

## Bachelor's Thesis (taken)

### Implementation and Profiling of XCS in the Context of Embedded Computing

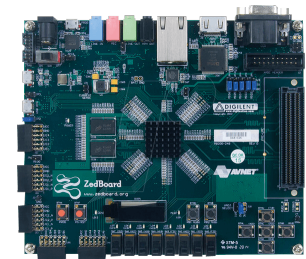
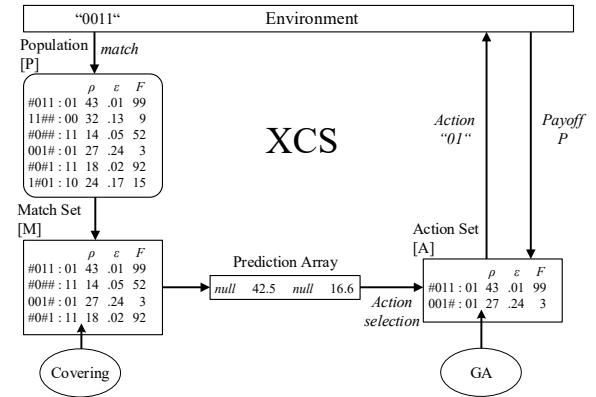
Self-aware computing systems continuously reason about their environment to self-adapt to changes and maintain optimal behavior. Learning Classifier Systems (LCS) are prominent techniques to introduce such self-awareness capabilities. The most studied variant is XCS, which is a rule-based learning technique that combines Reinforcement Learning with a Genetic Algorithm. On embedded systems, XCS allows to adapt to the external environment, e.g. to minimize the energy consumption, provided it is not too computationally intensive. Hence, the goal of this thesis is to investigate the computational load that XCS imposes on resource-constrained embedded systems.

#### Type of project

- Implement XCS on the ARM CPU of a Xilinx System-on-Chip (SoC)
- Profile multiple runs of XCS with different learning problems and configurations
- Evaluate the results and determine parameter settings to deploy XCS resource-efficiently

#### Prerequisites

- Programming skills (C/C++)
- Interest in embedded computing and/or machine learning



Supervisor

Tim Hansmeier, O3 116

[tim.hansmeier@uni-paderborn.de](mailto:tim.hansmeier@uni-paderborn.de)

