

VGDR (Virtual Grid Based Dynamic Routing Protocol)

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Abstract

WSN is a wireless sensor network which has a large number of nodes to establish the communication with sink nodes. In order to establish a communication link with sink node a routing process has to be mentioned. The routing can be performed by using various routing techniques. Routing is a term which is used for the process of moving information from source to destination node or sink node. In traditional routing technique the best route for reaching the sink node is determined by using distance information. The shortest path is considered as the best route or path. In traditional technique of routing only the shortest path is considered but the parameter of energy was ignored. To overcome this a new technique is proposed in this paper. In proposed technique first of all the shortest path is searched. And to fulfill the constraint of the energy the in proposed technique only those nodes are selected as cluster heads which poses the high amount of energy. The cluster head having higher energy amount can helps to enhance the lifetime of the network.

Keywords

Clusters, Cluster Heads, Wireless Sensor Network, Grid, VGDR, Cell headers.

I. Introduction

WSN stands for wireless sensor network. WSN stands for Wireless Sensor Network. WSN consist of number of nodes. These nodes made clusters collectively. A cluster is a combination of relative nodes. Then from these clusters a cluster head is selected which is used to transfer the data to sink node. [14] The nodes in the WSN consumes a amount of energy. This enrgy makes the cluster nodes to be active at the time when th communication is fgoing on. The lifetime of the network relies upon the amount of energy consumed by the cluster nodes. WSN faces the problem of limited lifespan due to lack of energy available in the network. It has the ability of monitoring large areas, accessing remote places, real-time reacting, and relative ease of use. WSN is used in various fields such as in military activities like reconnaissance, surveillance and target acquisition etc. The use of wireless sensor networks is increased in last decades and at the same time the problem of energy constraints has been arrived [26]. Since all the operations of the nodes depends upon the energy so it is very difficult to replace or recharge battery once a sensor node is installed. Failure of single node can affect the working of whole system. [11]

II. Virtual Grid Routing Scheme

This section represents a brief description on Virtual grid routing scheme. This section covers that how to create a virtual; infrastructure of a grid and to manage the fresh routed for current locations. To create the virtual infrastructure the sensor fields are divided into small grids. These grids are collection of equal sized cells. The total number of cells describes the function of the sensor nodes. The nodes which are located near to the center of the infrastructure are gathered together in a set and used as cell headers. The cell headers are use to manage the information about the current location of the sink node. Cell header allows the rest of the nodes not to participate in the node re-adjustment process. Gateway nodes are used by the neighboring node to establish communication between them. When the gateway node is joined with the set of cell headers it will result in the virtual backbone structure [32].

III. Problem Formulation

As we know that for formation of network we need to find the route between all the nodes coming in the network, for this purpose

routing is done. Routing is defined as moving of information from source to destination. Along the way, at least one intermediate node is encountered. It can be referred as medium for sending packets from source and destination. Previously the routing was done on the basis of the minimum distance from the sink. Later the virtual gridding protocol was introduced. GRID is a two-level hierarchical reactive routing protocols. The main idea of GRID is that a geographic area is divided into different logic grids and the gateway election is held in each grid. A number of mobile nodes may exist in each grid. The nodes that are present in the grid form a straight line structure the node that is present near the center are selected as the cluster head. The sink is kept m at the center. The major problem of using this protocol is that the node that are located far from the center choose long route for the communication, due to static routing, that results in increase in the distance and the energy consumption was more. Also the cluster head was chosen on the basis of the distance from the sink, energy of the node was not taken in consideration. So there is a need to find some solution for the problem for the efficient routing in the network.

IV. Proposed Work

Routing is defined as moving of information from source to destination. For efficient network the routing protocol that is used should consume less energy, and less distance. As in virtual gridding protocol, the sink was kept mobile and the cluster heads were selected on the basis of the distance of nodes from the center. Due to the static routing, the node that were away from the center had to take long route from communication. So to resolve these problems. A new approach is proposed in this work. The problem of the cluster head selection was earlier done on the basis of the distance of the node from the sink, energy of the node was not considered due to which the if the node with the lower energy is chosen as the cluster head, it stability period is less. So in this approach the cluster head selection is done on the basis of the energy, the node that is having highest energy in the cluster is chosen as the cluster head which will increase the stability of the network. As the high energy node will have maximum life time that will results in the stability of the network. The problem of straight line communication is also considered, in proposed approach the routing is done on the basis of the minimum distance.

By using minimum distance routing concept, the energy of the system will be decreased that will result in increasing the life time and the stability of the network. Therefore this method of routing is considered to be better and more efficient than the traditional algorithm of routing.

V. Methodology

1. As a initial step the main work is to firstly defining the network dimension that how much are it need to cover how many nodes will be there and many other network parameters
2. Next step is to split the network into different grids as the main work is on basis of grid routing so the network will be split into different grids
3. Later on as the nodes in count are defined but also need to localize then in the network with defining the x and the y coordinates of the nodes and then deploy them in the network as per the location it got on random basis
4. As the mobile based communication will be there with the sink so the sink movement is mandatory in each and every round of communication, so next step is to work on the movement of the network sink
5. Further as per proposed work of the thesis as there is need to change the CH selection approach and the routing the network is applied as per the advanced energy based selection and then the route will be on basis of shortest distance coverage by the node.
6. This will affect the energy consumption of the network and the network will be more stable
7. Finally the network parameters are calculated to get the performance of the proposed work.
8. Graphical representation of the network parameter for the performance analysis is done finally

Block diagram is as follow:

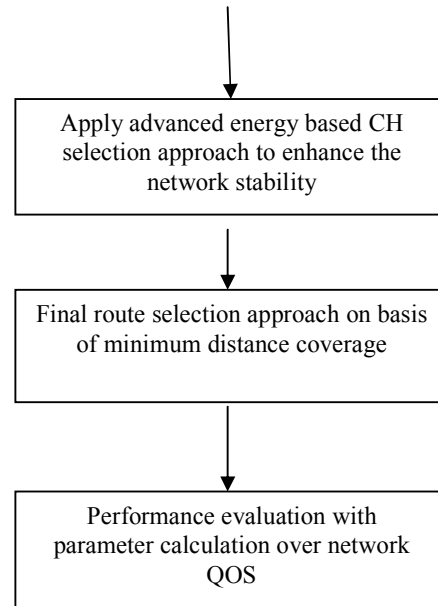
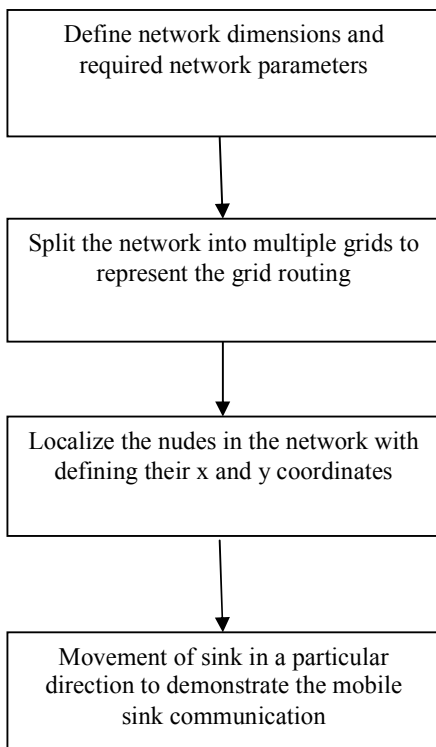


Fig.1 : Block diagram of proposed technique

VI. Results and Analysis

Results and analysis of proposed technique after performing simulation in MATLABs is as follows:

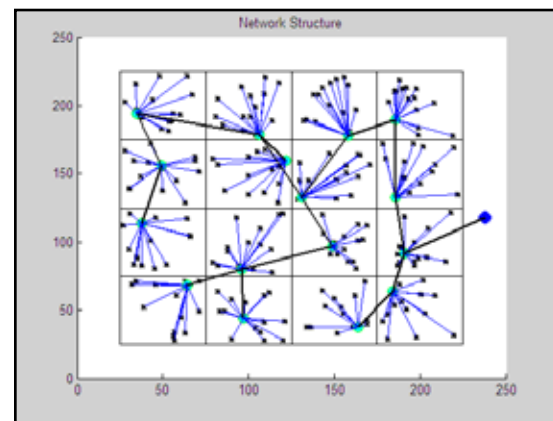


Fig.2 : Graph shows the structure of the network

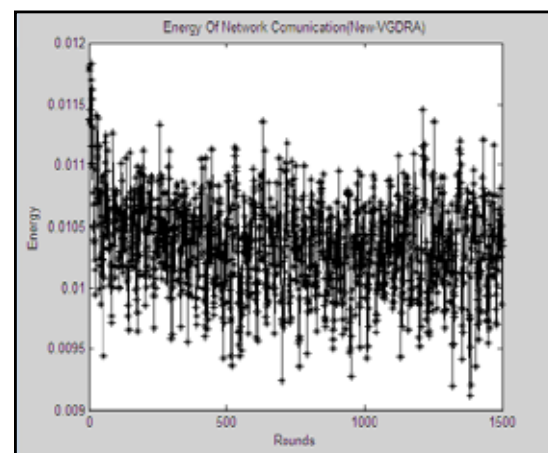


Fig. 3 : Graph shows the Energy consumed by network while communication in new VGDRA

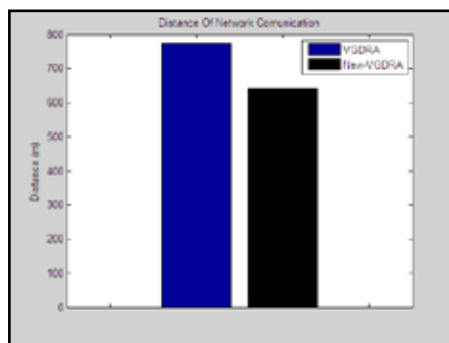


Fig. 4 : Graph shows the comparison between traditional and new VGDR technique on the basis of distance of network communication.

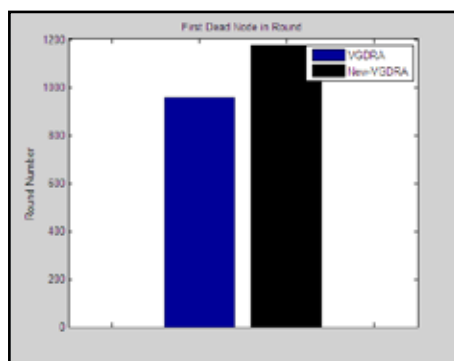


Fig. 5 : Comparison between traditional and New VGDR on the basis of dead nodes in first Round

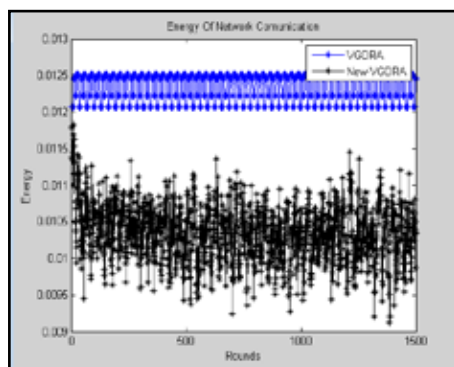


Fig. 6 : Shows the comparison between traditional and new VGDR on the basis of energy consumption

VII. Conclusion and Future Scope

As the network stability and the network lifetime is the prior objective of the wireless communication so the proposed work mainly focus on it. After implementing the proposed work in the thesis the results demonstrate that the proposed work is much better than the traditional approaches those were used to communicate in the network on behalf of CH selection on basis of center of each cluster. The proposed approach of CH selection and the final routing between nodes to the sink is much efficient as per the analysis done of results so proposed work is better to work on in field of grid routing

As most of the work is focused on CH selection so further enhancement can be done on route selection strategies which will consider the other effective parameters or route selection so that overall performance of network get enhanced and reliable. So in future the main focus should be on the route selection approach in the network of grid routing.

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