Rendered Low Energy Adaptive Cluster Head Wireless Sensor Network

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Abstract— Wireless Sensor Network is a network, which can automatically set with a more number of tiny sensors. These nodes can perform the packet Communication among itself within their network range and also they are assembled in a way to sense, observe and monitor the physical entity of the real world environment. here in this paper Cluster Head based routing WSN is studied and we proposed one of the important wireless sensor network routing protocol such as Rendered LEACH by using efficient cluster head substitution method and dual power transmitting. Here we compared the Rendered LEACH with normal LEACH it performs with throughput, network life time and Cluster head replacement.

Keywords— *LEACH, RLEACH, WSN, CH, BS.*

I.   INTRODUCTION

WSN consists of more number of sensor nodes which can sense their locality and connect either among itself or to external base transceiver station. The important features of these wireless sensor nodes include tiny size, low cost, less computation power, many functional which can perform sensing, data processing, routing, etc., and it can make communication within small distances. In unattended hostile regions, these devices are paced in general that make the power source of the sensors bit difficult to recharge. However, so many methods and techniques are used in research work for secure energy in sensor nodes to improve the lifetime of network   [1]. Prolonged network lifetime, reliable data transfer, energy conservation, security in sensor nodes, and scalability are the main requirements for WSN applications.
 The WSN has usually varying strength in the node of frequency along its area. Sensor networks is an energy constrained since the individual sensors, which the network is formed with, are extremely energy-constrained as well. The entire sensor device are small and less power, small range at the time of communication. Both the probably difference of node frequency among some regions of the network and the energy constraint of the sensor nodes it effects a nodes slowly die making the network less dense. Also it is quite common to deploy WSNs in harsh environment, which makes many sensors is faulty. Because of this reason, these networks need to be fault-tolerant so that the need for maintenance is reduced. Instantly the network topology is continuously and dynamically changing and it is really not a best solution to refresh it by impart new sensors instead the existing ones. The main   solution for this problem is to implement routing protocols it can perform efficient and utilizing the less amount of energy as possible for the communication among nodes. In wireless sensor network for adequate performance protocol should be efficient various protocol are developed it gives the information about energy power in sensor network. Routing techniques [2] can be categorized in three ways such as direct transmission algorithm, host to host transmission algorithm and CH based algorithm.

II.   SURVEY

Energy efficient routing algorithm can be classified as follows, data centric routing algorithm, location based routing algorithm and hierarchical routing algorithm. Data centric routing algorithm [3] uses meta data to identify the route from source to destination before any real data transmission to remove unnecessary   data transmission, Location based routing algorithm requires accurate location information for every sensor node. Hierarchical routing algorithm splits the network into clusters. Cluster head is selected in each cluster. CH gathers the data from its neighbor, accumulated the data and sends to sink. It is a type of approach is Energy efficient but relatively difficult than other methodology, Data centric protocols are undertrained based and they depend on the naming of the desired data, thus it remove the duplicated transmissions. The base station sends information to a certain area for information and waits for response from the nodes of that particular region. Since data is requested through queries, aspect based naming is required to identify the properties of the data. Based on the query, sensors gathered a particular data from the area of interest and the appropriate information is only required to transmit to the BS and thus avoids the number of transmissions [4]. Hierarchical routing is to perform energy efficient routing, i.e., higher energy nodes can be used to process and send the information, week energy nodes are used to perform the sensing in the area of interest. E.g. LEACH, LEACH gives contribution to many protocols. The methodology of this protocol are firm and well managed with homogeneous sensor environment. According to this protocol, for each round, new cluster head is selected and hence new cluster formation is identified. This affects to unnecessary routing overhead resulting in enormous use of fixed energy. If a cluster head has not utilized more of its energy during previous round, than there is probability that week energy node may change it as a cluster head after cluster head selection process. Time constraints are required at time of changing cluster heads at every round considering residual energy of current cluster head.   An efficient cluster head replacement algorithm [5] is required to conserve energy. In

clustering protocols as LEACH, sensor nodes use same amplification energy to transmit data inattentive of span between transmitter and receiver. To secure the energy, there must be a transmission technique that specify required amplification energy for convey the message to cluster head or base station. For example, transmitting a packet to cluster head with similar amplification power level is needed by a node located at farthest end of network to base station results in wastage of energy. One result can be having universal idea of network and then nodes conclude how much they need to upgrade the signal. Identifying and calculating distances with in entire network topology required lot of routing and so, this approach does not work for retaing energy. WSNs have many research challenges and network issues when set up the sensor nodes to monitor the physical world. Hierarchical routing protocols is convenient for organizing the nodes to improve the scalability of the WSNs. The conventional clustering algorithm LEACH [6,7] uses randomized rotation with homogeneous clustering of local cluster heads to improve the scalability and performance of network. The lifetime of the network has extended by using a HEED clustering protocol[8,9] this formed the clustering and cluster head selection based on the residual energy of sensor nodes and the cost of communication from source to destination. LEACH is a clustering protocol[10] in which the random rotations of local cluster heads are handled in manner to distribute energy load with in all sensor nodes in the network. LEACH is needed since it provides scalable network by limiting the communication present inside different clusters. For the so many drawbacks in this paper proposed Rendered Leach to improve the residual energy.

III. PROPOSED METHOD

Here in this paper we use the two method to improve the network lifetime and throughput, here protocol changes the cluster head at each round and once a cluster head is formed, it will not get another chance for next 1/p rounds. For every round, cluster heads are replaced and whole cluster formation process is undertaken. In this work, Rendered LEACH by introducing effective cluster head changing method. It is a beginning in cluster head formation for each next round. Suppose existing cluster has not used more energy during its time and has more energy than required threshold it keeps remain cluster head for next round. Like this manner energy lost in routing packets for new cluster head and cluster formation can be saved. If a cluster head has less energy than required threshold it will change as to LEACH algorithm algorithm. In LEACH, energy is set same for all kinds of transmissions. Using low energy level for intra cluster transmissions with respect to cluster head to BS transmission leads in saving much amount of energy. Moreover, multi power levels also reduce the packet drop ratio, collisions or interference for other signals. When a node act as a Cluster head, routing protocol informs it to use high power amplification and in next round, when that node becomes a cluster member, routing protocol switches it to low level power amplification. Finally, soft and hard threshold schemes

are also implemented in Rendered LEACH that gives better results.

IV. RESULTS AND DISCUSSION

Simulation done by using MAT LAB, simulation shows that Rendered LEACH performs better considering metrics of throughput, network life time, and optimized cluster head formation of network. Here we consider the following parameters.

Number of Nodes	100
Network size	400 X 400
Initial Energy Eo	0.5 J
Data Aggregate Energy	5 NJ/bit
Amplification Energy (Cluster to BS) Efs Emp	10pJ/bit 0.0013pJ/bit

By using the above parameter we done the simulation, Consider the life time of LEACH and Rendered LEACH, below figure 1 shows Rendered Leach of number of rounds versus Dead nodes, Packet to BS, number of cluster heads, Packet to cluster Head. Rendered LEACH has greater stable period due to its efficient cluster head replacement scheme and dual transmitting power level for inter and intra cluster communication. Another important part is efficiency of a routing protocol is its throughput. A base station receiving more data packets confirms the efficiency of routing protocol. Throughput depends on network life time in a sense but not always. Considering the simulated results as shown in figure second shows Stable in number of rounds versus packet to base station. Figure third show numbers of cluster heads chosen at each round. All the techniques basically used same algorithm hence no major difference is there in cluster head formation and calculation manner however, Rendered LEACH differs from LEACH in a sense that initially its number of cluster heads remain stable and then cluster head formation behavior goes similar to that of LEACH. Initially as stated above, Rendered LEACH executes same cluster heads for next rounds if they have energy greater than defined threshold.
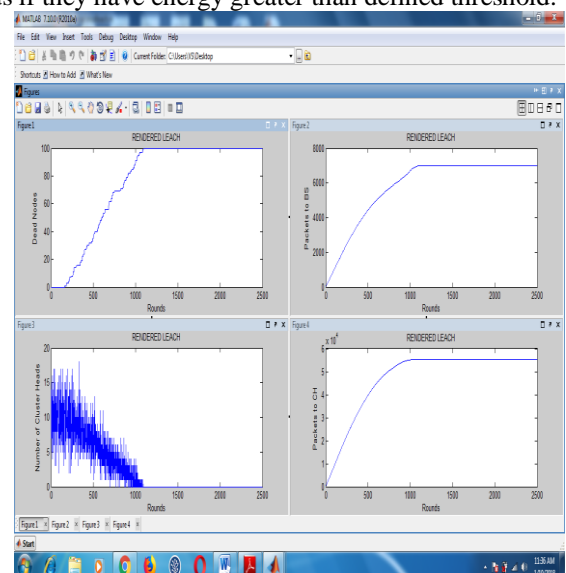

Fig.1: Rendered Leach number of rounds versus Dead nodes, Packet to BS, Number of CH, Packet to CH

LEACH has lowest performance with respect to network life time. Rendered LEACH has greater stable period due to its efficient cluster head replacement scheme and dual transmitting power level for inter and intra cluster communication. Simulated results depicted in figure 2 shows difference in LEACH and Rendered Leach it can Represent network life time by showing number of rounds versus alive nodes respectively
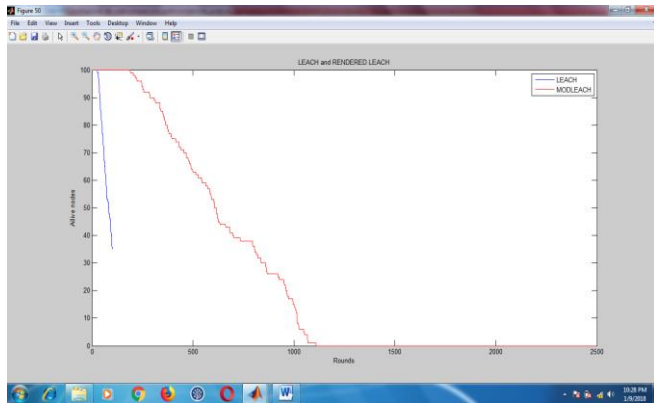
Fig.2: LEACH V/S Rendered Leach

V. REFERENCES

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