A Hybrid Efficient Routing Protocol in Wireless Sensor Networks

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Abstract

We propose an empirical and efficient model of energy efficient routing protocol for wireless sensor networks. Parameters which we select to compute the routing are important for optimal path computation.The parameters we use to compute the optimal path are signal strength,channel capacity and queue delay. Intermediate nodes should have more signal strength and channel capacity and queue delay should be minimum. In-out transmission rate should be optimal while transmitting the data packets from source to destination. Our proposed model gives efficient results than traditional models

I.INTRODUCTION

Wireless Sensor Networks will be networks of modest, battery controlled sensor nodes with constrained on-board preparing, storage and radio abilities [1]. Nodes sense and send their reports toward a preparing focus which is designated "sink." Designing conventions and applications for such networks must be vitality mindful in request to draw out the lifetime of the system, in light of the fact that the substitution of the inserted batteries is a troublesome procedure once these nodes have been installed.

Using Direct Transmission (DT)[1][2], sensor nodes transfers to the sink, so that the result nodes that are away from the sink would be killed first. Apart of that using Minimum Transmission Energy (MTE), data is transferred over routes of cost sufficient, where the cost leads to the emits the power expended. MTE monitors the nodes that are near to the sink behaves like relays with more probability than nodes that are away from the sink node. These former nodes are stop transmission first. Under both DT and MTE, a piece of the field won't be observed for a huge piece of the lifetime of the network, and therefore the detecting procedure of the field will be one-sided.

In previous work there is a system proposed named LEACH. It supports well and it energy load is efficiently distributed well and dynamically distributes to created clusters.The greater part of the scientific outcomes for LEACH-type plans are acquired expecting that the nodes of the sensor arrange are prepared with a similar measure of vitality[3][4]—this is the situation of homogeneous sensor networks. In this paper we contemplate the effect of heterogeneity as far as hub vitality. We expect that a level of the hub populace is outfitted with more vitality than whatever is left of the nodes in a similar system—this is the situation of heterogeneous sensor networks. We are persuaded by the way that there are a great deal of applications that would profoundly profit by understanding the effect of such heterogeneity[5].

II.RELATED WORK

In previous researches, wireless sensor networks (WSNs) have turned out to be a standout amongst the most fascinating regions of research. A WSN is made out of various wireless sensor nodes which structure a sensor field and a sink. These extensive quantities of nodes with minimal effort, low-power, and fit for correspondence at short separations perform restricted calculation and impart wirelessly structure the WSNs. Explicit capacities, for example, detecting and routing can be acquired through collaboration among these nodes[6].

These capacities make wireless sensors helpful for checking regular functions, ecological changes, controlling security, evaluating traffic streams, observing military application, and following well disposed powers in the battlefields. These errands require high dependability of the sensor networks. To make sensor networks progressively strong, the consideration regarding research on heterogeneous wireless sensor networks has been expanding in later past[7][8].

Clustering is a key strategy used to expand the lifetime of a sensor network by diminishing vitality utilization [10]. A sensor network can be made adaptable by framing clusters. Pioneer of the cluster is regularly alluded to as the cluster head (CH)[6]. A CH might be chosen by the sensors in a cluster or pre-assigned out by the network originator. Different clustering calculations have been explicitly intended for WSNs for adaptability and effective communication. The idea of group based routing is additionally used to perform energy effective routing in WSNs. In a various

leveled architecture, higher energy nodes (cluster heads) can be utilized to process and send the data while low energy nodes can be utilized to perform out the sensing.

Sensor nodes are viewed as homogeneous since the inquires about in the field of WSNs have been advanced, be that as it may, in all actuality, homogeneous sensor networks scarcely exist. Indeed, even homogeneous sensors have distinctive abilities like diverse dimensions of starting energy, consumption rate, and so on. In heterogeneous sensor networks, normally, a vast number of cheap nodes perform sensing, while a barely any nodes having nearly more energy perform information separating, combination and transport. This prompts the inquire about on heterogeneous networks where at least two sorts of nodes are considered [8].

III.PROPOSED WORK

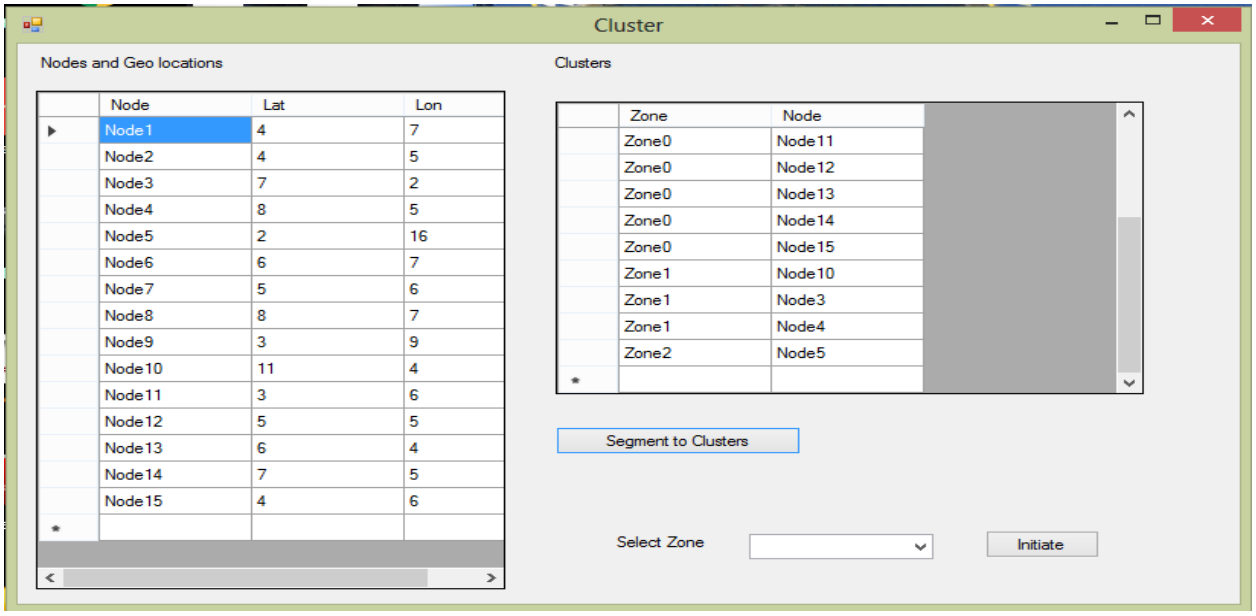
We propose an efficient routing protocol with optimal parameters like signal strength, channel capacity, queue delay and in-out. In this model we eliminate the unnecessary nodes or intermediate nodes while transmission of data packets between source and destination. Cluster implementation groups the similar type of objects based on the latitudes and longitudes of the nodes. We use k mid center point cluster implementation for cluster generation. While transmission of data from source to destination.

Cluster Implementation:

In this model initially we select the centroids randomly from the set of objects in the dataset. Every object has its spatial parameters like latitude and longitude. We group the objects or nodes based on the distance between the nodes. The following algorithms shows sequential steps of clustering as

Step1:Read the set of nodes($N(n_1,n_2\ldots n_l)$) with latitudes and longitudes
Step2: Select 'k' random centroids from the list of nodes
Step3:Calculate the Euclidean distance between centroids(C_i) and the selected nodes $N(n_1,n_2\ldots n_l)$)
Step4 : Set initial_distance=0
do-While (Eucl_distance(C_i,O_i) <=initial_distance) then
Optimal_distance:= Euclidean_distance;
Centroid_id=Ci;
End while
Step 5: Reinitiate the clusters with new centroid set for every iteration
Step6 .Continue the process or steps from 2 to 5

We select k number of centroids from the list of nodes 'N'and compute the distance between centroid and remaining nodes ($N(n_1,n_2\ldots n_l)$) .do with all centroids and compute the minimum distance and assign the node n_i to respective cluster and proceed the same steps until all nodes computation is completed



Cost computation:

Evolutionary approach for efficient cooperative communication over nodes in network with the parameters channel capacity and signal strength, it leads to the communication cost between the nodes, here our approach finds the optimal communication cost by applying the process of path selection operation

between the nodes, again calculate the communication cost between the source and destination nodes followed by relay node In node communication establishment module we construct a general node to node communication through the socket programming, Every node can communicate with each other .data packet can be transmitted from source node to destination node, each node acts as server, it can accept the any connection and receives the data packets from any other node and transmits the data packets to other nodes

The main advantages with proposed system is Routing implementation through signal strength and channel capacity gives optimal path

Source node makes request for path for required destination. Cluster implementation groups the nearest nodes based on its parameters.Select the destination node and transmit the packets through intermediate nodes and check for queue delay .Cost is the computation of signal strength, channel capacity and queue delay parameters through intermediate nodes between source and destination. After selection

of the cluster, we get all nodes signal strength and channel capacities and connectivity between the nodes. We select the nodes with minimum queue delay and maximum aggregated value of signal strength of the nodes

Cost : = signal strength(N_i) + Channel Capacity(N_i)

And if (Queue_delay(N_i)< threshold) then

Select node

Else ignore and Move_NEXT()

IV.CONCLUSION

We have been concluding our current research work with efficient route parameters and cluster implementation. Cluster implementation groups the similarity set of objects based on the latitudes and longitudes of the nodes. While transmission of data packets, we select the intermediate nodes based on the signal strength and channel capacity. This is an energy efficient model which saves the energy of the nodes based on the parameters which we selected for computation

REFERENCES

[1] G. Smaragdakis, I. Matta, and A. Bestavros, "SEP: A stable election protocol for clustered heterogeneous wireless sensor networks," in Second international workshop on sensor and actor network protocols and applications (SANPA 2004), 2004.

[2] H. Zhou, Y. Wu, Y. Hu, and G. Xie, "A novel stable selection and reliable transmission protocol for clustered heterogeneous wireless sensor networks," Computer communications, vol. 33, pp. 1843-1849, 2010.

[3] Kulakowski P, Calle E ,Marzo JL, Performance study of wireless sensor and actuator networks in forest fire scenarios, International Journal of Communication Systems, Vol 26, issue 4,2013,pp 515-529.

[4] Wang Y, Shi PZ, Li K, Chen ZK, An energy efficient medium access control protocol for target tracking based on dynamic convey tree collaboration in wireless sensor networks, International Journal of Communication Systems , 25:9, 2012, pp 1139-1159.

[5] W. R. Heinzelman, A. Chandrakasan, and H. Balakrishnan, Energyefficient communication protocol for wireless microsensor networks, Proceedings of the IEEE Hawaii International Conference on System Sciences ,Maui, HI, USA, January 2000, pp 110.

[6] Georgios Smaragdakis, Ibrahim Matta and AzerBestavros, SEP: A Stable Election Protocol for clustered heterogeneous wireless sensor networks, supported in part by NSF grants ITR ANI-0205294, EIA-0202067, ANI0095988, and ANI-9986397, 2004,pp 1-11.

[7] Li Qing, Qingxin Zhu, Mingwen Wang, Design of a distributed energyefficient clustering algorithm for heterogeneous wireless sensor networks, Computer Communications, 29:12, 2006, pp. 22302237. 47

[8] Liliana M.Arboleda, NidalNaseer, Comparison of clustering algorithms and protocols for wireless sensor networks, IEEE CCGEI, Ottawa, May 2006, pp 1787-1792.

[9] G M Shafiullah, Amoakoh Gyasi-Agyei, Peter J Wolfs, A Survey of Energy-Efficient and QoS-Aware Routing Protocols for Wireless Sensor Networks, Novel Algorithms and Techniques In Telecommunications, Automation and Industrial Electronics ,2008, pp 352-357.

[10] VivekKatiyar, Narottam Chand, SurendraSoni,Clustering Algorithm For Wireless Sensor Network:A Survey, International Journal of Applied Engineering and Research, 1:2,2010,pp. 273-287.