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Centre for Electronics Frontiers & CDT-MINDS Webinar

Toward neuromorphic intelligence for edge computing applications

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Biography

Melika Payvand is a research scientist at the Institute of Neuroinformatics, University of Zurich and ETH Zurich. She received her M.S. and Ph.D. degree in electrical and computer engineering from the University of California Santa Barbara in 2012 and 2016 respectively. Her research activities and interest is in exploiting the physics of the computational substrate for online learning and sensory processing on the edge. She is co-coordinating the European NEUROTECH project and is in the scientific committee of the Capocaccia workshop for neuromorphic intelligence. She is serving as the chair for the neural network and neuromorphic engineering track at the IEEE flagship conference International Conference in Circuits and Systems (ISCAS), and is in the technical committee of Neural Systems, Applications and Technologies in Circuits and System society. She is a guest editor of Frontiers in Neuroscience and is the winner of the best neuromorph award of the 2019 Telluride neuromorphic workshop. Her research has resulted in more than 30 peer reviewed journal articles, book chapters and conference proceedings.

Abstract

Our digital society is shifting to an era of pervasive "edge-computing" systems designed to process signals in continuous time for a wide variety of tasks. Artificial Intelligence (AI) is fuelling this revolution and enabling these systems to achieve remarkable results for both pattern recognition and generation. However, the current technology used to run AI algorithms is not optimally suited for the low-power and real-time requirements of edge-computing devices and cannot sustain the growing needs for embedding such systems in all aspects of our daily lives. Moreover, learning is an important part of the problem since the training process typically requires large amounts of memory and power. Neuromorphic technology proposes a solution to directly process such data in-situ and in real-time, using biologically-inspired methods to process and learn data in parallel under stringent power and area budgets. In this talk, I will present some of our efforts in designing and benchmarking this technologies on edge computing applications. Moreover, I propose some learning technologies for edge devices which can learn from the data they monitor in an always-on fashion.

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