

AN IMPLEMENTATION OF HOLE DETECTION AND HEALING BY USING HEAL ALGORITHM

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Abstract

In an Wireless sensor networks(WSN), playing an Essential role in detection and Transmission of Data in an Environmental or Topological Area,As many no of Mobile Sensors are deployed on an region with an Communicating between them and Transmits an data to an Emerging Point,Considering Hole can be occurred by sensor failure ,or destruction.We Proposed an comprehensive solution for an Hole formed,is Hole Detection and Healing,For,this we have Proposed an Two Phases of work 1)Hole Detection and 2) Hole Healing.The First Phase work consists of three sub tasks i) Hole Identify,ii) Hole Discovery and iii) Border Detection. The Second phase works consists of Hole Healing by using an Localized Assisted and Deployment algorithm called Heal by using ,Which Provides an Precise Solution for Hole Detection and Healing and it is Sends accurate information and inter-communication between other sensors.And we Explained about aggeration on Heal Algorithm.

Keywords: Hole Detection, Hole Region, Healing, communication.

1. INTRODUCTION

An Wireless Sensors Consists of distributed autonomous sensors deployed to detect and monitor Physical and environmental conditions such as Pressure, Air, Temperature etc.,and to cooperatively pass their data through the network to a main location.The Wireless Sensors can built many number of Nodes where can be connected through one to many sensors.Each sensor node network consists of Microcontroller, Internal or External Antenna,Electronic Circuit Board,Radio Transmitter and Receiver,Battery .Sensors are limited to Energy, Latency, memory and communication range,together works can communicate between sensors.

Wireless Sensor Networks are facing a lot of problems like latency, Communication, Reliable, scalability. A Sensor Node Network Performs two demand tasks Sense and communicate, not only perform in these tasks but also perform commination with Neighbour Sensors for onward communication and Transmission of sense data to Wireless mobile satation.If any sensor fails to sense data or failed to send the data there was a chance to form an Hole in an area,Hole means there was an sensor failure,Thus the network cannot sense and sends the data to mobile satation. There leads to a huge malicious effect on that region.One of Fundatamental word in Wireless Sensors is Region of interest(RoI) [1], where the sensing and communication can be done. However, Holes Cannot be stopped.In order to Hole, To Overcome this seeks to Hole detection and Hole Healing by Localized Assisted and Deployment Algorithm Called Heal.

2. LITERATURE REVIEW

Hole Detection and Healing Can be Revived by many articles but did not explained in detailed way about Heal algorithm [1], [2], Compared the results of Many sensors With an other SMART and DSSA algorithms but did not explained about data Process Communication between neighbour sensors.

In the year 2006, Kun, Nai, wan, xiaohu [3] Proposed a technique for Detecting Hole by using an 1and 2 hop cooperative neighbors,were it has an drawback of it does not detect the boundary nodes.

In the year 2005, Robert Ghrist and Abubakr Muhammad [4],Proposed a technique Coverage and hole detection Via Homology,but it is very complicated and prepared by many mathematical Expressions.

3. EXISTING SYSTEM

The[1],Expained about the Hole detection by using Methodologies, By using the same Rules and Graphs we imlements our paper For an first phase the Hole Detection and hole Healing can be done but not covers [1],[2] and does not explains about communication between the Neighbour sensors,and many holes are formed. Every Sensor has an own ID and all the Sensors Deployed are Homogeneous sensors. The First phase of paper is Work starts.We will show single hole and Four holes in an area for dealing in area communication.

3.1 Hole Detection

Hole Detection is done according to the Technique of Tent rule, Fang le Proposed it, for an identify of Hole in an

region, For detecting we Perform Three steps, ssare Hole identification, Hole Discovery and Border Detection.

3.2 Hole Identification

Hole identifies is when consider of any node path is failure to sense the region and not sended the data to neighbour sensor nodes it leads to an Hole ,for, an Verification of Failure Sensor it sended other neighbour sensors to communicate with failure node ,it sended an Acknowledgement to all neighbour sensor network starts for Heal phase.

3.3 Hole Discovery

There is an problem with sensors where to Trace and sense the region,by using an Tent rule, First it stops all the sensor nodes communicating each other,again restarts communicating each other with an ID for detection of Hole,It Cannot sense the failure node, calls for HD Packet to Sensor network,There by hole discovery is finds out by te network.Hole Detection Packet is pickups from hole neighbour sensor nodes {center,Boundary},it also calculates the distance between the sensor nodes b_m and b_n longest distance between the nodes called as boundary of the region { b_0, b_1, \dots, b_n }.

$$\text{Dist} = \text{Max} \{ \text{Dist}(b_i, b_k) / b_j, b_i \} \in \{ b_0, b_1, \dots, b_n \}$$

For,calculation of mid point,

$$\begin{cases} x_v = (x_{b_m} + x_{b_n}) / 2 \\ y_v = (y_{b_m} + y_{b_n}) / 2. \end{cases}$$

There by calculating mid point the struck node neighbour deletes the Hole Detection packet and it becomes Hm(Hole Manager), HM Commands all the neighbour sensors to sensing.

3.4 Border Detection

The Border Region node executes Tent rule, and data transforms all over the sensor nodes it calculates the gathered information between the sensors that identifies the sensor nodes,Each node executes Tent Rule and Finalise Hole Manager,There by calculates the Minimum diatance to Maximum distance through by region if any largr hole forms at a time it calculates the distance and stops theHealing process.

3.5 Hole Healing

Hole Healing process consists of HHA Determination and Node Relocation[1],by Attractionand repulsive forces the neighbour sensors changes their direction to execute the Healing process.HHA(Hole Healing Area) determination,it calculates the data from the sensing region HM becomes the manager transfers the data to other sensors to cover an region with an certain distance for all sensors can communicates between the nodes,node relocation is to

relocate all the values through the distance vector it relocates the direction and it confirms all neighbour sensors to follow the sensing data which was sended by the HM node.

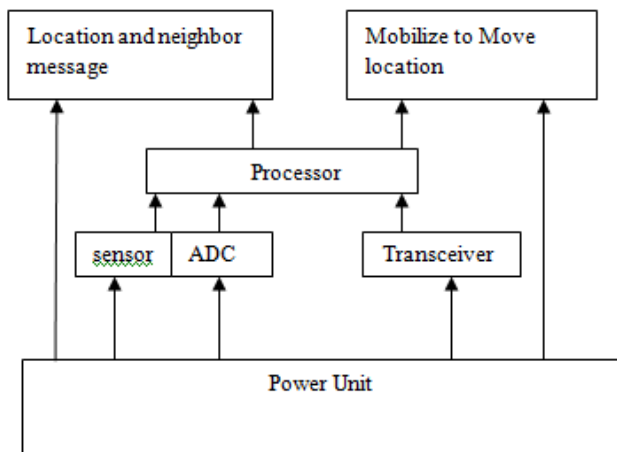
4. PROPOSED SYSTEM

We proposed an Communication Heal Algorithm where an all the sensors can communicate with an Id and sense the region.The Heal Algorithm shows the Hole Detection and Healing.

4.1 Heal Algorithm for Hole Healing and Detection:

- 1) **Initialize the Htimer and Neigh_timer**
- 2) **If Timer expire**
 - **Generate the hello message**
 - $Pkt \leftarrow nd_{id} \& Pos(x, y)$
 - Broadcast Hello message
 - $Schedule(T_{now} + T_{Rand_{const}})$
- 3) **If Pkt Recv in node in n_i**
 - If $Pkt.type = Hello$
 - $Mov(Future_{pos})$
 - $Free(pkt)$
 - $Rebroadcast(Pkt)$
 - Else
 - $Free(pkt)$
- 4) **If Node n_i 's Timer_{Neig}.expired**
 - **Foreach $M \in Tbl_N$**
 - If $M.T_{ex} < T_{now}$
 - Set $Id_{fail} = M.Id$
 - $Delete(M)$
 - $Timer_{Hole_{disc}}.Schedule(T_{now} + T_{Rand})$
 - $Schedule(T_{now} + T_{Rand})$
- 5) **Node n_i 's If Timer_{Hole_{disc}}.expired**
 - Generate pkt
 - $MDist_{fail} = 0$
 - $n_i \rightarrow pkt.src$
 - $pkt.type = Hole_{disc}$
 - $(x_{n_i}, y_{n_i}) \rightarrow pkt.Spos$
 - $n_i \rightarrow pkt.pat_h$
 - $Init(pkt.hop \& pkt.Cpos)$
 - $broadcast(pkt)$
- 6) **If Timer_{Hole_{Heal}}.expired in Node n_i**
 - Generate Pkt
 - $Pkt.src = n_i$
 - $(x_c, y_c) \rightarrow Pkt.Cpos$
 - $MDist_{fail} \rightarrow Pkt.dst$
 - $Pkt.type = Hole_{Heal}$
 - $broadcast(Pkt)$

Block Diagram



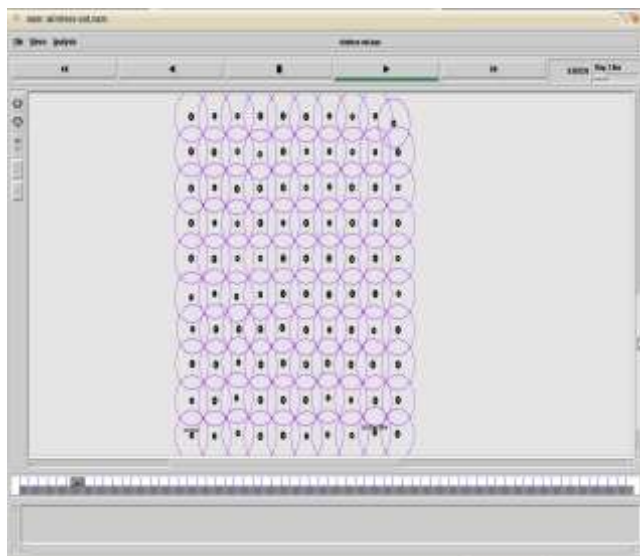
Advantages

1. Heal Algorithm can transfer faster information to all other nodes.
2. Healing process taken in very short time compared to other algorithms.
3. There will be no loss of data through the Healing process.
4. Antenna coverage will not decrease.

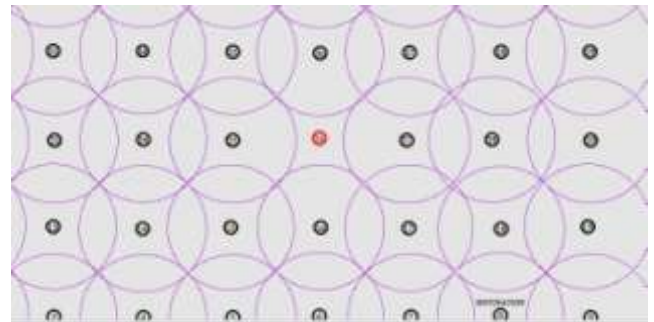
We used the technique as for the communicating between the other sensors where the data can show and the id of sensors all shown very clearly.

Specification	One Hole	Four Holes
Usage	100 sensors	100 Sensors
Radius	50 mts	50 mts
Protocol	AODV	AODV

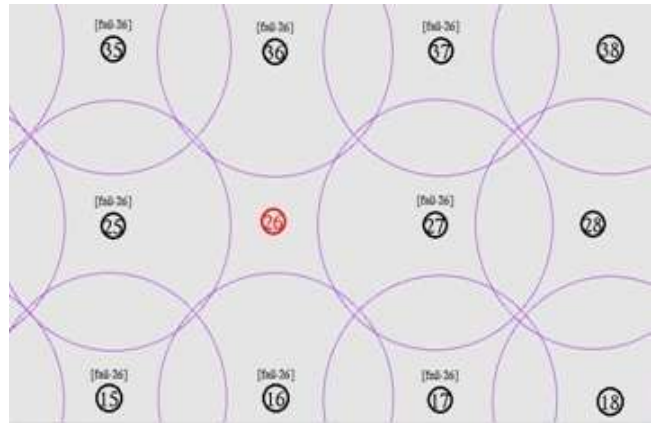
5. EXPERIMENTAL RESULTS



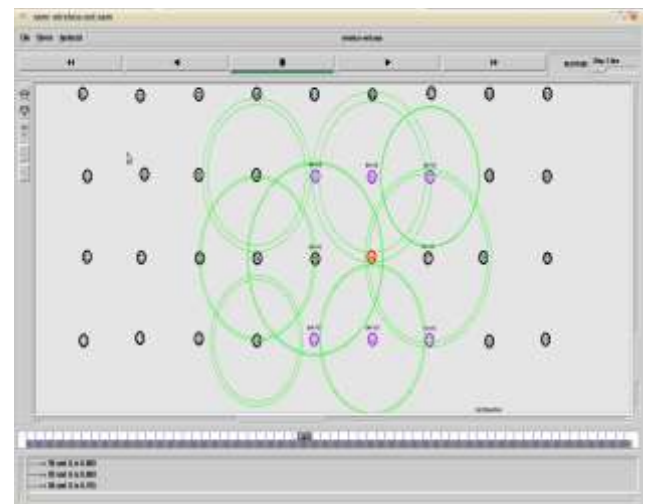
1. Initial Network Setup



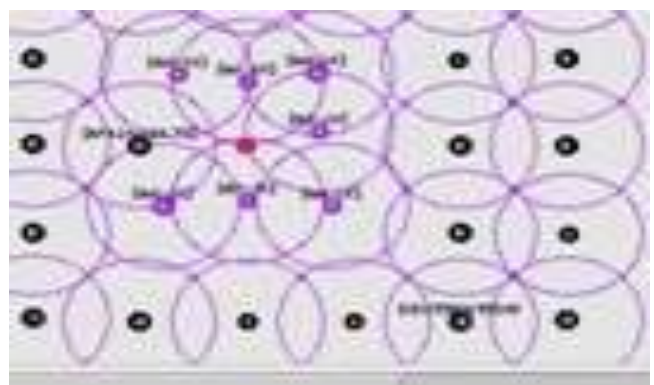
2.Hole Found(Red Colour)



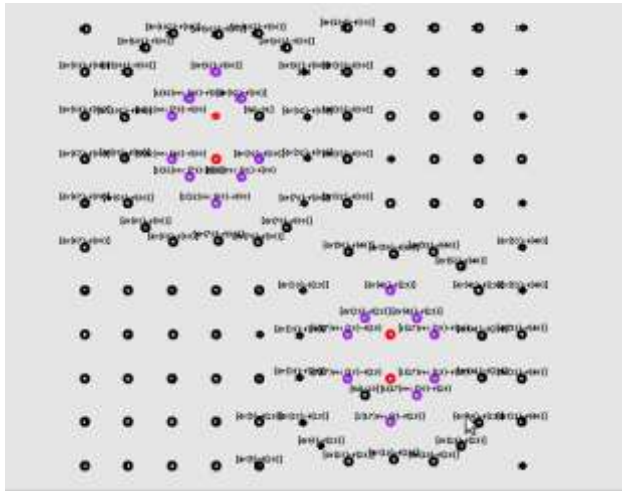
3. Identify and sending the data 26 node is failure.



4.Hole Discovery and Hole Manager selected.



5.Hole Healing



6. Many Holes are formed in an same region.

[6]. S.P. Fekete, A. Kroller, D. Pfisterer, S. Fischer, and C. Buschmann, "Neighborhood-Based Topology Recognition in Sensor Networks," Proc. Int'l Workshop on Algorithmic Aspects of Wireless Sensor Networks, pp. 123-136, 2004.
 [7]. Y. Wang, J. Gao, and S.B. Mitchell, "Boundary Recognition in Sensor Networks by Topological Methods," MobiCom '06, pp. 122-133, 2006.

Drawbacks of Heal Algorithm

1. If any Sensor gets failure there will not rectify of sensor by any other sources.
2. If many holes are Sensors around the holes moves their regions and boundaries will reflect for data Transmission.
3. More no of sensor nodes moves towards Hole.

6. CONCLUSION

We Implement Localized Assisted and Deployment algorithm called Heal for Hole detection and Healing, Here We improve Data Communication between the sensors with out any defects. There was considering many holes are formed the energy efficiency of sensors may decrease through this more needful work should be done.

The future work for the Hole Detection and Healing Is deployment of sensors in an area Mountains, Emergency areas, Military Areas, where Can Sense Accurate Data and sends to Mobile Station.

REFERENCES

[1]. Musthapa Reda Senouci, Abdel hamid Mellouk, senior member, IEEE and Khalid Assnounce "Localized Movement-Assisted Sensor Deployment Algorithm for Hole-Detection and Healing" 2014.
 [2]. K. Kavitha, T. Thamarai Mandan, M. Suresh Kumar "An Optimized Heal Algorithm For Hole Detection and Healing in Wsn" 2015
 [3]. B. Kun, T. Kun, G. Naijie, L.D. Wan, and L. Xiaohu, "Topological Hole Detection in Sensor Networks with Cooperative Neighbors," Proc. Int'l Conf. Systems and Networks Comm. (ICSN '06), p. 31, 2006
 [4]. R. Ghrist and A. Muhammad, "Coverage and Hole-Detection in Sensor Networks via Homology," Proc. Fourth Int'l Symp. Information Processing in Sensor Networks (IPSN '05), pp. 254-260, Apr. 2005.
 [5]. F. Stefan and K. Christian, "Hole Detection or: How Much Geometry Hides In Connectivity?" Proc. 22nd Ann. Symp. Computational Geometry (SCG '06), pp. 377-385, 2006.