ABSTRACT

Wireless sensor networks (WSN) are utilized for event detection along with data collection in industrial streaming and environmental monitoring applications. Power conservation is an important phenomenon in sensor devices deployed in an unattended area. The tenure of the battery is the most critical characteristics in extending the lifetime of the WSN. The life of the battery is extended by clustering the nearby sensors. The nearer cluster heads of the sink are over loaded by the heavy relay traffic and their energy drains out quickly. To overcome this, different techniques have been developed and still, it finds the attention of the researchers.

This work proposes an algorithm to enhance the network lifetime by using energy efficient re-clustering protocol and cluster head rotation. In most of the existing algorithms including LEACH, LEACH-DT and LEACH-EP the threshold time has been used for each round of the cluster head tenure. In an event driven system, it is not suitable as event occurrence is uncertain and it leads to energy wastage if there are no events in that round of cluster head tenure. The intended technique uses unused energy along with threshold as amount of energy instead of the time period for cluster head rotation. It promotes to reduce the network holes and balances the energy consumption in wireless sensor network. The data reporting in event driven system reduces the number of hop to the sink by adopting the best shortest path in the algorithms which reduces the energy depletion. Apart from this, utilization of redundant nodes deployed randomly in a targetted unattended area is also addressed. Several methods have been used to control the deployment of nodes into the desired area of interest. But randomly distributed nodes
are prone to overlap which causes the redundancy of data as they capture similar data. While deploying, sensors are dropped from high altitude which causes damage to some of the nodes. The proposed algorithm has been addressed to utilize such overlapped nodes. The algorithm cease to emit the data from such nodes to reduce the redundancy of data. It enhance the efficiency of the network and helps to extend the lifetime of the network.

When an event occurs, multiple sensors tend to access the shared medium to transmit the data, which leads to network clogging and data packets collide at the receiver end. The new algorithm proposed induces the selection of aggregation node. In the event affected area, it prepares the sleep wake-up schedule using medium access control to calculate the priority node and this particular node is active during the transmission. This, in turn, reduces overhearing, collision, and congestion. In the same time, proposed algorithm addresses the simultaneous occurrence of events in an event driven applications to pass the information to base stations. The algorithm uses alternate shortest path algorithm which helps to retain the freshness of the data.

The software of the sensor nodes needs to be updated on the field to replace with new features and existing bug fixes. In software updating, sensor node packet loss compels the retransmission which involves a lot of time and energy consumption. In this work, data collection and data dissemination is designed in an adaptive and energy efficient way to reduce the energy depletion and increase the network throughput.