

IEEE Design&Test Special Issue Call for Papers:

Intelligent Resource-Constrained Sensor Nodes

Guest Editors:

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Aim and Scope:

Following continued system miniaturization for over past 5 decades, the size of unit computing has been steadily shrinking. In foreseeable future, Computing will be all around us, in mostly invisible forms, and is expected to lead 50+ billions of IoT (Internet of Things) devices. At the forefront of which will be distributed sensing nodes acting as the eyes and ears of IoT.

Significant progress in the transducer community has made it possible to sense variety of parameters (images, video, audio, location, temperature, pressure, smell, among many others) in miniaturized sensor nodes. However, typically due the small form factors, such sensor nodes often face severe resource constraints (e.g. energy, size, latency, connectivity bandwidth). Future Intelligent Systems require such sensor nodes to intelligently work under varying operating condition, work with the network and cloud maximizing information transfer and cooperatively among themselves to increase collaborative intelligence. There will be huge amounts of data (some estimates project 30 exabytes per month in the world) generated by such IoT Sensor Nodes leading to network congestion. Moreover, since communication energy-cost is typically very high, sending all the generated data to the cloud leads to low sensor battery lifetime. This calls for transforming from the 'data domain' to 'information domain' (using in-sensor analytics) as soon as possible in the network hierarchy. The sensors need to 'learn' what to sense, when to sense and at what resolution, at an individual level and through collaboration among multiple sensors. The Sensor Nodes need to decide 'on-the-fly' how much to send to the cloud to minimize network traffic while maximizing information transferred and network intelligence.

Topics of Interest:

This special-issue will cover recent advances of such context-aware, self-learning, intelligent Sensor Nodes for IoT enabled by advances focused within the sensor nodes, operating under **severe resource constraints (e.g. energy, size, latency, connectivity bandwidth)**. Papers highlighting a focus on vertically integrated sensor node SoC design challenges are encouraged. Specific topics of interest include, but not limited to:

1. Context-Awareness under Resource Constraint in IoT Nodes
2. Intelligent Sensing (e.g. Compressed Domain Sensing, Subsampling and reconstruction, Collaborative Sensing)
3. Intelligent Computing and Architecture (e.g. In-Sensor Analytics, Compressed Domain Processing)
4. Intelligent Communication (e.g. Adaptive Radios, Cognitive Radios, Collaborative Radios, Sensor Nodes for Dynamically Reconfigurable Networks)
5. Intelligent Energy Management (e.g. Dynamically Reconfigurable Power Conversion LDO, Switching Mode, Energy-Management for intermittently powered devices)

6. Theoretical contributions focusing on system intelligence or collaborative-intelligence through interactions among the above
7. Other topics of general interest to Intelligent Resource-Constrained Sensor Nodes

Submission Guidelines:

Prospective authors should follow the submission guidelines for IEEE Design & Test. All manuscripts must be submitted electronically to the IEEE Manuscript Central Web site at <https://mc.manuscriptcentral.com/dandt>. Indicate that you are submitting your article to the special issue on “Intelligent Resource-Constrained Sensor Nodes”. All articles will undergo the standard IEEE Design & Test review process. 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 D&T Author Resources at <http://ieee-ceda.org/publication/paper-submission-instructions>, to view submission guidelines and requirements and to view important [author information](#).

Schedule:

- Articles due for review: 15th Aug, 2018
- Reviews completed: 15th Oct, 2018
- Article revisions due: 15th Nov, 2018
- Notice of final acceptance: 30th December 2018
- All materials due to edit: 15th Jan 2019
- Publication date: Mar/Apr 2019

Questions:

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