IEEE Design&Test

Call for Papers

Special issue on Approximate Computing: challenges, methodologies, algorithms and architectures for Dependable and Secure Systems

Aims and Scope:

Following the current trend, by 2040 computers will need more electricity than the world energy resources can generate. Already by 2025, data centers alone will consume 20% of all available electricity. A similar trend already exists on the communications side where, for example, energy consumption in mobile broadband networks and mobile terminals is comparable to datacenters. In addition to the traditional personal communications, the Internet-of-Things (IoT) will soon connect up to 50 billion devices through wireless networks to the cloud, which will accelerate these trends. In this scenario, the **Approximate Computing (AxC)** paradigm can pave the way to ease the power requirements and reduce the impact of the computation on the energy budget. It emerged almost 10 years ago with the promise of achieving significant gains in overhead reduction (i.e., energy, area and latency) at the cost of a slightly (i.e., still acceptable) precision reduction of the computing system leading to an accuracy degradation of the application executed on the AxC computing system. Many techniques as well as CAD tools have been developed so far targeting the different abstraction layers: Circuit, Architecture and Software.

However, in the past 4 years, AxC started to move from its infancy to the mainstream. Widely adopted Machine Learning algorithms already deeply leverage on AxC techniques, Hardware manufacturer started to exploit AxC in their designs (i.e., NVIDIA GPU Volta architecture). Finally, new applications domains start to exploit AxC such as **Testing**, **Dependability** and **Security**.

This special issue seeks original manuscripts that will cover connections between the AxC paradigm and the dependability and security of digital designs: (i) how the dependability and security can exploit AxC paradigm; (ii) how the AxC paradigm impacts the dependability and security of digital design.

Topics of Interest:
The special issue will feature works that address issues related to the interplay between Approximate Computing paradigm and Dependability and Security, with a special attention

to the interplay in Artificial Intelligence applications. Submissions in the following topics are requested, though not restricted to:

- Approximation techniques and tools for Dependable systems
- Approximation techniques and tools for Secure systems
- Dependability assessment models and techniques for Approximate Systems
- Dependability-oriented design of Approximate Systems
- Security evaluation for Approximate Systems
- Security-oriented design of Approximate Systems

Submission Guidelines:

The special issue particularly welcomes and encourages the submissions from industry or collaborative works between industry and academia for this fast-growing area.

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 Approximate Computing: challenges, methodologies, algorithms, and architectures for Dependable and Secure Systems. 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:

- Submission deadline: November 4th, 2020
- Reviews completed: February 10th, 2021
- Article revisions due: March 10th, 2021
- Notice of final acceptance: April 10th, 2021
- All materials due to edit: May 10th, 2021
- Publication date: by June/July 2021

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