Abstract

Time constraint is the main factor in real time operating system and it affects the deadline of the process. To achieve deadline, proper scheduling algorithm is required to schedule the task. In this paper an Adaptive scheduling algorithm is developed which is the combination of Earliest Deadline First (EDF) and Ant Colony Optimization (ACO). The EDF algorithm places the process in a priority queue and executed using the deadline. The priority of the processes depends upon the deadline and handles the under loaded condition. The limitation of EDF algorithm is that it cannot handle the overloaded condition. The execution of ACO algorithm is based on the execution time. Process which contains the minimum execution time is executed first. The limitation of ACO algorithm is, it takes more time for execution than EDF. Therefore, to remove the limitation of both the algorithms an Adaptive scheduling algorithm is developed. It increases performance of the system and decreases the system failure. Also the percentage of missing deadline is reduced. The advantage of an Adaptive scheduling algorithm is, it handles over-loaded and under-loaded condition simultaneously. The performance of an Adaptive scheduling algorithm is calculated in terms of Success Ratio that is the number of process scheduled and CPU Utilization. The result of execution time is compared with the EDF and ACO scheduling algorithm. The goal of an Adaptive scheduling algorithm is to show the switching between the scheduling algorithms and to decrease the system failure and increase
the system performance.

References

- Marko Bertogna and Sanjoy Baruah; Limited Preemption EDF Scheduling of Sporadic Task Systems; IEEE Transactions on Industrial Informatics, Vol. 6, no. 4, November 2010.
- Lalatendu Behera Durga Prasad Mohapatra; Schedulability Analysis of Task Scheduling in Multiprocessor Real-Time Systems Using EDF Algorithm; 2012 International Conference on Computer Communication and Informatics Coimbatore, INDIA
- Shuhui Li, Shangping Re, Yue Yu, Xing Wang, Li Wang, and Gang Quan; Profit and Penalty Aware Scheduling for Real-Time Online Services; IEEE Transactions on Industrial Informatics, Vol. 8, no. 1, February 2012.
- Ching-Chih Han, Member and Kwei-Jay Lin; Distance constraint scheduling and its application to real time system; IEEE Transactions On Computers, Vol. 45, no. 7, July 1996.
- Xuefeng Piao, Sangchul Han, Heeheon Kim, Minkyu Park, Yookun Cho; Predictability of Earliest Deadline Zero Laxity Algorithm for Multiprocessor Real-Time Systems; Proceedings of the Ninth IEEE International Symposium on Object and Component-Oriented Real-Time Distributed Computing 2006
Aggregation of EDF and ACO for Enhancing Real Time System Performance


Index Terms

Computer Science            Algorithms

Keywords

Real-Time Scheduling algorithm  Earliest Deadline First  Ant Colony Optimization
Load balancing

Adaptive Scheduling Algorithm