Label-QoS switching protocol for quality of service assurance in dynamic swarm robot local network

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Summary

This paper presents the modeling and analysis of a proposed label–quality of service (QoS) switching protocol for heterogeneous robot in a swarm. Establishing the data communication and network in multirobot task allocation is an important aspect in robot collaboration. Instead of passing the data through the cloud network, each robot can be configured as a node in its swarm for intercommunication. This research was conducted to model and propose aggregation and classification methods in a swarm robot network inspired from multiprotocol label switching, namely, label-QoS switching protocol. Each packet of data is forwarded with a proposed 2-side label values that are concerned with addressing and QoS. This proposed protocol was applied in each of the node's routing, and it was set up with forwarding information table. The simulation and analysis were conducted in 2 situations: (1) with a constant n–label switch mobile robot and a number of packet data increasing with time and (2) with a constant number of packet and varying n–label switch mobile robot by time. With reference to the network parameter performances, it shows that the anomaly treatment by the proposed protocol is able to prioritize the data forwarding between the robots at the edge of the swarm with class of service although the robot community at the center is increasing or getting crowded.