Gateway–based Threshold Distributed Energy Efficient Clustering (G-TDEEC)

Abstract

Wireless sensor network basically is made up of several sensor nodes that sense physical quantities such as temperature and pressure in a physical environment, capture these quantities and relay the data to another node called the Base station (BS). The transmission of the sensed information from the deployment area to the BS has been observed to drain the limited energy resource of the sensor nodes. Some researchers are of the view that, placing the BS at the centre of the sensing field will sufficiently reduce the energy consumption during data transmission. Based on this, some of the descendants of DEEC protocol such as TDEEC (Threshold Distributed Energy Efficient Clustering) protocol also placed the BS at the centre of the deployment field to conserve network energy. So what happens to TDEEC scheme if it was to be deployed at a place such as military surveillance where the BS may be far from the sensing field? In this research work, a gateway-based TDEEC, G-TDEEC protocol is proposed. The new scheme introduced a gateway at the centre of the sensing area and then installed the BS far away from the sensing field. The cluster heads relay their data to the gateway which will then aggregate the data and then send the final report to the BS. Simulation was performed to
assess the performance of the proposed protocol and the TDEEC scheme using MatLab 2017a. The simulation results showed that, the proposed protocol performed better than the existing scheme in terms of stability period, throughput, residual energy and the network lifetime.

References


Index Terms

Computer Science Distributed Systems

Keywords

G-TDEEC Protocol; Network lifetime; Centre, Outside; Gateway; MatLab simulation.