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DISTANCE BASED CLUSTER HEAD ELECTING TECHNIQUE FOR ENERGY CONSTRAINT APPLICATIONS

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Abstract: *Wireless Sensor Networks (WSN) is made of substantial amount of energy, and also it has computationaland communication constraints, WSN applications spread over fields like military, habitat monitoring, in these applications replacing or recharging the batteries is impossible scenario. Once they are placedin threatening situations. Consequently, to keep the system alive as long as possible, communication between the WSN nodes must be finished with balanced parameters (energy vs. amount of data transfer). The paper will address above issue. In this paper, a routing algorithm is proposed by making necessary modifications in higher connectivity algorithm which considers the distance as a factor for electing the clusterhead. The modified algorithm is also implemented for multicasting. Factors like mobility have also been considered.*

Keywords: *Wireless Sensor Networks, Clusterhead election, Multicasting.*

1. INTRODUCTION

With advancement in Micro-Electro-Mechanical Systems (MEMS), Wireless Sensor Networks (WSNs) will play an imperative role in our everyday lives. People were depended on wired sensors for long time, for basic things like temperature checking, to complex errands, for example, observing life-signs in hospital patients. Remote Sensor Networks give unforeseen applications in this new field of design [1]. From military applications, for example, battle zone mapping and target reconnaissance, to making context aware homes [2] where sensors can screen security and give automated administrations custom-made to the individual client; the quantity of uses are endless. Smart Dust is one of such application [3].

However this new innovation poses numerous configuration objectives, [1] that as of not long ago, have not been viewed as practical for these applications.

One such issue is that how to make an authoritative structure amongst these nodes [8]. Since the fundamental point of WSNs is the capacity to convey theminanad hoc way, as it is not practical to compose these nodes into groups pre-deployment. Hence, there has been an expansive measure of examination into methods for making these organizational structures [6], [7], [8].

- Sensor Node: A sensor hub is the core segment of a WSN. Sensor hubs can be tackled numerous parts in a system, for example, sensing; storage of information; directing; and information handling.
- Clusters: Clusters are the hierarchical unit for WSNs. The thick way of these systems oblige the requirement for them to be separated into groups to streamline assignments such a correspondence.
- Clusterheads:Clusterheadsare the pioneers of a cluster. They need to compose exercises in the group. These errands not constrained to information conglomeration and organizing the correspondence calendar of a cluster

The clustering marvel as should be obvious, assumes an essential part in association of the system, as well as can drastically influence system execution. There are a few key confinements in WSNs, that grouping plans must consider

- Constrained Energy: Unlike wired designs, wireless sensor nodes are off-grid, means that they have restricted energy storage and the proficient utilization of this energy will be crucial in deciding the scope of suitable applications for these systems. The constrained energy in sensor hubs must be considered as legitimate grouping can decrease the general energy use in a system.
- Network Lifetime: The energy confinement on hubs brings about a restricted system lifetime for hubs in a system. Legitimate clustering should endeavor to diminish the energy use, and thus expand system lifetime.
- Limited Abilities: The little physical size and little measure of storage energy in a sensor hub limits a considerable lot of the capacities of hubs as far as transforming and correspondence capacities. A decent grouping algorithm ought to make utilization of imparted assets inside a hierarchical structure, while considering the impediment on individual hub capacities [8].
- Application Dependency: Often a given application will vigorously depend on cluster association. At the point when planning a clustering algorithm, application strength must be considered as a decent clustering calculation ought to have the capacity to adjust to a mixed bag of use prerequisites.

A WSN system is made of expansive number of sensor hubs which are thickly conveyed in a range needed to be checked Sensor hubs gather information and forward it to base station or sink straightforwardly, or through multicasting correspondence. Anyhow these sensor hubs have constrained measure of memory, transforming limit, correspondence range or more all restricted measure of energy (force) in light of the fact that sensor hubs are battery fueled. It is difficult to supplant or energize batteries of the hubs when they work in threatening situations. Henceforth, energy sparing is a critical issue for a WSN. Numerous methods for energy funds are produced which incorporates sleep scheduling, MAC protocols, routing protocols, information conglomeration, and topological control and so on.

Here centered around group arrangement transform by considering higher connectivity algorithm Cluster development is a piece of heuristic routing protocols. These protocols are energy efficient and give adaptability [4]. A survey [14]on different steering procedures and protocols can be found in [4]–[11]. Every group comprises of part hubs and a cluster head (CH). CH is in charge of gathering and amassing information from the part hubs and sending it to other CH. the goal of the CH race is to give energy[6]-[17]efficiency to improve the lifetime of the WSN. Data conglomeration is one of the ways which can give energy efficiency. To upgrade the lifetime for the versatile system, it is obliged to utilizemulticasting for intra cluster steering and additionally bury group directing. There are a few uses of WSN like forest fire identification for which data must be gotten by the BS inside the limited deferral to avoid catastrophes. For such applications, it is hard to upgrade lifetime of a WSN [12]–[13]. Direct transmission gives insignificantdefer however expands vitality utilization of WSN hubs. Then again, multicasting is energy efficient as hubs need to transmit over a shorter distance; and vitality utilization is specifically relative to the distance.

2. IMPLEMENTATION

The proposed work divided into phases and explained below

Distance calculation phase:

Initially nodes were created by using geographical area of 600*600 and placed randomly and all nodes were divided into 9 different groups i.e. clusters using the same geographical area calculated the distance between each and every node from every node using mathematical formula of distance between two points.

Clusterhead election phase:

After calculating the distances between nodes clusterhead has to be selected. For selecting the clusterhead higher connectivity algorithm was followed by using distance factor. In every group which node has more number of nodes nearer to that will be selected as a clusterhead for that particularcluster.

Multicasting phase:

In direct transmission of data energy loss will be there, if we use multicasting data will be transferred for more number of nodes with less energy. In every group all the nodes won't be interested only limited no of nodes shows interest. Initially one source node will be created from the source node data will transferred to every clusterhead .clusterhead transfers the data to the nodes which are interested in multicasting.

Mobility phase:

After participating in multicasting nodes changes their places from one cluster to another cluster randomly. After changes again clusters will be formed and for those clusters CH will be selected and multicasting operation will be performed on those nodes.

3. RESULTS AND ANALYSIS

A. Simulator and Parameters used:

We have tested higher connectivity protocol using distance factor using NS2 simulator. Analyzed he protocol by introducing multicasting and mobility. Nodes were deployed in the geographical area of 600x600.Simulation has taken 20sec of time ,used Omni directional antenna and used wireless interface .Simulation parameters are shown in Table-1.

Parameter Name	Value
Nodes Deployment Area	600 x 600
Number of Nodes	100
Antenna	Omni directional
Channel	Wireless
Source Node	As per algorithm
Traffic Type	TCP
Propagation Model	Two ray ground Model

Queue length	200
Simulation Time	20 Seconds

Table: 1

B.Results and discussion

100 nodes were placed in an area randomly and divided into 9 different group or zones called clusters as shown in fig:1 and given colors for identification of clusters. For every zone clusterhead has to be elected for that we used distance factor and calculated distance from every node as shown in fig:2 using that cluster head elected for each and every node as shown in fig:3.

For data transfer here we used multicastinginstead of direct transfer for energy saving the in a cluster all the nodes will not be interested to participate in multicasting , for that in every group interested nodes are indicated with red color, the initialization of multicasting is shown in fig:4. If the nodes changes the clusters then we need to rearrange them as clusters, again we have to calculate the distance to reelect the clusterhead as shown in fig: 5fig: 6

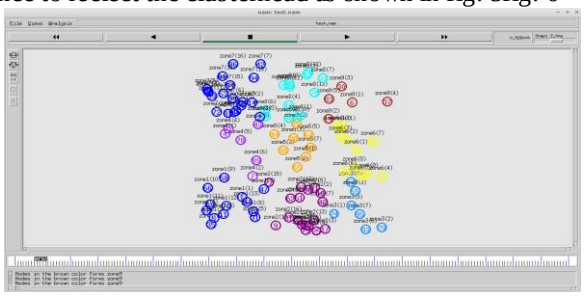

Fig 1: Formation of zones

Fig 2:Calculation of distance b/w nodes

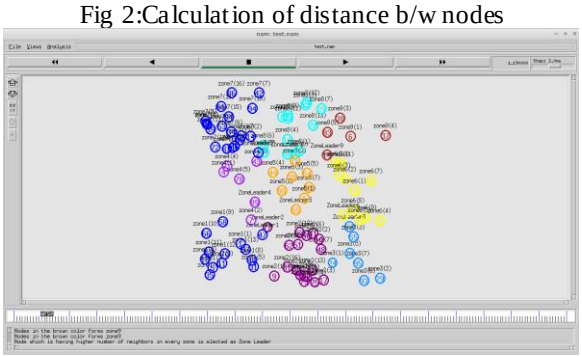

Fig 3:Clusterhead selection

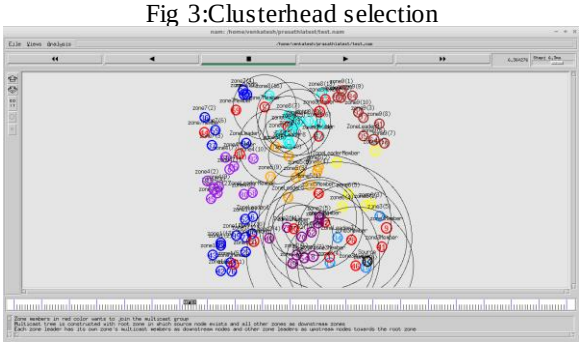

Fig 4:Initializing the multicasting

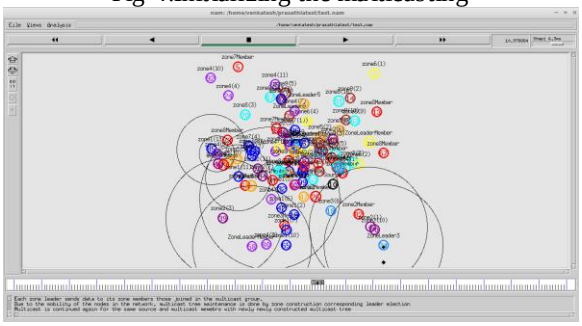

Fig 4:mobility

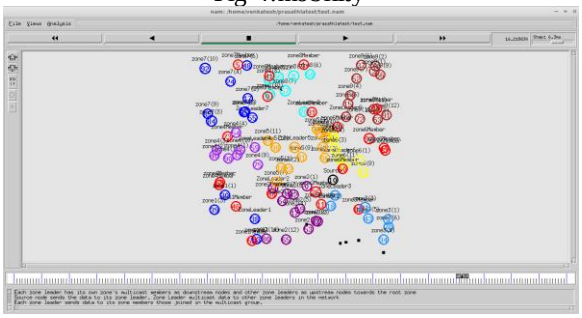

Fig 5:multicasting

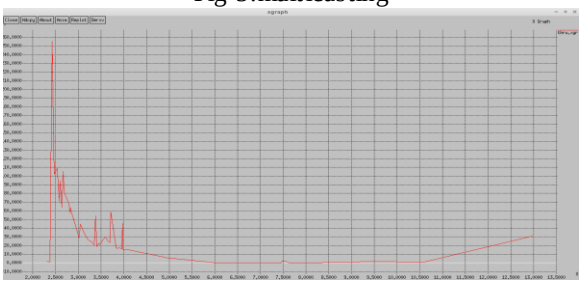

Fig 6: Throughput

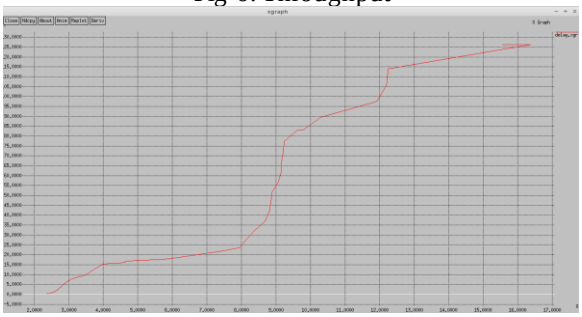

Fig 7: delay

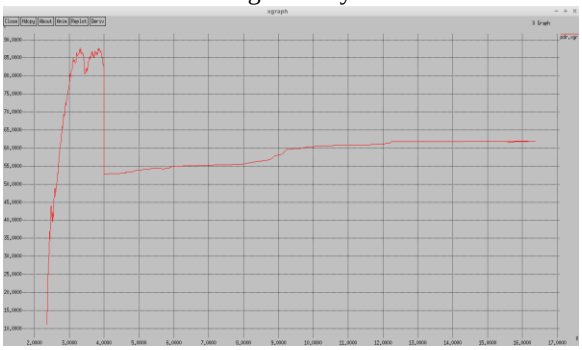

Fig 8: PDR

4. CONCLUSION

This paper we have proposed and examined higher connectivity algorithm using distance factor and analyzed the method for electing the cluster head and multicasting.We hope that the results of simulation given by us will be useful to other researchers to analyse of two contradicting parameters namely energy and delay before implementing it on a real test bed

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