Comparative study on energy consumption in dynamic window secured implicit geographic forwarding routing protocol

Abstract

An Ideal WSNs should operate with the least possible energy required in order to increase the lifetime of the sensor nodes and at the same time, ensure network connectivity. But the Inherent power limitation makes power-awareness a critical requirement for WSN, this calls for the need to manage energy in sensor nodes. Also In order to ensure successful transmission of data from sensor node source to destination, it becomes necessary to maintain network availability. The network must be resilient to individual node failure which can happen due to zero power posses by the node and due to security attacks posed on the node and the network. Dynamic Window Secured Implicit Geographic Forwarding (DWSIGF) routing protocol has proven to be robust, efficient and resistant to some security attack which causes failure in network availability. However the extent to which energy is consumed in sensor nodes which deploys DWSIGF as its routing protocol has never been mentioned. In this research, we performed a comparative study on energy consumption in DWSIGF routing protocol. Using the first order radio model, we determined the energy consumed in a network. The protocol (DWSIGF) is matched up against its counterpart SIGF as the traffic is increased. Observation shows that DWSIGF due to the variable timing assigned to the CTS collection window, CTS signal fails to reach destination as collection window time expires, thus the need for retransmission. This in turn consumes more energy than the counterpart SIGF which has a fixed CTS collection time. The simulation work was done using Matlab 7.0. Energy consumed in the random variant of both protocols (DWSIGF and SIGF) was also observed to be higher than the priority variant of the protocols.

Keyword: DWSIGF; Energy consumption; Handshaking; MAC; SIGF