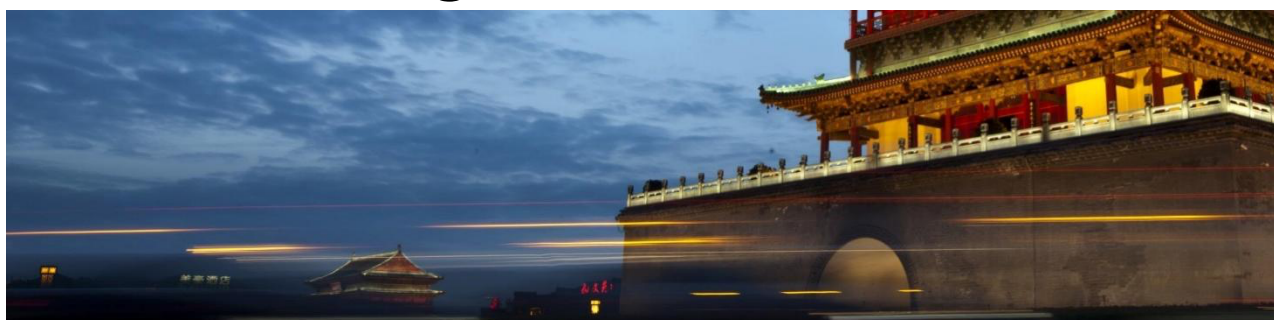# The 9th IEEE International Conference on Cyber Security and Cloud Computing (IEEE CSCloud 2022)

The 8th IEEE International Conference on Edge Computing and Scalable Cloud (IEEE EdgeCom 2022)

June 25-27, 2022
Xi'an, China

Conference Program and Information Booklet

Organized By
IEEE CSCloud/EdgeCom 2022 Committee

Sponsored By
IEEE
IEEE Computer Society
IEEE TCSC
IEEE STC Smart Computing
North America Chinese Talents Association
Longxiang High Tech

Welcome to IEEE Computer Society Smart Computing Special Technical Community (SCSTC)

IEEE SCSTC is built up for changing people's future work and life; attracting intelligent computing talents in smart computing field; producing high quality research work and services in human-centric technologies to change the world; leading the research of smart computing by solving challenging problems; and expanding the smart computing community in a self-sustainable financial way. Two main layers are involved in the concept of smart: one is the traditional optimization; the other one is the intelligent living.

Vision: IEEE Computer Society Smart Computing STC is to enable smart life with smart data, smart cloud, and smart security and become a community leader in these technical fields.

We will create a smart computing society for changing people's future work and life; attract intelligent computing talents in smart computing field; produce high quality research work and services in human-centric technologies to change the world; lead the research of smart computing by solving challenging problems; and expand the smart computing community in a self-sustainable financial way. Two main layers are involved in the concept of smart: one is the traditional optimization; the other one is the intelligent living.

Mission: IEEE Computer Society Smart Computing STC is to utilize smarting computing technologies to increase humans' life by integrating smart data, smart cloud, and smart security in both optimizations and intelligences. We will build up the largest professional and academic community in smart computing and aim to enhance humans' life by utilizing smart computing technologies. This expected community will be providing an integrative research platform for global researchers who are interested in smart computing that covers both optimizations and intelligent living. The target area is a convergence of three novel dimensions at the collaborative application layer, namely smart data, smart cloud, and smart security. This is a social network-based community that is planned to be a long-term self-sustaining organization.

Purpose: The main purpose of this proposed STC is to serve the smart computing research community and advance the research by covering three dimensions, including smart data, smart cloud, and smart security. Current existing STCs cannot satisfy the demands of research interests in convergences of multiple disciplines, which include data, cloud computing, and security. Most existing STCs only have isolative focus in one specific field. However, data, cloud computing, and security are becoming strongly tied techniques, which are hard to separately considered for many contemporary researches or future technical development. Therefore, building up a STC in Smart Computing has an urgent demand for both smart computing research and professional practices.

Scope: the scope of Smart Computing STC is a technical group within the Computer Society. Term Smart in "Smart Computing" mainly covers two aspects, including optimizations and intelligence, by which smart concept will be adopted for new networking-oriented technologies. We are looking for intelligent approaches gaining optimal performances by high-speed data mining and data analysis throughout all aspects in distributed computing and integrated systems. Both aspects are strongly relevant to the performance of the system at the application layer during the process of data transmissions within the distributed environment. This concentration emphasizes the optimizations and intelligences of networking performances and empowers the capabilities of the connected computing devices in distributed systems, which distinguishes from other societies or communities.

Activities: IEEE Computer Society Smart Computing STC organizes a bunch of research community-oriented activities. We aim to unionize scholars or students who have similar or relevant research interests in smart computing and grow the research community globally. Our memberships owners will have a great opportunity to build up an active social network and strengthen the knowledge scope throughout the following activities:

- Improve communications and interconnections between peers.
- Explore the theory, applications, implementations, and research of smart computing.
- Publish whitepapers, reports, technical manual, and handbooks on research, policies, standards, products, services, and applications.
- Organize conferences and workshops that are related to smart computing.
- Release newsletters with updated news regularly.
- Host academic publications focusing on smart computing.
- Develop smart computing standards.
- Standardize the mechanisms, operating principles, and industrial manual guidelines.

Official Permanent Site: https://stc.computer.org/smart-stc/

IEEE CSCloud/EdgeCom 2022 Program at a Glance

Saturday, June 25th, 2022 (Beijing Time)	
	Conference Room
8:45 – 9:00	Opening
9:00 – 10:00	Keynote 1
10:00 – 11:00	Keynote 2
11:00 – 11:20	Award Session
11:20 – 13:00	Break
13:00 – 14:00	CSCloud Session 1
14:00 – 15:00	EdgeCom Session 1
15:00 – 16:00	CSCloud Session 2
Sunday, June 26th, 2021 (Beijing Time)	
9:00 – 10:00	CSCloud Session 3
10:00 – 11:00	CSCloud Session 4
11:00 – 12:00	CSCloud Session 5
12:00 –14:00	Break
14:00 –15:00	EdgeCom Session 2
15:00 –15:00	CSCloud Session 6

Registration:

Online Registration System
http://www.cloud-conf.net/cscloud/2022/cscloud/index.html

Presentation Online Rooms:

Zoom (https://zoom.us/)

Important Notice:

Due to the outbreak of COVID-19, this year the IEEE CSCloud/EdgeCom 2022 will be a virtual conference online.
For all participants, please do notice all the time mentioned in this booklet is based on Beijing's time zone, which is UTC+8.

IEEE CSCloud/EdgeCom 2022 Keynotes

June 25th, 2022, 10:00 AM

Title: Federated Learning of Structure Discovery and Rule-Based Systems With Privacy Constraints

Prof. Witold Pedrycz
IEEE Fellow
University of Alberta, Canada

Bio: Witold Pedrycz (IEEE Life Fellow) is Professor and Canada Research Chair (CRC) in Computational Intelligence in the Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Canada. He is also with the Systems Research Institute of the Polish Academy of Sciences, Warsaw, Poland. Dr. Pedrycz is a foreign member of the Polish Academy of Sciences and a Fellow of the Royal Society of Canada. He is a recipient of several awards including Norbert Wiener award from the IEEE Systems, Man, and Cybernetics Society, IEEE Canada Computer Engineering Medal, a Cajastur Prize for Soft Computing from the European Centre for Soft Computing, a Killam Prize, a Fuzzy Pioneer Award from the IEEE Computational Intelligence Society, and 2019 Meritorious Service Award from the IEEE Systems Man and Cybernetics Society. His main research directions involve Computational Intelligence, fuzzy modeling and Granular Computing, knowledge discovery, pattern recognition, data science, knowledge-based neural networks among others. Dr. Pedrycz is involved in editorial activities. He is an Editor-in-Chief of Information Sciences, Editor-in-Chief of WIREs Data Mining and Knowledge Discovery (Wiley), and Co-editor-in-Chief of Int. J. of Granular Computing (Springer) and J. of Data Information and Management (Springer).

Abstract: Quite often in real-world environment, data can be available only locally coming with strict constraints imposed on their usage beyond individual data islands. Such restrictions constitute genuine conceptual and algorithmic challenges when it comes to solving problems of global data analysis and the development of global models. A lot of pursuits located in this realm fall under the umbrella of federated learning where this learning paradigm is linked with the computing ideas of cloud computing. The discovery of the structure of data to be realized at the global level becomes highly demanding given the required privacy of attributes to address the existing challenge, a number of ways of conceptualization of the collaborative clustering are discussed. In spite of the diversity of the ensuing optimization mechanism, it is worth stressing that building a global structure is completed at a higher level of abstraction. Subsequently, it is shown that a sound conceptual setting involves concepts of information granules and mechanisms of Granular Computing. The quality of constructed relationships is also analyzed at the level of granular constructs. The accommodation of privacy constraints in the design of rule-based architectures with the rules assuming the form "if condition is Ai then y=fi(x), i=1,2,...,c is elaborated in detail. The attributes not publicly available are expressed through information granules Ai built through collaborative clustering whereas remaining attributes (x) are used in the construction of the local functions. A way of forming the rules through unsupervised federated learning is investigated along with the detailed algorithmic developments. A granular characterization of the obtained model formed by the server vis-a-vis data located at the level of individual clients is discussed and a number of case studies is studied.

IEEE CSCloud/EdgeCom 2022 Keynotes

June 25th, 2022, 9:00 AM

Topic: Blockchain and Zero-trust Computing

Prof. Xiuzheng Cheng
Shandong University, China

Bio: Dr. Xiuzhen Cheng is a Distinguished Professor in School of Computer Science and Technology, Shandong University, China. From 2002 to 2020, she was a professor of Computer Science at School of Engineering and Applied Sciences (SEAS) in The George Washington University, USA. Dr. Cheng conducts research in the broad area of distributed and trusted computing, particularly in blockchain computing, edge computing, and IoT security. She was the recipient of the NSF CAREER award, SEAS Distinguished Researcher Award, and a few best paper awards.

Dr. Cheng is a Fellow of IEEE. She is the founder and steering committee chair of the International Conference on Wireless Algorithms, Systems, and Applications (WASA, launched in 2006), and the founding EiC of the SDU-Elsevier High-Confidence Computing Journal (launched in 2021). Dr. Cheng served/is serving on the editorial boards of several technical journals and the technical program committees of many professional conferences/workshops. She also chaired a few international conferences.

Abstract: Blockchain has emerged as a new technology to enable multiple agents to complete transactions that require strong security and reliability, even though these agents do not trust each other and the media supporting their interactions is not trustworthy. Such a property drives zero-trust computing to come into being, which is a computing paradigm supporting collaborative computing services in a zero-trust environment. In this talk, we first introduce zero-trust computing, using the evolutions of cryptocurrency, web, and computing paradigms as examples to demonstrate why zero-trust computing plays fundamental and critical roles in enabling the exciting applications driven by the next-generation Internet technologies in the coming years. Then we talk about the open challenges of blockchain and zero-trust computing whose solutions can nurture various zero-trust based applications that are expected to burgeon in the near future. Finally we report our effort in blockchain and zero-trust computing, serving as a catalyst for further studies to advance zero-trust computing technologies and their applications.

Technical Program

The 9th IEEE International Conference on Cyber Security and Cloud Computing (IEEE CSCloud 2022)

CSCloud 1:

06/25/2022, 13:00 – 14:00, Online Conference

- Harashta Tatimma Larasati, Muhammad Firdaus and Howon Kim, Quantum Federated Learning: Remarks and Challenges.
- Xiangyu Gao and Meikang Qiu, Recommendation System Design for Social Media using Reinforcement Learning.
- Weitao Tang, Tonglin Zhang and Baijian Yang, SemiCon: A Semi-supervised Learning for Industrial Image Inspection.
- Muhammad Firdaus, Harashta Tatimma Larasati and Kyung-Hyune Rhee, A Secure Federated Learning Framework using Blockchain and Differential Privacy

CSCloud 2:

06/25/2022, 15:00-16:00, Online Conference

- Xiaofeng Chen, Zunbo Wei, Xiangjuan Jia, Peiyu Zheng, Mengwei Han and Xiaohu Yang, Current Status and Prospects of Blockchain Security Standardization.
- Xiaofeng Chen, Qing Zhang, Lu Zhang, Xiangjuan Jia, Peiyu Zheng and Xiaohu Yang, Standardization Financial Blockchain: Technologies, Challenges, and Future.
- Xiaofeng Chen, Lu Zhang, Yijian Zhang, Jingyi Du, Xiangjuan Jia and Xiaohu Yang, A Fundamental Analysis of Standardization for Blockchain and Distributed Ledger Technologies in ISO.
- Xiaofeng Chen, Xiangjuan Jia, Jing Xu, Lu Zhang, Zunbo Wei and Xiaohu Yang, Applications oriented Technical Ecology for the Standardization of Blockchain in IEEE.

CSCloud 3:

06/26/2022, 9:00 – 10:00, Online Conference

- Dian Xu, Wei Hu, Fang Liu, Zimeng Fan and Qingsong Shi, Balance Multi-Head Attention based on Software and Hardware Co-design.
- Xun Liu, Jing Wu, Jiayin Zhou and Haonan Gu, Low energy consumption and time deterministic energy-saving workflow task scheduling algorithm based on DVFS.
- Xiang Li, Yihao Li and Ping Yi, Graph-based Malicious Account Groups Detection in Electronic Trading of Bulk Commodities.
- Xian Luo, Weiran Wang, Dai Zhang, Shengwei Wang and Xiang Li, Energy-Efficient Communication Based on Multi-RIS and Sleep Strategy in Electric IoT.

CSCloud 4:

06/26/2022, 10:00 – 11:00, Online Conference

- Tariqul Islam, Kamrul Hasan, Saheb Singh and Joon Park, A Secure and Decentralized Auditing Scheme for Cloud Ensuring Data Integrity and Fairness in Auditing.
- Beiyuan Yu, Pan Li, Jianwei Liu, Ziyu Zhou, Yiran Han and Zongxiao Li, Advanced analysis of email sender spoofing attack and its related security problems.
- Shaobo Zhang, Tianxiu Xie, Keke Gai, and Lei Xu, ARC: An Asynchronous Consensus and Relay Chain-based Cross-chain Solution to Consortium Blockchain.
- Qingfeng Chen, Jing Wu, Jing Liu, and Yu Han, Neural Networks Implemented by Differential Evolutionary Algorithms to Counter Attacks.

CSCloud 5:

06/26/2022, 11:00 – 12:00, Online Conference

- Sida Dai, Tao Han, Mingchuan Yang, Yuan Zhang and Lichuan Wang, Towards Small Scale Urban Fire Detection Dataset.
- Jun Zeng, Ruixuan Ba, Qimei Chen, Lihua Wu, Hao Wang and Yunfei Xiong, Prediction of Hard Drive Failures for Data Center Based on LightGBM.
- Zekun Liu, Jianyong Yu, Linlin Gu and Yuqi Liu, Maximizing the Influence in Dynamic Social Networks: An Entropy-Based Linear Threshold Model.
- Li Zhu, Gong Chen and Zhanli Li, One Novel Dynamic Entity Intelligent Inspection Technology of Bulk Commodity Trading Market

CSCloud 6:

06/26/2022, 15:00- 16:00, Online Conference

- Ze Tian, Xianglong Ren, Jun Zhang, Feihu Fan and Chen Yue, Design of Shared Register File of GPU Unified Shader Array.
- Haonan Gu, Jing Wu, Mingqi Li, Yi Guo, A Time Deterministic Dynamic Segmentation Scheduling Algorithm.
- Yang Yu, Rui Jin, Hao Yin, Zijian Zhang and Keke Gai, A Searchable Re-encryption-based Scheme for Massive Data Transactions.
- Dongliang Guan, Sheng Liu, Yihao Li and Ping Yi, Graph-based Algorithm for Self-trading Accounts Detection in Bulk Commodity Trade.
- Xian Luo, Zehua You, Rongtao Liao, Fen Liu and Liang Dong, A Communication-efficient Semi Asynchronous Federated Learning Network in Power Grid.

Technical Program

The 7th IEEE International Conference on Edge Computing and Scalable Cloud (IEEE EdgeCom 2022)

EdgeCom 1:

06/25/2022, 14:00 – 15:00, Online Conference

- Shuai Yuan, Hongbo Zhao and Liwei Geng, An Offloading Algorithm based on Deep Reinforcement Learning for UAV-Aided Vehicular Edge Computing Networks.
- Ze Tian, Feihu Fan, Jun Zhang, Xianglong Ren and Wei Yang, High-Speed Transcendental Function Operation Unit Design.
- Song Yang, Zheng Zhang, Hao Jiang, Cong Zheng and Xiaoyue Zhao, Topic-Aware Popularity and Retweeter Prediction Model for Cascade Study.
- Zichun Wang, Low Resource Neural Machine Translation.

EdgeCom 2:

06/26/2022, 14:00 – 15:00, Online Conference

- Yang Sun, Wei Hu, Fang Liu, Feihu Huang, Min Jiang and Dian Xu, Speformer: An Efficient Hardware-Software Cooperative Solution for Sparse Spectral Transformer.
- Xiangbin Kong, Xiuping Ouyang, Hao Li, Min Lin, Xiang Chen, Juan Liao, Huifang Liu and Bingqing Liu, Prediction of the Impact of Mobile Payments on the Consumption of individual Nodes on Communication Networks.
- Jiale Hu, Zongxiao Li, Peiran Li and Jianwei Liu, A Lightweight and Secure Authentication Protocol for 5G mMTC.
- Ze Tian, Jun Zhang, Xinglong Ren, Feihu Fan and Chen Yue, Survey of Shared Register File design for Unified Shader Array in GPUs.