Fuzzy based Load and Energy Aware Multipath Routing for Mobile Ad Hoc Networks

Abstract

Routing is a challenging task in Mobile Ad hoc Networks (MANET) due to their dynamic topology and lack of central administration. As a consequence of un-predictable topology changes of such networks, routing protocols employed need to accurately capture the delay, load, available bandwidth and residual node energy at various locations of the network for effective energy and load balancing. This paper presents a fuzzy logic based scheme that ensures delay, load and energy aware routing to avoid congestion and minimise end-to-end delay in MANETs. In the proposed approach, forwarding delay, average load, available bandwidth and residual battery energy at a mobile node are given as inputs to a fuzzy inference engine to determine the traffic distribution possibility from that node based on the given fuzzy rules. Based on the output from the fuzzy system, traffic is distributed over fail-safe multiple
routes to reduce the load at a congested node. Through simulation results, we show that our approach reduces end-to-end delay, packet drop and average energy consumption and increases packet delivery ratio for constant bit rate (CBR) traffic when compared with the popular Ad hoc On-demand Multipath Distance Vector (AOMDV) routing protocol.

References

Fuzzy based Load and Energy Aware Multipath Routing for Mobile Ad Hoc Networks


Index Terms

Computer Science
Networks
Keywords
MANET  Fuzzy Logic  Load Balancing  Multipath Routing.