MIM WEBINARS

AN IN-MEMORY COMPUTING SERIES

Next Talk: 15/November/2021, 4-5:30pm CET

IN-MEMORY COMPUTING BASED MACHINE LEARNING ACCELERATORS: OPPORTUNITIES AND CHALLENGES

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Traditional computing systems based on the von Neumann architecture are fundamentally bottlenecked by data transfers between processors and memory. The emergence of data-intensive workloads, such as machine learning (ML), creates an urgent need to address this bottleneck by designing computing platforms that utilize the principle of co-located memory and processing units. We present a comprehensive overview of the emerging paradigm of computing using NVM and CMOS based crossbars for accelerating ML workloads. We describe the design principles of crossbars, including the devices and associated circuits that constitute them. We discuss intrinsic approximations arising from the device and circuit characteristics and study their functional impact on the MVM operation. Next, we present an overview of spatial architectures that exploit the high storage density of NVM crossbars. Furthermore, we elaborate on software frameworks that effectively capture device–circuit–architecture characteristics to evaluate the performance of large-scale deep neural networks (DNNs) using resistive crossbar-based hardware. Finally, we discuss open challenges and future research directions that need to be explored in order to realize the vision of resistive crossbars as the building blocks of future computing platforms.

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

Mondays in Memory (MIM) is a free biweekly webinar series open to everyone around the world and dedicated to all aspects and technologies related to in-memory computing (including, in a broader sense, near-memory computing too). MIM will be held on the first and third Monday of each month (starting in May 2021) at 4pm CET (7am Pacific time, and 10pm Beijing time).
Each webinar starts with a 40mins talk by a speaker, followed up with a 40mins questions and discussions with the speaker and two panel members. Dr. Nima Taherinejad hosts the webinars, and together with his team they organize the MiM series.

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Kaushik Roy is the Edward G. Tiedemann, Jr., Distinguished Professor of Electrical and Computer Engineering at Purdue University. He received his BTech from Indian Institute of Technology, Kharagpur, PhD from University of Illinois at Urbana-Champaign in 1990 and joined the Semiconductor Process and Design Center of Texas Instruments, Dallas, where he worked for three years on FPGA architecture development and low-power circuit design. His current research focuses on cognitive algorithms, circuits and architecture for energy-efficient neuromorphic computing/ machine learning, and neuro-mimetic devices. Kaushik has supervised 91 PhD dissertations and his students are well placed in universities and industry. He is the co-author of two books on Low Power CMOS VLSI Design (John Wiley & McGraw Hill). For more information, please see his webpages at https://engineering.purdue.edu/NRL/Group