CS554 Project Ideas

GeMTC:MTCSim - Analyze Many-Task Computing Workflows on GPU Simulators

Overview
General Purpose Computation on Graphics Processing Units (GPGPU) has enabled many applications to offload compute intensive work to an accelerator such as a GPU. This has the opportunity to free the host CPU and allow for more efficient computations to process on high performance resources. The MTC paradigm involves running many tasks over a short period of time, where the primary metrics are measured in seconds.

The goal of this project is to take existing GPGPU simulators such as GPGPU-Sim and run Many-Task Computing Workloads analyzing important metrics from the workloads.

A successful project will complete the following steps:
- Identify advantages/disadvantages of several GPGPU simulators (i.e., GPGPU-Sim)
- Run MTC Workloads across simulators for comparison.
- Adjust GPGPU Simulator Settings to account for current and future generations of hardware.

Relevant Systems and Reading Material
GeMTC – http://datasys.cs.iit.edu/projects/GeMTC
Swift – http://swift-lang.org

Preferred/Required Skills
No GPU programming skills required!
Preferred: OpenMP, Threaded programming. Required: C

Project Mentor
I am a 3rd year Ph.D. student and 2013 Starr/Fieldhouse Research Fellow from the Department of Computer Science at the Illinois Institute of Technology. I work as a Research Assistant in the Data-Intensive Distributed Systems Laboratory, a Teaching Assistant for the Department of Computer Science, and a Guest Graduate Student Researcher at Argonne National Laboratory.

I am involved in the GeMTC project, which aims to provide improved programmability and efficiency of hardware accelerators (GPGPUs, Intel Xeon Phi) in the Distributed Systems and High-Performance Computing spaces.

More information can be found at http://datasys.cs.iit.edu/~skrieder and http://datasys.cs.iit.edu