IEEE CAMAD 2023 Special Session

Edge Intelligence and Artificial Intelligence of Things (Edge AI & AIoT)

Scope

Internet of Things (IoT) devices produce an abundance of data from various sensors embedded in geographically distributed objects, ranging from environmental sensors to wearable devices and industrial sensors. This deluge of data has created a demand for innovative approaches to handle and extract valuable insights from the data at the edge of the network where the data is generated. By leveraging Edge Computing and Artificial Intelligence techniques, it becomes possible to process and analyze the data in real time, enabling timely and informed decision-making.

The special session aims to bring together researchers, practitioners, and industry experts to discuss recent advancements, challenges, and emerging trends in the field of Edge Intelligence (Edge AI) and Artificial Intelligence of Things (AIoT), with a specific emphasis on processing IoT and sensor data. It will provide a platform for sharing knowledge, exchanging ideas, and exploring novel applications, algorithms, architectures, and protocols in this rapidly evolving domain. The session recognizes the proliferation of IoT devices and the massive volume of sensor data generated, as well as the critical role of distributed processing in harnessing the potential of such data, enabling real-time decision-making and intelligent analysis at the network edge.

Topics of interest include, but are not limited to:

- Edge computing architectures and platforms for AIoT
- Machine learning and deep learning techniques for Edge AI
- Distributed processing of IoT data at the edge
- Federated Learning and distributed intelligence in edge computing
- Heterogeneity and individualization challenges in distributed intelligence
- Edge-based data analytics and decision-making for IoT applications
- Resource allocation and management in Edge AI and AIoT
- Fault tolerance and failure resilience in Edge AI and AIoT
- Trustworthy, transparent, and explainable Edge AI and AIoT
- Energy-efficient and sustainable Edge AI and AIoT
- Privacy and security issues in Edge AI and AIoT
- Performance evaluation and optimization of Edge AI and AIoT
- Integration of Edge AI and AIoT with cloud, fog, and continuum computing
- Integration of Edge AI and AIoT with emerging architectures, including non-Von Neumann computing
- Edge AI-enabled communication protocols and sensor networks
- Edge AI and AIoT for
    - smart cities and urban environments,
    - healthcare and biomedical applications,
    - industrial automation and manufacturing,
    - autonomous vehicles and transportation systems,
    - environmental monitoring and sustainability.
- Edge AI and AIoT applications in emerging domains

Special Session Chairs

Dr. Atakan Aral, Umeå University, Sweden (atakan.aral@umu.se)
Dr. Vincenzo De Maio, Vienna University of Technology (vincenzo.maio@tuwien.ac.at)
Dr. Shashikant Ilager, Vienna University of Technology (shashikant.ilager@tuwien.ac.at)

Biographies

Dr. Aral is an Assistant Professor of Distributed Systems at the Department of Computing Science, Umeå University, Sweden, and the Principal Investigator / International Coordinator of the SWAIN project (https://swain-project.eu/) at the Faculty of Computer Science, University of Vienna, Austria. He received an M.Sc. degree in Computer Science and Engineering from Politecnico di Milano, Italy (2011) and a Ph.D. degree in Computer Engineering from Istanbul Technical University, Turkey (2016). Dr. Aral received numerous prestigious awards from institutions, including the Italian and Turkish governments, and has been involved in organizing committees for prominent conferences such as IFIP/IEEE NOMS 2016, ACM EdgeSys 2022, and ACM EdgeSys 2023. He is an IEEE Senior Member and the Climate Change SIG Chair at the Center for AI and ML, TU Wien. His research interest center around resource and reliability management for Edge Computing, Edge AI, and the Internet of Things.

Dr. Vincenzo De Maio is a postdoctoral researcher at the Vienna University of Technology, Austra. His research interests cover resource management in hyper heterogeneous distributed systems, sustainable HPC, and the integration of Non-Von Neumann Architectures in the computing continuum. He obtained his Ph.D. from the Distributed and Parallel Systems (DPS) group at the University of Innsbruck, Austria, in 2016, with a focus on energy modeling in Cloud Data Centers. He got his Master's Degree “cum laude” in Computer Science in 2011 at the University of Salerno, Italy. He has been actively involved in the organization of conferences such as IC2E 2020-2021, and he is also on the program committee of many important conferences in his research area, i.e., ACM Supercomputing and IEEE IPDPS. He has received different awards for his research contributions, such as the IEEE/ACM UCC 2016 “Best Paper Award”.

Dr. Ilager is a Postdoctoral Researcher at the Vienna University of Technology, Austria. His research interests cover the boundaries of large-scale distributed systems and machine learning. He obtained his Ph.D. from the Cloud Computing and Distributed Systems (CLOUDS) Lab at The University of Melbourne, Australia, in 2021, with a focus on ML-based energy-efficient resource management techniques in cloud data centers. He has been actively involved in organizing committees, such as IC2E 2022, and IEEE Cloud 2022/2023, and has also served as workshop co-chair of ACM/IEEE HiPC 2019 and guest editor of Wiley SPE Journal 2021. He has received several awards for his research and service contributions, such as the ACM/IEEE CCGRID 2020 Best Paper Award and the IEEE TCCLD Outstanding Ph.D. Thesis Award (2022) and the IEEE Outstanding Service Award (2021).