

# Enhancement of Levelwise Cluster Head Selection with the Concept of New Nodes As Cluster Head Nodes

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**Abstract**— The energy conservation in a network is a key challenge for a protocol, which affects the network for better data communication and scheduling. This paper presents a model which works in levels and in each level. The data distribution and collection in each level are done by CHs. This proposed work will focus on distance based data transmission and load dividing techniques at level 1 between CHs and normal node used as new node concept used as CH node. Which will help to stabilize the network by maximizing the lifespan of the network. The objectives of the work is to implement reclustering, multihop data transmission processes model and data distribution model by minimizing the packet loss accomplishing the load divide technique at level 1 among nodes.

**Keywords:** Wireless Sensor Network, reclustering, cluster head, LEACH.

## I. INTRODUCTION

The recent technology helps to enabled the event of affordable, low-power, multifunctional sensor nodes that are tiny in size and communicate unbound distances. These tiny sensor nodes has a limited energy, the energy conservation of a node in a network is a key challenge for a protocol, which affects the network in better data communication and scheduling. Many protocols are designed to minimize the energy utilization of the nodes by establishing some rechargeable node and some data dividing rules. There are some level based models, which works in phases and in each phase CHs are selected according to equations and in level 0 CHs selected will never take part in level 1 [2][3]. The data distribution and collection in each level are done by CHs but maximum load is generate at level 0 CHs because all the normal or maximum number of normal nodes send data to the closegest CH at this level. This is the drawback when data forwarded at level 0. This proposed work will focus on distance based data transmission and load balancing techniques at level 0 between CHs and new nodes as a CHs. These nodes are the not a special nodes, Which are the normal nodes. The new node work as CH node for the other node which wants to send a data to CH but now it has option to send a data to others nearer node(new node). Which has a nearer than Certain CH for which normal sensor node was sending the data. Which will help to stabilize the network by maximizing the lifespan of the network.

The objectives of the work is also to implement the reclustering, multihop data transmission processes model and data distribution model by minimizing the packet loss accomplishing the load divide technique at level 1 among nodes.

## II. PREVIOUS WORK

The Previous approaches works in at different level (level 0 and level 1 or level 1 and level 2) [2] [3]. In level 0 cluster head is selected on the basis of probabilistic threshold (based on remaining energy), in level 1 the cluster heads are selected and formation of cluster is accomplished[2]. In level 2 [3] reclustering process starts where all the selected cluster heads reselect the second level cluster heads using threshold which is based on nodes remaining energy and distance to base station. In level 1 CHs selected are those who do not take part in level 0 as CHs. The data distribution and collection in each level are done by CHs but maximum load is generate at level 0 CHs because all the normal or maximum number of normal nodes send data to the nearer CH at this level. This is the drawback when data forwarded at level 0.

## III. PROPOSED METHODOLOGY

The model works in levels, focused on distance based data transmission and load dividing techniques at level 1 between

CHs and new nodes concept work at level 0. The new node work as CH node for other node who wants to send data to CH but now it has option to send data to others nearer node (new node). The whole proposed method helps to improve the data transmission with compression at both level without any loss of data and increase the stability of sensor networks with load balancing at level 1 by sending the whole data to sink, equally divided data to two nearer CHs, equally divided data to sink and nearer CH or whole data to nearer CH .

The model is divided into two levels and works as:

Level 0: The formation of clusters occur and selection of cluster head election is done in this level and are based on below equation. The data transmission and load balancing is also done in this level between selected cluster heads and new nodes.

$$T(i) = \left( \frac{P_c}{1 - P_c + \text{mod}\left(r, \text{round}\left(\frac{1}{P_c}\right)\right)} \right) * E_{rem} / E_{max}$$

Where

$P_c$  is the optimal probability for initial cluster head  $r$  is the current round,  $E_{rem}$  is the remaning energy of sensor node and  $E_{max}$  is the maximum or initial energy of sensor nodes.

Level 1: The new cluster head selection is done in which those cluster heads among nodes are selected who do not become the cluster heads in level 0. The selection process is based threshold  $T(s)$  shown below:

$$T(s) = \left( \frac{P_{sc}}{1 - P_{sc} + \text{mod}\left(r, \text{round}\left(\frac{1}{P_{sc}}\right)\right)} \right) * \frac{E_{rem}}{E_{max}} * D_{max} / D$$

Where

$P_{sc}$  is called optimal probability for second level cluster heads,  $D_{max}$  is the maximum distance of sensing field and  $D$  is called the distance between sensor node and base station. The load dividing also work in this level.

#### IV. RESULTS AND DISCUSSION

To implement reclustering, multihop data transmission processes model and data distribution model by minimizing the packet loss in a network consist of 100X 100 m<sup>2</sup> area field, 100 nodes,  $P_c=0.5$  and  $P_{sc}=0.2$ , rounds=2000 with packet size 4000 bits, the base station at 50X175 m is done in MATLAB. To accomplishing the load divide technique at level 1 and new nodes participation as CH concept among nodes to stabilize the network is calculated by the time interval from the start of the operation to the first node dies.

The Figure 1 defines the network life time by increasing the alive nodes during each round and overall network lifetime also increased.

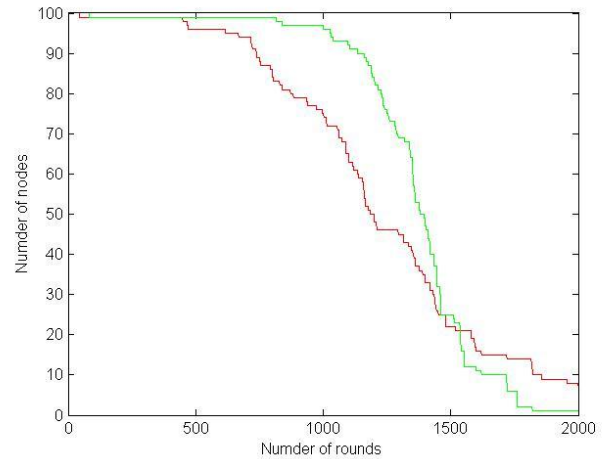


Figure 1. Network Lifetime using alive nodes

The figure 2 defines the energy consumption per round.

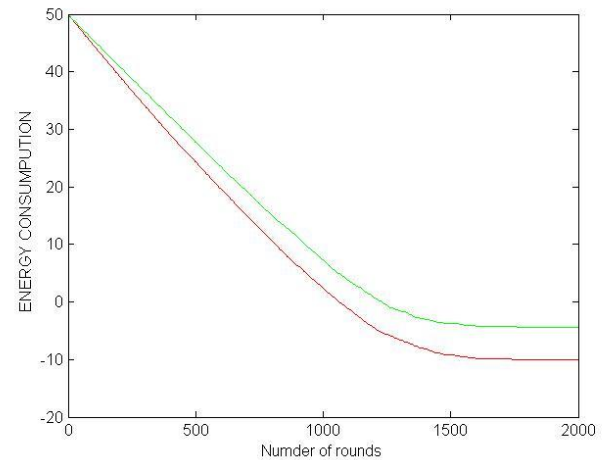


Figure 2. Energy consumption

#### V. CONCLUSION

By implementation distance based data transmission and load dividing techniques at levels between CHs and new nodes concept also minimizing the packet loss and increases the network life time which stabilized 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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