

**Special Issue: Distributed Learning and Blockchain Enabled Infrastructures for Next Generation of Big Data Driven Cyber-Physical Systems**

Modern Cyber-Physical System (CPS) is composed by integrating and networking the physical world, computational components, and Internet-of-Things (IoT) devices such as sensors, actuators, etc. Typical CPS applications include autonomous driving systems, smart home, robotics systems, smart healthcare systems, etc. With the prevalence of CPSs, the huge volume of ever-increasing data produced by heterogeneous IoT devices raise crucial challenges in both system architectures and data management. First, traditional centralized CPSs have the shortcomings of destitute transparency and scalability, making it difficult to scale with the ever-increasing volume of data generated across CPSs. Moreover, CPSs are often associated with sensitive data, while their centralized infrastructures expose them to vulnerability, data breaches, and denial of services. Therefore, the decentralized CPS infrastructure becomes a potential solution, in particular, it is essential to explore new big data processing techniques with decentralized CPS infrastructures.

Distributed learning and blockchain techniques, envisioned as the bedrock of future intelligent networks and IoT technologies, have attracted tremendous attentions from both academy and industry due to the nature of decentralization, data security, and privacy benefits. The decentralized architectures, together with the ability to enable secured, trusted and decentralized autonomous ecosystems, revolutionize increasingly centralized CPSs for infrastructures and applications, as well as reshaping of traditional data mining and knowledge discovery patterns. However, adopting distributed learning and blockchain technologies in big data driven CPS applications requires essential insights with respect to concrete application domains, scalability, privacy issues, performance, and financial benefits as well.

In this special issue, we are looking for original submissions around all theoretical and application-oriented research of big data driven applications using distributed learning and blockchain technologies.

The potential topics include, but are not limited to:

- Data and transaction management on blockchain in CPSs
- Distributed data analytics in blockchain enabled CPSs
- Data mining and knowledge discovery over distributed learning in CPSs
- Novel distributed learning models with strict resource constraints in CPSs
- Distributed learning for emerging applications in CPSs
- Data security, privacy and trust on distributed learning and blockchain in CPSs
- Distributed learning and blockchain in cloud/edge/fog computing for CPSs
- Distributed learning and blockchain based lightweight data structure for CPS data
- Big data algorithms, tools and services using distributed learning and blockchain technologies in CPSs
- Performance optimization and energy efficiency for distributed learning and blockchain enabled big data applications in CPSs

**Important Dates:**

Submission deadline: 31 December 2022

Initial notification: 01 March 2023

Submission deadline for revised papers: 01 May 2023

Final acceptance/rejection notification: 15 June 2023

**Guest Editors:**

Dr. Xiaokang Zhou (Managing Guest Editor), Associate Professor

Faculty of Data Science

Shiga University, Japan

Email: zhou@biwako.shiga-u.ac.jp

Dr. Giancarlo Fortino, Professor, IEEE Fellow

Department of Informatics, Modeling, Electronics, and Systems

University of Calabria, Italy

Email: giancarlo.fortino@unical.it

Dr. Alireza Jolfaei, Associate Professor

College of Science and Engineering

Flinders University, Australia

Email: alireza.jolfaei@flinders.edu.au

Dr. Lianyong Qi, Professor

School of Computer Science

Qufu Normal University, China

Email: lianyongqi@qfnu.edu.cn

Dr. Mohammad Hammoudeh, Professor

Department of Computing and Mathematics

Manchester Metropolitan University, UK

Email: m.hammoudeh@mmu.ac.uk

**A List of Guest Editor Biographies:**

Dr. Xiaokang Zhou is currently an associate professor with the Faculty of Data Science, Shiga University, Japan. He received the Ph.D. degree in human sciences from Waseda University, Japan, in 2014. From 2012 to 2015, he was a research associate with the Faculty of Human Sciences, Waseda University, Japan. He also works as a visiting researcher in the RIKEN Center for Advanced Intelligence Project (AIP), RIKEN, Japan, since 2017. Dr. Zhou has been engaged in interdisciplinary research works in the fields of computer science and engineering, social and human informatics, and information system architecture. His research interests include ubiquitous computing, big data, machine learning, behavior and cognitive informatics, cyber-physical-social systems, and cyber intelligence and security. He has published more than 100 refereed papers in prestigious international journals and conferences, including THMS, TLT, TCSS, TETC, IoTJ, TSC, TBD, TII, TCBB, TNSE, TVT, and TOMM, etc. His research works published in noted

international conferences have won several positive praises, including the best paper awards of IEEE DependSys'21, EAI CloudComp'21, IEEE SmartData'20, ICADIWT'16, IEEE ITME'14, AIM'13, and IET U-Media'12, the outstanding paper awards of CENet'21. Dr. Zhou is the recipient of 2020 IEEE SMC Society Andrew P. Sage Best Transactions Paper Award, and 2020 IEEE TCSC Award for Excellence for Early Career Researchers. He has worked as program chair/co-chair and TPC member for several noted international conferences sponsored by IEEE and Springer. Dr. Zhou has served as guest editor for several reputable scientific journals, including FGCS, JPDC, MTAP, Ad Hoc Networks, WWW, CAEE, BDR, INF, IEM, TCBB, and BAE. He is currently serving as associate editor for Human-Centric Computing and Information Sciences, Journal of Ambient Intelligence and Humanized Computing, Computers & Electrical Engineering, and Journal of Circuits, Systems, and Computers. Dr. Zhou is a member of the IEEE CS, and ACM, USA, IPSJ, and JSAI, Japan, and CCF, China.

Giancarlo Fortino is Full Professor of Computer Engineering at the Dept of Informatics, Modeling, Electronics, and Systems of the University of Calabria (Unical), Italy. He received a PhD in Computer Engineering from Unical in 2000. He is also distinguished professor at Wuhan University of Technology and Huazhong Agricultural University (China), high-end expert at HUST (China), senior research fellow at the Italian ICAR-CNR Institute, CAS PIFI visiting scientist at SIAT – Shenzhen, and Distinguished Lecturer for IEEE Sensors Council. He is the director of the SPEME lab at Unical as well as co-chair of Joint labs on IoT established between Unical and WUT and SMU and HZAU Chinese universities, respectively. Dr. Fortino is Web of Science Highly Cited Researcher 2020. His research interests include human-machine systems, wearable computing, wireless/body area networks, Internet of Things, and agent-based computing. Dr. Fortino is currently the scientific responsible of the Digital Health group of the Italian CINI National Laboratory at Unical. He is author of 500+ papers in int'l journals, conferences and books. He is (founding) series editor of IEEE Press Book Series on Human-Machine Systems and EiC of Springer Internet of Things series and AE of many int'l journals such as IEEE TAC, IEEE THMS, IEEE IoTJ, IEEE SJ, IEEE JBHI, IEEE SMCM, IEEE OJEMB, IEEE OJCS, Information Fusion, JNCA, EAAI, etc. He organized as chair many int'l workshops and conferences (100+), was involved in a huge number of int'l conferences/workshops (500+) as IPC member, is/was guest-editor of many special issues (60+). He is cofounder and CEO of SenSysCal S.r.l., a Unical spinoff focused on innovative IoT systems. Dr. Fortino is currently member of the IEEE SMCS BoG and of the IEEE Press BoG, and chair of the IEEE SMCS Italian Chapter.

Dr. Alireza Jolfaei is an Associate Professor of Networking and Cyber Security in the College of Science and Engineering at Flinders University, Adelaide, Australia. He is a Senior Member of the IEEE and a Distinguished Speaker of the ACM. His main research interest is in Cyber-Physical Systems Security. He has published over 100 papers, which appeared in peer-reviewed journals, conference proceedings, and books. Before Flinders University, he has been a faculty member with Macquarie University, Federation University, and Temple University in Philadelphia, PA, USA. He received the prestigious IEEE Australian council award for his research paper published in the IEEE Transactions on Information Forensics and Security. Dr. Jolfaei has served as the Secretary of the

IEEE NSW Joint Chapter on Consumer Technology, Broadcast Technology, and Product Safety Engineering, as the Chairman of the Computational Intelligence Society in the IEEE Victoria Section, and also as the Chairman of Professional and Career Activities for the IEEE Queensland Section. Dr. Jolfaei was the founder and councillor of IEEE Student Branch at Federation University Australia, and also contributed to the foundation of IEEE Northern Territory Subsection. He has served as the guest associate editor of IEEE journals and transactions, including the IEEE IoT Journal, IEEE Sensors Journal, IEEE Transactions on Intelligent Transportation Systems, and IEEE Transactions on Industry Applications. He has served as a program co-Chair, a track Chair, a session Chair, and a Technical Program Committee member, for major conferences, including IEEE TrustCom and IEEE ICCCN.

Dr. Lianyong Qi, received his Ph.D degree from the Department of Computer Science and Technology, Nanjing University, China. In 2010, he visited the Department of Information and Communication Technology, Swinburne University of Technology, Australia. Now, he is a professor of the School of Computer Science, Qufu Normal University, China. His research interests include big data and recommender systems. He has published over 100 research papers ( first author / corresponding author ) in international journals ( e.g., IEEE JSAC, IEEE TSC, IEEE TCC, IEEE TBD, IEEE TII, IEEE T-ITS, IEEE TCSS, IEEE TNSE, ACM TOMM, ACM TOSN, ACM TOIT, ACM TIST, etc) and international conferences ( e.g., ICWS, ICSOC), including 9 Best Paper Awards. He is currently serving as the managing editor of Journal of Organizational and End User Computing (SCI/SSCI) and editorial board of International Journal of Intelligent Systems (SCI). He has served 10+ international conferences as chairs.

Dr. Mohammad Hammoudeh (Senior Member, IEEE) received his BSc in Computer Communications in 2004 (Arts Sciences & Technology University, Lebanon), his MSc in Advanced Distributed Systems in 2006 (University of Leicester, UK) and his PhD in Computer Science in 2008 (University of Wolverhampton, UK). He is a Professor (Chair) of Cyber Security in the Department of Computing and Mathematics at the Manchester Metropolitan University, UK. Mohammad heads the CfACS Internet of Things Lab he founded in 2016 where he leads a multi-disciplinary group of research associates and PhD students. From this he established the Lab as a leading research hub with a broad portfolio of successful, industry-sponsored projects. He has been awarded above £2.5M in competitive research funding as Principal/Co-Investigator for 16 research projects. He has a global collaborative research network spanning the academic community, industry, policy makers and wider technology stakeholders in the field of cybersecurity, the Internet of Things and complex highly decentralized systems. He published over 80 refereed conference papers, over 65 peer reviewed journal articles, and is a successful editor of 4 books and many journal special issues. He is a Senior Member of IEEE and Fellow of the Higher Education Academy UK.