Nunnapus Benjamas 2012: High Performance Parallel Association Rule Mining on Multi-Core Cluster. Doctor of Engineering (Computer Engineering), Major Field: Computer Engineering, Department of Computer Engineering. Thesis Advisor: Assistant Professor Putchong Uthayopas, Ph.D. 53 pages.

Association rule mining has been deployed in many decision support systems. To extract significant patterns and generates some interesting rules from very large dataset. These rules can help users make better decisions and bring enormous benefits to the society. Faster processing speed enables users to experiment with various approaches and processes a much larger dataset. Thus, a fast and scalable data mining technique is very important. There are many challenges in accelerating a large scale data mining such as proper data decomposition and I/O minimization, work load balancing and communication minimization.

This thesis proposes various strategies to speed up parallel association rule mining. First, improving the I/O performance by selecting a proper data distribution and I/O scheduling on the system. Second, propose the scheduling strategy to increase the efficiency of the task execution. Finally, propose an effective scheduling of communication message that take into consideration the message size and interconnection network utilization. These proposed strategies are combined into an approach called Unified I/O, Communication and Execution Scheduling (U-ICE).

From the extreme evaluation using simulation, the U-ICE approach can great improve the speed of a parallel association rule mining on a large dataset. This thesis allows one to efficiently process a massive dataset which has very board applicability in many areas.

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