Safety .108.....	108
<i>Desheng Xu (China COMAC Shanghai Aircraft Design and Research Institute) and Junyi Zhai (China COMAC Shanghai Aircraft Design and Research Institute)</i>	

## **CSCloud 5: Artificial Intelligence Security**

An Analytical Framework to Control the Synchronization on Networks .113.....	113
<i>Wenting Wang (Shenzhen Technology University), Xingxing Zhou (Guangdong Academy of Agricultural Sciences, Guangzhou Jinying Agri-tech Incubate Co Ltd), and Minmin Zhang (Northeastern University)</i>	
A Biologically Inspired Feature Enhancement Framework for Zero-Shot Learning .120.....	120
<i>Zhongwu Xie (Shenzhen University), Weipeng Cao (Shenzhen University), Xizhao Wang (Shenzhen University), Zhong Ming (Shenzhen University), Jingjing Zhang (Army Engineering University of People's Liberation Army of China), and Jiyong Zhang (Hangzhou Dianzi University)</i>	
Clustering Ensembles Based on Probability Density Function Estimation .126.....	126
<i>Yingyan Wu (Shenzhen University), Yulin He (Shenzhen University), and Joshua Zhexue Huang (Shenzhen University)</i>	
Formal Analysis of QUIC Handshake Protocol using ProVerif .132.....	132
<i>Jingjing Zhang (Army Engineering University of PLA), Lin Yang (National Key Laboratory of Science and Technology on Information System Security), Xianming Gao (National Key Laboratory of Science and Technology on Information System Security), and Qiang Wang (Southern University of Science and Technology)</i>	
Observation Points-Based Particle Swarm Optimization Algorithm .139.....	139
<i>Shengsheng Xu (Shenzhen University), Yulin He (Shenzhen University), and Joshua Zhexue Huang (Shenzhen University)</i>	

## **CSCloud 6: Intelligent Computing**

Design and Implementation of Virtual Pottery Space Based on Ceramic Cloud Service Platform .145	145
<i>Wentao Zhang (Jingdezhen Ceramic Institute), Hua Huang (Jingdezhen Ceramic Institute), and Meikang Qiu (Harrisburg University Sci &amp; Tech)</i>	

Intelligent Algorithm for Ceramic Decorative Pattern Style Transfer Based on CycleGAN .151.....	
	<i>Xinxin Liu (Jingdezhen Ceramic Institute), Hua Huang (Jingdezhen Ceramic Institute), and Meikang Qiu (Harrisburg University Sci &amp; Tech)</i>
Traffic Identification Algorithm Based on Improved LRU .157.....	
	<i>Song Wen (Guangxi University for Nationalities), Donghong Qin (Guangxi University for Nationalities), Ting Lv (Guangxi University for Nationalities), Lina Ge (Guangxi University for Nationalities), and Xiaodong Yang (Guangxi Academy of Sciences)</i>
Deep Binarized Convolutional Neural Network Inferences over Encrypted Data .160.....	
	<i>Junwei Zhou (Wuhan University of Technology), Junjiong Li (Wuhan University of Technology), Emmanouil Panaousis (University of Greenwich), and Kaitai Liang (University of Surrey)</i>
Cost Minimization for Music Uploading to a Cloudlet .168.....	
	<i>Grace Peng (Roslyn High School) and Meikang Qiu (Columbia University)</i>

## CSCloud 7: Short Papers

Energy Consumption for IoT Streaming Applications .174.....	
	<i>Manoj Muniswamaiah (Pace University), Tilak Agerwala (Pace University), and Charles C. Tappert (Pace University)</i>
Risks of Increase in the IoT Devices .178.....	
	<i>Sahba Bahizad (University of Washington)</i>
Green Computing for Internet of Things .182.....	
	<i>Manoj Muniswamaiah (Pace University), Tilak Agerwala (Pace University), and Charles C. Tappert (Pace University)</i>
The Accuracy of GPS-Enabled Fitbit Activities as Evidence: A Digital Forensics Study .186.....	
	<i>Atheer Almogbil (Johns Hopkins University), Abdullah Alghofaili (Johns Hopkins University), Chelsea Deane (Johns Hopkins University), Timothy Leschke (Johns Hopkins University), Atheer Almogbil (King AbdulAziz City for Science and Technology), and Abdullah Alghofaili (King Saud University)</i>
Performance of Databases in IoT Applications .190.....	
	<i>Manoj Muniswamaiah (Pace University), Tilak Agerwala (Pace University), and Charles C. Tappert (Pace University)</i>

## EdgeCom 1: Edge Computing

Parallel Multi-Threaded Gridrec Algorithm for Computer Tomography on GPU for Edge Computing .193.....	
	<i>Xintong Chen (Shanghai Jiao Tong University), Yongxin Zhu (Chinese Academy of Sciences, University of Chinese Academy of Sciences, Shanghai Jiao Tong University), Xiaoying Zheng (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Si Miao (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Tianhao Nan (Shanghai Jiao Tong University), and Wanyi Li (Shanghai Jiao Tong University)</i>

Truthful Computation Offloading Mechanisms for Edge Computing .199.....	
	<i>Weibin Ma (University of Delaware) and Lena Mashayekhy (University of Delaware)</i>
Service Placement for Real-Time Applications: Rate-Adaptation and Load-Balancing at the Network Edge .207.....	
	<i>Saadallah Kassir (The University of Texas at Austin), Gustavo de Veciana (The University of Texas at Austin), Nannan Wang (Fujitsu Laboratories of America), Xi Wang (Fujitsu Laboratories of America), and Paparao Palacharla (Fujitsu Laboratories of America)</i>
CUPA : A Configurable User Privacy Approach For Android Mobile Application .216.....	
	<i>Zainab Alkindi (Sultan Qaboos University), Mohamed Sarrab (Sultan Qaboos University), and Nasser Alzidi (Sultan Qaboos University)</i>
A Resource Management Model for Real-Time Edge System of Multiple Robots .222.....	
	<i>Zheyuan Hu (Beihang University), Jianwei Niu (Beihang University), Tao Ren (Beihang University), Huiyong Li (Beihang University), Ye Rui (Shanghai Aerospace Technology Institute), Yuan Qiu (Shanghai Aerospace Technology Institute), and Liang Bai (Shanghai Aerospace Technology Institute)</i>

## EdgeCom 2: Intelligence and Deep Learning

Research on Load Forecasting Method of Distribution Transformer Based on Deep Learning .228...	
	<i>Lei Chen (State Grid Zhejiang Electric Power Co., LTE), Huihua Yu (State Grid Zhejiang Hangzhou Fuyang District Power Supply Co., Ltd.), Li Tong (State grid Zhejiang electric power research institute), Xu Huai (Peking University), Peipei Jin (Peking University), Yu Huang (Peking University), and Chengfeng Dou (Peking University)</i>
FPGA-Based Hardware Acceleration for Image Copyright Protection Syetem Based on Blockchain.234	
	<i>Wanyi Li (Shanghai Jiao Tong University), Yongxin Zhu (Chinese Academy of Sciences, University of Chinese Academy of Sciences, Shanghai Jiao Tong University), Li Tian (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Tianhao Nan (Shanghai Jiao Tong University), and Xintong Chen (Shanghai Jiao Tong University, Chinese Academy of Sciences)</i>
Cloud-Based Livestock Monitoring System Using RFID and Blockchain Technology .240.....	
	<i>Liuqing Yang (Columbia University), Xiao-Yang Liu (Columbia University), and Jeong Soo Kim (Columbia University)</i>
Edge Computing-Based 3D Pose Estimation and Calibration for Robot Arms .246.....	
	<i>Qun Ma (Beihang University), Jianwei Niu (Beihang University), Zhenchao Ouyang (Hangzhou Innovation Institute), Mo Li (Beihang University), Tao Ren (Beihang University), and QingFeng Li (Hangzhou Innovation Institute)</i>
Craft Distillation: Layer-Wise Convolutional Neural Network Distillation .252.....	
	<i>Cody Blakeney (Texas State University), Xiaomin Li (Texas State University), Yan Yan (Texas State University), and Ziliang Zong (Texas State University)</i>

## EdgeCom 3:

Research on Edge Intelligence-Based Security Analysis Method for Power Operation System .258...	
<i>Zheng Zhu (Shanghai Electric Power Research Institute), Yingjie Tian (Shanghai Electric Power Research Institute), Fan Li (Shanghai Electric Power Research Institute), Hongshan Yang (Transwarp Inc), Zheng Ma (University of Southern Denmark), and Guoping Rong (Nanjing University)</i>	
Assessing the Reliability of Hybrid Clouds with Monte Carlo Simulation .264.....	
<i>Xiaowei Wang (Tsinghua University), Gefan Ren (Hunan University), Huajian Zhou (Tsinghua University), Guotao Xie (Tsinghua University), Yougang Bian (Tsinghua University), and Biao Xu (Hunan University)</i>	
Automated Student Engagement Monitoring and Evaluation During Learning in the Wild .270.....	
<i>Yuehua Wang (Texas A&amp;M University-Commerce, USA), Anuhya Kotha (Texas A&amp;M University-Commerce, USA), Pei-heng Hong (Texas A&amp;M University-Commerce, USA), and Meikang Qiu (Texas A&amp;M University-Commerce, USA)</i>	
Performance Analysis of Two Cloud-Based IoT Implementations: Empirical Study .276.....	
<i>Mohammed Aleisa (University of Idaho, Majmaah University), Abdullah Abu Hussein (St. Cloud State University), Faisal Alsubaei (University of Jeddah), and Frederick T. Sheldon (University of Idaho)</i>	
Change-Encryption: Encryption Using Spatiotemporal Information as a Function Model .281.....	
<i>Chuangchuang Dai (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Haijing Luan (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Qingbing Yu (Hong Kong KCharf Sci&amp;Tec International Co., Ltd), Xiaoyu He (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Yunhao Wang (The Lenovo Research), Bincheng Shuai (The Lenovo Research), Xiaobing Guo (The Lenovo Research), Zhonghua Lu (Chinese Academy of Sciences, University of Chinese Academy of Sciences), and Beifang Niu (Chinese Academy of Sciences, University of Chinese Academy of Sciences)</i>	
<b>Author Index 289</b> .....	