Call for Papers: Special Issue on Stochastic Computing for Neuromorphic Architectures

Aim and Scope:

Artificial intelligence (AI) applications are a major driver in the hardware development of smart systems. An unprecedented number of proposals for better neuromorphic and neuro-inspired hardware architectures have been suggested, ranging from extremely large and high-performance "wafer-scale" circuits to using emerging nano-electronic devices for storing and manipulating information. The proposed special issue looks at neuromorphic hardware from a different perspective: How to provide sufficient AI and machine learning (ML) performance in applications with extremely limited resources like area, power, and energy? Among such approaches, stochastic computing promises outstanding area- and power-efficiency because it offers very compact and reliable realizations of the basic arithmetic operations found in a broad range of neuromorphic applications. One objective of the special issue is to introduce the readers with no stochastic computing background to this discipline. This will involve both: showcasing recent advances, and identifying open problems that prevent this technology from widespread adoption and developing solutions to address such problems. The special issue will also discuss interesting applications of stochastic computing to extremely low-cost and low-power realizations of neuromorphic and neuro-inspired architectures, including hardware implementation of convolutional neural networks.

The proposed special issue specifically addresses research presented at the SCONA (Stochastic COmputing for Neuromorphic Architectures) workshop co-located with the DATE 2020 conference in Grenoble in March 2020. The special issue is, however, open to all submissions, including those not presented at the SCONA workshop.

Topics of interest include but are not restricted to:

- Stochastic primitives for neural networks and other neuromorphic architectures
- Neuromorphic hardware architectures based on stochastic computing
- Methods for design, synthesis, analysis, and verification of stochastic circuits
- Stochastic circuits and architectures based on emerging technologies
- Applications of neuromorphic stochastic architectures and case studies

Submission Guidelines:

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 Stochastic Computing for Neuromorphic Architectures. 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:

Submission Deadline: 1 May

Notification First Round: 1 July

Submission of Revision: 1 August

Final Notification: 15 September

Final Papers Due: 30 September

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