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