

Improving Cached Data Offloading Optimization Based on Enhanced Hybrid Ant Colony Genetic Algorithm

Publons ID	(not set)
Wos ID	WOS:000842744200001
Doi	10.1109/ACCESS.2022.3197205
Title	Improving Cached Data Offloading Optimization Based on Enhanced Hybrid Ant Colony Genetic Algorithm
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Publish Date	2022
Journal Name	IEEE ACCESS
Citation	1
Abstract	<p>The data offloading mechanism is one of the critical strategies needed on edge networks to help cloud computing network performance in serving user data requests. This strategy should be optimized to prevent network congestion. The main problem of this strategy is how to assess the priority of cached data so that the cache memory buffer capacity can be optimized. In this paper, we modeled the cached data offloading strategy using the Knapsack Problem 0/1 (KP01) approach. Several researchers proposed a meta-heuristic algorithm to solve cached data offloading using the KP01 approach. Meta-heuristic algorithms require a reliable solution selection method to find the global optimal solution. However, some studies still use the roulette wheel selection method to provide a set of solutions. The RWS method has a weakness of imbalance the particle fitness with its cumulative probability. Therefore, it is difficult to find the global optimal solution. This study proposed a nested-Roulette Wheel Selection (nRWS) method on hybrid Ant Colony Optimization (ACO) and Genetic Algorithm (GA) to address the cached data offloading optimization using the KP01 approach. The simulation results show that the proposed nRWS method is able to find the global optimal solution in terms of the value of the objective function and hit ratio which is superior to previous studies.</p>
Publish Type	Journal
Publish Year	2022
Page Begin	84558
Page End	84568
Issn	2169-3536
Eissn	
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:000842744200001
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