Title: Multi-objective task scheduling algorithm for load balancing in cloud computing based on improved Harris hawks optimization

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Abstract:

Recently, task scheduling and virtual machine (VM) allocation have emerged as the most significant challenges in resource management in cloud computing environments, which is some kind of optimization problem. The main objective of task scheduling and virtual machine allocation problems is to reduce task length and completion time while boosting resource utilization. Several task scheduling algorithms use heuristic and meta-heuristic techniques to solve this optimization problem. Among these well-known techniques is the Harris hawks optimization (HHO) algorithm. However, most of these approaches failed to consider limitations of HHO, which will have an impact on the task scheduling process. To solve the task scheduling problem in cloud computing (CC), this paper proposes an adaptive task scheduling algorithm that enhances the HHO approach. Rather than selecting a random solution, the suggested approach selects the best-fit solution, whose characteristics are carried over to the next solution in the HHO exploration phase. Furthermore, the modified HHO avoids the local optima solution of HHO by employing a mutation process involved in exploitation phase of HHO. The simulation results demonstrate that the proposed algorithm outperforms the current approaches in terms of standard division for load balancing, makespan, scheduling length, throughput, and resource utilization.