

硕 士 研 究 生 读 书 报 告



题目 基于GPU的并行计算设计与分析

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Design and Analysis of Parallel Computation Based on GPU

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摘要

本文探讨了如何通过GPU来实现并行计算，从而解决高性能计算机计算的问题。在现如今GPU的并行计算经过了很多年的发展，而且GPU设备的性能以及并行度也得到了很大的提高。由于GPU并行处理特性的优势，可以利用GPU的并行计算的技术来加速计算的速度，其广泛应用在图像处理、信号处理、全息计算等领域。OpenCL提供了统一的对不同并行计算平台的编程接口，通过使用OpenCL提供的接口，我们可以就利用GPU实现并行计算。混合OpenCL的技术可以提供跨平台的分布式的并行计算。本篇阐述了OpenCL以及混合OpenCL的设计与实现，并且分析了OpenCL利用GPU加速的性能。

**关键词**：GPU，OpenCL，混合OpenCL，并行计算

Abstract

This paper will introduce how to implement parallel computation based on GPU to solve the problem of high performance computation on computers. Nowadays, the parallel computation on GPU has been developed for many years. And the performance and parallelism of GPU devices have been greatly improved. Based on advantages of GPU parallel characteristic, the parallel acceleration technique based on GPU can be used to improve the performance of computation. It’s commonly used to areas like image processing, signal processing and holographic computation. OpenCL provides unified programming interface for various parallel computing platforms. The parallel computation on GPU can be implemented with the interfaces provided by OpenCL. The hybrid OpenCL can provide more various distributed and parallel computing platforms. In this paper, we introduce the design and implementation of OpenCL and hybrid OpenCL, and analyze the performance of OpenCL acceleration on GPU.

**Keywords**: GPU, OpenCL, hybrid OpenCL, parallel computation

1 引言