IJCSC 0973-7391 Volume 7 • Number 1 Sept 2015 - March 2016 pp. 210-213 available online at www.csjournalss.com

An Efficient Energy Hole Detection Approach for Mobile Sensor Networks

[1]Yashwant Singh Sangwan, [2]Surender Jangra
[1]Deptt. of Computer Science, Govt. College, Adampur (Hissar), Haryana, INDIA
[2]Deptt. of Computer Applications, GTB College, Bhawanigarh(Sangrur), Punjab, INDIA
yssangwan@gmail.com, jangra.surender@gmail.com

Abstract: The mobile nodes in WSNs are having the battery limitation. During installation of WSNs, initial power of the network nodes is defined as well as the energy loss parameters are specified. As the communication is performed over the network some amount of energy is lost. In this paper energy efficient communication routing is developed which minimizes communication load and maximizes energy saving. The proposed approach is a hole detection mechanism that make use of periodic analysis over the network is to identify the network hole. It may be initialized by several nodes at some time only if they detect any dead or non responding node. As the nodes or mobile, the algorithm will work in two phases, in first phase it will identify the optimal energy effective and hole sensitive path. In second stage, it will perform a periodic check on the position and energy of nodes so that the node path will be identified.
Keywords: Energy hole; sink mobility; routing algorithm; wireless sensor network;

I. INTRODUCTION

Wireless sensor networks (WSNs) are made of small in size that are used in many computational as well as monitoring purpose. It is an energy based network in which each node spent some amount of energy during transmission of data. Sensor nodes have an energy constraint. Most of the researcher's workded on the energy saving approach so that the lifetime of the network can be increased. One of the problem in sensor network is energy hole. It is the critical node position that disrupt the communication as the data is communicated at hole position. This one is become more dangerous when the hole exists near the sink node.

II. RELATED WORK

Most of the papers in focus on static applications. In paper[1] tried to enhance the network lifetime using sink node. Further new Ant Based Routing Protocol is proposed in [2-7].

K.T et al. [1] observed the impact of sink mobility in two cases in WSNs by introducing random way and random walk mobility.
M. Marta et al. [8], suggest a distributed and localized resolution to decide sinks' actions when the movement ways are not fixed in WSNs by helping multi-hop communication.
Luo et al. [9], suggested a routing based protocol for WSNs with low power network construction mobile network sink to improve the network duration and data rate

Somasundara A [10] has explored as several mobile sinks to resolve the problem of network growth by traffic analysis of the network and assume that sensor nodes are located within range of at minimum one mobile sink.

III. PROBLEM FORMULATION

Here we present the problem statement of the proposed approach and related network model.

a) Problem Statement

A mobile network is the most required and busy public area network. The main advantage of this network is its user friendly nature. As the network formation is done under any scenario or the scene, the analysis of the work is done under different parameters such throughput, loss rate etc. One of the critical network parameter is battery specification. According to this battery adaptive node network is critical because some amount of energy is lost with each communication.

In this paper, we presented a hole detection mechanism that make use of periodic analysis over the network is to identify the network hole. The network here that will be simulated will have mobile energy nodes, with limited transmission range, multi-hop ad-hoc network. In this system the hole detection may be initialized by several nodes at same time only if they detect any dead or non responding node. As the nodes are mobile, the algorithm will work in two phases, it first phase it will identify the optimal energy effective and hole sensitive path. In second stage, it will perform a periodic check on the position and energy of nodes so that that the node path will be identify.

b) Network Model

The proposed system model work as under

- Network has source and destination specification
- All sensor node have static location
- Coordinator node control all the other supporting nodes
- There may be exists more than one coordinator.
- All parameters depend on two main vectors called network size and the density.

IV. PROPOSED APPROACH

Flow Chart:

The proposed work is actually the construction of the network algorithm with scene and scenario specification so that effective network construction is been defined. The algorithm is here been defined in the form of network construction and communication.

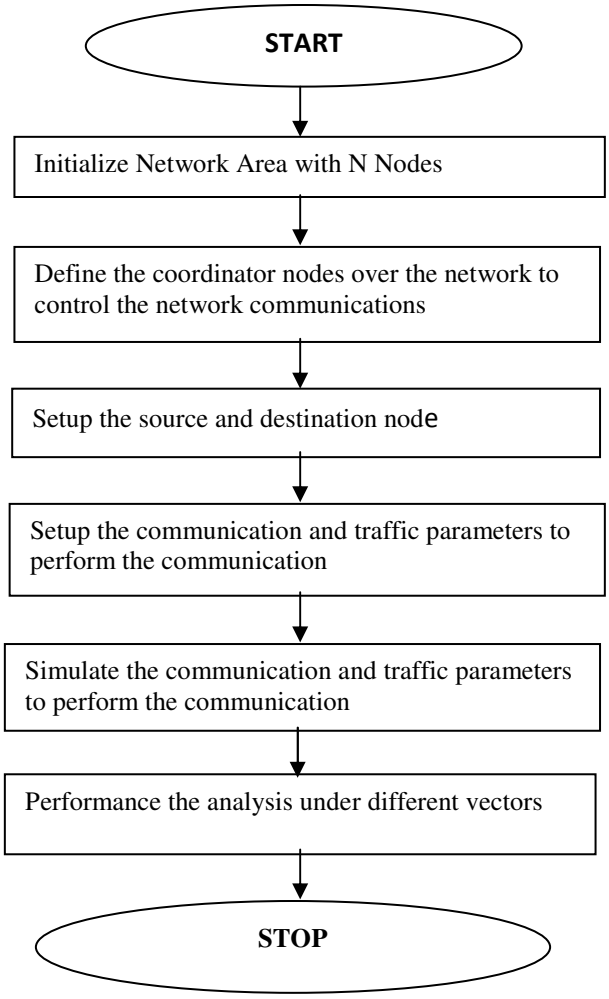

Fig. 1 Proposed Flow Chart

Algorithm:

Algorithm(Src,Dst)

/*The Network is Defined with Source and Destination Node specification*/

{

1. Define a Mobile Sensor Network with Random Mobility Model and Energy Constraints
2. Define the Low Energy Node called Energy Hole at some Node over the network
3. Set CNode=Src
4. While (CNode<>Dst)
5. [Repeat Process till destination Node not arrived]
6. {
7. Perform The Distance based Analysis on Each node respective to Current Node
8. For i=1 to N
9. {
10. If(Distance(CNode,Node(i))<Thresold)
11. [Consider as Neighbor Node]
12. {
13. Perform Position Analysis at TimeStamp T1
14. Perform Position Analysis at Time Stamp T2
15. Perform the Estimation of Node Speed And Direction
16. If(Speed<Threshold and Direction>0)
17. [Set Node as favourable Hop Node]
18. {
19. Perform the Communication Analysis at Current Time Stamp under Energy Analysis, LossRate Analysis, Response Time Analysis And delay Analysis
20. Perform Aggregative Analysis on Each Node under Communication Parameters
21. If(Effective(CurrentCommunication)andEffective(AggregativeCommunication))
22. {
23. Set I as Next Hop
24. }
25. Else if(Effective(CurrentCommunication))
26. {
27. Set I as Next Hop
28. }
29. Elseif (Effective(AggregativeCommunication))
30. {
31. Set I as Next Hop
32. }
33. }
34. }

IJCSC 0973-7391 Volume 7 • Number 1 Sept 2015 - March 2016 pp. 210-213 available online at www.csjournalss.com

V. PERFORMANCE ANALYSIS

Here Swarm based termite hill routing protocol is presented. We used the NS2 simulation tool to improve the network lifetime by avoiding energy hole in the network. The simulation parameters are shown in Table1.

Table1.Simulation Parameters

Parameters	Values
Routing Protocol	AODV
Number of Nodes	25
Simulation time	10 sec
Packet Size	512
Data Traffic, Data rate	CBR,250 Kbps
MAC Protocol	802.11
Topology	Random

For comparing various network topologies we require some metrics to estimate the network cost. The network cost is basically in terms of communication over the network. We takes the following parameters to evaluate the proposed work and compares with other protocol:

1. No. of packets transferred
2. No. of packets loss
3. Data transfer rate
4. Delay rates

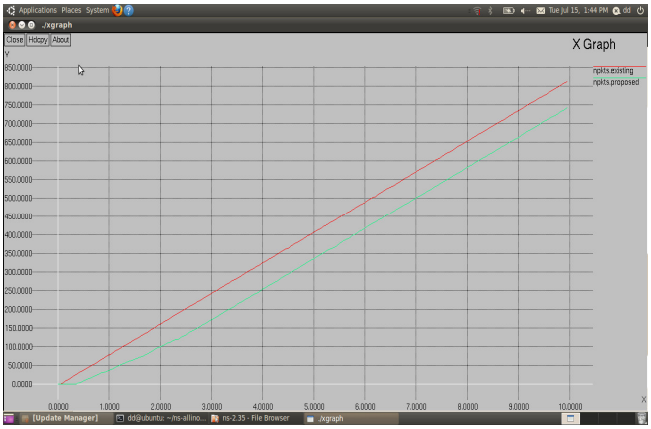

Fig.2: Packet Transmitted (Existing Vs Proposed)

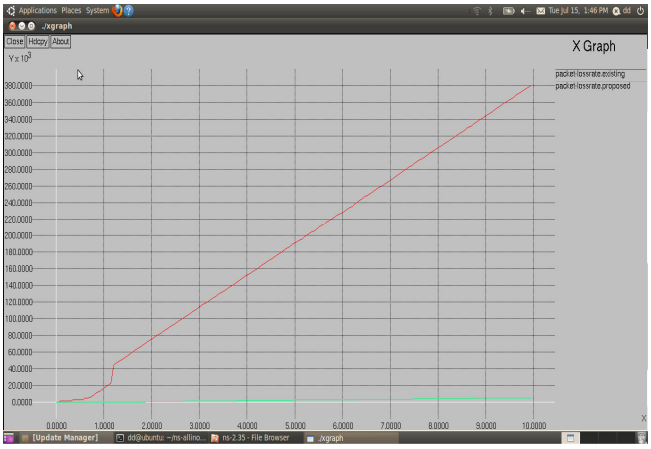

Fig.3: Packet Lost (Existing Vs Proposed)

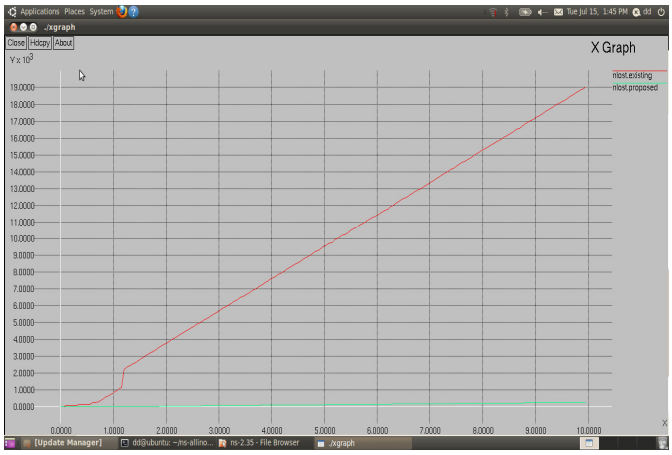

Fig.4: Packet Loss Rate (Existing Vs Proposed)

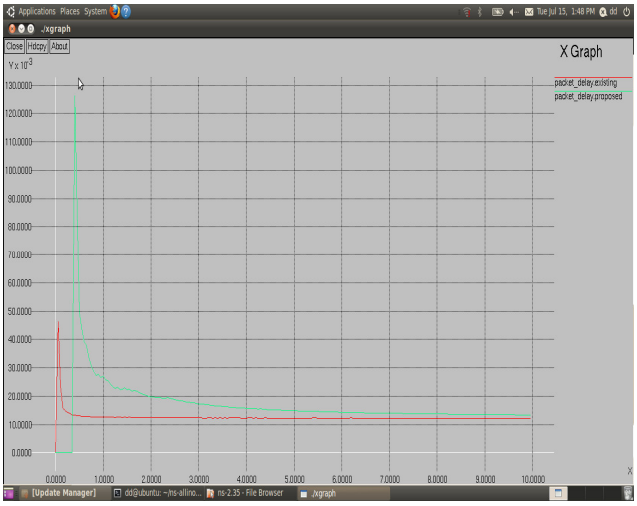

Fig.5: Packet Delay (Existing Vs Proposed)

We can clearly seen in Fig. 2 to 5 that, proposed approach has higher network throughput(Fig. 2), no packet loss(Fig. 3), minimum packet loss ratio (Fig. 4) and improved packet delay ratio(Fig. 5).

VI. CONCLUSION

In this present work, the mobile communication in some such network scenarios is been discussed an simulated. The proposed approach is a hole detection mechanism that make use of periodic analysis over the network is to identify the network hole. It may be initialized by several nodes at some time only if they detect any dead or non responding node. As the nodes or mobile, the algorithm will work in two phases, in first phase it will identify the optimal energy effective and hole sensitive path. In second stage, it will perform a periodic check on the position and energy of nodes so that the node path will be identified.

REFERENCES

1. K. T, and K. M, "Impact of Sink Mob. on N/w Performance in WSNs," presented in 1st Int'l Conf. on N/w & Commn., pp. 7-11, 2009, IEEE. doi: 10.1109/NetCoM.2009.76.
2. Zungeru A.M, Ang L.M. , Prabaharan S.R.S, and K. P. Seng, "Ant Based Routing Protocol for Visual Sensors," in: A. Abd Manafet al. (Eds.): ICIEIS 2011, part II, CCIS252, pp. 250-264, 2011.
3. Zhang Y., Kuhn L.D, and Fromherz M.P.J, "Improv. on Ant Routing for Sensor Networks,", LNCS, 3172, pp. 289-313, 2004.
4. Perkins C., and Royerv E., "Ad-hoc on-demand distance vector routing," in the Pro. of 2nd IEEE Workshop on Mobile Computing Systems and Applications, 1999.
5. Saleem M., and Farooq M., "Beesensor: A bee-inspired power aware routing algorithms," , LNCS 3449, pp. 136-146, April, 2005.
6. Roth M., and Wicker S., "Termite: ad-hoc N/W with stigmergy," *GLOBECOM '03, IEEE* Global Telec. Conf., vol. 5, pp. 2937-2941, 2003 .
7. http://en.wikipedia.org/wiki/Termite>
8. Marta M., and Cardei M., "Using Sink Mobility to increase WSNs Lifetime," published in the Proc. of the 9th IEEE Int'l Symp WWMN, pp. 1-10, 2008.
9. Luo J., Panchard J, Piorkowski M., Grossglauser M., and Hubaux J., "MobiRoute: Routing towards a Mobile Sink for Improving Lifetime in Sensor Networks," published in the Pro. 2nd IEEE/ACM Int'l Conf. Disb. Com. in WSNs, pp. 480-497, 2006.
10. Somasundara A., Kansal A., Jea D., Estrin D., and M. Srivastava, "Controllably Mobile Infrastructure for Low Energy Embedded Networks," published in IEEE Trans. on Mob. Comp., vol. 5(8), pp. 958- 973, 2006.