Chair of Computer Architecture and Parallel Systems
Faculty of Informatics
Technical University of Munich

BA/MA

Porting Rodinia Benchmarks for Heterogenous HPC-Systems

The Chair of Computer Architecture and Parallel Systems searches for a BA/MA in the field of **Parallel Programming and High Performance Computing.**

Background

HALadapt is a hardware abstraction layer implemented as a runtime system. The runtime system is based on a library approach that operates independently of the operating system and the underlying hardware.

HALadapt offers the user the possibility to define a kernel that can be a complete algorithm or just a simple matrix multiplication. For such a kernel, the user can provide several implementation variants for different processing units and system states. When beforehand defined kernels are selected for execution, the runtime system is able to dynamically select the implementation that best fits to an eligible optimization objective and the current system state. The data necessary for a selection decision is collected empirically by monitoring the execution at runtime. So, HALadapt possess a data base which stores past execution times of an implementation with the problem size acting as a key. If enough data is available the data base also allows predicting execution times of unknown problem sizes. Besides the dynamic selection of the best fitting implementation, the runtime system also makes sure that the input data necessary for execution is available on the corresponding processing unit at the time of execution. Hence, the user does not have to care about data transfers.

Work Packages

- Understand Rodinia Benchmarks and HALadapt
- Provide HALadapt Implementation for Rodinia Benchmarks
- Performance Evaluation and Optimization

Your Profile

- Bachelor/Master's Student in higher semester
- Knowledge in Parallel Programming (e.g. Lecture: Parallel Programming, Parallel Program Engineering)
- Knowledge in GPU, HPC-Systems is a plus
- English/German Communication Skill
- Willingness to Travel to Karlsruhe/Munich

Contact (Appointment by Arrangement)

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In Cooperation with:
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Institute of Computer Science & Engineering (ITEC)
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