

ABSTRACT

This research proposes energy efficient routing mechanism with MAC protocol consideration in ad hoc network that will prolong the lifetime of mobile nodes, and, consequently, prolong the network lifetime. There are 2 categories of routing protocols that are proposed in this research. The first category is energy-aware routing protocols which aim at minimizing energy consumption to extend network lifetime. These protocols propose a route discovery technique based on energy consumed in Medium Access Control (MAC) which includes data and control packet transmissions. The MAC modeling considered here includes all operation modes of networked devices such as transmissions, receptions and idle states. Moreover, the energy model considers the energy consumed in overhearing state, and in retransmissions due to errors, caused by interfering nodes, and collisions. The optimal path is the path with lowest energy consumed. The second category is hybrid aware routing protocols that combines the advantage of both energy aware and battery aware routing protocols to achieve not only minimizing the total energy consumed, but also extending the network lifetime simultaneously. Two hybrid routing protocols are proposed here. They consider the currently remaining battery level in various nodes, focusing on balancing energy usage among nodes by avoiding nodes that have low remaining battery level. The result shows the proposed algorithms outperform other reviewed algorithms.