

2022 IEEE 1st Global Emerging Technology Blockchain Forum: Blockchain & Beyond (iGETblockchain 2022)

**Irvine, California, USA
7-11 November 2022**



**IEEE Catalog Number: CFP22CQ3-POD
ISBN: 978-1-6654-5260-1**

**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:	CFP22CQ3-POD
ISBN (Print-On-Demand):	978-1-6654-5260-1
ISBN (Online):	978-1-6654-5198-7

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

TABLE OF CONTENTS

A Multilayer Distributed Ledger Technology Architecture for Immutable Registry of Mobility and Location Information.....	1
<i>Matheus Leal, Flávia Pisani, Markus Endler</i>	
A Novel Deep Reinforcement Learning-Based Automatic Stock Trading Method and a Case Study.....	7
<i>Youzhang He, Yuchen Yang, Yihe Li, Peng Sun</i>	
A Novel Machine Learning-Assisted Pairs Trading Approach for Trading Risk Reduction	13
<i>Zichao Chen, Cara Wang, Peng Sun</i>	
A Systematic Review of the Use of Blockchain in Internet of Medical Things	19
<i>Madeleine B. P. Vega, Antonio M. Saraiva, Marcos A. Simplicio, Bruno C. Albertini, Roberto F. Silva</i>	
A Trustless Federated Framework for Decentralized and Confidential Deep Learning	25
<i>Chao Li, Qiuyu Shen, Cheng Xiang, Bharath Ramesh</i>	
Adoption of Blockchain Technology in Academic Certificate-Verification Systems.....	31
<i>Mercy Effiong, Alex Norta, Chibuzor Udokwu, Marie Hattingh</i>	
Assessing Cybersecurity Resilience of Distributed Ledger Technology in Energy Sector Using the MITRE ATT&CK® ICS Framework	37
<i>Sri Nikhil Gupta Gourisetti, Annabelle Lee, Ramesh Reddi, Kateryna Isirova, Md Touhiduzzaman, David Jonathan Sebastian-Cardenas, Kent Lambert, Ümit Cali, Michael Mylrea, Farrokh Rahimi, Puica Nitu, Philip Huff, Marco Pasetti, Shammya Shananda Saha</i>	
Benford's Wallet	42
<i>Chloe Ceren Tartan, Owen Vaughan, Craig Steven Wright, Wei Zhang</i>	
Block-FeST: A Blockchain-Based Federated Anomaly Detection Framework with Computation Offloading Using Transformers.....	48
<i>Zahra Batool, Kaiwen Zhang, Zhongwen Zhu, Sarang Aravamuthan, Ulrich Aivodji</i>	
Blockchain-Enabled Economic Transactions: Recurring Financial Accruals and Payments.....	54
<i>Razvan Mihai, Omer Faruk Ozkul, Gora Datta, Nicolae Goga, Sergii Grybniak, Constantin Viorel Marian</i>	
Blockchain, AI and IoT Empowered Swarm Drones for Precision Agriculture Applications	59
<i>Islam Guven, Mehmet Parlak</i>	
Challenges of Proof-Of-Useful-Work (PoUW).....	65
<i>Felix Hoffmann</i>	
Combining Blockchain and Semantic Technologies: A Survey.....	70
<i>Anwar Alsamani, Arnold Beckmann</i>	
Cybersecurity and Privacy Aspects of Smart Contracts in the Energy Domain	76
<i>D. Jonathan Sebastian-Cardenas, Sri Nikhil Gupta Gourisetti, Shammya Shananda Saha, Komal Khan, Leonard C. Tillman, Umit Cali, Tamara Hughes</i>	
Dissolving Metaphors in Peer-To-Peer Energy Trading: Towards a More Concrete Understanding of Metering, Legitimacy and Revenue Flows.....	82
<i>Almero De Villiers, Paul Cuffe</i>	

Distributed Spectrum Sharing Using Blockchain: A Hyperledger Fabric Implementation	88
<i>Anas Abognah, Otman Basir</i>	
Elesto Protocol: Self-Sovereign Identity System.....	94
<i>Andrea Giacobino, David Grierson, Gianguido Sorà, Har Preet Singh, Martin Schäffner, Patrick McHale, Simon Maggs</i>	
Evaluation of Urban Mobility Alternatives for Blockchain Use in Metaverse.....	100
<i>Muhammet Deveci, Ilgin Gokasar, Umit Cali</i>	
Evolving Neuromorphic Systems on the Ethereum Smart Contract Platform.....	104
<i>Hongchi Wu, Binhao Fang, Cheng Xiang, Gregory Cohen, André Van Schaik, Bharath Ramesh</i>	
Framework for Governance Tailoring: Case Study for a Blockchain-Based Supply Chain Application	110
<i>Ismael Avila, José Reynaldo F. Filho, Vasco Varanda Picchi</i>	
HFabD+M: A Web-Based Platform for Automated Hyperledger Fabric Deployment and Management	116
<i>Ioannis Zikos, Andreas Sendros, George Drosatos, Pavlos S. Efrimidis</i>	
Hybrid AI-Based Anomaly Detection Model Using Phasor Measurement Unit Data	122
<i>Yuval Abraham Regev, Henrik Vassdal, Ugur Halden, Ferhat Ozgur Catak, Umit Cali</i>	
IPv4 and IPv6 for Blockchain Networks: A Comparative Analysis	128
<i>Jack Davies, Alessio Pagani</i>	
Improved Resilience of Local Energy Markets Using Blockchain Technology and Self-Sovereign Identity	133
<i>Umit Cali, Marthe Fogstad Dynge, Md Sadek Ferdous, Ugur Halden</i>	
Integrating Blockchain-Based Access Control Model TBAAC for Privacy and Accountability for Water Science Project.....	138
<i>Tanvi Jain, Ralph Deters</i>	
Integrating Blockchain for Healthcare Group Decision Making.....	144
<i>Manisha Singh, Gaurav Baranwal, Anil Kumar Tripathi</i>	
On Coexistence of Decentralized System (blockchain) and Central Management in Internet-Of-Things.....	150
<i>Hiroshi Watanabe</i>	
Opportunities and Challenges in Metaverse for Industry 4.0 and Beyond Applications	156
<i>Umit Cali, Murat Kuzlu, Enis Karaarslan, Vukica Jovanovic</i>	
Performance Study for Improving Throughput in Hyperledger Fabric Blockchain Platform	162
<i>Satyanarayana Nanduri, Harish Vemula</i>	
Potential of Smart Contracts in the Pharmaceutical Supply Chain of Belarus	168
<i>Alena Labanova, Richard Michael Dreyling, Alex Norta</i>	
Proof-By-Location as a Socially Responsible Financial Infrastructure.....	174
<i>Donald J. Patterson, Bill Tomlinson</i>	

Recurring Payments on EVM-Based Platforms	180
<i>Sergii Grybniak, Nicolae Goga, Oleksandr Nashyvan, Razvan Mihai, Igor Mazurok, Yevhen Leonchyk, Gora Datta, Omer Faruk Ozkul, Constantin Viorel Marian</i>	
SSI Meets Metaverse for Industry 4.0 and Beyond.....	186
<i>Umit Cali, Md Sadek Ferdous, Enis Karaarslan, Sri Nikhil Gupta Gourisetti, Michael Mylrea</i>	
Sharding and Its Impact on Fork Probability.....	192
<i>Reza Nourmohammadi, Kaiwen Zhang</i>	
Standardization Efforts for Blockchain in Energy Domain and Power Grid Applications.....	198
<i>Umit Cali, Murat Kuzlu, Sri Nikhil Gupta Gourisetti, Sambeet Mishra, Marco Pasetti, Claudio Lima, Tamara Hughes, Farrokh Rahimi, Puica Nitu</i>	
Subnetworks in BlockDAG	204
<i>Oleksandr Antonenko, Sergii Grybniak, Denis Guzey, Oleksandr Nashyvan, Ruslan Shanin</i>	
Supplier Selection in Healthcare Using Blockchain.....	210
<i>Twinkle Kumari, Manisha Singh, Gaurav Baranwal, Anil Kumar Tripathi</i>	
Tamper-Proof Evidence Via Blockchain for Autonomous Vehicle Accident Monitoring.....	216
<i>Mehmet Parlak, Nurkan Fatih Altunel, Utku Ayaz Akkas, Emir Tarik Arici</i>	
Telco Tokenization and Stablecoin Development an Industry Opportunity	222
<i>Shamit Bhat, Monique Jeanne Morrow</i>	
The IEEE Blockchain Transactive Energy Demo Initiative	228
<i>James Kempf, Paul Heitmann, Umit Cali</i>	
Towards Deanonimization of Mixing Services in Bitcoin.....	234
<i>Chábeli Castaño Arango, Roberto Luna-Garcia, Steven Cutchin, Gaby G. Dagher</i>	
Towards a Distributed Autonomous Organisation for Financing, Governing and Disbursing Revenues of a Battery Energy Storage System	240
<i>Hanumantha Rao Bokkissam, Iacopo Savelli, Thomas Morstyn, Paul Cuffe</i>	
Verifying Correctness of Smart Contracts with Conditionals.....	246
<i>Fahad Alhabardi, Bogdan Lazar, Anton Setzer</i>	
Waterfall: A Scalable Distributed Ledger Technology.....	252
<i>Sergii Grybniak, Dmytro Dmytryshyn, Yevhen Leonchyk, Igor Mazurok, Oleksandr Nashyvan, Ruslan Shanin</i>	
Web3 for Sensitive Data, Enterprise, Government, Private, and Permissioned Use	258
<i>Kim Aksel Tahuil Borgen</i>	
When Permissioned Blockchain Meets IoT Oracles: An On-Chain Quality Assurance System for Off-Shore Modular Construction Manufacture	264
<i>Lingming Kong, Chen Chen, Rui Zhao, Zhe Chen, Liupengfei Wu, Zhongze Yang, Xiao Li, Weisheng Lu, Fan Xue</i>	
Generating Trust Using Product Genome Mapping: A Cure for ESG Communication.....	270
<i>Ramesh Subramoniam, Aditya Parameswaran, Ram Ramanan, Rakesh Sreekumar, Sunil Cherian</i>	

Author Index