2021 IEEE International Conference on Smart Data Services (SMDS 2021)

Virtual Conference 5 – 11 September 2021



IEEE Catalog Number: CFP21W29-POD ISBN: 978-1-6654-0059-6

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:
 CFP21W29-POD

 ISBN (Print-On-Demand):
 978-1-6654-0059-6

 ISBN (Online):
 978-1-6654-0058-9

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 Web: www.proceedings.com



2021 IEEE International Conference on Smart Data Services (SMDS) SMDS 2021

Table of Contents

Message from the Steering Committee Chair xi Message from Congress General Chairs xi Message from the SMDS 2021 Chairs xiii Organizing Committee xiiii Reviewers xiv In Memoriam: Professor Mikio Aoyama xvi
Invited Paper
Federated Process Mining: Exploiting Event Data Across Organizational Boundaries
SMDS Conference Papers
SMDS Session 1
Towards a Reinforcement Learning-Based Exploratory Search for Mashup Tag Recommendation 8 Richard Anarfi (University of Massachusetts Boston, USA), Benjamin Kwapong (University of Massachusetts Boston, USA), and Kenneth K. Fletcher (University of Massachusetts Boston, USA)
Chinese Stock Trend Prediction Based on Multi-feature Learning and Model Fusion
Graph Convolutional Network-Strengthened Topic Modeling for Scientific Papers

SMDS Session 2

AC2M: An Automated Consent Management Model for Blockchain Financial Services Platform Zhiyu Xu (Swinburne University of Technology, Australia), Tengyun Jiao (Swinburne University of Technology, Australia), Ziyuan Wang (Swinburne University of Technology, Australia), Sheng Wen (Cyberspace Security Research Center, Peng Cheng Laboratory, China), Shiping Chen (The Commonwealth Scientific and Industrial Research Organisation, Australia), and Yang Xiang (Swinburne University of Technology, Australia)	. 33
Data Readiness Report	. 42
SMDS Session 3	
Cognitive Advisory Agent	52
Using Blockchain for Enhancing Collaboration Among Independent Enterprises: A Knowledge-Based Approach Niranjan Marathe (University of Texas at Dallas, USA), Haan Johng (University of Texas at Dallas, USA), Tom Hill (Fellows Consulting Group LLC, USA), and Lawrence Chung (University of Texas at Dallas, USA)	55
Here, There, Anywhere: Profiling-Driven Services to Tame the Heterogeneity of Edge Applications Manish Pandey (Kyungpook National University, South Korea), Breno Dantas (Virginia Tech, USA), Minh Le (Walmart, USA), Young-Woo Kwon (Kyungpook National University, South Korea), and Eli Tilevich (Virginia Tech, USA)	61
SMDS Session 4	
Ship Trajectory Anomaly Detection Based on Multi-feature Fusion	72
SMDS Session 5	
ML Model Change Detection and Versioning Service	82
Why Did You Turn on That Light? Alimire Nabijiang (Louisiana State University), Supratik Mukhopadhyay (Louisiana State University), Chanachok Chokwitthaya (Louisiana State University), Yimin Zhu (Louisiana State University), Girish Rentala (Louisiana State University), and Qun Liu (Louisiana State University)	85

From Big Data to Smart Data-Centric Software Architectures for City Analytics: The Case of the PELL Smart City Platform
Mubashir Ali (University of Bergamo, Italy), Patrizia Scandurra (University of Bergamo, Italy), Fabio Moretti (TERIN-SEN-SCC, ENEA, Italy), Laura Blaso (TERIN-SEN-SCC, ENEA, Italy), Mariagrazia Leccisi (Università degli Studi Roma Tre, Italy), and Fabio Leccese (Università degli Studi Roma Tre, Italy)
SMDS Session 6
Turning a Curse into a Blessing: A General Approach to Resolve Endogeneity Problem in Data-Rich Environment
Improving Knowledge Based Detection of Soft Attacks Against Autonomous Vehicles with Reputation, Trust and Data Quality Service Models
SMDS Session 7
Assessing the Effectiveness of the Shared Responsibility Model for Cloud Databases: the Case of Google's Firebase
Targeted VAE: Variational and Targeted Learning for Causal Inference
Track Before Detect: A Novel Approach for Unsupervised Anomaly Detection In Time Series 142 Ralph Bou Nader (Institut Polytechnique de Paris, France), Nour Assy (Institut Polytechnique de Paris, France), Walid Gaaloul (Institut Polytechnique de Paris, France), Yehia Taher (Université de Versailles Saint-Quentin-en-Yvelines, France), and Rafiqul Haque (Intelligencia SARL, France)

SMDS Session 8

Blockchain Based RAN Data Sharing
An Analysis of Transaction Handling in Bitcoin
Semantic Data Integration to Support Prosecutors in Their Investigations: Lessons Learned and Challenges
SMDS Session 9
DynGraphTrans: Dynamic Graph Embedding via Modified Universal Transformer Networks for Financial Transaction Data
An Auxiliary Learning Task-Enhanced Graph Convolutional Network Model for Highly-Accurate Node Classification on Weakly Supervised Graphs
SMDS Session 10
HOPE-Graph: A Hypothesis Evaluation Service Considering News and Causality Knowledge 196 Futoshi Iwama (IBM Reserch - Tokyo, Japan), Miki Enoki (IBM Reserch - Tokyo, Japan), and Sachiko Yoshihama (IBM Reserch - Tokyo, Japan)
Nonnegative Latent Factor-Incorporated Fuzzy Double c-Means Clustering for Incomplete Data216 Ming Li (Uniersity of Shanghai for Science and Technology, China) and Yan Song (Uniersity of Shanghai for Science and Technology, China)
Efficient Mobility Support Services for Highly Mobile Devices in 5G Networks

Blockchain Symposium Papers

Enhancing Scalability of Trusted Blockchains through Optimal Sharding	226
China), MengChu Zhou (New Jersey Institute of Technology Newark, ŬSA), JingRu Zhen (Anhui Normal University, China), and JiLai Zhang (Anhui Normal University, China)	
Decentralized Collaborative Learning with Probabilistic Data Protection	234
Rudy Raymond (IBM Research–Tokyo, Japan)	
An Elasticity Framework for Smart Contracts	244
Schahram Dustdar (Technische Universitat Wien Vienna, Austria), Jose	
Marıa Garcıa (Universidad de Sevilla, Spain), Pablo Fernandez	
(Universidad de Sevilla, Spain), and Antonio Ruiz-Cortes (Universidad de Sevilla, Spain)	
Author Index	249