Title

Methodologies and Performance Impacts of General Purpose Computing on GPUs

Author

Shinichi Yamagiwa (Kochi University of Technology)

Abstract

Graphics Processing Units (GPUs) has been applied to graphics applications to implement realistic perspectives of virtual scenes especially in entertainment market. Due to the demands from the market for creating super high definition scenes with high frame rate that simulates physics phenomenon naturally in visualization applications, the last decade promoted drastic performance improvement of GPUs. Obtaining the growth rate more than the Moore's law, in the very near future, performance of GPUs will reach 10TFLOPS due to concurrent execution of multithreads on its multicore/manycore architecture. Researchers from the high performance computing field focus on the incredible high performance, and recently they are going to apply the GPU horse power to general purpose applications. This field is called the General Purpose computing on GPUs (GPGPU). When we program any application in a GPGPU environment, it is hard to extract the potential performance of GPUs because originally it is designed to process graphics applications. Therefore, to grab the best performance, the programmer needs to master the hardware architectural and the processing conceptual aspects of GPUs. This tutorial will begin to focus on such aspects of GPGPU environment, and will introduce the recent methodologies of advanced programming at GPGPU environment. The tutorial will also discuss performance impacts presenting recent research results from Caravela Projects led by the speaker.