Research Assistant / Master's Thesis

Characterizing Memory Accesses in a City-Scale Traffic Simulator
Full Time Position at TUMCREATE, Singapore

Availability: Now
Contact: Dr. Philipp Andelfinger (philipp.andelfinger@tum-create.edu.sg)

Background

We have an open position for a research assistant at **TUMCREATE in Singapore** with a background in Computer Science focusing on performance engineering and parallel computing.

Objective & tasks

TUMCREATE is researching into the Ultimate Public Transport System (UPTS) for Singapore based on autonomous mobility and enabling infrastructure. Large-scale computer simulations are employed in order to design and evaluate the envisioned transport system. To counter the enormous runtimes of large simulations, each simulation run is parallelized across a number of interconnected execution nodes. However, after parallelization, communication over a network is required to reflect the interactions within the simulation, instead of the local memory accesses in a sequential simulation. If detailed information about the memory accesses in the simulator were available prior to parallelization, the simulation could be partitioned in a way that minimizes network traffic and thus decreases the simulation runtime.

The goal of the Master's thesis is to create a tool to characterize the memory accesses within an existing traffic simulator. The tool will generate graphs that show the amount of data accessed across class boundaries in a C++-based simulator. Existing memory profiling tools such as *valgrind* will be applied and extended to identify the source code locations associated with memory accesses and thus to provide the basis for determining source and destination classes of memory accesses.

What we expect from you

- Bachelor's Degree in Computer Science or similar
- Strong programming skills in C or C++
- Good understanding of operating system concepts such as system calls and virtual memory
- Experience with profiling and debugging tools
- Proficiency in at least one scripting language (e.g., Perl or Python).
- Ability to work independently
- Motivation to learn new topics
- Good communication skills

What we offer you

- An international and multidisciplinary working environment
- Opportunity to work on a project with real-life relevance
- Work with researchers from world-renowned Universities (TU Munich and NTU Singapore)

Send your resume/CV to the contact person if interested
NOTE: Only shortlisted candidates will be contacted