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Survey On Multihop Cluster Head Techniques in MODLEACH

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Abstract— MODLEACH is modified version of LEACH protocol, in this protocol, for every round, new cluster head is elected and hence new cluster formation is required. This paper gives the over view of Enhanced MODLEACH for cluster head selection. The data transfer in clusters among nodes depends upon the approach used, the intra cluster and inter cluster technique increases the network life. So this paper presents the data transfer techniques and clustering in MODLEACH protocol.

***Keywords*:-** WSN, LEACH, MODLEACH, life time, cluster heads, Residual energy.

I. INTRODUCTION

Clustering is the main concern in designing the wireless sensor network protocols, some uses intra-clustering technique and some uses inter-clustering techniques. These clustering mechanism helps in improving the data transfer rate in a network. The network composed of number of sensor nodes, which are scattered in a network field either in a homogenous or heterogeneous mode. The purpose of the sensor node is to sense the field and send appropriate signal to the base station, this is done by using some clustering techniques.

The MODLEACH is one of the clustering technique and is the modified version of LEACH protocol, According to this protocol, for every round, new cluster head is elected and hence new cluster formation is required. This paper presents the a review on MODLEACH & Clustering technique and how data is to be transferred in a network among nodes.

II. RELATED WORK

[1] This paper presents the enhanced technique to improve the network life time using MODLEACH. The paper uses intra- clustering and inter-clustering method in data transfer mode to enhance the MODLEACH. The cluster head uses multi-hop technique which acts as a forwarder node and these forward node sends data upward nodes depending upon the distance from the base station.

The step by step work used in this paper is as[1]:

1. First implement MODLEACH clustering Protocol.
2. After implementing the MODLEACH, data transformation is done and the data transformation mode depends on inter-clustering between CHs to sink, CHs to CHs nodes and CH to CH as the forward node[1].
3. The CHs are selected on probability based and the life of CH remains upto the sufficient energy. The CH may changes according to energy and rounds, after this data collection is to be done from neighbour nodes that are normal.
4. When the data is collected from neighbour nodes CHs examine the sink and sends data to certain upward CH nodes based on distance condition, if the upward node is nearer to the sink then data is transferred directly to that upward node[1].

The layout of the work flow is given in figure 1.

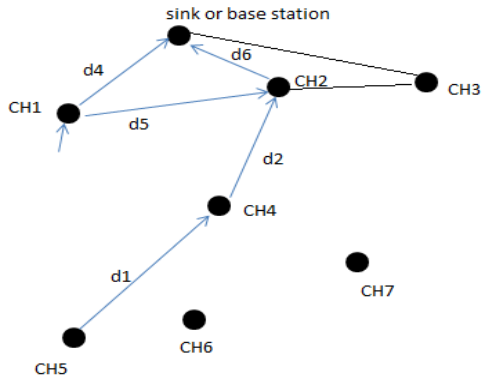

Figure 1. Data flow layout[1]

Here, d denotes some distance between CHs and let us assume d2>d3, d4>d5, d8>d6 and d7<d6 the data transfer will be CH5 -> CH4 -> CH2 -> Sink AND DIRECT FROM CH1 -> SINK.

[2]. In this paper they proposed a model, based on residual energy for cluster head selection and LZW compression Technique during the transmission of data packets from CHs to base station. This paper collaborate the clustering technique and LZW compression technique to improve the network life time. The LZW compression is used during the packet transfer which minimizes the packet size and better transmission rate. This technique improves the throughput and life time of network and saves the energy of node during transmission and helps to transfer more data in less energy consumption.

The working flow used in this paper is given below[1]:
Step1. Initially generate WSN nodes (N) having average energy, based on average energy concept and set rounds.
Step2. Select cluster head (CH) on the bases of probability and average residual energy.
Step3. Check the residual energy of node if condition satisfies then
Set the node as Cluster head (CH).
Otherwise
Set the node as normal node.
Step4. Collect the data from cluster members (CM).
Step5. Use the LZW compressing technique based on minimum threshold distance value, and collects the compressed data and sends it to base station (BS) with standard threshold distance value if the distance is less than CH.
Step6. Link broadcast average energy information to WSN structure.

[3] This paper try to improve LEACH protocol by implementing multihop communication for data communication between CH and BS. This paper also mentioned some fuzzy logic for cluster head selection in future.
The working of LEACH protocol is based on rounds and each round consist a setup phase and steady state phase.
The paper is based on energy model to analyze data delivery.

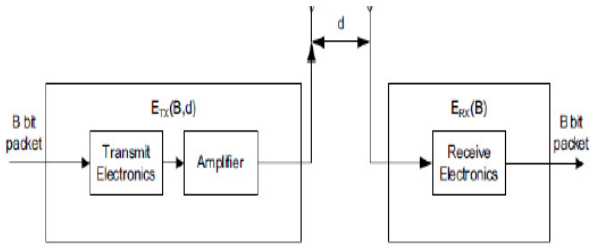

Figure 2. system and energy model [3]

The paper assumptions about the sensor nodes and the underlying network model used in this paper is given as[3]:
1. The network is homogeneous that all nodes have equal initial energy at the time of deployment.
2. The network is static and nodes are distributed randomly.
3. There exists only one base station, which is placed in the middle
4. The Energy of sensor nodes cannot be recharged after deployment of network.
5. Sensor nodes are equipped with GPS so aware about their location
6. No power and computational constraints in Base- Station
7. Deployed Nodes can use power control to vary the amount of transmission power, which depends on the distance to the Receiver.

[4] This paper discussed the design issues of sensor network and the classification & comparison of routing protocol. The following design issues are discussed in this paper are[1]:

a. Fault Tolerance: Fault tolerance is the ability to sustain sensor network functionalities without any interruption due to sensor node failures. This can arise due to the lack of power among sensor nodes.

b. Scalability: This defines the number of sensor nodes in deployed fields and protocol should be scalable to increase the number of nodes.

c. Production cost: To justify the cost of each sensor node during the deployment effects the network cost, so cost should be low.
d. Power consumption: The battery power consumption depends upon the distance among nodes and distance from base station.

e. Data Delivery model: The defines the data collected by the nodes is delivered at the sink. This depends upon the delivering model used during the transmission.

g. Quality Of Service (QoS): This define the quality given to the applications, it defines the lifetime, energy efficiency, data reliability and location awareness.

[5] This paper presents a new improved algorithm to balance the energy consumption of the entire network using LEACH protocol (LEACH-TLCH). This paper also used the same system energy model to dissipate the node energy. The technique works in phases, the setup phase and steady state phase. The energy consumption is less than LEACH and the number alive nodes are more in each round a compare to LEACH.

III. CONCLUSION

This paper presents the brief study of how to enhance the network life time using the designing parameters like dead nodes, alive nodes, residual energy and throughput. To enhance these parameters there are some design issues to overcome. The paper presents the study of clustering techniques and some data transfer techniques for better communication.

ACKNOWLEDGMENT

The above paper content I have mentioned are studies form different papers and the contents are true to my knowledge.

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Authors Profile

Ms. Manpreet Saini is pursuing M Tech in computer science from Punjab Technical University. She is working on Wireless sensor networks and her main focus is to impliment her work to improve the Lifetime of network using improved advance MODLEACH Technique.

Mr Sukhbeer Singh pursed Bachelor of Engineering from Jammu University and Master of technology from Punjab technical University in 2011. He is currently working as Assistant Professor in Department of Computer Science, Bcet Samba Jammu since 2017. He has published more than 10 research papers in reputed international journals including IEEE and ACM. His main research work focuses on Digital image processing, and wireless sensor network. He has 7 years of teaching experience.

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