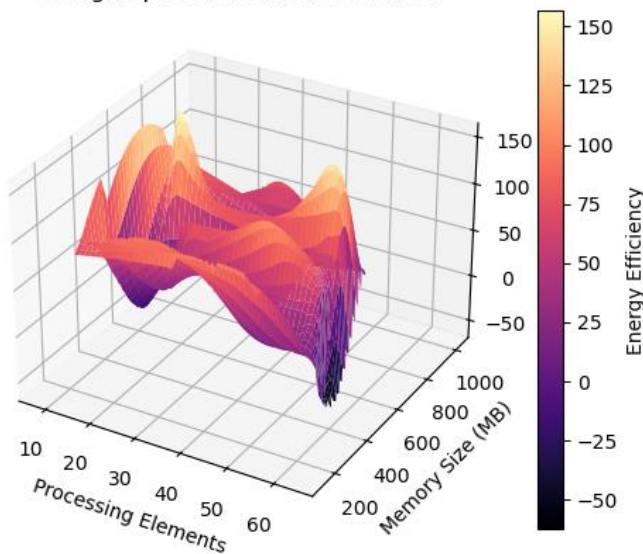


# Chair for Embedded Systems

Prof. Dr. J. Henkel

## Multiple Bachelor/Master Theses Design Space Exploration for Deep Neural Networks

Design Space for DNN Accelerator



Particularly in the last decade, **Deep Neural Networks (DNNs)** have shown outstanding improvements in machine learning. These improvements have allowed them to be used in various applications such as natural speech recognition, pattern recognition, etc. As the number of DNN application domains grows, there is a need for efficient DNN implementations, so that with reasonable effort, good outcomes may be achieved.

There is a large design space when it comes to mapping DNNs to a particular architectural hardware platform like FPGAs and others, as far as design techniques are concerned. Finding an optimal or near-optimal design point requires a systematic **design-space exploration (DSE) process**.

This project aims to explore the architectural design space of mapping DNNs on FPGA platforms, leveraging techniques such as systematic DSE and evolutionary algorithms. Depending on your interest and depending on whether it is a BA or MA, the tasks could include (but are not limited to):

- Evaluate state-of-the-art DSE frameworks
- Visualize different mapping strategies
- Explore evolutionary algorithms for DSE

### Skills required/beneficial for the thesis

- Programming skills (C++, Python)
- Background in deep neural networks

### Skills acquired within the thesis

- Apply your programming experience to research
- Gain practical insight in DNN implementations, design-space alternatives, and algorithms and tools for automatic DSE

### Language

- The collaboration with the colleagues can be in English

### Contact

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