Designing and Comparative Analysis of Advanced SEP for Heterogeneous Wireless Sensor Networks

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Authors:

Rashmi Sharma, Amit Bindal, Anuradha Bindal

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Abstract

Wireless Sensor Networks (WSNs) are comprised of thousands of sensor nodes, with restricted energy, that cooperate to accomplish a sensing task. In Wireless Sensor Network, the energy efficiency is the key issue for designing the protocol because sensor nodes have one time battery backup. There are many modern protocols which extend the lifetime of the wireless sensor network by efficiently using battery power of the sensor node. In this research work, a new strategy and protocol based on Stable Election Protocol (SEP) in Wireless Sensor Network have been proposed. For proposed system, we have assumed heterogeneous of environment i.e. the impact of heterogeneity of nodes, in terms of their energy, in wireless sensor networks that are hierarchically clustered. In these networks some of the nodes become cluster heads, aggregate the data of their cluster members and transmit it to the sink. We assume that a percentage of the population of sensor nodes is equipped with additional energy resources. We also assume that the sensors are randomly (uniformly) distributed and are not mobile, the coordinates of the sink and the dimensions of the sensor field are known. Firstly, all the nodes has been categorized as Normal Nodes and Advanced Nodes. Than Advanced nodes are
further categorized as Alive Advanced nodes and Dead Advanced Node. Cluster head is selected among advanced nodes only. Cluster head collect data from member nodes, aggregate it and transmit it to base station. Cluster head selection is most important. Once the cluster head is selected then the cluster head broadcasts an advertisement message to the nodes. The nodes receive the message and decide to which cluster head it will belong for the current round. An advanced-SEP has been implemented and compared with existing SEP. Three parameters i.e. number of dead nodes; number of alive nodes and packets transmitted to base station has been taken as performance parameters. The simulation result shows that performance and throughput of our proposed protocol gives the effective and significant energy efficiency as well as more network lifetime compared to other protocols. MATLAB R2013a has been taken as implementation platform.

References


Index Terms

Computer Science Wireless
Keywords

Wireless Sensor Networks; SEP; ESEP; LEACH; Sensor Nodes etc.