FABRIZIO OTTATI

Digital hardware design for deep learning

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RESEARCH TOPIC

In my Ph.D., I am focusing on the acceleration of **Spiking Neural Networks** (SNNs) on digital circuits. In particular, I am targeting **FPGA** platforms, using **high level synthesis** (HLS), and focusing on computer vision tasks that take advantage of **event cameras**.

I am also investigating the upper layers of the design stacks: in particular, I am looking at **compiler** optimizations, using frameworks such as **LLVM** and **MLIR**, that allow to improve the performance and resource usage on FPGAs.

In conclusion, I am mainly interested in **computer architecture** and **digital hardware** design and automation for **deep learning** inference, at the different levels of the design stack.

PROJECTS

Open Neuromorphic

Open Neuromorphic is an organisation that promotes open source software and hardware in the neuromorphic computing research field.

Expelliarmus

expelliarmus is a library that allows to decode binary files generated by Prophesee cameras to NumPy structured arrays.

Tonic

Tonic provides publicly available event-based vision and audio datasets and event transformations.

EXPERIENCE

Visiting researcher

Cognitive systems and nodes - Professor Charlotte Frenkel

Feb 2023 - Sep 2023 | TU Delft

Design of an FPGA accelerator for the neuromorphic controller of an autonomous drone, in collaboration with MAVLab, led by Professor Guido De Croon.

PUBLICATIONS

- *To Spike or Not To Spike: A Digital Hardware Perspective on Deep Learning Acceleration*, Fabrizio Ottati et al., ArXiv, 2023.
- *NeuroBench: Advancing Neuromorphic Computing through Collaborative, Fair and Representative Benchmarking*, Jason Yik et al., ArXiv, 2023.
- *Custom Memory Design for Logic-in-Memory: Drawbacks and Improvements over Conventional Memories*, Fabrizio Ottati et al., ArXiv, 2021.

TECHNICAL SKILLS

Deep Learning | PyTorch | Git | C/C++ | Unix | FPGA | Digital Hardware Design | Computer Architecture | High Level Synthesis

SOFT SKILLS

Leadership | Proactivity | Resourcefulness | Integrity | Openness to criticism

LANGUAGES

Italian ● ● ● ● ●
Mother tongue
English ● ● ● ● ○

EDUCATION

Ph.D. in Electronics and Telecommunications Engineering

Politecnico di Torino

Nov 2020 - Feb 2024

M.Sc. in Electronic Engineering, Microelectronics

Politecnico di Torino

Oct 2017 - Apr 2020

Grade: 110/110 cum laude.
GPA: 29.6/30.

B.Sc. in Electronic Engineering

Politecnico di Torino

Oct 2014 - Oct 2017

Grade: 108/110.
GPA: 27.93/30.