IJCNN2021
VIRTUAL EVENT
18-22 JULY 2021

WORKSHOP: DEEP LEARNING IN UNCONVENTIONAL NEUROMORPHIC HARDWARE

Call for abstracts

Submit abstracts by
April 30, 2021

Workshop website 🔗

https://events.femto-st.fr/DLUNH/

Workshop on Deep Learning in Unconventional Neuromorphic Hardware
1-day workshop, virtual event

Organizing committee
- Gallicchio, Claudio (University of Pisa)
- Brunner, Daniel (FEMTO-ST)
- Soriano, Miguel C. (IFISC, CSIC-UIB)

Program committee
- Porte, Xavier (FEMTO-ST)
- Semenova, Nadezhda (FEMTO-ST)
- Estébanez, Irene (IFISC, CSIC-UIB)

Description

The importance and impact of Deep Learning and Deep Neural Network methodologies are by now widely accepted. This exceptional success is nowadays associated with special purpose hardware acceleration technologies (e.g., GPUs, TPUs), based primarily on conventional electronic hardware. However, the observed architecture of biological neural systems fundamentally differs from von Neumann processors. Following a biological inspiration, unconventional neuromorphic hardware using photonics, 3D integration, spintronic, in-memory substrates, and architectures attract increasing attention as a way to implement Deep Learning algorithms. The common objective is to leverage substrate or architecture inherent advantages in terms of speed, power consumption, latency, and scalability.

A significant effort to increase synergy between neuromorphic computing substrate developments and Deep Learning concepts is needed. This includes developing high-performance Deep Neural Networks topologies amenable to neuromorphic implementations, finding solutions to manage the intrinsic physical noise for neuromorphic computation, and exploring learning solutions alternative to Backpropagation. Simultaneously, inherent properties of neuromorphic substrates motivate novel Deep Learning models and algorithms with intriguing possibilities, for example leveraging intrinsic continuous dynamics offered by photonics.

This workshop intends bringing researchers from different backgrounds (including without being limited to Physics, Computer Science, and Engineering) together to address the challenges posed by developing Deep Learning in unconventional neuromorphic hardware. It aims at providing the ideal platform for cross-pollination of views among the diverse covered fields.

Topics

Accordingly, we call for contributions that address (without being limited to) the following topics:
- Deep Learning concepts for neuromorphic implementations:
  - Deep Neural Networks based on linear dynamics and/or partially untrained layers
  - Neural ODEs and Continuous-depth neural architectures
  - Spiking Neural Networks
  - Noise-engineering
  - Learning in deep neural architectures beyond Backpropagation
- Computational and neuromorphic concepts, including
  - Analogue and distributed computing
  - Quantum hardware reservoirs
- Unconventional and next generation hardware:
  - In memory computing
  - Massively parallel hardware networks
  - 3D integrated Neural Network integration
  - Photonic computing

Invited speakers

- Kohei Nakajima (University of Tokyo)
- Julie Grollier (CNRS/Thales lab)
- Sylvain Gigan (Sorbonne Université / Ecole Normal Superior)

Abstract Submission

We ask for extended abstracts of maximum 2 pages. For submissions, please visit the following website:
https://easychair.org/conferences/?conf=dlunh21

Important dates

- Abstract submission deadline: April 30, 2021
- Decision notification: May 30, 2021

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