A Novel Approach To Enhance The Lifetime And Throughput Of Wireless Sensor Network Using Actor Nodes.

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ABSTRACT: Wireless sensor networks is a self-configured network means any node can join it or leave it at any time. it is a self-healing and self-organizing. Self-healing networks allow nodes to reconfigure their link associations and find other pathways around powered-down nodes or failed nodes. Self-organizing allows a network automatically join new node without the need for manual interference. In this paper, we are using actor nodes to solve energy hole problem so that we can reduce energy consumption and can enhance throughput of network.

Keywords: WSN, AODV, Energy holes, routing, energy consumption

I. INTRODUCTION

A wireless ad hoc network is the collection of mobile nodes, without any requirement of centralized access point. Every node in the network, act as a router and packet forwarder. Now days, the ad hoc networking is used for the commercial uses. There are the many applications of the ad hoc networks, ad-hoc network are using in the military and it is also using for the other security operations. The secure routing is the biggest issue in the ad hoc routing applications. In ad hoc networks it is very difficult to design the security due to its unique characteristics. The characteristics of ad hoc network are lack of central authority, topology changes due to node mobility, shared radio channel and limited availability of resources. The wireless network uses the different kinds of communication protocols. [7] Wireless networks use a carrier sense protocol for the synchronization. These protocols are used to enable the group of wireless computers to share the same frequency and space. MANETs are a kind of wireless ad-hoc networks that usually has a routable networking environment on top of a Link Layer ad hoc network. Even it very useful in the today's world but it has some limitations because of its some security issues and performance. The routing protocols are broadly classified as proactive and reactive routing protocols. The reactive routing protocols are the protocols which establish link between source and destination when required .On the other hand the proactive routing are protocols which establish link between source and destination on the basis of predefined routing tables which are stored on the mobile nodes. The simulation result shows that the reactive protocols are more efficient than reactive protocols for

mobile ad hoc networks. In our work, we are using AODV reactive type of routing protocols.

II. LITRATURE REVIEW

R.Bhatt and R.Datta, [5] presents a redeployment scheme of Wireless Sensor Network. The formation of hole due to resource degradation, jamming, intention destruction of nodes, unsymmetrical deployment, and energy consumption can degrade the QoS of the network. During the lifecycle of sensor Networks, nodes experience active, repair, fail and sleep states. They used the Markov algorithm to obtain the probabilities of all states. **Aleksandra Mateska and L.Gavrilovska** [1], have presents a distributed Coverage and connectivity (c2 algorithm) algorithm. The C2 algorithm defines the redeployment of sensor nodes into a clustered topology, assuming a hexagonal grid structure. Each Cluster head has been chosen of each cell. (C2 algorithm improves the network coverage and connectivity in the center of designed hexagonal cells and rearranging the sensor nodes.

Sahoo, Jang-Zern Tsai, Hong-Lin Ke[2], a distributed hole recovery algorithm has proposed that use the method based on vectors to find the direction and magnitude of the nodes. They used the vector algebra as a tool to determine the direction of nodes. At the intersection point of sensing discs of sensors, the resultant vectors are found. On the basis of the value of resultant vectors, the magnitude and direction of the mobility node is decided.

Senouci, Mellouk, Assnoune [3] proposed a lightweight and comprehensive algorithm HEAL, that would address the hole detection and healing. HEAL is a distributed and localized algorithm, it works in two different phases. The first phase consists three sub-tasks hole-detection, hole recovery and border detection. They proposed a localized and distributed hole detection algorithm (DHD). DHD deals with the holes of various form and sizes.

Chenxi Qiu and Haiying Shen [4] ,focused on to heal the coverage holes in their study by finding the shortest node movement paths, thus can significantly reduced the energy consumption. They proposed a new approach of Delaunay-based Coordinate-free Mechanism (DECM) for coverage. DECM is a distributed based method, which can detect the coverage hole and can found the shortest path to recover them. DECM method is very much similar with the Voronoi diagram based method (VOR).

Kiran Maraiya et.al(2011),"Application based Study on Wireless Sensor Network" has described overview of wireless sensor network and how it is different from traditional network. They also discussed about the design challenges and key features of the protocol used in this network.[6] What is the different network topologies used in the network, what are the different types of its applications, types of its constrain and protocol stack architecture all are studied in this paper.

III. PURPOSED SCHEMA

Wireless Sensor Networks suffers formation of hole in the network due to unbalanced energy consumption, its asymmetric deployment and destruction of nodes in the network. The dynamic increase in QoS parameters such as coverage and connectivity may also lead to the formation of holes which in turn degrades the performance of networks. Most of the research has been done on coverage and connectivity issues but only a few researches has been done on the coverage holes. The network must need to be augmented with the spare nodes if a coverage hole is detected in the network due to node failure or damage. Hole problem not only affect the network coverage but also the network connectivity. There are basically two type of redeployment strategy. One is pro-active and other is on-demand. In pro-active, we previously define the set of nodes which can be replaceable with the faulty nodes. But in on demand, we provide the set of replaceable node only when they are required.
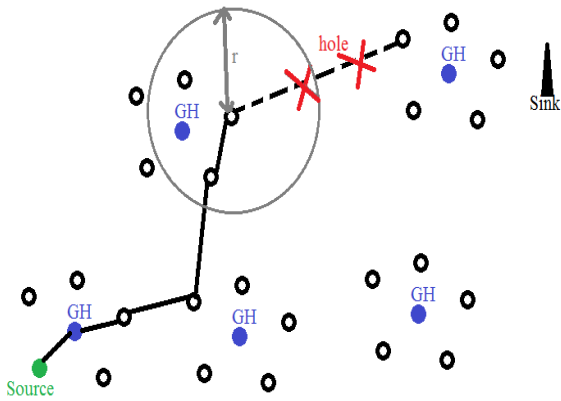
Methodology:

Fig 1: Hole problem in WSN

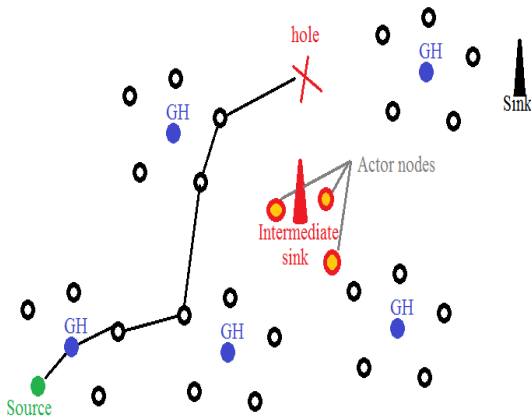Hole problem because of much difference between two nodes

Fig 2: Intermidiate Sink in WSN

Introduce intermediate sink with number of actor nodes. Intermediate sink will give instructions to actor nodes and actor nodes can move in any direction.
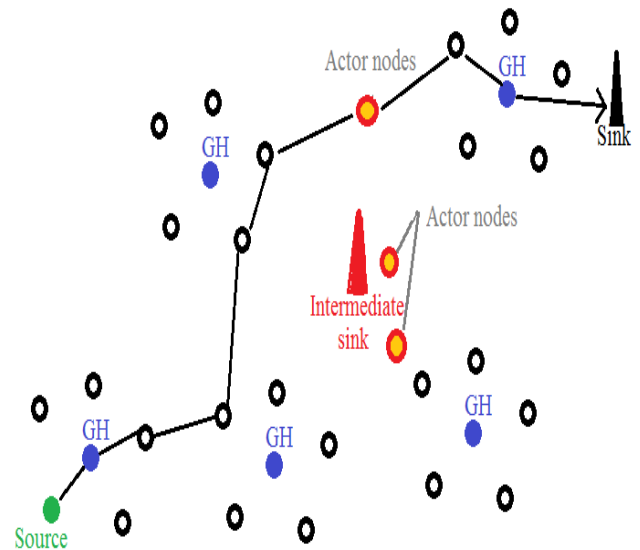

Fig 3: Forwarding data in WSN

If in case if there is a hole problem in between path then the node which is disable to forward data will send request message to intermediate sink for help.

Fig 4: Intermidiate Sink

Intermediate sink will give instruction to actor node, and actor node will moves and came in between path to complete path, the whole process will comes along with gridding.

IV.   RESULTS

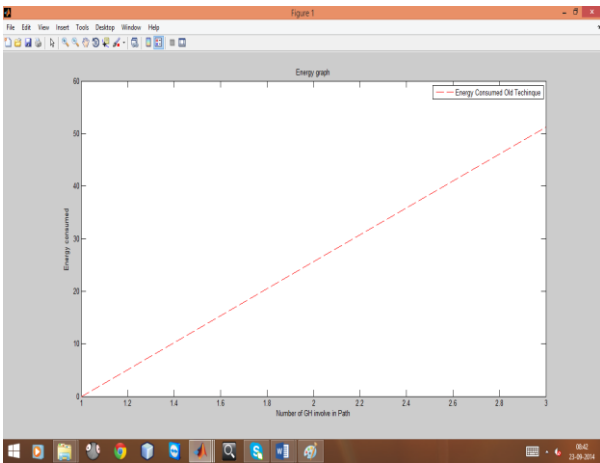**Eergy Consumed in previous Technique**

Fig 5: Results

This graph shows the energy consumption in old technique. The curve shows that how much energy it consumed during simulation.
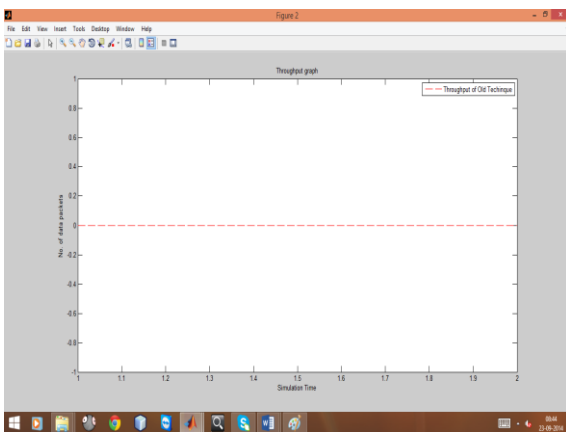
Throughput in Previous Technique

Fig 6: Results

This graph shows the throughput of simulation as we know that no one data packet is delivered till sink so the throughput in this case is zero.
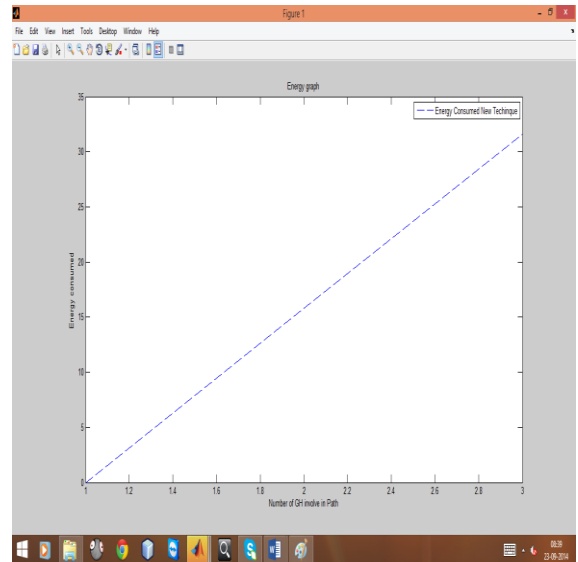
Energy Consumed in New Technique

Fig 7: Results

This graph shows the energy consumption in new technique. The curve shows that how much energy it consumed during simulation.
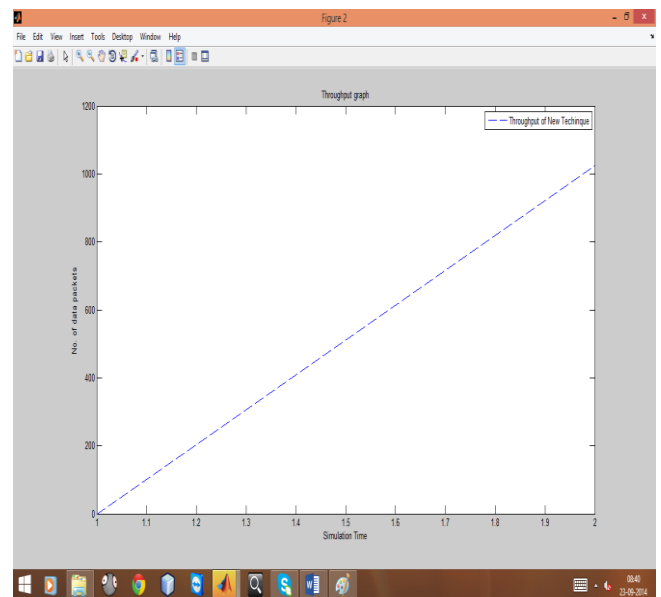
Throughput in New Technique

Fig 8: Results

As the data delivered till outer sink so it has some throughput which is shows by the curve in graph.
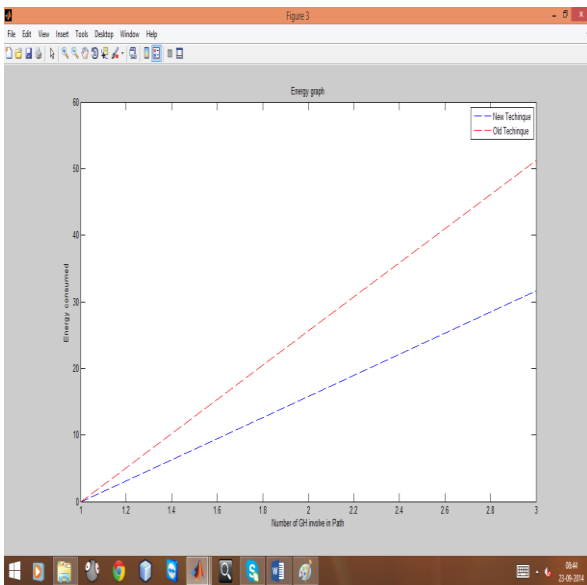
Energy Comparison graph

Fig 9: Results

This is energy comparison graph, here red line shows the energy consumed by old technique and blue line shows energy consumed by new technique. So from here it is cleared that in our new technique energy consumption is low.
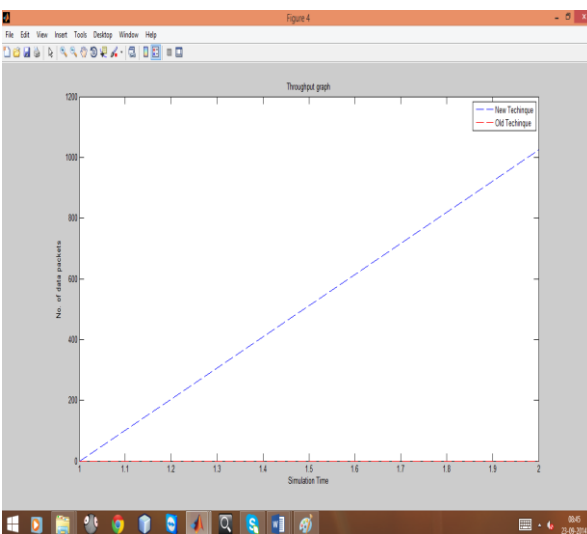
Throughput comparison graph

Fig 10: Results

This graph shows the comparison graph for throughput. Red line shows throughput for old case and blue line shows throughput for new case, so its also cleared from graph that our new technique have high throughput.

V.   CONCLUSION AND FUTURE SCOPE

Conclusion

In this paper, the routing approaches is implemented which is based on agent nodes. It helps to fill energy holes from the network. Here a intermediate sink is placed in between network which is responsible to control to agent nodes. If a cluster head/grid head faced any problem regarding energy holes then it will inform to intermediate sink and it will send some agents to fill that hole. This process will helps to enhance the performance and life time of network.

Future Scope

The proposed algorithm presented in this paper considers the mobile agent between the nodes. These agent nodes are uses for the data transmission. They will make path hole free that is chosen by the source node. In future scope we can make a normal nodes behave like agent nodes so that they can helps each other and can enhance performance.

REFERENCES

[1] Aleksandra Mateska and L.Gavrilovska"*WSN coverage and connectivity improvement utilizing sensor movement*" pp-686-693, European Wireless 2011.

[2] Prasan Kumar Sahoo, Jang-Zern Tsai and Hong-Lin Ke" *Vector Method based Coverage Hole recovery in Wireless Sensor Network*"in IEEE 2010.

[3] Mustapha Reda Senouci, Abdelhamid Mellouk and Khalid Assnoune*" Localized Movement-Assited Sensor Deployment Algorithm for Hole*

Detection and Healing" pp-1-11,Transactions on Parallel and Distributed Systems IEEE 2013.

[4] Chenxi Qiu and Haiying Shen "*A Delaunay-based Coordinate free mechanism for full coverage in wireless Sensor Networks*" pp-500-509, International Conference on Parallel processing,IEEE 2012.

[5] Ravindra Bhatt, Raja Dutta "*A Stochastic Process Based Framework Of Redeployment Model for Wireless Sensor Network*" in IEEE 2013.

[6] Kiran Maraiya Kamal Kant Nitin Gupta , "Application based Study on Wireless Sensor Network" International Journal of Computer Applications (0975 – 8887) Volume 21– No.8, May 2011

[7] H. Siraj, "On the Relationship Between Route Selection Policies and Route Demand in Ad-Hoc Networks", M. Eng. Design Project Report, Cornell University, May 2007