UNIVERSITY OF SOUTH FLORIDA

Defense of a Master's Thesis

Parallelization of Genetic Algorithm to solve MAX-3SAT problem on GPUs
by
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For the MSCS degree in Computer Science & Engineering

There are many combinatorial optimization problems such as traveling salesman problem, quadratic-assignment problem, flow shop scheduling, that are computationally intractable. Genetic Algorithm is a heuristic algorithm used to solve combinatorial optimization problems. MAX-3SAT is an example of combinatorial optimization problem which has wide range of applications as many real-world problems can be translated to MAX-3SAT problem. Genetic algorithms are suitable to solve MAX-3SAT problems but usually undergo premature convergence. To prevent this convergence and maintain diversity, one possible solution is to use large population size. This increases computation cost and time. Since Genetic Algorithms perform the same fitness function on large data (population), it provides data and instruction parallelism. Hence Genetic algorithm can be scaled on to GPU architecture. GPUs are affordable, efficient parallel computing hardware. Hence in this thesis we use CUDA framework to implement a parallel version of Genetic Algorithm on GPU. We use the MAX-3SAT problem to verify our algorithm. Compared to the CPU implementation with similar workload, the proposed GPU implementation is up to 4x faster and often finds better results.

Friday, March 1, 2019
10:00am
ENB 313

THE PUBLIC IS INVITED

Examining Committee

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