**RELAXED MODEL CHARACTERIZATION OF DEGREE-GUIDED TASK ASSIGNMENT WITH DATA LOCALITY CONSTRAINT**

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**ABSTRACT**

Nowadays popular IT giants such as Google and Facebook receive and process user data measured in units of PB (petabytes, which is approximately one million gigabytes). In order to provide a solution to data-intensive applications and services, Google developed Map-Reduce, which is a programming model to implement cluster computing systems. In such systems, task data is divided in chunks and those chunks are replicated and distributed to a number of servers. Since incoming task data is huge and server storage is limited, servers are not able to save all necessary chunks for every task. Servers have to remotely acquire task data that are not present locally before they proceed to computation. Due to the fact that network connections have inevitable latencies, servers complete assigned tasks with local data faster than those with remote data. Task assignment, therefore, is essential to guarantee the performance of clustered computing.

In this research, we have proposed a degree-guided task assignment algorithm that significantly outperforms the Random Server Algorithm at light load. However, the performance of this algorithm drops sharply when system reaches queuing threshold. At high load, the performance of the system converges to the Random Server Algorithm. We have begun to look for an enhancement that solves the performance plunge at high loads. Specifically, my work in this thesis concentrates on characterizing the performance of degree-guided algorithm in a relaxed model, in which all leftover task chunks (that has not been assigned) during a time slot are treated as fresh chunks in the next time slot. This will help us to analyze variable point characterization of degree-guide algorithm.