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Patent Search

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Inventor

Name	Address	Country
Dr. Kakumani K C Deepthi	Assistant Professor Department of Computer Science and Engineering SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Dr. Prasanthi Boyapati	Assistant Professor Department of Computer Science and Engineering SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Mr. Boddu L V Siva Rama Krishna	Assistant Professor, Department of Computer Science and Engineering, SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Mr. Addagatla Prashanth	Assistant Professor, Department of Electronics and Communication Engineering, Institute of Aeronautical Engineering, Dundigal, Hyderabad - 500043, Telangana, India	India
Dr. Ganesh Naidu Ummadisetti	Assistant Professor, Department of Computer Science and Business system, B V Raju Institute of Technology, Narsapur, Medak - 502313, Hyderabad, Telangana, India	India
Mr. Mandala Rajkumar	Assistant Professor, Department of Computer Science and Engineering, Sri Indu College of Engineering and Technology, Sheriguda Ibrahimpatnam, Hyderabad - 501510, Telangana, India	India
Dr. A Ugendhar	Associate Professor, Department of Computer Science and Engineering, MVSR Engineering College, Nadergul, Hyderabad - 501510, Telangana, India	India
Dr. Sukanya K	Associate Professor, Department of Electronics and Communication Engineering, TKR college of Engineering and Technology, Meerpet - 500097, Telangana, India	India

Applicant

Name	Address	Country
Dr. Kakumani K C Deepthi	Assistant Professor Department of Computer Science and Engineering SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Dr. Prasanthi Boyapati	Assistant Professor Department of Computer Science and Engineering SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Mr. Boddu L V Siva Rama Krishna	Assistant Professor, Department of Computer Science and Engineering, SRM University, Neerukonda - 522240, Andhra Pradesh, India	India
Mr. Addagatla Prashanth	Assistant Professor, Department of Electronics and Communication Engineering, Institute of Aeronautical Engineering, Dundigal, Hyderabad - 500043, Telangana, India	India
Dr. Ganesh Naidu Ummadisetti	Assistant Professor, Department of Computer Science and Business system, B V Raju Institute of Technology, Narsapur, Medak - 502313, Hyderabad, Telangana, India	India
Mr. Mandala Rajkumar	Assistant Professor, Department of Computer Science and Engineering, Sri Indu College of Engineering and Technology, Sheriguda Ibrahimpatnam, Hyderabad - 501510, Telangana, India	India
Dr. A Ugendhar	Associate Professor, Department of Computer Science and Engineering, MVSR Engineering College, Nadergul, Hyderabad - 501510, Telangana, India	India
Dr. Sukanya K	Associate Professor, Department of Electronics and Communication Engineering, TKR college of Engineering and Technology, Meerpet - 500097, Telangana, India	India

Abstract:

Cloud platforms scheduling resources based on the demand of the tasks submitted by the users, is critical to the cloud provider's interest and customer satisfaction. we propose a multi-objective cloud task scheduling algorithm based on an evolutionary multi-factorial optimization algorithm. First, we choose execution time, execution cost, and virtual machines load balancing as the objective functions to construct a multi-objective cloud task scheduling model. Second, the multi-factor optimization (MFO) is applied to the task scheduling problem, and the task scheduling characteristics are combined with the multi-objective multi-factor optimization (MO-MFO) algorithm to construct an assisted optimization task. Finally, a dynamic adaptive transfer strategy is designed to determine the similarity between tasks according to the degree of the MFO problem and to control the intensity of knowledge transfer. The results of simulation experiments on the cloud task test dataset show that our method significantly improves scheduling efficiency, compared with other evolutionary algorithms (EAs), the scheduling method simplifies the decomposition of complex problems by a multi-factor approach, while using knowledge transfer to share the convergence direction among sub-populations, which can find the optimal solution interval more quickly and achieve the best results among all objective functions.

Complete Specification

Description:FIELD OF INVENTION

Multi-objective optimization techniques are used to optimize multiple objectives simultaneously. In the context of cloud computing, task scheduling is a critical problem that requires efficient solutions. The algorithm uses execution time, execution cost, and virtual machines load balancing as the objective functions to construct a multi-objective cloud task scheduling model. The multi-factor optimization (MFO) technique is applied to the task scheduling problem, and the task scheduling characteristics are combined with the multi-objective multi-factor optimization (MO-MFO) algorithm to construct an assisted optimization task.

BACKGROUND OF INVENTION

In recent years, Cloud computing has been developed and become the foundation of a wide range of applications. It allows users to access a catalog of standardized services and respond to their business needs flexibly and adaptively, in the event of unforeseen demands, paying solely for the consumption they have made. Task scheduling problem is considered one of the most critical cloud computing challenges. The problem refers to how to reasonably order and allocate the applications provided by the users to be executed on virtual machines. Furthermore, the quality of scheduling performance has a direct effect on customer satisfaction. The task scheduling problem in cloud computing must be more accurately described in order to improve scheduling performance. In this paper, a multi-objective task scheduling algorithm is proposed based on the decision tree in a heterogeneous environment. We introduce a new Task Scheduling-Decision Tree (TS-DT) algorithm for allocating and executing an application's task. To evaluate the performance of the proposed TS-DT algorithm, a comparative study was conducted among the existing algorithms; Heterogeneous Earliest Finish Time (HEFT), Technique for Order of Preference by Similarity to Ideal Solution that incorporates the Entropy Weight Method (TOPSIS-Entropy), and combining Q-Learning with the Heterogeneous Earliest Finish Time (QL-HEFT). Our results show that the proposed TS-DT algorithm outperforms the existing HEFT

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