

The 7th IEEE International Conference on Smart Cloud (IEEE SmartCloud 2022)

October 8-10,
Shanghai, China

Conference Program and Information Booklet



Organized By
IEEE SmartCloud 2022
Committee

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

About IEEE SCSTC

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/>



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IEEE SmartCloud 2022 Program at a Glance

Saturday, October 8, 2022	
	Room A
8:00-8:45	Conference Preparing and Online Facility Tuning
8:45 - 9:00	Opening
9:00 – 9:55	Keynote by Prof. Bhavani Thuraisingham
10:00-11:00	Keynote by Prof. X. Sean Wang
11:00-11:20	Award
11:20-13:00	Break
13:00-14:00	SmartCloud 1
14:00-15:00	SmartCloud 2
15:00-16:00	SmartCloud 3
16:00-17:00	SmartCloud 4

Sunday, October 9, 2022	
	Room A
9:00-10:00	SmartCloud 5
10:00-11:00	SmartCloud 6
11:00-12:00	SmartCloud 7
12:00-14:00	Break
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15:00-16:00	SmartCloud 9
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Registration:

Online Registration System (<http://www.cloud-conf.net/smartcloud/2022/index.html>)

Presentation Online Rooms:

Zoom (<https://zoom.us/>)

Virtual Conference Link: See email

Important Notice:

Due to the outbreak of COVID-19, this year the IEEE SmartCloud 2022 will be a virtual conference online. For all participants, Please note that all times mentioned in this manual are based on Beijing, China time zone, UTC+8.



IEEE SmartCloud 2022 Keynote

October 8, 2022, 9:00, Room A



Title: Trustworthy Machine Learning and Its Applications in IoT Systems

Prof. Bhavani Thuraisingham, PhD

Fellow of ACM, IEEE, AAAS, NAI, IMA

Erik Jonsson School of Engineering and Computer Science

The University of Texas at Dallas, USA

Abstract: The collection, storage, manipulation, analysis and retention of massive amounts of data have resulted in new technologies including big data analytics and data science. It is now possible to analyze massive amounts of data and extract useful nuggets. However, the collection and manipulation of this data has also resulted in serious security and privacy considerations. Various regulations are being proposed to handle big data so that the privacy of the individuals is not violated. Furthermore, the massive amounts of data being stored may also be vulnerable to cyber attacks. Furthermore, Artificial Intelligence Techniques including machine learning are being applied to analyze the massive amounts of data in every field such as healthcare, finance, retail and manufacturing.

Machine techniques are being integrated to solve many of the security and privacy challenges. For example, machine learning techniques are being applied to solve security problems such as malware analysis and insider threat detection. However, there is also a major concern that the machine learning techniques themselves could be attacked. Therefore, the machine learning techniques are being adapted to handle adversarial attacks. This area is known as adversarial machine learning. In addition, privacy of the individuals is also being violated through these machine learning techniques as it is now possible to gather and analyze vast amounts of data and therefore privacy enhanced data science techniques are being developed. Finally, Machine Learning techniques have to be fair and not discriminate. They also have to produce accurate results. Integrating Machine Learning with features like Security, Privacy, Integrity and Fairness have come to be known as Trustworthy Machine Learning,

With the advent of the web, computing systems are now being used in every aspect of our lives from mobile phones to smart homes to autonomous vehicles. It is now possible to collect, store, manage, and analyze vast amounts of sensor data emanating from numerous devices and sensors including from various transportation systems. Such systems collectively are known as the Internet of Transportation, which is essentially the Internet of Things for Transportation, where multiple autonomous transportation systems are connected through the web and coordinate their activities. However, security and privacy for the Internet of Transportation and the infrastructures that support it is a challenge. Due to the large volumes of heterogenous data being collected from numerous devices, the traditional cyber security techniques such as encryption are not efficient to secure the Internet of Transportation. Some Physics-based solutions being developed are showing promise. More recently, the developments in Data Science are also being examined for securing the Internet of Transportation and its supporting infrastructures. Our goal is to develop smart technologies for a Smart World.

To assess the developments on the integration of Machine Learning and Security over the past decade and apply them to the Internet of Transportation, the presentation will focus on three aspects. First it will examine the developments on Trustworthy Machine Learning including aspects of insider threat detection as well as the advances in adversarial machine learning. Some developments on privacy aware and policy-based data management frameworks will also be discussed. Second it will discuss the developments on securing the Internet of Transportation and its supporting infrastructures and examine the privacy implications. Finally, it will describe ways in which Trustworthy Machine Learning could be incorporated into the Internet of Transportation and Infrastructures.

Bio: Dr. Bhavani Thuraisingham (aka Dr. Bhavani) is the Founders Chair Professor of Computer Science, the Founding Executive Director of the Cyber Security Research and Education Institute, and the Co-Director of the Women in Cyber Security and Women in Data Science Centers at the University of Texas at Dallas. She is also a visiting senior research fellow at Kings College, the University of London since 2015 conducting research on the foundations of IoT and was a Cyber Security Policy Fellow at the New America Foundation focusing on workforce development 2017-8. She is also a Member of the Faculty of Computer Science at the University of Dschang Cameroon, Africa since 2021 giving lectures (pro-bono) on Trustworthy Machine Learning, She is an elected Fellow of several prestigious organizations including the ACM, the IEEE, the AAAS and the NAI (National Academy of Inventors). Her research, development and education efforts have been on integrating cyber security and data science/machine learning for the past 37 years including at Honeywell Inc., The MITRE Corporation, the National Science Foundation, and Academia. Dr. Bhavani has received several awards including the IEEE Computer Society's 1997 Technical Achievement Award, ACM SIGSAC 2010 Outstanding Contributions Award, 2011 AFCEA Medal of Merit, 2013 IBM Faculty Award, 2017 ACM CODASPY (Data and Applications Security and Privacy) Lasting Research Award, the 2017 Dallas Business journal Women in Technology Award, and the 2019 IEEE ComSoc Technical Recognition Award for Communications and Information Security. She has delivered around 200 keynote and featured addresses, and over 100 panel presentations, authored 16 books, published over 130 journal articles and over 300 conference papers. Dr. Bhavani received her PhD in Computability Theory from the University Wales, UK and the prestigious earned higher doctorate (D.Eng) form the University of Bristol, England for her published work in Secure Data Management.



IEEE SmartCloud 2022 Keynote

October 8, 2022, 10:00, Room A



Title: Cloud Computing from a Task Centric Perspective

Dr. X. Sean Wang

Fellow of CAAI and CCF, ACM Member, IEEE Senior Member
School of Computer Science,
Fudan University, China

Abstract: Cloud computing has become basic infrastructure that provides the computing needs for all sorts of applications. However, the model of cloud computing services seems still based on securing a single cloud service provider before launching tasks. This model requires a deep understanding of what services to acquire. In this talk, we try to argue for a task centric view, namely to envision a system that allows an understanding of the computing needs of a task (e.g., via automated or artificial annotation) and provides an automated process of acquiring or accepting suitable synchronous or asynchronous services from perhaps heterogeneous computing providers.

Bio: X. Sean Wang is Professor at the School of Compute Science, Fudan University, a CAAI and CCF Fellow, ACM Member, and IEEE Senior Member. His research interests include data analytics and data security. He received his PhD degree in Computer Science from the University of Southern California, USA. Before joining Fudan University in 2011 to be the dean of its School of Computer Science and the Software School, he served as the Dorothean Chair Professor in Computer Science at the University of Vermont, USA, and as a Program Director at the National Science Foundation, USA. He has published widely in the general area of databases and information security, and was a recipient of the US National Science Foundation CAREER award. He's a former chief editor of the Springer Journal of Data Science and Engineering. He's currently on the steering committees of the IEEE ICDE and IEEE BigComp conference series, and past Chair of WAIM Steering Committee.



Technical Program

The 7th IEEE International Conference on Smart Cloud (IEEE SmartCloud 2022)

SmartCloud 1:

October 8, 2022, 13:00, Room A

- Bruno Guindani, Danilo Ardagna and Alessandra Guglielmi. MALIBOO: When Machine Learning meets Bayesian Optimization.
- Yanyan Qin, Chuping Wang, Ning Wang, Guoshi Wang and Xiuli Li. Code-sensitive Function Recognition Algorithm Based on Machine Learning.
- Geetika Tiwari and Ruchi Jain. Detecting and Classifying Incoming Traffic in a Secure Cloud Computing Environment Using Machine Learning and Deep Learning System.

SmartCloud 2:

October 8, 2022, 14:00, Room A

- Zhiyan Chen and Ligang He. Optimizing Offloading Strategies for Mobile Edge Cloud Systems.
- Wang Tianyou, Qin Yuanze, Huang Yu, Lou Yiwei, Xu Chongyou and Chen Lei. Power Grid Data Monitoring and Analysis System Based on Edge Computing.
- Zhe Yang, Ziyuan Zhang and Peng Nie. A Deep-Learning-Based Optimal Auction for Vehicular Edge Computing Resource Allocation.
- Xiangyu Gao and Meikang Qiu. Energy-Based Learning for Polluted Outlier Detection in Backdoor.

SmartCloud 3:

October 8, 2022, 15:00, Room A

- Xiuli Li, Guoshi Wang, Chuping Wang, Yanyan Qin and Ning Wang. Software Source Code Security Audit Algorithm Supporting Incremental Checking.
- Heng He, Jiaqi Liu, Jinguang Gu and Feng Gao. An Efficient Multi-Keyword Search Scheme over Encrypted Data in Multi-Cloud Environment.
- Keke Zhang, Xu Chen, Yongjun Jing, Shuyang Wang and Lijun Tang. Survey of Research on Named Entity Recognition in Cyber Threat Intelligence.
- Tong Zhu, Chenyang Liao, Lanting Guo, Ziyang Zhou, Wenwen Ruan, Wenhao Wang, Xinyu Li, Qingfu Zhang, Hao Zheng, Shuang Wang and Yuetong Liu. Detecting and Warning Abnormal Transaction of Virtual Cryptocurrency Based on Privacy Protection Framework.

SmartCloud 4:

October 8, 2022, 16:00, Room A

- Peng Nie, Ziyuan Zhang and Zhe Yang. Dynamic Online Double Auction Mechanism based on Deployment Constraints in the Internet of Vehicles.
- Minjie Ding, Mingang Chen, Wenjie Chen and Lizhi Cai. Evaluation method of Chinese natural language processing in the cloud.
- Pengyu Zhang. A numerical object extraction method for Chinese text.
- Li Zhu and Yu Xia. Power load curve clustering based on ISODATA.

SmartCloud 5:

October 9, 2022, 9:00, Room A

- Yueying Zhou, Yongxin Zhu and Xiaoying Zheng. Hierarchical diagnosis of liver fibrosis based on federal learning.
- Dong Mao, Zhongxu Li, Zuge Chen, Hanyu Rao, Jiuding Zhang and Zehan Liu. Based on Neural Networks: A Semantic Segmentation Algorithm for Optimization of Distributed Storage of Energy Big Data.
- Hongkai Wang, Xiaogang Gong, Comdong Mao, Hanyu Rao, Zuge Chen and Jingyao Zhang. Electric Power Asynchronous Heterogeneous Data Accelerated Compression for Edge Computing.
- Li Zhu and Bin Liu. Prediction of user electricity consumption based on adaptive K-Means algorithm.

SmartCloud 6:

October 9, 2022, 10:00, Room A

- Shufeng He, Dianqi Sun and Hongshan Yang. Research on 3D Product Service System Based on Spherical Model.
- Zhanli Li, Ni Jia and Hongmei Jin. Night fatigue driving detection algorithm based on lightweight Zero-DCE.
- Feng Zhou, Xiaoli Wan, Xin Du, Zhihui Lu and Jie Wu. Design and Implementation of An Intelligent Health Management System for Nursing Homes.
- Qifeng Tang, Zhiqing Shao, Lihua Huang, Hsunfang Cho and Yiguang Zhang. niDts: A New Generation Intelligent Data Trading System.

SmartCloud 7:

October 9, 2022, 11:00, Room A

- Xiaoqi Zhang, Guangsong Li and Yongjuan Wang. GAN-based Abnormal Transaction Detection in Bitcoin.
- Yuqi He, Zhiquan Lai, Zhejiang Ran, Lizhi Zhang and Dongsheng Li. Accelerating Sample-based GNN Training by Feature Caching on GPUs.
- Xiaonan Lv, Zongwei Huang, Liangyu Sun, Miaomiao Wu, Li Huang and Yehong Li. Research and design of web-based capital transaction data dynamic multi-mode visual analysis tool.
- Fang Li, Gang Wu, Jianhua Lu, Mingye Jin, Wenli Li and Junxiong Lin. SmartCMP: A Cloud Cost Optimization Governance Practice of Smart Cloud Management Platform.

SmartCloud 8:

October 9, 2022, 14:00, Room A

- Hong-an Li, Diao Wang, Zhanli Li and Tian Ma. Image super-resolution reconstruction based on big data and cloud computing.
- Peng Xingyu, Song Yilun, Yuan Kangjian, Guo Xu and Lu Zhihui. UCloudStack - A Private Cloud Platform for Lightweight Delivery.
- Michael S. MacFadden and Meikang Qiu. Performance Impacts of JavaScript-Based Encryption of HTML5 Web Storage for Enhanced Privacy.
- Bhavani Thraisingham. Trustworthy Machine Learning for Securing IoT Systems.

SmartCloud 9:

October 9, 2022, 15:00, Room A

- Lin Chen, Qingchun Yu, Wei Liang, Jiahong Cai, Jiahong Xiao and Yanlu Li. Overview of medical data privacy protection based on blockchain technology.
 - Xinyu Wang, Xin Du, Wenli Li and Zhihui Lu. A Bandwidth Prediction Method Based on Hybrid LSTM for Content Delivery Network.
 - Hongshan Yang, Wanggen Liu, Chenyun Liu, Tianqing Wang and Lei Peng. Transwarp Data Cloud: A Stable, Efficient, and Intelligent Data Application Cloud Platform.
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SmartCloud 10:

October 9, 2022, 16:00, Room A

- Yuanhao Sun, Cheng Lv, Xi Liu, Tianyang Lei, Zhuoyi Guo and Ning Li. TDH: An Efficient One-stop Enterprise-level Big Data Platform.
 - Changchun Zhang, Cheng Lv, Zhenqiang Chen, Yucheng Lu, Yuxuan Tian and Jiabao Wu. Transwarp ArgoDB: A Distributed Flash Database.
 - Ajay Katangur, Somasheket Akkaladevi and Sadiskumar Vivekanandhan. Priority Weighted Round Robin Algorithm for Load Balancing in the Cloud.
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