Call for Papers for the Special Session

Prospects of edge AI:

algorithms, devices, and applications

Aim and scope of the special session

Internet of things (IoT) era will enable various activities having high impacts on the ways of works and human life based on intelligent computing with the information network system. With the remarkable progress in machine-learning algorithms on traditional large-scale processors with GPU acceleration, cloud AI technologies have allowed us to enjoy the benefits of intelligent computation targeting a broad range of data. However, recent surge in unstructured data obtained in edge domains brings about heavy network traffic and it is becoming unfeasible to utilize cloud computing with the present network system. Thus, developing disruptive technologies for this challenge is indispensable to implement next-generation information network systems.

The most promising technology is an emerging research field, called "edge computing" or "edge AI", that reduces network traffic with intelligent computing almost in edge domains. Edge AI requires computational performances completely different from those for cloud computing technologies: suitable and prompt computing of unstructured data with restricted hardware resources in terms of circuit scale, processing speed, power supply, and memory storage. In other words, higher priorities lie in real-time computation with highly-energy efficient ways, while the machine learning algorithm and required computing accuracy

change according to application.

The objective of this special session is to discuss challenges and future directions of AI systems, based on the novel computing paradigms specialized to edge AI. The special session covers various aspects: 1) novel machine learning models and algorithms, 2) novel AI hardware and neuromorphic devices, natural computing for hardware innovation, and 3) emerging AI applications in edge environments.

List of candidate topics

The topics of interest include (but not limited to).

1. Adaptation of existing cloud AI models and algorithms to edge environments:

- model compression, model pruning, lower precision numerical MAC operations
- new AI models algorithms specialized for edge environments

2. Novel AI/neuromorphic devices and natural computing for hardware innovation

- Digital and analog AI/neuromorphic devices
- Optical/Photonic Computing
- Physical reservoir computing (optics/photonics, materials, mechanics etc.)
- Probabilistic computing, Stochastic computing, Reversible computing
- Any other topics related to natural computing

3. Applications of edge AI utilizing the technologies specialized to edge environments

- Internet-of-Things, sensor data analytics
- Surveillance, anomaly detection
- Autonomous vehicles, robots and drones
- intelligent networking systems
- machine-to-machine(M2M) communications
- Any other topics related to edge AI

Special session organizers (* primary contact)

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Submission Instructions and important dates

Prospective authors should follow the guidelines of WCCI 2022.

https://wcci2022.org/submission/

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