MIM WEBINARS MiM

AN IN-MEMORY COMPUTING SERIES

Next Talk: 17/May/2021, 4-5:30pm CET

MEMRISTOR BASED COMPUTATION-IN-MEMORY FOR EDGE AI: OPPORTUNITIES AND CHALLENGES

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Evolving IoT applications are extremely demanding in terms of storage, energy efficiency as well as intelligence. Todays' computer architectures fail to meet these requirements due to e.g., memory-processor data transfer bottleneck. Hence, alternative computing architectures are being explored in the light of emerging new device technologies.

This talk provides a broad overview of memristor based computation-in-memory (CIM) architectures, gives its potential in enabling smart local energy efficient computing, and highlights the major challenges ahead. The talk first briefly addresses the need of new computing paradigm with energy efficiency of order of fJ/operation to enable zillions of e.g., edge applications, and shows the limitations of both CMOS scaling and today's computing architectures. Then it classifies the sate-of-the art computer architectures and highlight how the trends is going toward computation-in-memory (CIM) architectures in order to eliminated and/or significantly reduces the limitations of today's technologies. The concept of CIM based on memristor devices is discussed and logic and arithmetic circuit designs using such devices and how they enable such architectures are covered; data measurements are shown to demonstrate the CIM concept in silicon. The strong dependency of application domains on the selection of appropriate CIM architecture and its building blocks, as well as the huge potential of CIM (in realizing order of magnitude improvement in terms of energy efficiency) are illustrated based on some case studies. Future CIM challenges including architectures, design, test, and reliability are highlighted.

More information about the event and the speaker:
https://www.ict.tuwien.ac.at/staff/taherinejad/MiM/

Said Hamdioui is currently Chair Professor on Dependable and Emerging Computer Technologies, Head of the Computer Engineering Laboratory (CE-Lab), and also serving as Head of the Quantum and Computer Engineering department of the Delft University of Technology, the Netherlands. He is also co-founder and CEO of Cognitive-IC, a start-up focusing on hardware dependability solutions. Hamdioui received the MSEE and PhD degrees (both with honors) from TUDelft. Prior to joining TUDelft as a professor, Hamdioui worked at Intel Corporation (Califorina, USA), at Philips Semiconductors R&D (Crolles, France) and at Philips/ NXP Semiconductors (Nijmegen, The Netherlands). His research focuses on two domains: Dependable CMOS nano-computing (including Testability, Reliability, Hardware Security) and emerging technologies and computing paradigms (including memristors for logic and storage, in-memory-computing, neuromorphic computing, etc).

For more details, see his website: http://ce.et.tudelft.nl/Hamdioui