

Real-Time and Energy-Efficient Task Allocation in Fog-Edge IoT Networks Using a Hybrid Metaheuristic Model

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Abstract: The massive growth in Internet of Things (IoT) devices has increased the demand for energy-efficient computation and instant data processing in real-time. Conventional cloud-based models are plagued with high latency and bandwidth limitations and are thus unsuitable for use in delay-sensitive IoT applications. To overcome these challenges, in this paper, we suggest an energy-conscious task offloading and load balancing scheme specific to Fog-Edge-enabled IoT environments. In the proposed scheme, computational tasks are allocated dynamically to IoT devices, fog nodes, and edge servers depending on the energy consumption, latency, and network load. A lightweight load balancing mechanism is used to allocate the resources optimally to the fog and edge levels. Simulations with the help of iFogSim illustrate that the proposed scheme reduces the execution time and energy utilization to a large extent compared to the traditional offloading and random assignment methods and thus is highly apt to be used in IoT applications that require processing in real-time and with limited resources.

Keywords: iFogSim, load balancing, fog nodes execution time

