

2022 IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT 2022)

**Vancouver, Washington, USA
6-9 December 2022**



IEEE Catalog Number: CFP22B46-POD
ISBN: 978-1-6654-6091-0

**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:	CFP22B46-POD
ISBN (Print-On-Demand):	978-1-6654-6091-0
ISBN (Online):	978-1-6654-6090-3

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

2022 IEEE/ACM International Conference on Big Data Computing, Applications and Technologies (BDCAT) **BDCAT 2022**

Table of Contents

Message from the General Chairs	xi
Message from the Program Committee Chairs	xii
Organizing Committee	xiii
Program Committee	xiv

Full Papers

MT-IceNet - A Spatial and Multi-Temporal Deep Learning Model for Arctic Sea Ice Forecasting	1
<i>Sahara Ali (University of Maryland Baltimore County, USA) and Jianwu Wang (University of Maryland Baltimore County, USA)</i>	
Detection of Uncertainty in Exceedance of Threshold (DUET): An Adversarial Patch Localizer	11
<i>Terence Jie Chua (Nanyang Technological University, Singapore), Wenhan Yu (Nanyang Technological University, Singapore), Chang Liu (Nanyang Technological University, Singapore), and Jun Zhao (Nanyang Technological University, Singapore)</i>	
Context-Aware Resemblance Detection Based Deduplication Ratio Prediction for Cloud Storage	21
<i>Yuqing Geng (University of South China, China), Wenlong Tian (University of South China, China; Nanyang Technological University, Singapore; Hunan Provincial Base for Scientific and Technological Innovation Cooperation, China), Ruixuan Li (Huazhong University of Science and Technology, China), Weijun Xiao (Virginia Commonwealth University, USA), Chunping Ouyang (University of South China, China), Yongbin Liu (University of South China, China; Hunan Provincial Base for Scientific and Technological Innovation Cooperation, China), Qifei Liu (University of South China, China), Jing Li (University of South China, China), Xuming Ye (University of South China, China), and Zhiyong Xu (Suffolk University, USA)</i>	
Fast Exploratory Analysis with Spatio-Temporal Aggregation over Polygonal Regions	30
<i>Catherine Higgins (University of New Brunswick, Canada) and Suprio Ray (University of New Brunswick, Canada)</i>	

Triggerability of Backdoor Attacks in Multi-Source Transfer Learning-Based Intrusion Detection	40
<i>Nour Alhussien (Augusta University, USA), Ahmed Aleroud (Augusta University, USA), Reza Rahaeimehr (Augusta University, USA), and Alexander Schwarzmann (Augusta University, USA)</i>	
Enhanced Deep Learning Super-Resolution for Bathymetry Data	48
<i>Xingyan Li (University of Maryland, Baltimore County, USA), Jian Li (NASA Goddard Space Flight Center, USA), Zachary Williams (NASA Goddard Space Flight Center, USA), Xin Huang (University of Maryland, Baltimore County, USA), Mark Carroll (NASA Goddard Space Flight Center, USA), and Jianwu Wang (University of Maryland, Baltimore County, USA)</i>	
Payload-Byte: A Tool for Extracting and Labeling Packet Capture Files of Modern Network Intrusion Detection Datasets	58
<i>Yasir Ali Farrukh (Texas A&M University, USA), Irfan Khan (Texas A&M University, USA), Syed Wali (Texas A&M University, USA), David Bierbrauer (United States Military Academy, USA), John A. Pavlik (United States Military Academy, USA), and Nathaniel D. Bastian (United States Military Academy, USA)</i>	
Compressed Matrix Computations	68
<i>Matthieu Martel (LAMPS, Université de Perpignan, France)</i>	
Extracting Relations Between Sectors	77
<i>Atakan Kara (Kariyer.net, Turkey), F. Serhan Daniş (Galatasaray University, Turkey), Günce Keziban Orman (Galatasaray University, Turkey), and Sultan Nezihe Turhan (Galatasaray University, Turkey)</i>	
Mining Large Data to Create a Balanced Vulnerability Detection Dataset for Embedded Linux System	83
<i>Mansour Alqarni (Ontario Tech University, Canada) and Akramul Azim (Ontario Tech University, Canada)</i>	
Circular Economy and Construction Supply Chains	92
<i>Dan Incorvaja (Cardiff University, UK), Yasin Celik (Cardiff University, UK), Ioan Petri (Cardiff University, UK), and Omer Rana (Cardiff University, UK)</i>	
GeauxTrace: A Scalable Privacy-Protecting Contact Tracing App Design Using Blockchain	100
<i>Tao Lu (Louisiana State University, USA), Fang Qi (Tulane University, USA), John Ner (Louisiana State University, USA), Tianqing Feng (Louisiana State University, USA), Brian Cunningham (University of Illinois at Urbana-Champaign, USA), and Lu Peng (Tulane University, USA)</i>	
JobViewer: Graph-Based Visualization for Monitoring High-Performance Computing System	110
<i>Tommy Dang (Texas Tech University, USA), Ngan V.T. Nguyen (Texas Tech University, USA), Jie Li (Texas Tech University, USA), Jon Hass (Dell Inc., USA), Alan Sill (Texas Tech University, USA), and Yong Chen (Texas Tech University, USA)</i>	

Development of Open-Source, Edge Energy Management System for Tactical Power Networks	120
<i>Syed Wali (Texas A&M University, USA), Irfan Khan (Texas A&M University, USA), Yasir Ali Farrukh (Texas A&M University, USA), Muhammad Areeb Fasih (NED University of Engineering and Technology, Pakistan), Muhammad Hassan ul Haq (NED University of Engineering and Technology, Pakistan), and Majida Kazmi (NED University of Engineering and Technology, Pakistan)</i>	
Atmospheric Gravity Wave Detection Using Transfer Learning Techniques	128
<i>Jorge Lopez Gonzalez (University of Puerto Rico, Rio Piedras, USA), Theodore Chapman (University of Rochester, USA), Kathryn Chen (University of California, Santa Barbara, USA), Hannah Nguyen (University of Maryland, Baltimore County, USA), Logan Chambers (Albany State University, USA), Seraj A.M. Mostafa (University of Maryland, Baltimore County, USA), Jianwu Wang (University of Maryland, Baltimore County, USA), Sanjay Purushotham (University of Maryland, Baltimore County, USA), Chenxi Wang (NASA Goddard Space Flight Center, USA; University of Maryland, Baltimore County, USA), and Jia Yue (NASA Goddard Space Flight Center, USA; Catholic University of America, USA)</i>	

Short Papers

Privacy-Preserving Adversarial Network (PPAN) for Continuous non-Gaussian Attributes	138
<i>Mohammadhadi Shateri (École de Technologie Supérieure, Canada) and Fabrice Labeau (McGill University, Canada)</i>	
Machine Learning-based Classification of Birds through Birdsong	N/A
<i>Yueying Chang (The University of Melbourne, Australia) and Richard O. Sinnott (The University of Melbourne, Australia)</i>	
Supporting Green Neuromorphic Computing: Machine Learning Guided Microfabrication for Resistive Random Access Memory	154
<i>Abdi Yamil Viceniedelmoral (Washington State University Vancouver), Md Mehedi Hasan Tanim (Washington State University Vancouver), Feng Zhao (Washington State University Vancouver), and Xinghui Zhao (Washington State University Vancouver)</i>	
A Comprehensive Review of Anomaly Detection in Web Logs	158
<i>Mehryar Majd (Hasso Plattner Institute, University of Potsdam, Germany), Pejman Najafi (Hasso Plattner Institute, University of Potsdam, Germany), Seyed Ali Alhosseini (Hasso Plattner Institute, University of Potsdam, Germany), Feng Cheng (Hasso Plattner Institute, University of Potsdam, Germany), and Christoph Meinel (Hasso Plattner Institute, University of Potsdam, Germany)</i>	
Surrogate-Based Digital Twin for Predictive Fault Modelling and Testing of Cyber Physical Systems	166
<i>Hayatullahi Bolaji Adeyemo (University of Birmingham, UK), Rami Bahsoon (University of Birmingham, UK), and Peter Tiño (University of Birmingham, UK)</i>	
Learning and Preserving Relationship Privacy in Photo Sharing	170
<i>Jialin Liu (Prairie View A&M University, USA), Lin Li (Prairie View A&M University, USA), and Na Li (Prairie View A&M University, USA)</i>	

Poster Papers

An Effective Supplementation of Insufficient Data by Generative Adversarial Networks	174
<i>Abdulkabir Abdulraheem (Kyungpook National University, Republic of Korea) and Im Y. Jung (Kyungpook National University, Republic of Korea)</i>	
Communication and Energy Efficient Edge Intelligence	176
<i>Sabtain Ahmad (Vienna University of Technology, Austria)</i>	
Physics Informed Neural Networks: Reducing Data Size Requirements via Hybrid Learning	178
<i>Charlotte Lew (Palos Verdes Peninsula High School, USA)</i>	
Anomaly Detection of high-Dimensional Data Based on Ensemble GANs with Dropout	180
<i>Wanghu Chen (Northwest Normal University, China), Jilong Yao (Northwest Normal University, China), Meilin Zhou (Northwest Normal University, China), Jing Li (Northwest Normal University, China), and Mengyang Shen (Northwest Normal University, China)</i>	
Honey-CNT Based Resistive Switching Device for Neuromorphic Computing Applications	182
<i>Md Mehedi Hasan Tanim (Washington State University, USA), Abdi Yamil Vicenciodelmoral (Washington State University, USA), Zoe Templin (Washington State University, USA), Xinghui Zhao (Washington State University, USA), and Feng Zhao (Washington State University, USA)</i>	

REU Symposium Papers

Population-Based Hierarchical Non-Negative Matrix Factorization for Survey Data	184
<i>Xiaofu Ding (UCLA, USA), Xinyu Dong (UCLA, USA), Olivia McGough (Reed College, USA), Chenxin Shen (UCLA, USA), Annie Ulichney (Yale University, USA), Ruiyao Xu (UCLA, USA), William Swartworth (UCLA, USA), Jocelyn T. Chi (UCLA, USA), and Deanna Needell (UCLA, USA)</i>	
Differences in Monitoring the DNS Root Over IPv4 and IPv6	194
<i>Tarang Saluja (Swarthmore College), John Heidemann (University of Southern California), and Yuri Pradkin (University of Southern California)</i>	
Networked and Multimodal 3D Modeling of Cities for Collaborative Virtual Environments	204
<i>Benjamin Hall (Murray State University), Joseph Kessler (Truman State University), Osayamen Edo-Ohanba (University of Missouri-Kansas City), Jaired Collins (University of Missouri, Columbia), Haoxiang Zhang (University of Missouri, Columbia), Nick Allegreti (University of Missouri, Columbia), Ye Duan (University of Missouri, Columbia), Songjie Wang (University of Missouri, Columbia), Kannappan Palaniappan (University of Missouri, Columbia), and Prasad Calyam (University of Missouri, Columbia)</i>	

Multi-Layer Recurrent Neural Networks for the Classification of Compton Camera Based Imaging Data for Proton Beam Cancer Treatment	213
<i>Joseph Clark (Lander University, USA), Anaise Gaillard (George Mason University, USA), Justin Koe (The Cooper Union, USA), Nithya Navarathna (University of Maryland, Baltimore County, USA), Daniel J. Kelly (University of Maryland, Baltimore County, USA), Matthias K. Gobbert (University of Maryland, Baltimore County, USA), Carlos A. Barajas (University of Maryland, Baltimore County, USA), and Jerimy C. Polf (University of Maryland School of Medicine, USA)</i>	
Identifying Evolution of Software Metrics by Analyzing Vulnerability History in Open Source Projects	223
<i>Erik Maza (Kean University, USA) and Kazi Zakia Sultana (Montcalir State University, USA)</i>	
Accuracy, Fairness, and Interpretability of Machine Learning Criminal Recidivism Models	233
<i>Eric Ingram (University of Houston, USA), Furkan Gursoy (University of Houston, USA), and Ioannis A. Kakadiaris (University of Houston, USA)</i>	
A Predictor-Corrector Method for Multi-Objective Optimization in Fair Machine Learning	242
<i>Sean Wang (Cornell University, USA), Arielle Carr (Lehigh University, USA), and Sihong Xie (Lehigh University, USA)</i>	
Data Quality and Linguistic Cues for Domain-Independent Deception Detection	248
<i>Casey Hanks (University of Maryland, USA) and Rakesh Verma (University of Houston, USA)</i>	
Focused Stochastic Neighbor Embedding for Better Preserving Points of Interest	259
<i>Rafael Baez Ramirez (The University of Texas at El Paso, USA), Sanuj Kumar (New Mexico State University, USA), Tuan M. V. Le (New Mexico State University, USA), and Huiping Cao (New Mexico State University, USA)</i>	
Understanding DNS Query Composition at B-Root	265
<i>Jacob Ginesin (Northeastern University) and Jelena Mirkovic (USC/ISI)</i>	
FaultHunter: Automatically Detecting Vulnerabilities in C Against Fault Injection Attacks	271
<i>Logan Reichling (Ohio Northern University), Ikran Warsame (University of Cincinnati), Shane Reilly (University of Cincinnati), Austen Brownfield (University of Cincinnati), Nan Niu (University of Cincinnati), and Boyang Wang (University of Cincinnati)</i>	
Simulated Forest Environment and Robot Control Framework for Integration with Cover Detection Algorithms	277
<i>Avi Spector (University of Maryland College Park), Wanying Zhu (University of Georgia), Jumman Hossain (University of Maryland, Baltimore County), and Nirmalya Roy (University of Maryland, Baltimore County)</i>	
Accuracy-Fairness Tradeoff in Parole Decision Predictions: A Preliminary Analysis	284
<i>John W. Gardner (University of Houston, USA), Furkan Gursoy (University of Houston, USA), and Ioannis A. Kakadiaris (University of Houston, USA)</i>	

Image Processing and Machine Learning for Tumor Tissue Detection Using MRI Images in Bacteria Based Cancer Therapy	288
<i>Emily Hitchcock (Salisbury University, USA), Sarah Hodges (Liberty University, USA), Kevin Zuang (Brown University, USA), Rosy J. Lu (Yale University, USA), Yuanwei Jin (University of Maryland Eastern Shore, USA), Qiuhong He (Purdue University, USA), and Enyue Lu (Salisbury University, USA)</i>	
An Experimental Analysis on Mining Proportional Process Models from Process Logs	297
<i>Joo-Eun Bae (Kyonggi University, Republic of Korea), Jin-Hyong Lee (Kyonggi University, Republic of Korea), Young-In Park (Kyonggi University, Republic of Korea), So-Hyang Park (Kyonggi University, Republic of Korea), Kyoung-Sook Kim (Kyonggi University, Republic of Korea), and Kwanghoon Pio Kim (Kyonggi University, Republic of Korea)</i>	
Author Index	307