Improved Task Scheduling on Parallel System using Genetic Algorithm

Abstract

Parallel Processing refers to the concept of speeding-up the execution of a task by dividing the task into multiple fragments that can execute simultaneously, each on its own processor i.e. it is the simultaneous processing of the task on two or more processors in order to obtain faster results. It can be effectively used for tasks that involve a large number of calculations, have time constraints and can be divided into a number of smaller tasks. The scheduling problem deals with the optimal assignment of a set of tasks onto parallel multiprocessor system and orders their execution so that the total completion time is minimized. The efficient execution of the schedule on parallel multiprocessor system takes the structure of the application and the performance characteristics of the proposed algorithm. Many heuristics and approximation algorithms have been proposed to fulfill the scheduling task. It is well known NP-complete problem. This study proposes a genetic based approach to schedule parallel tasks on heterogeneous parallel multiprocessor system. The scheduling problem considered in this study includes - next to search for an optimal mapping of the task and their sequence of execution and also search for an optimal configuration of the parallel system. An approach for the simultaneous optimization of all these three components of scheduling method using genetic algorithm is presented and its performance is evaluated in comparison with the First Come First Serve (FCFS), Shortest Job First (SJF), Round Robin (RR), Priority and Largest Job First (LJF)
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scheduling methods.

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**Index Terms**

Computer Science  Parallel Processing

**Keywords**

Parallel Multiprocessor System  Directed Acyclic Graph (DAG)  simultaneous optimization  Genetic Algorithm