Cluster-Based Approach for Sink Node in Wireless Sensor Network

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Abstract: *In Wireless Sensor Networks, Clustering is an adequate way of lending scalability and data aggregation. Routing is Essential in WSN's, For critical services in WSNs Multihop routing is employed. Since MANET and Internet routing techniques doesn't performs well. Because of this large amount of work has to be done. Routing in Internet assumes with high reliable wired connections, and thus packets errors are rare; But this is not true. Also Routing in MANET depends more on neighboring symmetric links; this is too often not true. These discrepancies necessitates the invention and deployment of new solutions.*

1. INTRODUCTION

In Wireless Sensor Networks, nodes are deployed in ad hoc fashion, Routing in WSNs typically starts with neighbor discovery, nodes sends number of messages (Data packets) and constructs a local neighbor tables. These includes information of Individual neighbor's ID and location previous to neighbor discovery. Also it includes other information like Residual energy, End to end delay with in-between nodes, and an cost of link quality. Once table is finished, Messages are directed from source node location to destination address based on geographic coordinates, not IDs in Routing Algorithms. Geographic Forwarding (GF) is a classic routing algorithm that works like this. A wireless sensor network generally consists of many sensor nodes armed with sensing, computing, & short range communication devices over wireless channels. These nodes are dispersed over a vast area; e.g., WSNs monitors area depending on type of application interest. In such, the primary goal of the network is to aggregate data from the surroundings and forwards it to a sink node. With size limitation, Design and management of networks are becoming challenging; in precise, regulation in memory, communication capacity and power need to be considered in order to enhances the nodes longevity.

II. BACKGROUND

In the paper titled "*Mobile data gathering with load balanced clustering and dual data uploading in wireless sensor networks*," A three-layer groundwork is proposed by author for mobile data aggregation in WSNs, which includes the sensor layer, cluster head layer, and mobile collector (called SenCar) layer. The groundwork employs load balanced clustering and dual data uploading, which is named as LBC-DDU. The motive is to get good scalability, network lifetime and low latency. At the sensor layer, (LBC) algorithm is scheduled for sensors coordinate themselves into clusters. This plan brings multiple cluster heads to equates the work load and facilitates dual data uploading. Multiple cluster heads in a cluster helps to perform energy-saving in inter-cluster communications. At the mobile collector layer, SenCar involves of two antennas that enables two cluster heads to parallely upload data to SenCar with many-user multiple-input and multiple-output (MU-MIMO) technique. The Designing for SenCar is develop and to handles dual data uploading capability by electing polling points in each individual cluster. By visiting each polling point, SenCar can efficiently collects data from cluster headstand forwards this data to the sink. Simulations are carried out to check the efficiency of the proposed LBC-DDU approach. The results elaborates that when each individual cluster has two cluster heads, LBC-DDU attains over 50% energy saving per node and 60% energy saving on cluster heads.

In the paper titled "*Mobility assisted data gathering with solar irradiance awareness in heterogeneous energy replenishable wireless sensor networks*" the authors characterizes that systems underwriting static information social occasion may encountering lopsidedness in vitality utilization because of non-uniform transfer bundle. Despite the fact that portable information gathering bears a sensible technique in tackling this issue, it unavoidably offers longer information accumulation inertness because of the utilization of versatile information aggregators. In the in the mean time, vitality gathering has been dealt with as a promising handy solution to diminish vitality impediment in wsn's. In this] paper, a Joint outline of these two methodologies and inclination a novel two layer heterogeneous design for WSN, which includes of two sorts of hubs: static sensor hubs and these are fueled by sun oriented boards, and bunch heads that have constrained versatility and can be remotely revived by power transporters. In view of system design, An information gathering game plan, called portability helped information gathering with sun powered irradiance mindfulness (MADG-SIA), where hubs are assembled around group heads that adaptively modify their positions as indicated by sun based irradiance, and the detecting information are sent to the sink by the bunch heads acting as information accumulation focuses.

III. ALGORITHMS

A. Cluster Head Election-LEACH

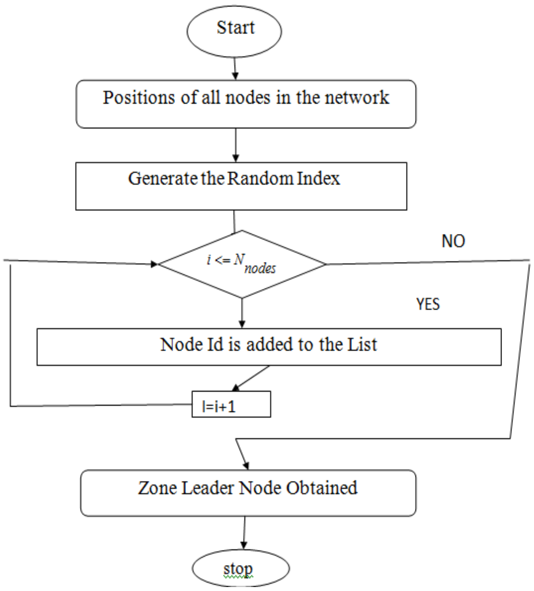

Figure 1: Cluster head election-LEACH

B. Cluster head election-GRID

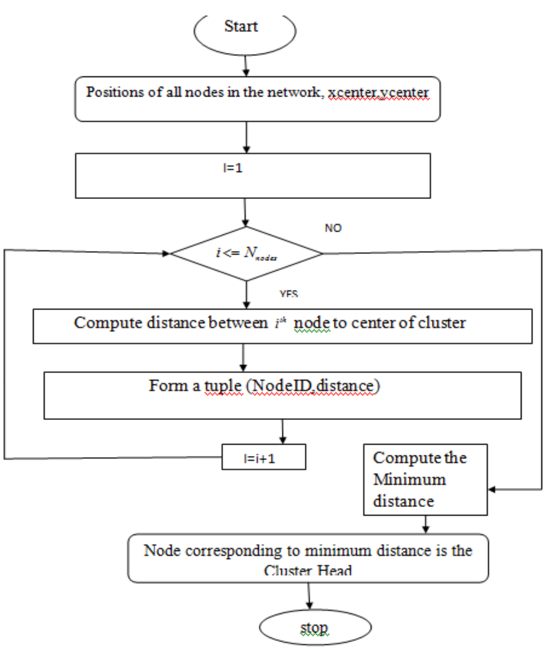

Figure 2: Cluster head election-GRID

Figure 1 shows cluster head election for LEACH algorithm. Figure 2 shows cluster head election for GRID algorithm. The LEACH will select the cluster head randomly. We need to know the positions of nodes in network. we need to generate random index and then we obtain a zone leader.

In case of LEACH, always a node is elected randomly as a cluster head. during each round, the node will be changing who becomes the cluster head. Inputs for the LEACH will be nodes in a clusters. Output will be a single node acting like a cluster head. The purpose of cluster is to perform intra-cluster communication. basically, in LEACH it is performed randomly.

In GRID, source node and destination node will act like a input, we need to check source node and destination node both are in same cluster.if they are in same cluster, source node and destination node will communicate directly. Then we need to check source node is a zone leader. If it is a zone leader, then the source node is added to the route. If it is not a zone leader, then we need to find the zone leader of sorce node, i.e cluster head of sorce node. Then we need to check destination node is a cluster head. If the destination node is a cluster head, add destination leader and stop routing process. If it is not, find out the destination zone leader, communicate with destination zone leader, then communicate with the destination.

It will be like a three hops, from sorce node to source node clster head, from their to destination node cluster head,from their to destination node. because in grid routing, normal node will maintain local topology, cluster head will maintain global limited topology. One cluster head will have the knowledge of other head in the network. that is why this is possible.

IV. RESULTS

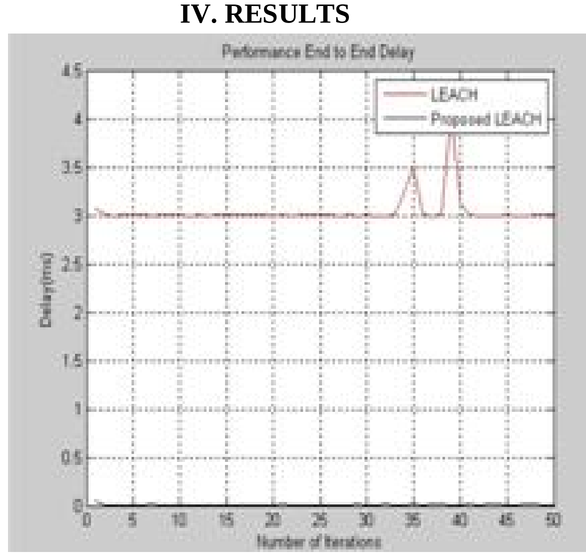

Figure 3: End to End delay

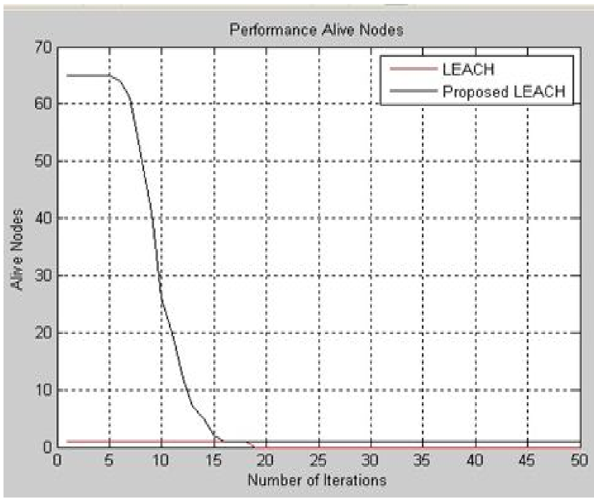

Figure 4: Alive Nodes

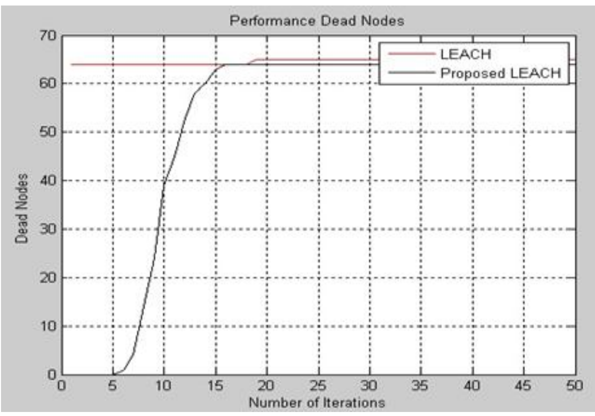

Figure 5: Dead Nodes

Figure 3 shows end to end delay of LEACH and GRID. Figure 4 shows the performance of alive nodes.Figure 5 shows the performance of dead nodes.

V.CONCLUSION

In LEACH, there is a lot of back and forth propagation between base station nad nodes. This will happen because cluster head and normal nodes will maintain local topology. In case of LEACH, because cluster head does not have knowledge of other clusters, it has to communicate with base station obviously. It consumes more hops for far away nodes. In grid routing, first source node and destination node if they are in same cluster, communicate directly other wisw find out source node is a cluster head. If it is a cluster head, then add it to route. If it is not a cluster head, find out the cluster head of source node, communicate from a source node to source node cluster head. Then check whether the destination node is a cluster head. If destination node is a cluster head, communicate with destination node directly and finish the routing. Otherwise find out the destination node cluster head, communicate with a source node cluster head to destination node cluster head. From destination node cluster head communicate to the destination node that is how grid based routing will happen. There is no back and forth propagation in grid routing. Hence it is advantageous when compared to LEACH algorithm.

VI. REFERENCES

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