Special Issue on

Innovative design methods for smart embedded systems

Call for Contributions

Nowadays, smart systems are considered the solution to a wide range of challenges, from globalization to climate change. As a result, they are becoming more and more relevant in a large number of critical sectors, like energy management in public spaces, healthcare, automotive, safety and security.

Compared to classical embedded systems, a distinctive aspect for these systems is their *smartness*, that is the ability to learn from the previous experience and to seemly react to the surrounding environment. However, this tight interaction with the physical environment implies a high level of heterogeneity in the hardware architecture. At the same time, the application scenarios are getting more and more complex, since an increasing amount of computation is constrained by tight performance, cost and safety requirements. As a result, it becomes mandatory to properly co-optimize architectures, learning methods and their specific application with respect to the problem under analysis, especially when the systems are adopted in safety-critical environments or when integrating emerging technologies.

Novel and comprehensive methodologies are thus required to ease the development of next-generation smart systems, with the goal of reducing design costs and time-to-market. On one hand, it becomes necessary to investigate innovative machine learning and artificial intelligence techniques to improve the *smartness* of the architectures. On the other hand, architectures must be revised to include infrastructural innovations to efficiently and effectively support these techniques. Finally, the integration of these aspects has to be carefully validated as, in this context, it is increasingly necessary to analyze the dynamic behavior of the resulting systems and their reactivity to unpredictable events (e.g., component failures or unexpected environmental changes).

In response to such challenges, this special issue seeks original technical contributions on innovative architectural aspects and novel techniques for developing the next generation of smart embedded systems, to push towards their design and validation. This special issue is also seeking for original applications of smart systems and the analysis of practical advantages with respect to classical embedded systems.

Contributions are solicited on, but not limited to, the following topics:

- Innovative architectures and emerging technologies in smart systems
- Machine learning and artificial intelligence techniques for smart systems
- Robust design of efficient smart systems
- Specification languages, formal modeling and verification methods
- Simulation-based validation of heterogeneous smart systems
- Case studies and practical applications of smart systems (e.g., smart transportation, smart grid, smart buildings, smart medicine)

Submitted papers should not have been previously published nor be currently under consideration for publication elsewhere. Conference papers may only be submitted if the paper was completely re-written or substantially extended (30%). The papers should be submitted via the Manuscript Central website and should adhere to standard ACM TECS formatting requirements. The page count limit is 25.

Authors should submit their journal version at Manuscript Central adhering to the formatting instructions on the TECS Web page and indicate that you are submitting to the Special Issue on *Innovative design methods for smart embedded systems* on the first page and in the field "Author's Cover Letter:" in Manuscript Central. For additional questions please send an email to the Guest Editors.

Important Dates

Submission Deadline: 30 November 2014
Acceptance Notification: 1 February 2015
Final Papers: 1 March 2015
Publication: Summer of 2015 (subject to editorial calendar)

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