An efficient mathematical analysis for saving energy in WSN routing protocol

ABSTRACT

The issue of energy efficiency in wireless sensor networks (WSNs) is a prime consideration. Therefore, we propose an energy-saving scheme for use in wireless sensor networks and this the goal of this Research. The proposed protocol is a mixture of the low energy adaptive clustering hierarchy (LEACH) and mediation device (MD) protocols. It combines the advantages of both. The suggested protocol includes a mechanism for avoiding the collisions that exist in the MD protocols. Also, it allows the cluster head to be in sleep mode if there is no data to be sent. (In addition, MD Device in the proposed protocol will send ID to the node which will send the data to the cluster head that avoid collision signals that unfortunately happen in MD protocols and know which node sent data). This is in contrast to the LEACH protocol and MD protocol, where the cluster head is always switched on. Placing the cluster head in sleep mode contributes to reducing energy consumption.In the proposed scheme, clustering is used as in LEACH, but the cluster head is asleep by default. However, when a sensor node has data to send, it informs the MD, which then awakens the cluster head, making it ready for receiving sensor data. To evaluate the proposed scheme, we suggest a mathematical model that estimates the energy that the scheme saves as compared with LEACH. The results show that substantial energy saving is possible when the cluster head can be placed in sleep mode for a large percentage of time. Intuitively, this time percentage is higher when sensors have less data to send.

 Keyword: WSN; Energy saving; LEACH; Sleep; Wake up; Routing