CHAPTER 8

CONCLUSION

8.1 CONCLUSION

The present research focuses on job scheduling in grid environment. Meta scheduler is using scheduling algorithms in Grid Computing. In grid environment, when a user submits the task, the grid Meta scheduler selects an appropriate resource for the task, which is complex. The resources are available worldwide and also in different administrative domains. The selected resources are to satisfy the user requirements. Hence, there is a need to enhance the scheduling algorithms to reduce the overall completion time.

The present research is focused on optimizing makespan and resource utilization using the following techniques

- Genetic Algorithm
- Ant Colony Optimization Technique
- Particle Swarm Optimization Technique
- Clustering Technique
- Heterogeneous Task Scheduling (HTS) for dependent tasks

In addition, it focused on parallelizing Fractal Image Compression application.
The outcome of the research for scheduling tasks to the resources in grid environment using optimization algorithms are summarized in this chapter. The thesis addresses the hybridized evolutionary optimization algorithms for scheduling.

Evolutionary GA method used for scheduling with QoS satisfaction is discussed in chapter two. This algorithm schedules a task to the resource, only when it satisfies the user requirement QoS parameters. GA is better in terms of makespan and resource utilization. Proposed GA based scheduling has performed 76% better than Min-Min, 75% better than Max-min, 40% better than MCT and 93% better than MET in terms of makespan. On an average, the proposed GA is 11% better than Min-Min, 0.01% better than Max-Min, 30% better than MCT and 78% better than MET in terms of Resource Utilization. However, the execution time of GA based scheduling is high.

In order to reduce the execution time, Load balanced ACO is proposed for scheduling in the third chapter. The load of the resources is balanced using local and global pheromone updates. ACO performs better than GA in makespan and resource utilization metrics. On an average, ACO is 83.6% better than Min-Min, 83.1% better than Max-Min, 59% better than MCT, 94.8% better than MET and 38% better than GA in terms of Makespan. ACO is 9% better than Min-Min, 1% better than Max-Min, 31% better than MCT, 77% better than MET and 0.09% better than GA in terms of Resource Utilization.

The fourth chapter dealt with PSO based scheduling algorithm. It concludes that when reliable resources are selected using history table of the resource, PSO performs better than GA and ACO methods. On an average, GA is 1% better than the proposed PSO and ACO is 0.8% better than proposed PSO in terms of Makespan. This is because the proposed PSO
selects the reliable resources. On an average, PSO is 15.7% better than GA and 15.1% better than ACO in terms of Resource Utilization.

Next Adaptive Machine Scoring Technique with Clustering (AMSTWC) method is proposed for computational and data grids with QoS satisfaction and load balancing of resources. It is compared with FCFS and AMST without clustering. On an average, the proposed algorithm is 25% better than FCFS and 32% better than AMSTWOC algorithm in terms of makespan. AMSTWC is 55% better than FCFS and 8% better than AMSTWOC in terms of resource utilization. It is observed that FCFS is 83% better than the proposed algorithm since FCFS is not checking for QoS requirements. The proposed algorithm is 100% better than AMSTWOC.

The sixth chapter concludes that for dependent scheduling the proposed method is better than the existing methods HCPT and CPOP in terms of makespan and speedup. On an average, the proposed algorithm is 0.01% better than HCPT and 14% better than CPOP algorithm in terms of makespan. In addition, the proposed algorithm is 0.02% better than HCPT and 16% better than CPOP algorithm in terms of speedup. A real time example of Fractal Image Compression using parallel computation is performed. Standard images of different sizes are compressed in a concurrent manner. When the number of clients increases, the speedup is also increased.

8.2 FUTURE SCOPE

In the present research QoS parameters like budget, deadline and RAM have been considered. Scheduling algorithms can consider other QoS parameters like communication bandwidth and communication link quality. Machine clustering can also be applied to task clustering to improve the algorithm execution time. The resource score parameters can be changed or some more parameters can be added to reflect the real grid environment.
which will give more reliable scheduling. The present research can also be extended to include punishment and encouragement factor for the resources in scheduling.

The reliability model may be improved to reflect the real time scenario in grid. Task migration can also be considered. If the resource assigned for a task is not functioning properly, the task can then be shifted to other resources which are reliable.