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Improved Network Lifetime Enhancement Method for Sink Relocation.

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ABSTRACT

In wireless sensor networks, we have to preserve the very limited energy of sensors as well as we have to prolong the network lifespan. For improving the network lifetime, the IEASR method is used. This work suggests a sink movement scheme to guide the sink when and where to move to. The main objective of the paper is to improve the network period and to lessen the depletion of energy in this network. A WSN contains of small sensor devices, which are fortified with limited battery power and are capable of wireless communications. For finding the sink node, the energy based path is used and information is transferred to node which is near to the destination. The general process of MCP with GREEDY algorithm is based upon energy based closest node selection. This kind of node choice procedure is used to find the sink node in the WSN.

Keywords: MCP, Greedy Algorithm, Sink Node, Relocation, Move Desk

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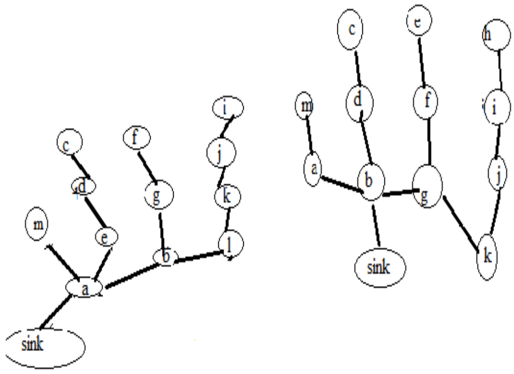
INTRODUCTION

WSN are important because they have potential to transform many sections of our economy and life, to industrialize, to computerization in almost all fields. The uses of WSN's are broad, like weather monitoring, inventory and manufacturing process. The drainage of battery cause more problems like communication hole-problem. Several studies have been made to conserve the battery power of sensors nodes. For example, assigning the periodic cycle for some sensor nodes to go to sleep mode, which helped in conserving the power [1-2]. Many efficient routing algorithms were designed to reduce the consumption of power [3-4].

Fig 1: Sink relocation of WSN



By using data collection methods to aggregate similar sensory data into an only datum to decrease the number of transmitted messages to improve the network lifetime of the WSN.

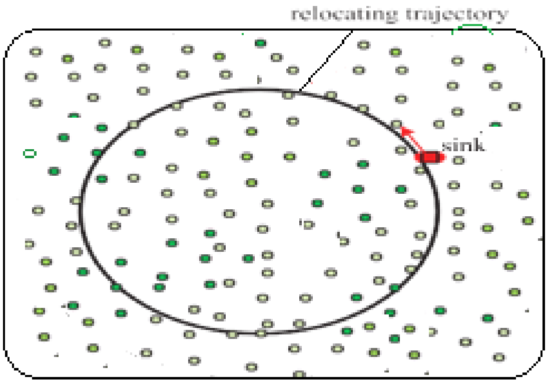
In the above diagram, 'a' is considered as hotspot. When the packets are sent continuously for long time, then node 'a' will be drained out. So it was proposed to move the hotspot after certain time so that the energy of nodes will not be drained out easily. The other saving energy approach is to use mobile sensors to change their locations from a region with a high level to a low region level. The sensor node gets discharged after relaying several rounds of sensed data with reported tasks. So we can use sink relocation method to improve the network lifetime.

RELATED WORKS

Luo and Huaux [5] insisted a sink mobility and routing method for data collection. The routing method looks for a circular trajectory at the periphery of the wireless sensor network. The circular ring around it is predetermined path for sink relocation. For trajectory around the circle, it will use a constant speed. While, Marta and Cardei [6] claimed for various sink relocation scheme with already determined hexagon trajectories. Here the trajectories will be continuously moving along the specified path. It will be easy to move the sink as we know it is moving in a constant velocity.

But this work does not take current battery energy into consideration. The independent sink movement scheme [7-8] was introduced where sink collects the information about nearby nodes energy, and moves according to their energy. Sun et al. [8] suggested to implement the sink relocation method by diving the given topographical region into 8 sectors. Here the sector which is having greater energy is called as Move Dest. For moving the sink, fist it collects the residual energy of nearby nodes. Then it chooses the sensor node which is having more energy within the transmission range. By this way the sink relocation can be done.

Fig 2: Predetermined sink mobility sink path schemes.



The sink relocation in EASR method generally performs the sink relocation depending upon the threshold energy of the sensor nodes. The author proposed that the battery of the nodes to be divided into three type levels. For first type level, energy of battery should be r/4, where r is radius of transmitting region after long time of transferring of packets. Here the energy of the node is just quarter of the energy provided. In second type level the energy of the node should be r/2, where it shows the node is having half of the assigned energy. In the third type level, the energy of the node should be r, which shows the node is having full battery. The sink will be relocated should be less than the threshold energy. He proposed that the threshold energy level of the node should be agreed to first type level. Here they determined the energy of the node by knowing the transmitting range of the sensor nodes.

PROPOSED SYSTEM

In proposed system IEASR method is used. The concept uses the MCP and GREEDY algorithm to find the closet node and the most powered node. For moving a packet forward first we have to find the nearest node between the source and destination node. With the help of forwarded node we have to find the node which is having more battery power, then we can send the packet.

In our paper we are using the routing method called MCP and GREEDY algorithm to search the best possible path. Routing principal depends on geographic position information. It helps the message move much nearer to the destination. The greedy algorithm consists of two methods generally, one is greedy forwarding and another is perimeter forwarding.

In greedy algorithm, a node sends a packet to a neighboring node which is nearer to the destination. Mostly it looks at the Euclidean distance. It itself compares the distance for the closer node. Well, when a greedy forwarding algorithm fails, we use perimeter forwarding method. Perimeter forwarding uses the idea of right hand rule. This method uses neighbor node which is directed towards the sink node to send to next forward node.

Greedy algorithm is as follows.

Set 100 nodes in random position of 1500×1500 topography and set all the thirteen parameters required for wireless sensor network.

Initialize the energy of the node be 100. For transmitting energy set re energy consumed as 1.0 and for transmitting energy consumed as 0.005 and for sleep mode the energy consumption is 0.0001. For calculating energy

Energy= energy-(distance*((transmitting or receiving or sleep mode)/150)).
If energy is less than 20, search for node having greater energy.

If node energy is more than 60 opt for sink relocation else check for other node.

We are using here dynamic routing protocol which will change its path according to the present state of the sensors nodes. The MCP uses the current left out energy of the sensor node that can be modelled. It decides the maximum capacity path for nodes. It regularly updates its energy for better transmission. Using the two algorithms at same time helps to improve the transmission of packets from source to destination.

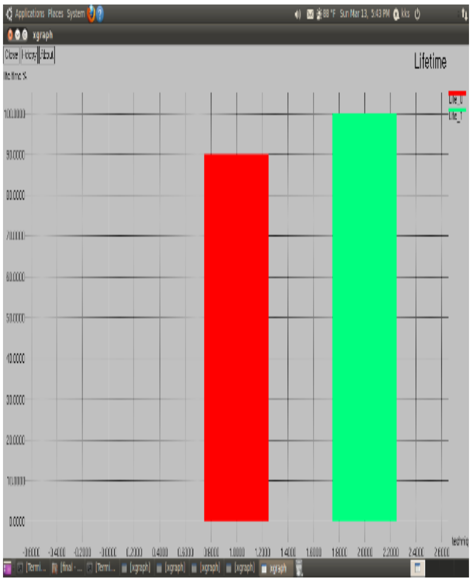
SIMULATION ANALYSIS

Here we have shown four simulation scenario. In first figure, we have shown the packet delivery forwarding ratio. Here, the no packets delivery ratio decreases while the sink relocation, while it significantly increases after sink relocation.

Fig 3: The packet delivery ratio comparisons in simulation scenario during sink relocation time.

The maximum content are transferred just after the sink relocation. In second figure, we have the network lifetime improvement where we considered our lifetime as hundred percent while the previous work as eighty-six percent. In the third figure we have shown the number of working nodes after a certain time period.

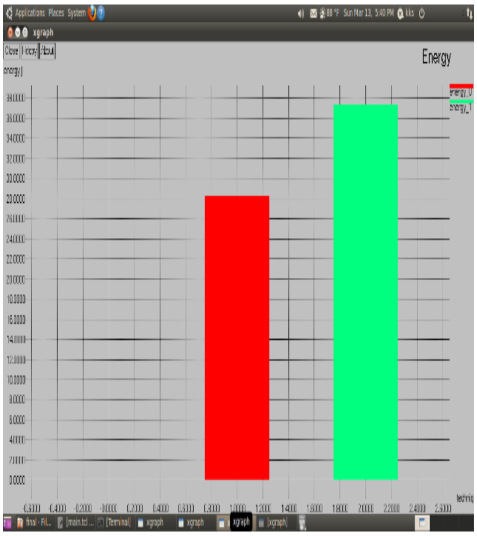
Fig 4: The lifetime of the sink node during simulation scenario.



The previously proposed work shows only eighty-six working nodes, while our proposed work shows ninety-five working nodes. In the fourth figure, it show the overall energy of nodes which has improved significantly.

Fig 5: Number of working nodes at the end of simulaton.

Fig 6: The energy of the sink node while relocation during simulation scenario.



CONCLUSION

In this paper, we've proposed in improved energy-aware sink relocation method (IEASR), that adopts the energy aware routing MCP and GREEDY ALGORITHM because the underlying routing methodology helps in finding best way to find a path to reach the sink node with ease. The improved energy aware sink relocation would extend the network life period of a WSN. Here simulation results show that the IEASR methodology outclassed the opposite associated approaches within the network lifetime in four totally different simulation eventualities.

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