A Parallel Algorithm to Calculate the Costrank of a Network

Abstract

We developed analogous parallel algorithms to implement CostRank for distributed memory parallel computers using multi processors. Our intent is to make CostRank calculations for the growing number of hosts in a fast and a scalable way. In the same way we intent to secure large scale networks that require fast and reliable computing to calculate the ranking of enormous graphs with thousands of vertices (states) and millions or arcs (links). In our proposed approach we focus on a parallel CostRank computational architecture on a cluster of PCs networked via Gigabit Ethernet LAN to evaluate the performance and scalability of our implementation. In particular, a partitioning of input data, graph files, and ranking vectors with load balancing technique can improve the runtime and scalability of large-scale parallel computations. An application case study of analogous Cost Rank computation is presented. Applying parallel environment models for one-dimensional sparse matrix partitioning on a modified research page, results in a significant reduction in communication overhead and in per-iteration runtime. We provide an analytical discussion of analogous algorithms performance in terms of I/O and synchronization cost, as well as of memory usage.
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References

- Russell Power, Jinyang Li. Piccolo Building fast, distributed program with partitioned tables.

Index Terms

Computer Science  Algorithms
Keywords
Parallel Computing  Distributed Algorithms  Pagerank