ROBOTIC PROCESS AUTOMATION OPTIMIZATION IN CLOUD COMPUTING VIA TWO-TIER MAC AND LYAPUNOV TECHNIQUES

Raj Kumar Gudivaka

Birlasoft Limited, Hyderabad, Telangana, India

ABSTRACT

An essential aspect of cloud-based robotic process automation (RPA) is optimizing energy efficiency and resource management. In order to meet the complicated requirements of heterogeneous robotic systems, this paper presents a unique Two-Tier Medium Access Control (MAC) solution. The suggested system improves resource allocation and guarantees great performance under various Quality of Service (QoS) criteria by incorporating cutting-edge Lyapunov optimization methods. By prioritizing jobs and robots according to their capabilities and urgency, the Two-Tier MAC framework increases system lifetime, energy efficiency, and throughput. Simulations show that the Two-Tier MAC performs better in important parameters like throughput, power consumption, and QoS satisfaction than the current protocols like IEEE 802.15.4, FD-MAC, and MQEB-MAC. The system's capacity to optimize cloud-based RPA is further demonstrated by its energy-aware scheduling and real-time adaptability.

KEYWORDS: *Robotic Process Automation, Cloud Computing, Two-Tier Medium Access Control, Lyapunov Optimization, Resource Management.*