



***IEEE Design & Test Special Issue Call for Papers:
Embedded Intelligence in the Internet-of-Things***

Aims and Scope:

Shortly, every human will be served by hundreds or thousands of sensing, decision making, and actuating machines, embodied as either as special-purpose components in the Internet-of-Things, or as more general-purpose mobile computing platforms such as smartphones. These smart things will be connected to each other, and the rest of the world. They will need to adapt to their environments and the needs of their users. For many that operate on battery or scavenged power, communication will impose severe energy consumption penalties. Decisions will be made locally, or local computation will be used to either convert sparse data to dense information for use elsewhere in the network; local analysis will be central to the quality of the results produced by the network. This implies new approaches to the design of machine learning hardware and algorithms, in which energy efficiency joins accuracy as a central optimization objective, and the communication and computation implications of partitioning machine learning algorithm components among embedded systems and higher-performance servers must be explicitly considered. This goes beyond the concepts of edge node feature extraction and data compression; partitioning may happen at any stage in the learning or classification pipelines, and may need to change dynamically. Further commercial advances in a wide range of application including autonomous vehicles, smart manufacturing, personalized medicine, as well as distributed and wearable sensing will be supported by new techniques for the design of efficient, application-aware embedded systems capable of learning about and adapting to their environments.

Topics of Interest:

This special issue will shed light on the recent advances enabling efficient machine learning and decision making on deeply embedded systems facing tight constraints on energy, computational load, and communication. The following topics are illustrative, but not exhaustive.

- low-overhead embedded machine learning algorithms;
- off-line training techniques and models tailored for use and efficient update in embedded application;
- tools and platforms for edge-to-cloud scaling in Internet-of-Things systems, and studies of these systems and applications;
- embedded intelligence in mobile computing systems;
- energy-efficient machine learning hardware for designing safe, reliable, dependable, and maintainable Internet-of-Things and mobile systems;
- security and privacy in embedded intelligence systems;
- verification and validation of these systems; and
- studies and analysis of embedded machine learning systems and applications.

Submission and Review Process:

Prospective authors should follow the submission guidelines for *IEEE Design & Test*. All manuscripts must be submitted electronically to IEEE Manuscript Central at <https://mc.manuscriptcentral.com/dandt>. Indicate that you are submitting your article to the special issue on Embedded Intelligence in the Internet of Things. Submitted manuscripts must not have been previously published or currently submitted for publication elsewhere.

Manuscripts must not exceed 5,000 words, including figures (with each average-size figure counting as 200 words) and a maximum of 12 references (50 for surveys). This amounts to about 4,000 words of text and a maximum of five small to medium figures. Accepted articles will be edited for clarity, structure, conciseness, grammar, passive to active voice, logical organization, readability, and adherence to style. Please see *IEEE Design & Test* Author Resources at http://www.ieee.org/publications_standards/publications/authors/magazines.html to view links in Submission Guidelines Basics and Electronic Submission Guidelines and requirements.

Schedule:

- Manuscripts due: 20 August 2018
- Reviews completed: 20 November 2018
- Revisions due: 20 December 2018
- Final version due: 15 February 2019

Guest Editors:

Robert P. Dick, *University of Michigan, USA*

Li Shang, *University of Colorado, USA*

Marilyn Wolf, *Georgia Institute of Technology, USA*

Shao-Wen Yang, *Intel Labs, USA*