MACHINE LEARNING ON EDGE DEVICES

Assignment

Machine learning (or better: Deep Learning) has become a standard in the industry. Applications such as facial recognition in video surveillance and object classification in spam filtering are real time processes and are deployed in a wide range of devices everybody uses today, like your smartphone or cameras.

Intuitively, a GPU should do the job, but it requires a lot of interaction with the CPU. This calls for low-latency architectures. One example is the Field Programmable Gate Array (FPGA) devices. Along the FPGA programmable logic, it integrates ARM processors, and RAM to optimize latency.

Activities

In this internship you will explore the frameworks for deploying ML models on edge devices.

Leading manufacturer in the field of FPGAs is Xilinx (Vitis-AI), but Coral.ai TPU (TensorFlow-Lite) is another type of edge device, which may compete with the GPU AI inference products by NVIDIA (TensorRT).

Internship overview

- Master Student
- Internship
- Mathware / Electronics / Technical software
- Location: Eindhoven

Technologies

- Computer vision
- Deblurring
- Superresolution
- Image denoising
- Deep Learning

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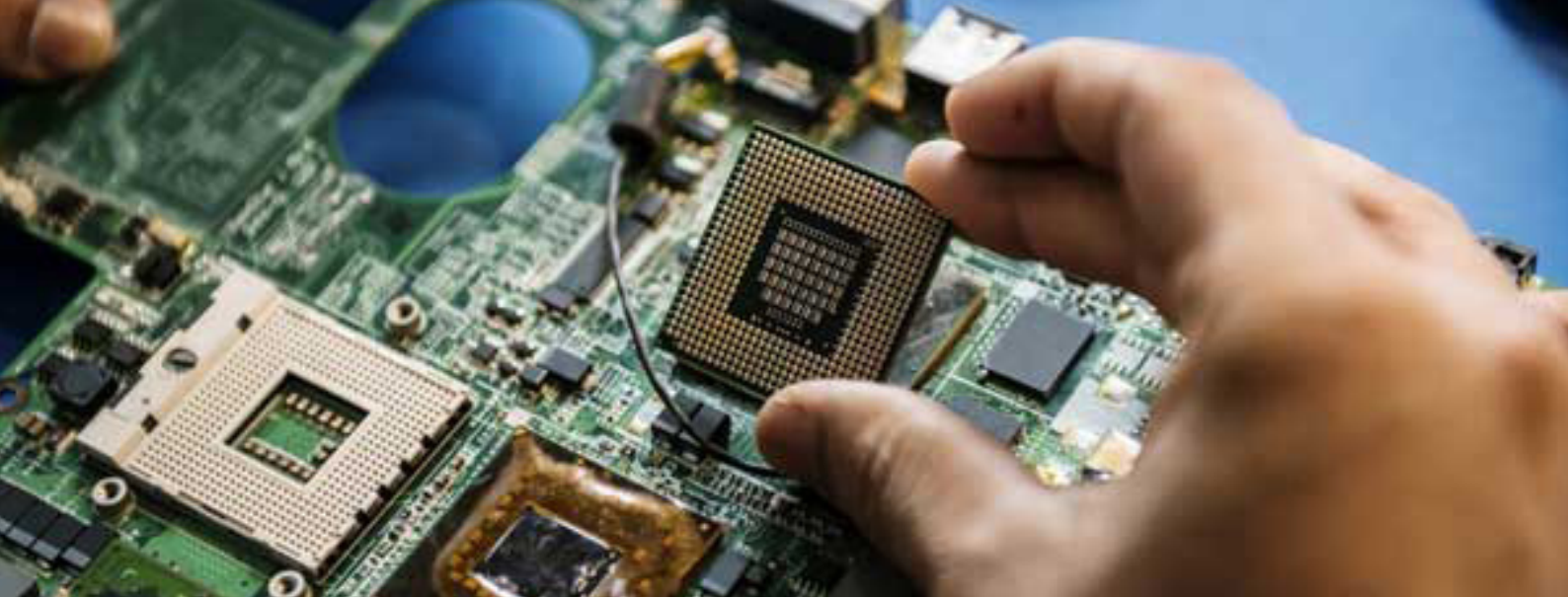
Context

We use high-level languages in the deployment of the latest ML models and image processing on the FPGA boards. A typical ML project consists of two phases. The first optimizes the weights in the model and the second is the inference phase, in which the trained model is deployed on the FPGA device.

The big difference with developing for CPU and GPU is that programming an FPGA device is harder and requires more steps. But recent trends show that manufacturers abstract all the programming to higher levels using languages such as Python, OpenCL and C++. This means that most of the low-level programming is hidden, and therefore, hardware has become accessible to the engineer without much knowledge of FPGAs.
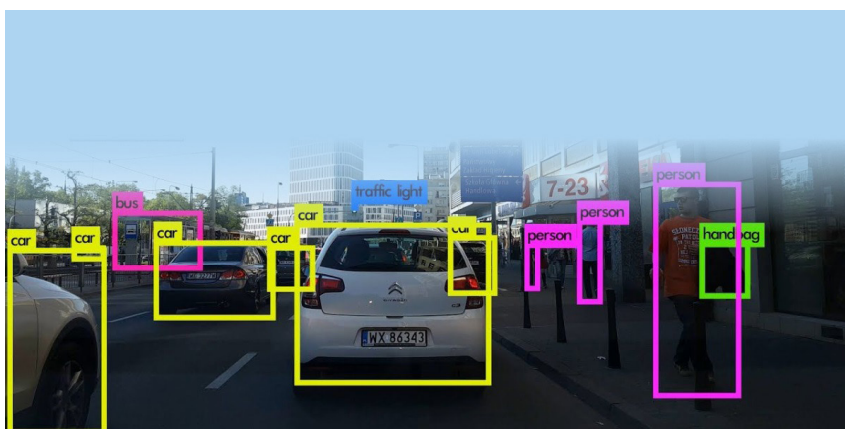
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Get in touch!
Would you like to know more about this student assignment?

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