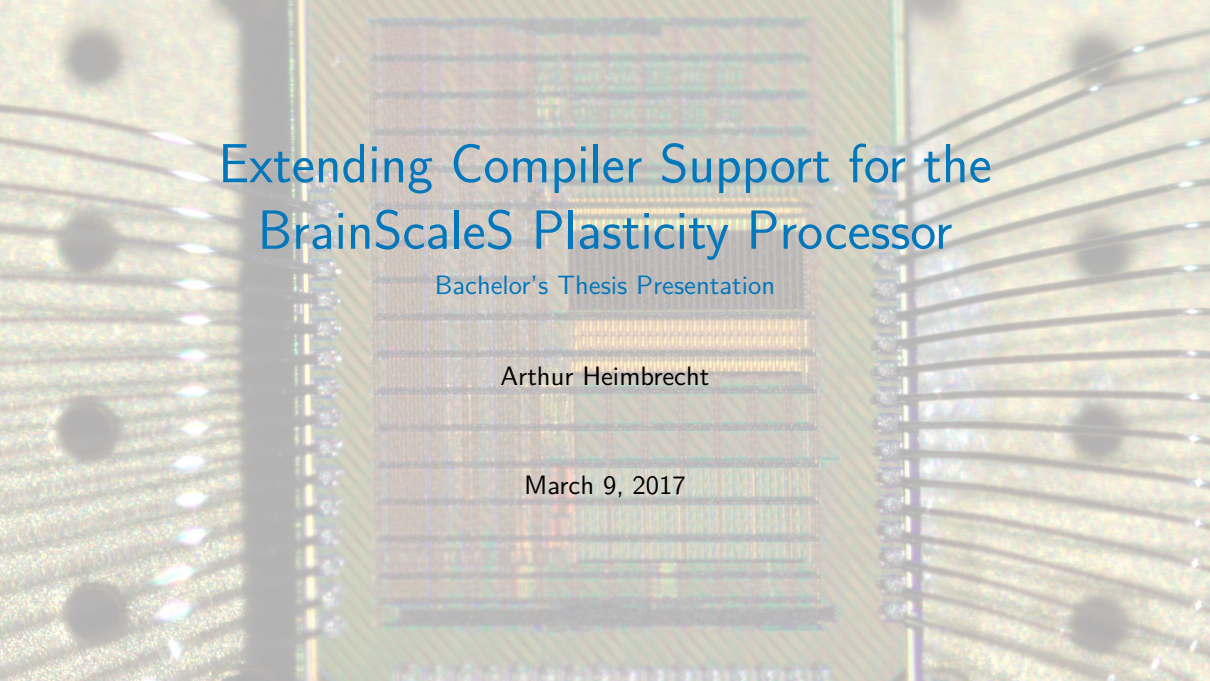


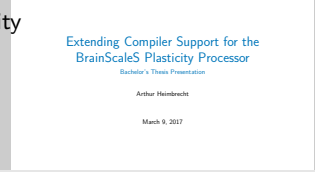
Extending Compiler Support for the BrainScaleS Plasticity Processor

Bachelor's Thesis Presentation

Arthur Heimbrecht

March 9, 2017

Extending Compiler Support for the BrainScaleS Plasticity Processor



Welcome everybody to this talk about my Bachelor thesis. As this is a quite technical talk, feel free to ask questions at any time.The topic of my thesis was Extending Compiler Support for the BrainScaleS Plasticity Processor.

Contents

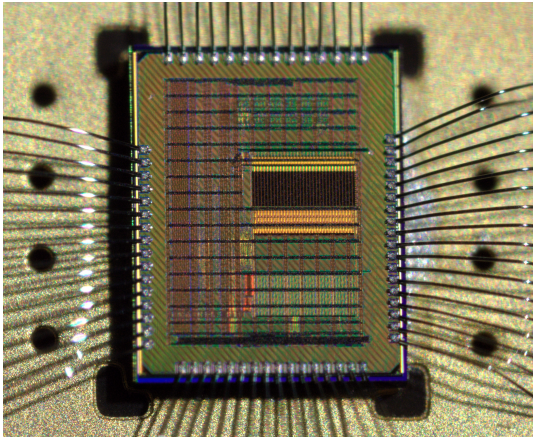
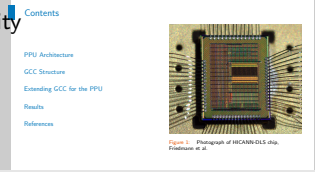


Figure 1: Photograph of HICANN-DLS chip, Friedmann et al.



as the title hints there are two main components to this talk, which are the plasticity processing unit (PPU) and Compilers. I will briefly talk about both of these and their applications. Afterwards I will explain, what I did during my thesis, which is of course followed by a short presentation of the result.

PPU Architecture

The design is clean

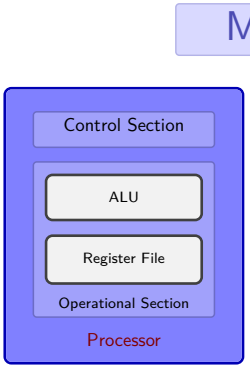
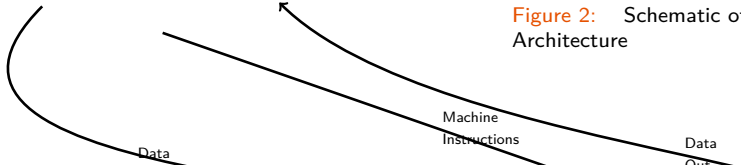


Figure 2: Schematic of Processor in von-Neumann Architecture



The design is clean
The rules are simple
The code is extensible

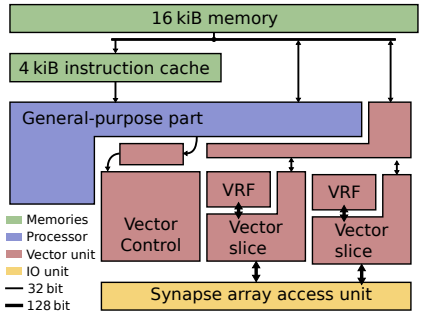


Figure 3: Structure of nux Architecture

GCC Structure

The design is clean
The rules are simple
The code is extensible

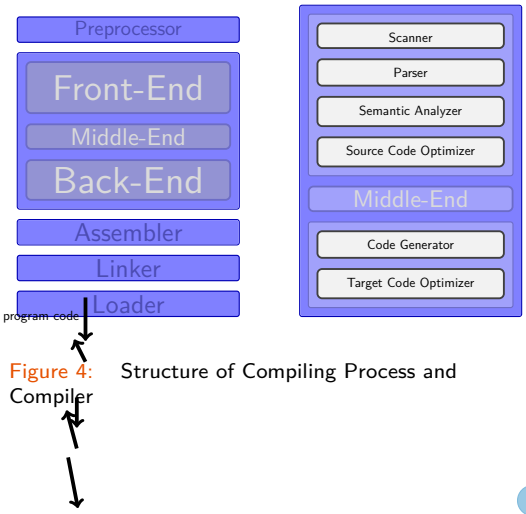


Figure 4: Structure of Compiling Process and Compiler

Extending GCC for the PPU

Results

 Simon Friedmann et al. “Demonstrating Hybrid Learning in a Flexible Neuromorphic Hardware System”. In: (2016).