Abstract

In this paper, different parallel implementations of Bellman-Ford algorithm on GPU using OpenCL are presented. These variants include Bellman-Ford for solving single source shortest path (SSSP) having two variants and Bellman-Ford for all pair shortest path (APSP) problems. Also, a comparative analysis of their performances on CPU and GPU is discussed in this paper. Write-write consistency in Bellman-Ford is overcome using synchronization mechanism available in OpenCL and by explicit synchronization by modifying the algorithm. An average speed up of 13.8x for parallel bellman ford for SSSP and an average speed up of 18.5x for bellman ford for APSP is achieved by proposed algorithm.

References

- A. S. Nepomniaschaya, An Associative Version of the Bellman-Ford Algorithm for
- Yefim Dinitz, Rotem Itzhak, Hybrid Bellman-Ford-Dijkstra Algorithm.
- Atul Khanna, John Zinky, "The Revised ARPANET Routing Metric;", in 1969 ACM.

Index Terms

Computer Science

Algorithms

Keywords

Shortest path problem, OpenCL, Graphical processing unit (GPU).