Special Issue

Memristors for Neuromorphic Circuits and Artificial Intelligence Applications

Message from the Guest Editor

Artifial Intelligence (AI) is a pervasive technology usually implemented in software. However, the solid-state nanoelectronic implementation of the memristor (for the first time in 2008 by the HP group led by Dr. Stanley Williams), a device predicted by Prof. Leon Chua in 1971 using symmetry arguments, opens up a new frontier for AI: the so-called Deep learning ICs. Less-known by the general public, these hardware-based neuromorphic systems will allow distributed energy-efficient deployment of AI in many areas requiring real-time response, intelligent decision and fast action. In this Special Issue we will try to give a general overview of this new technology and review the concepts of machine learning and deep learning, focused on applications. We will cover the state-of-the-art technological implementation of the memristor as an electron device with particular emphasis on resistive devices such as ReRAM and PCM. We will also present the actual state-of-the-art of memristor-based deep learning prototypes for di□fferent applications. Finally, we will dedicate a few papers to ethical issues related to AI.

Guest Editor

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Materials (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

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