Abstract

Wireless sensor network has revolutionized the way computing and software services are delivered to the clients on demand. It consists of number of sensors called nodes and a base station. Nodes collect data and send to the base station. The nodes are connected with each other without a wired connection. There are number of nodes which send data at a time and because of that numbers of problems occur. For this, nodes are divided into cluster and a cluster head will be formed. WSN is a battery powered system and when the battery dies no data send or received. So when all nodes participate for sending and receiving data then system dies early. When the energy of the cluster head is less, then next cluster head will be formed and at one time, one cluster head is formed. Cluster head collect data from nodes and then send to the base station. WSN is also used in many applications like, constant monitoring & detection of specific events, military and battlefield surveillance, forest fire and flood detection, habitat exploration of animals, patient and home appliances. This research work proposed a new method for cluster head selection having less computational complexity. It was also found that the modified approach has improved performance to that of the other clustering
approaches. In this work, the network area is divided into same sized small regions. Sensor nodes are randomly deployed in each predefined sub-area where each region will have its region head (RH) and multiple member nodes. The member nodes in a specific region will send the data to the RH. RH within the region will be elected by distributed mechanism and will be based on fuzzy variables. The Region heads are divided into 2 different classes boundary RH and non-boundary RH. Only boundary RH will send the data to the BS only when it will come within its region and Non-boundary region heads will evaluate the lower bound limit and upper bound limit of both x-axis and y-axis to evaluate the next relay node. It will choose the relay node on the path where BS is closely located which will reduce the transmission delay and will also reduce the data packet size. It was found that the proposed algorithm gives a much improved network lifetime as compared to existing work. Based on our model, transmission tuning algorithm for cluster-based WSNs has been proposed to balance the load among cluster heads that fall in different regions. This algorithm is applied prior to a cluster algorithm to improve the performance of the clustering algorithm without affecting the performance of individual sensor nodes. The proposed work is validated using throughput, average energy consumption, average remaining energy and network delay metrics.

References


Index Terms

Computer Science Wireless

Keywords

Wireless Sensor Network (WSN), Region Head, Base Station, Fuzzy Logic.