Ira A. Fulton Schools of Engineering
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Brain-Inspired Architecture for Efficient Learning and Robust Computing

Tuesday, March 17th
GWC 487
10:00 – 11:30 a.m.

ABSTRACT

Modern computing systems are plagued with significant issues in efficiently performing learning tasks. In this talk, I will present a new brain-inspired computing system that supports various learning tasks while offering significantly high computation efficiency and robustness than existing platforms.

My platform utilizes HyperDimensional (HD) computing, an alternative method of computation that implements principles of the brain functionality: (i) fast learning, (ii) robustness to noise/error, and (iii) intertwined memory and logic. These features make HD computing a promising solution for today's embedded devices with limited resources as well as future computing systems in deep nanoscaled technology that have issues of high noise and variability.

To leverage the memory-centric nature of HD computing, I exploit emerging technologies to enable processing in-memory which is capable of highly-parallel computation and data movement reduction. I will also show how this architecture can accelerate a wide range of big data applications such as deep learning.

BIOGRAPHY

Mohsen Imani is a Ph.D. candidate in the Department of Computer Science and Engineering at UC San Diego. His research interests are in brain-inspired computing, computer architecture, and embedded systems. His contributions resulted in grants funded by many governmental agencies (four NSF, three SRC) and industries including IBM, Intel, Micron, and Qualcomm. In addition, his Ph.D. research was the main initiative to open a new DARPA program focusing on brain-inspired computing.

Mohsen has received multiple prestigious awards from the UCSD school of engineering including the Gordon Engineering Leadership Award, the Outstanding Graduate Research Award, as well as the Best Doctorate Research Award at the Computer Science Department. He also received several nominations for the best paper awards from multiple conferences, including Design Automation Conference 2019.

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