Correct and Efficient Accelerator Programming

From 2011-12-01 to 2015-02-28, closed project | CARP Website

Objective

In recent years, massively parallel accelerator processors, primarily GPUs, have become widely available to end-users. Accelerators offer tremendous compute power at a low cost, and tasks such as media processing, simulation, medical imaging and eye-tracking can be accelerated to beat CPU performance by orders of magnitude. Performance is gained in energy efficiency and execution speed, allowing intensive media processing software to run in low-power consumer devices.

Accelerators present a serious challenge for software developers. A system may contain one or more of the plethora of accelerators on the market, with many more products anticipated in the immediate future. Applications must exhibit portable correctness, operating correctly on any configuration of accelerators, and portable performance, exploiting processing power and energy efficiency offered by a wide range of devices. The aim of CARP is to design techniques and tools for correct and efficient accelerator programming:

- Novel & attractive methods for constructing system-independent accelerator programs
- Advanced code generation techniques to produce highly optimised system-specific code from system-independent programs
- Scalable static techniques for analysing system-independent and system-specific accelerator programs both qualitatively and quantitatively

CARP will integrate these methods, providing a unified accelerator development flow. This will: Reduce the cost of accelerator programming and time-to-market quotas– Increase energy efficiency of accelerated software, conserving battery life in mobile devices– Increase confidence in the reliability of accelerated software. The CARP consortium is composed of leading European research experts and prominent tool providers. CARP will be validated at: – Realeyes OÜ, Estonia, developers of eye-tracking solutions– Rightware Oy, Finland, developers of benchmarks for mobile devices– ARM Ltd, UK, designers of the Mali GPU and associated tools.

Related information

Documents and Publications

Publishable Summary 1st Period
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Subjects