A NOVEL RELAY NODE ASSIGNMENT TO SAVE ENERGY CONSUMPTION IN WIRELESS SENSOR NETWORKS

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Abstract

Sensor Networks (SNs) belong to the class of intelligent networks employing sensor technology. Usually these networks are called Wireless Sensor Networks (WSNs) that originate communication electronics, self organizing capabilities of sensors according to some protocol and power issues. An important issue that has been taking attention of many researchers from the last few decenniums is the operation of a Sensor Network (SN) under energy limitations. Sensor networks consist of a wide range of diminutive sensor nodes, in which some are selected as member nodes and some as Relay Nodes. The main goal is to designate the possible Relay Nodes (RNs) to different terminal pairs to enhance data rate between all transmitter-receiver couples and to enlarge the network lifetime span. *Clustering* the sensor nodes efficiently and dynamically with least energy consumption is the current issue in front of researchers, so that lifetime of sensor nodes will be increased. Cooperation among Relay Nodes and Edge Nodes (ENs) along with restrained energy utilization depends upon some protocol such as LEACH for data transmission. We have revealed numerous considerations to elaborate the issues relevant to WSNs for instance Cluster-Head selection, low data reception rate, Relay Nodes Placement and number of Relay Nodes Assignment among Edge Nodes for optimal power usage.

Therefore to enlarge the lifetime span of a Sensor Network, there are two key controversies which include best data gathering mechanisms and energy based efficient data transmission. Energy utilization of a WSN is a big problem and to handle this we need the best method of sensor nodes assembly which can abate energy depletion. In this curiosity "Cluster chaining based sensor nodes assembly" [11] has been classified as the optimum technique for abbreviating power utilization of the network. In Cluster chaining based sensor nodes organization every cluster needs to be handled by a head called Cluster-Head. However, in a Clustering technique, the Cluster-Head node of each cluster will exhaust some additional energy as related to other non-Cluster Head nodes because of its additional functions such as data collection and averaging responsibilities. These responsibilities append facts accession from all member nodes; amalgamate facts to dilute the size, and the transportation of the collected facts to an end terminal located away from network. As an outcome Cluster-Head nodes dispose to use more energy than normal nodes hence, die faster than normal nodes. To solve this issue, two things should be taken under consideration. First one is to rotate the duties of Cluster-Head among all nodes in the cluster and second is energy utilization.

For resolving the controversy of energy utilization, Clustering is the best technique. To have a generous choice of the Cluster-Head we suggest the rotation of Cluster-Head duty among all nodes on the ground of present *energy values* of nodes and their *distances* from end terminal. The election of Cluster-Head depending on the energy values and distances of nodes can be a

best option. To rotate the Cluster-Head role among different nodes the energy value of each present Cluster-Head to conclude the threshold edge at which we can declare a new Cluster-Head called election state. The election state is activated when the remaining energy of the present Cluster-Heads goes beneath the selected threshold edge. Now if a Cluster-Head finds that its remaining energy goes beneath selected threshold edge for a certain time period then a fresh Cluster-Head is elected which depends on the same criteria.

In this thesis, we tackle the problem of energy limitation in WSN by assigning RNs. We propose a Cluster Chain Based Relay Nodes Assignment (CCBRNA) scheme to manage the energy constraints in WSN, which Assigns Relay Nodes (Cluster-Heads) on the basis of energy and distances parameters but priority is always given to the energy value. The primary model of CCBRNA based on LEACH and PEGASIS protocols is redeveloped to enlarge the lifetime span of network nodes. This scheme is sliced into two main steps. In the first step Cluster-Head is selected and then in second step data transmission starts using an internal chain of nodes according to the distances of nodes from Base Station. In data transmission step, data transportation between different clusters takes place and lastly data is sent to the end terminal moving via the nearest Cluster-Head.

Simulation in MATLAB verifies the enhanced lifetime of the nodes. We have used the distance as the key parameter while data transmission takes place. The scheme is efficient as when there are large number of nodes, chaining will take very less time and as well as energy to transmit the data to Cluster-Head. We have further applied an external chaining among Cluster-Heads of different clusters. With the applied limitations and suggested resources such as additional processor, it works well in relaying process.

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