2022 Fourth International Conference on Blockchain Computing and Applications (BCCA 2022)

San Antonio, Texas, USA 5-7 September 2022



IEEE Catalog Number: ISBN:

CFP22Y46-POD 978-1-6654-9959-0

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:
 CFP22Y46-POD

 ISBN (Print-On-Demand):
 978-1-6654-9959-0

 ISBN (Online):
 978-1-6654-9958-3

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



Table of Contents

Keynote Speeches	
Keynote Speech 1: A Connected World: Blockchain Scaling for Micropayments, IoT & the	1
Future of Data	
Jimmy Nguyen, Founding President – BSV Blockchain Association	
Keynote Speech 2: Transformation of Business and Financial Platforms: What we must	2
understand to renew existing systems Via Trainball IDM Compilities Clobal Subject Matter France	
Kip Twitchell, IBM Consulting, Global Subject Matter Expert Keynote Speech 3: Blockchain based Data science and data engineering: (Human) Ecology	3
in the Digital Age	3
Daniel Keane, Co-Founder & Managing Director, Predict Ecology	
Dunier reality of Foundaries Managing Director, Fronter Boology	
BCCA2022	
A Blockchain-enabled and AI-Supported COVID-19 Detection Method	4
Farzaneh Bannazadeh, Malini Manohar, Rakshit Mitra, Ismaeel Al Ridhawi, Ali Abbas,	
Mohsen Guizani	
Supporting long-term transactions in smart contracts	11
Christian Gang Liu, Peter Bodorik, Dawn Jutla	20
Review of Most Popular Open-Source Platforms for Developing Blockchains	20
Collin Connors, Dilip Sarkar Secure Decentralized Online Gaming with Lending Functionalities	27
Katharina Alefs, Florian Hartl, Luke Newman, Banu Ôzdeveci, Wisnu Uriawan	21
Modeling the Fork Probability of Blockchains: Did EIP-1559 Improve Ethereum?	33
Reza Nourmohammadi, Kaiwen Zhang	55
Stochastic analysis of the success rate in atomic swaps	41
Bence Ladoczki, Jozsef Biro, Janos Tapolcai	
Assuring Referential Integrity in Blockchain Applications	47
Kwok-Bun Yue	
Towards a middleware design for efficient blockchain oracles selection	55
Subhasish Goswami, Syed Muhammad Danish, Kaiwen Zhang	
A novel Blockchain-Based Data-Aggregation scheme for Edge-Enabled Microgrid of	63
Prosumers Vanionin Daiorkin, Muttuknishnan Baiaraian	
Veniamin Boiarkin, Muttukrishnan Rajarajan Secure and Scalable Blockchain-enabled traffic data management using a trust model	69
El-Hacen Diallo, Omar Dib, Khaldoun Al Agha	0,5
Flexible Fine-grained Data Access Management for Hyperledger Fabric	76
João Parente, Ana Nunes Alonso, Fábio André Coelho, João Vinagre, Paulo Bastos	, ,
FLoBC: A Decentralized Blockchain-Based Federated Learning Framework	85
Mohamed Ghanem, Fadi Dawoud, Habiba Gamal, Eslam Soliman, Tamer Elbatt, Hossam	
Sharara	
Sancus: an Anonymous and Trustworthy Blockchain-based Electronic Voting	93
Architecture	
Michele Scarlato, Reza Tourani, Moongu Jeon	
Blockchain-Based Decentralized Federated Learning	99
Ahmed Dirir, Khaled Salah, Davor Svetinovic, Raja Jayaraman, Ibrar Yaqoob, Salil S. Kanhere	107
COCP: Blockchain Proof-of-Useful-Work Leveraging Real-Life Applications Tatjana Davidovic, Milan Todorovic, Dusan Ramljak, Tatjana Jaksic Kruger, Luka Matijevic,	10/
Djordje Jovanovi, Dragan Urosevic	
Trust in the Context of Blockchain Applications	111
Shengwei You, Kristina Radiyojeyic, Jarek Nabrzyski, Paul Brenner	

	Learning a Scalable Algorithm for Improving Betweenness in the Lightning Network	119
_	Vincent Davis, Brent Harrison	
	Making Smart Contracts Predict and Scale	127
_	Syed Badruddoja, Ram Dantu, Yanyan He, Abiola Salau, Kritagya Upadhyay, Mark Thompson	
	Performance Modeling and Analysis of Hotstuff for Blockchain Consensus	135
_	Yahya Shahsavari, Kaiwen Zhang, Chamseddine Talhi	
	BxTB: cross-chain exchanges of bitcoins for all Bitcoin wrapped tokens	143
	Fadi Barbara, Claudio Schifanella	
	Performance Improvement of Blockchain-based IoT Applications using Deep Learning	151
	Techniques	
	Rizwan Patan, Reza M. Parizi	
	A Bivariate Performance Model across On- and Off-Chain in A NFT (Non-Fungible	159
	Token) Chain	
	Jongho Seol, Zuqiang Ke, Abhilash Kancharla, Shital Joshi, Nohpill Park	
	LAPS: Computing Loan Default Risk from User Activity, Profile, and Recommendations	167
	Wisnu Uriawan, Omar Hasan, Youakim Badr, Lionel Brunie	
	PoSC: Combined Score for Consensus in Internet-of-Things Applications	173
	Arshdeep Singh, Rahul Saha, Mauro Conti, Gulshan Kumar	
	TrustSim: A Decentralized Reputation and Trust Model Simulator	181
	Venkatesan S, Sandeep Kumar Shukla, Yuvaraj Rajendra	
	Cholula: Fast, Fault-tolerant, and Strongly Consistent Off-chain Object Storage	189
	David Shen, Cole Dumas, Callie Sardina, Lewis Tseng, Moayad Aloqaily	
	A UTXO-based Sharding Method for Stablecoin	195
	Si Yuan Jin, Bo Tong Xu, Philip Intallura, Yong Xia	
	Blockchain and Mobile Payment: Assessment on Privacy and Usability and a Scheme for	200
	Enhancement	
	Olson Italis, Samuel Pierre, Alejandro Quintero	
	Security Requirements for Vehicle-to-Everything (V2X) Communications Integrated with	208
	Blockchain	
	Eranda Jayatunga, Avishek Nag, Anca Jurcut	
	Fraud Detection in Blockchains using Machine Learning	214
	Baran Kilic, Alper Sen, Can Ozturan	
	A Review on Industrial Blockchain	219
	Mohammad Alja'afreh, Wassim El Ahmar, Mohamad Hoda, and Ali Karime	
	AI-based Blockchain for the Metaverse: Approaches and Challenges	231
	Ouns Bouachir, Moayad Aloqaily, Fakhri Karray, Abdulmotaleb Elsaddik	
A	SDTM2022	
	Trusted AI with Blockchain to Empower Metaverse	237
	Syed Badruddoja, Ram Dantu, Yanyan He, Mark Thompson, Abiola Salau, Kritagya Upadhyay	,
В	BLOCK TRUST 4.0 2022	
	ZCC: Mitigating Double-spending Attacks in Micropayment Bitcoin Transactions	245
	Prema Arote, Joy Kuri	243
_	BieVote: A Biometric Identification Enabled Blockchain-Based Secure and Transparent	253
	Voting Framework	233
	Md Jobair Hossain Faruk, Mazharul Islam, Fazlul Alam, Shahriar Hossain, Akond Rahman	
_	DNS based In-Browser Cryptojacking Detection	259
	Rohit Sachan, Rachit Agarwal, Sandeep Kumar Shukla	239
_	Making Blockchain Validators Honest	267
	Abiola Salau, Ram Dantu, Kirill Morozov, Syed Badruddoja, Kritagya Upadhyay	207
	TIOTOTO DOTOG TUILI DUILU, IXII II 11101020 1, D , VI DUULUUU (U, IXIIUG , U ODUULI , U)	

Covid-19 Contact Tracing and Vaccine Validation Using Blockchain Technology	274
Vandana Kamjula, Abinesh Anbalagan, Priti Halwai, Ismaeel Al Ridhawi, Ali Abbas	
Transformation of Business and Financial Platforms: What We Must Understand to	312
Renew Existing Systems	
Kip M. Twitchell	
DAIBC2022	
Smarter Contracts to Predict using Deep-Learning Algorithms	280
Syed Badruddoja, Ram Dantu, Yanyan He, Mark Thompson, Abiola Salau, Kritagya Upadhyay	
Decentralized Federated Learning: A Comprehensive Survey and a New Decentralized	289
Data Evaluation Scheme	
Laveen Bhatia, Saeed Samet	
A blockchain-based data market for renewable energy forecasts	297
Fabio Andre Coel, Filipe Silva, Carla Goncalves, Ricardo Bessa, Ana Alonso	
NFTBC2022	
Performance Modeling and Assurance for Cross Chain	305
Zuqiang Ke, Jongho Seol, Abhilash Kancharla, Nohpill Park	