

Hybrid PSO-GA Based Model for Task Assignment in Distributed Real Time System

Karishma*, Harendra Kumar

Department of Mathematics and Statistics, Gurukula Kangri
(Deemed to be University) Haridwar, Uttarakhand-249404, India

*Corresponding Author

ABSTRACT

In a distributed real-time system, one of the NP-hard problems is the assignment of tasks on parallel processors. This article established a method for resolving the task assignment problem in a heterogeneous multiprocessor system. In this model, two algorithms are developed; the first algorithm named HPSOGAK is the combination of particle swarm optimization (PSO), genetic algorithm (GA), and k-means technique, used for making the task-clusters in order to minimize the inter-tasks communication time; the second algorithm is based on GA used for scheduling the task-clusters onto appropriate processors to decrease response time and system cost. The generated model aims to concurrently reduce response time, and system cost, and increase the reliability of the system. By using new crossover and mutation operators, the efficacy of GA has been boosted in this study. Through simulation studies, the proposed model's effectiveness has been demonstrated. The generated model's outputs are compared to those of certain other models in simulation studies. This model performed admirably with random numbers of processors and tasks, and it is suitable for both fuzzy and crisp times.

Keywords: Genetic algorithm; Reliability; Particle swarm optimization; Response time.

