Analysing Effects of Asymmetric Linkage on Wireless Sensor Networks

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Abstract
Power consumption is an important factor when designing a route algorithm for Wireless Senor Networks (WSN). In Wireless Networks, the life time of a network is directly related to the power consumption of sensor nodes. The initial power of the nodes decreases in all data packet transfers and when the full power of the nodes eliminates the dying area and battery replacement does not occur in all cases due to local complexity. In order to develop a lifetime sensor, integration and transfer function work in a way that reduces energy consumption. The direct transfer of data from the sensor to the Base station consumes additional energy; therefore it is important to choose a route with a power saving device. In the proposed task, a merging algorithm is used to group nodes into groups in order to transfer data from nodes to the base channel. The proposed algorithm works well in both central and distributed environments. Composition of the proposed Cluster and selecting a cluster head, which transfers data from its cluster node to the base station, uses a hierarchical clustering algorithm and considers the distance parameter, power index and RSSI value to calculate proximity matrix to form clusters. In the proposed system a random and distributed algorithm taken that shows improvements in network life by reducing power consumption during transmission. Comparison of the results with the output algorithm indicates better performance of the proposed algorithm.

Keywords—Cluster, WSN, Asymmetric, Linkage, Agglomerative, Cluster Head

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I. INTRODUCTION

The Wireless Sensors Network is a self-configured and distributed network that incorporates small and low power tools known as monitoring and gathering information from the environment. WSN demonstrates its impact on different application areas [1, 2]. At WSN, randomly distributed sensors from a hostile environment collect data and send it to Base Station for further processing. Sending data packets directly to Base Station consumes more power over nerves away from Base Station leading to a rapid decrease in power level compared to nodes found a short distance from Base Station. The sensor does not work when all power is gone. Power consumption is directly related to radio transmission over a wireless sensor network. The Clustering algorithm shows improvements in network life compared to direct transfers as consolidation of space consumes less energy as instead of sending data to the Base Station located remotely, it transfers to a nearby location responsible for transferring data to the Base station in an integrated manner. Hierarchical collection begins to build a collection based on some of the same matrix. Nodes begin to organize together with their neighbors on the basis of the proximity matrix. After group formation, a random method is used to calculate the probability of nodes becoming a group header. A Node with a high value of opportunities within a cluster is selected as the header of the cluster. Proximity matrix is an important factor when creating a collection. In the proximity matrix the proposed function includes an effective Euclidean distance between nodes, a residual strength indicator and a Received Signal strength indicator (RSSI). The calculated amount of transfer costs incorporating the above factors makes for equal connections as the cost of transferring data from point A to point B is different than sending data from point B to point A. This type of parallel transmission helps to consider all of the above factors while compiling the composition and selection of the header leads to better performance compared to the existing router algorithm where the algorithm typically considers equitable communication costs while transferring data from nodes to Base station.

II. RELATED WORK

In energy effectiveness examination, LEACH [5] is an advanced algorithm; LEACH follows TDMA's method of transferring data packets. LEACH works in two phases. In the first stage, the node begins to sort them by group and selects a group header with a higher probability node that acts as a local channel. In the second stage, data transfer, integrated into the header of the collection, in the base station occurs. LEACH is a random and widely distributed way to extend network life. The main effect of LEACH is the random and variable value of the collection and the power indicator is ignored when constructing the collection.

PEGASIS [7] shows a better quality of life network compared to the LEACH protocol. PEGASIS creates a series-like series where each node receives data packets from its immediate neighbor. The data collected at each location goes from one place to another until the Cluster head transfers the data to the base station. The main effect of PEGASIS distance and power parameters are taken into account when selecting a group head where in the worst case the low power node compared to elsewhere in the network selects as CH and dies prematurely.

HAC (Hierarchical Agglomerative Clustering) [12] the way to the bottom where CH chooses for the first time and on the basis of the cluster head, cluster formation occurs. HAC is an intermediate structure in which the base station has prior global knowledge. The nodes begin to organize in a group on the basis of matrix similarities. The process continues until all the nodes in the network do not connect to any cluster.

H-DHAC [13] overcomes GPS limitations. H-DHAC requires two types of data to be compiled: (a) Eligibility Data (enter binary numbers 0 and 1 to indicate whether nodes are connected or not). (b) Quantity data (location information).

III. PROPSOED WORK

The proposed algorithm is based on the structure of the category group. Since the proposed method uses the resemblance coefficient RSSI function, power and distance, the connection between nodes becomes asymmetric in the cost of transferring from point A to point B is not equal to node B to point A.

Step I: Information congregation

Node swap JOIN the message with all other nodes in the 1-hop range. These messages from nodes contain their residual capabilities, RSSI and their ID.

Step II: Immediacy values

Calculate the distance between two nodes using the RSSI value obtained. A parallel matrix is then formed on the basis of spatial information in the first round as initially the same power of all nodes while in another active circle of power and distance is used which leads to asymmetric connections as the power differs from one node to another.

Step III: Aggregation

Aggregation involves repeated repetition until all nodes in the hop range can be associated with any set. Inaccessible nodes present themselves as a singleton CH that directly transmits data to the primary channel.

In creating clusters, nodes begin to organize themselves into a group by means of a step-by-step linking method, each node calculating its approximate coefficient as RSSI function, power index and Euclidean calculated distance, after the final matrix calculation where each component interacts with any group or self-proclaimed singleton CH, the selection of CH steps within the group begins.

Step IV: Cluster Head

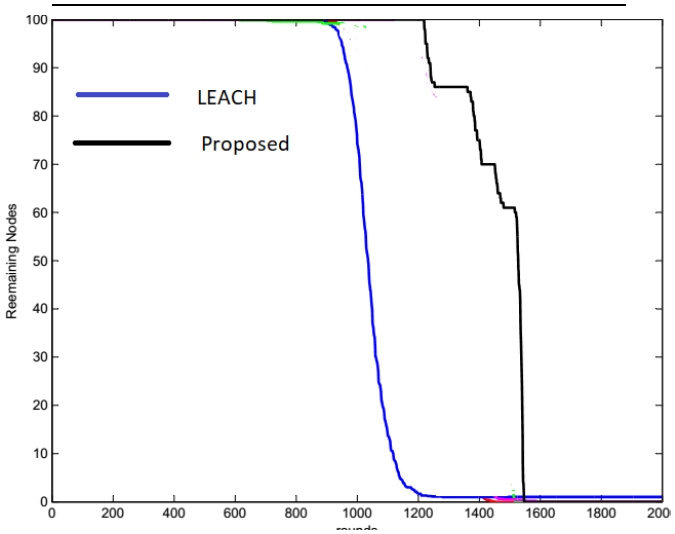
1. Advertising Category: All nodes within a group stream JOIN the message as an invitation message. A Node with a high number of opportunities is defined as a set of that particular round. The Head of the Cluster sends a message of acknowledgment.
2. Integration Phase: At this stage the sensor node begins to hear data from locations and waits for their opportunity to transfer data to the header as the cluster head creates a TDMA schedule to prevent conflicts between nodes.
3. Transfer Phase: Combined data packets run from all nodes within a cluster at a header, starting with the header of the cluster to the base station.

IV. EXPERIMENT & RESULT

To analysis the performance of algorithm MATLAB 2016a is used for simulation. For simulation model, network of 100 stationary sensors and one sink is used. The nodes are supposed to be randomly arranged within the field which is a square area of *(a*a)*.

Table 1. Simulation Parameters

Parameter	*Value*
Node Number	100
Sensing Field Range	(0,0)-(100,100)
Channel bandwidth	1 Mbps
Threshold	87.7m
E_{elec}	50 nJ/bit
ε_{fs}	10 pJ/bit/m^2
ε_{amp}	0.0013 pJ/bit/m^4
	0.5 J
Data Packet Size	2000 bytes
E_{DA}	5 nJ/bit



Compared performance estimates with that of LEACH and proposed activity indicate that the algorithm provides up to 60% improvement over the rest of your life. LEACH has very poor performance. It is because of the nodes that behave as CHs in LEACH that sends data to the primary channel directly that uses a large amount of power as a random selection of nodes such as CH and thus power consumption is inconsistent. The performance of our proposed algorithm is very reasonable. It divides the network into k groups, which ensures uniform distribution of CH across the network. CHs conduct data collection on cluster heads and relay

cluster which is responsible for transferring data between clusters through the track tree. Rather than random selection of cluster node ,proposed algorithm works on calculated cluster head which rotate at each round, so life expectancy rate of network increases.

V. CONCLUSION

In this paper we have proposed a new route algorithm that categorizes nodes into groups by considering a different route parameter. This route algorithm is naturally asymmetric where the transfer costs of sending data from node 1 to node 2 differ from the transfer costs of node 2 to node 1. The proposed algorithm is also a less expensive solution as it does not require GPS ((Global positioning system) to calculate the distance between nodes that make it suitable

both internal and external environment. The proposed algorithm does not require prior global knowledge that makes it suitable for a distributed area.

The result of the proposed algorithm tested in MATLAB 16 (a). Comparison of the numbers and images of the proposed algorithm with an outgoing algorithm such as LEACH shows an improvement in network time as it shows from the calculation that the time required to die first and last place in the network is much higher compared to the existing algorithm.

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