CS554 Project Ideas

GeMTC:GMon – Extend GeMTC with Monitoring and Visualization Capabilities

Overview

GeMTC is a CUDA based GPGPU framework which allows Many-Task Computing (MTC) workloads to run efficiently on NVIDIA GPUs. Users call a C API, which allows their task to be scheduled and run on a GPU. Users push a TaskDescription to the GPU, which is a structure containing the application they would like to run, and any parameters for that application. Applications that run inside of GeMTC are referred to as Micro-Kernels.

The successful completion of this project will achieve the following steps:

- Log important GeMTC operations that occur on both the CPU and GPU.
- Calculate important dynamic metrics:
    o How long did an application (Micro-Kernel) run?
    o How long was a worker busy/idle?
- Visualize metrics and automatically push them to a web browser for quick viewing.

Relevant Systems and Reading Material

GeMTC – http://datasys.cs.iit.edu/projects/GeMTC

Xeon Phi - http://software.intel.com/en-us/mic-developer

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

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