

Special Session

Code: p379q

Title

AI for Edge and Cloud Computing Systems

Proposer / Main Organizer

Provide complete address/affiliation, phone, email and biography.

The main organizer will be the primary contact person to whom all correspondence will be sent

Jing Bi, Associate Professor
Beijing University of Technology, Beijing, China
E-mail: bjing@bjut.edu.cn

***Jing Bi** received the Ph.D. degree in Computer Science from Northeastern University, Shenyang, China, in 2011. She was a Visiting Research Scholar with the Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ, USA from 2018 to 2019. She is currently an Associate Professor with the Faculty of Information Technology, School of Software Engineering, Beijing University of Technology, Beijing, China. Her research interests include distributed computing, cloud computing, large-scale data analytics, machine learning and performance optimization.*

Haitao Yuan, Associate Professor
Beihang University, Beijing, China
Email: yuan@buaa.edu.cn

***Haitao Yuan** received the Ph.D. degree in Computer Engineering from New Jersey Institute of Technology (NJIT), Newark, NJ, USA in 2020. He is currently an Associate Professor with the School of Automation Science and Electrical Engineering, Beihang University, Beijing, China. His research interests include cloud computing, edge computing, data centers, big data, machine learning, deep learning and optimization algorithms.*

MengChu Zhou, Distinguished Professor
New Jersey Institute of Technology, Newark, USA
E-mail: zhou@njit.edu

***MengChu Zhou** received the Ph. D. degree in Computer and Systems Engineering from Rensselaer Polytechnic Institute, Troy, NY in 1990. He joined New Jersey Institute of Technology (NJIT), Newark, NJ in 1990, and is now a Distinguished Professor of Electrical and Computer Engineering. His research interests are in Petri nets, intelligent automation, Internet of Things, big data, web services, and intelligent transportation.*

IEEE Member or SMC Society Member

Jing Bi, IEEE Senior Member and SMC Society Member

Haitao Yuan, IEEE Senior Member and SMC Society Member

MengChu Zhou, IEEE Fellow and SMC Society Member

Category

Cybernetics

Number of Expected Paper Submissions:

6 or more

Keywords

Computational Intelligence, Heuristic Algorithms, Machine Learning

Brief Description and Justification (200-250 words):

With the fast development of information and communication technologies, Internet of Things (IoT) represents a comprehensive environment that interconnects a large number of heterogeneous physical objects or things such as appliances, facilities, animals, vehicles, farms, factories, etc. to the Internet, to enhance efficiency of applications such as logistics, manufacturing, agriculture, urban computing, home automation, ambient assisted living and various real-time ubiquitous computing applications. Commonly, an IoT system follows the architecture of the Cloud-centric Internet of Things (CIoT) in which the physical objects are represented in the form of Web resources that are managed by the servers in the global Internet. Although the CIoT model is a common approach to implement IoT systems, it is facing the growing challenges in IoT. Specifically, CIoT faces challenges in bandwidth, latency, uninterrupted, resource-constraint and security. In addition, applications involving voluminous data but needing low-latency computation and local feedback require that the computing be performed as close to the data sources as possible. Given the growth in such application scenarios and the recent advances in algorithms and techniques, machine learning and inference at the edge and in the cloud are unfolding and growing at a rapid pace. Furthermore, realizing the computing continuum and coupling these edge applications with centrally located cloud resources and applications also present a challenge that requires cooperation and coordination between various components of the software stack.

The session aims to present efficient scientific and engineering solutions, which address the challenges and opportunities for edge and cloud computing systems, and provide visions for future research and development. In addition, researches on smart mobile devices, big data analysis, edge computing, cloud computing, and cyber-physical systems are also highly related. Specifically, contributions to theory and practice, including but not limited to, the following technical areas, are invited.

- *Big data analysis for energy-aware edge-cloud computing*
- *AI enabled IoT applications at the edge*
- *Collaborative training at the edge and in the cloud*
- *Low-carbon industrial Internet*
- *Edge computing architectures, systems, and applications*
- *Efficiency edge-cloud data orchestration*
- *Cyber-security and privacy aspects of edge and cloud computing*
- *Energy-efficient dynamic resource provisioning*
- *Data analysis for task prediction and scheduling*
- *Edge computing for different application domains such as industrial automation, smart transportation, and social applications*
- *Machine learning for sustainable industrial Internet optimization*
- *Industrial applications and case studies*