

# Improved Modleach By Using More Energetic Cluster Head Selection Technique

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**Abstract**— The cluster head selection of any clustering technique in Wireless sensor networks effects stability of a network and also makes that particular protocol more efficient. Many cluster head techniques in any cluster protocol like MODLEACH is based on probability and threshold but does not affect the network life if used in multihop concept. This paper, presents an energy efficient multi-hop of clustering approach in MOLEACH, where cluster heads are selected on the basis of remaining energy of sensor nodes and probability parameters. The node having the maximum energy will get more chance to act as a Cluster head. It increases the stability period of the network because cluster head needs more energy than normal nodes.

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

## I. INTRODUCTION

Designing a protocol according to the network field is a main challenge as the wireless area network have wide range of applications, a wireless sensor is accomplished of tiny sensor nodes with certain limited initial energy. Each node depends on energy for its activities; this has become a major issue in wireless sensor networks as at the same time it faces the problem of energy constraints in terms of limited battery lifetime for data transfer. The clustering mechanism helps in improving the data transfer rate in a network by using intra-clustering technique and inter-clustering techniques.

The MODLEACH protocol, the modified version of LEACH protocol has a variety of use in wireless sensor network. According to MODLEACH protocol, at each round, new cluster head is selected and hence new cluster formation is required. The cluster head selection of any clustering technique in Wireless sensor networks effects stability of a network and also makes that particular protocol more efficient. The previous method[2] is based on probability and threshold but does not affect the network life if used in multihop concept. This paper, presents an energy efficient multi-hop of clustering approach in MOLEACH, where cluster heads are selected on the basis of remaining energy of sensor nodes and probability parameters. The node having the maximum energy will get more chance to act as a Cluster head. It increases the stability period of the network because cluster head needs more energy than normal nodes.

## II. RELATED WORK

The paper “Enhancing MODLEACH using multihop cluster heads as forwarder nodes” 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 working method used in this paper depends upon the forward node the step by step work used in this paper is as[1][2]:

1. The implementation of MODLEACH clustering Protocol.
2. After implementation of 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[2].
3. The selection of CHs is based on probability and the life of CH remains. 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 working layout is given in figure 1.

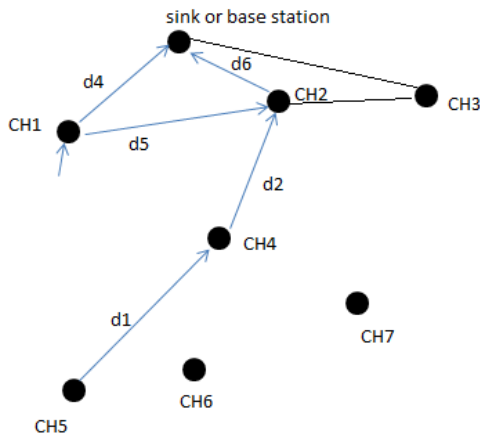


Figure 1. Data flow layout[1]

Here, d denotes some distance between CHs and let us assume  $d_2 > d_3$ ,  $d_4 > d_5$ ,  $d_8 > d_6$  and  $d_7 < d_6$  the data transfer will be CH5 -> CH4 -> CH2 -> Sink AND DIRECT FROM CH1 -> SINK[1].

### III. PROPOSED TECHNIQUE

The proposed consists of area of 100x100 with n nodes deployed randomly with base station away from the network. we use intra- clustering and inter-clustering method in data transfer mode to enhance the MODLEACH by using multi-hop cluster heads.

The working of the method is given as:

**Step2:** Initially generate a Wireless network with n nodes having average energy and construct the MODLEACH.

Step2. Select cluster head (CH) on the bases of probability and average residual energy. The CH may changes according to energy and rounds, after this data collection is to be done from neighbour nodes that are normal nodes (which is the concept of inter cluster).

**Step3.** Check the 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). When the data is collected from cluster members ,CHs examine the sink and sends data to certain upward CH nodes based on distance condition and energy, if the upward node is nearer to the sink then data is transferred directly to that upward node

### IV. RESULTS AND DISCUSSION

In this section we will find the parameter values and comparison of proposed technique with previous technique for better result. The evaluation of the results is

implementation using MATLAB with 100 nodes network in 100m X 100m area. The field with different parameter values is shown in table 1.

The performance is calculated using dead nodes, alive nodes, packet delivered to CHs and number of cluster head. The analysis of the network life time and throughput is shown in Figure 2, Figure 3, figure 4, figure 5 and figure 6.

Table 5.1 Value of Parameters used

Parameter	Values
Area (x, y)	100,100
Nodes (n)	100
Probability (p)	0.1
Initial Energy	0.5J
Transmitter energy	$50 * 10^{-9}$
Receiver energy	$50 * 10^{-9}$
Free space(amplifier)	$10 * 10^{-12}$
Multipath(amplifier)	$0.0013 * 10^{-12}$
Effective Data aggregation	$5 * 10^{-9}$
Packet Size	4000 bits

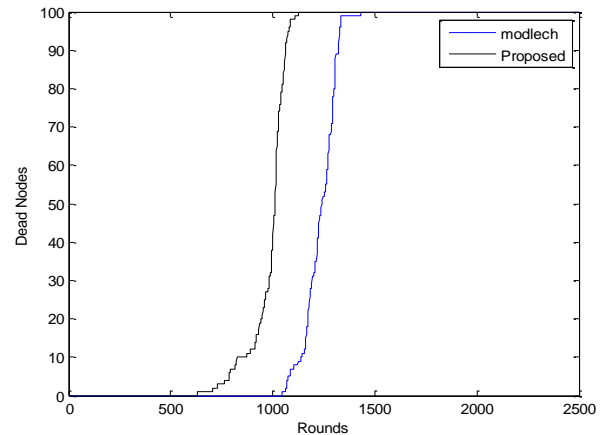


Figure 2. Performance Network Lifetime using dead nodes

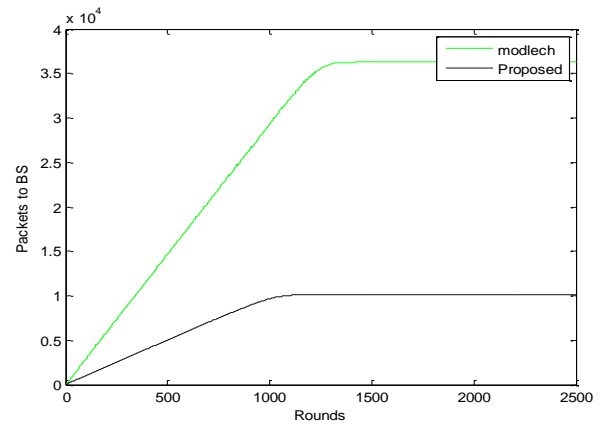


Figure 3. Performance using number of packets delivered

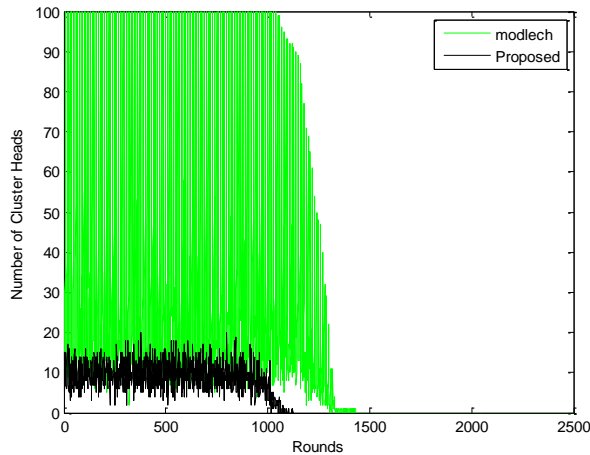


Figure 4. Number of Cluster head per round

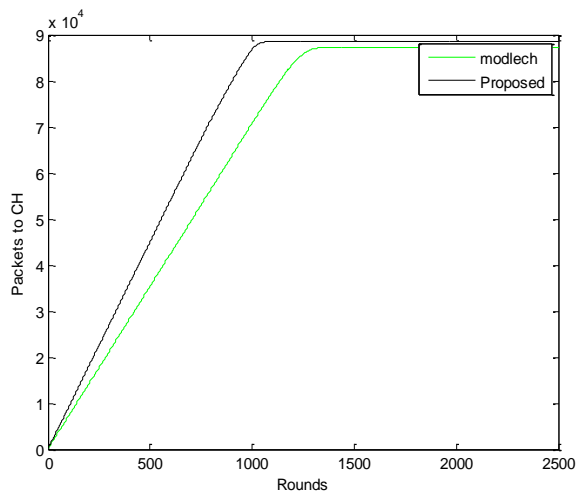


Figure 5. Performance using number of packets delivered to CHs

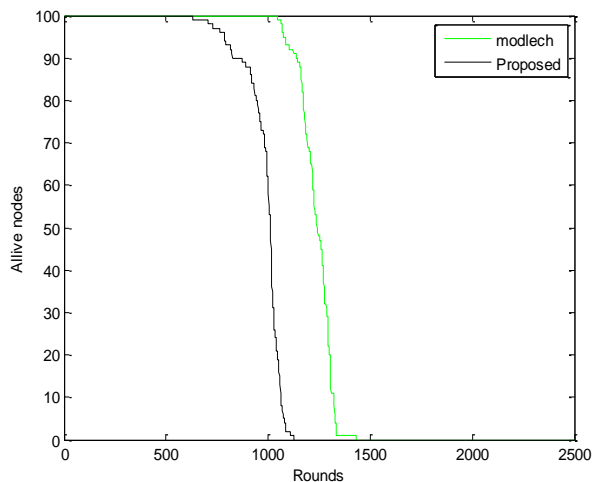


Figure 6. Performance Network Lifetime using alive nodes

## V. CONCLUSION

By implementing the inter-cluster technique with multihop concept for better network management, the cluster head selection based on remaining energy helps to improve the network life time by minimizing the dead nodes and increasing the throughput. It increases the stability period of the network.

## 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.

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