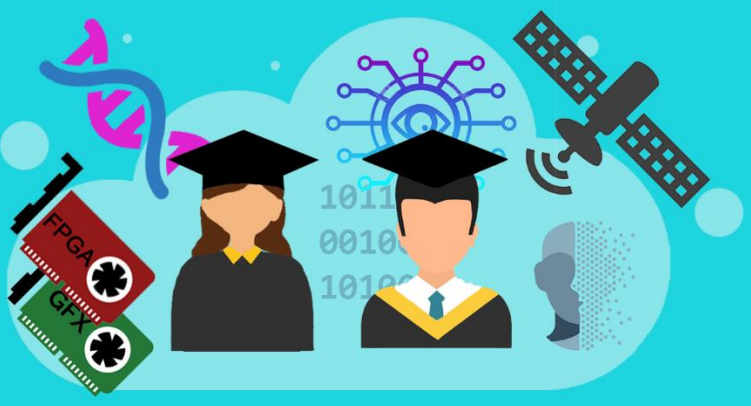
Diploma Thesis

Microproccessors and Digital Systems Laboratory



Development of scalable control techniques for resource management of large scale asymmetric many-core systems

Resource management strategies for many-core systems need to enable sharing of resources such as power, processing cores, and memory bandwidth while coordinating the priority and significance of system- and application-level objectives at run-time in a scalable and robust manner. State-of-the-art approaches use heuristics or machine learning for resource management, but unfortunately lack formalism in providing robustness against unexpected corner cases. While recent efforts deploy classical control-theoretic approaches with some guarantees and formalism, they lack scalability and autonomy to meet changing run-time goals.

The goal of this thesis is to explore supervisory control techniques for many-core systems and optimize them for large scale asymmetric many-core systems. Specifically, we need to combine the strengths of classical control theory with state-of-the-art heuristic approaches to efficiently meet changing runtime goals.

PREREQUISITES:

Good knowledge of C/C++, computer architecture, control theory

READING MATERIAL:

1. SPECTR: Formal Supervisory Control and Coordination for Many-core Systems Resource Management

2. Yukta: Multilayer Resource Controllers to Maximize Efficiency Approximation-aware coordinated power/performance management for heterogeneous multi-cores.

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