Energy and memory efficiency in WSN by star topology

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Abstract

In the wireless sensor network Star network are most popular network in which central node is act as like hub. The main advantage of the star network is minimizes the failure of all connected node to the central hub it means node can be added or remove easily. A WSN system incorporates a gateway that provides wireless connectivity back to the wired world and distributed nodes. We are proposing a system detection of clone node on the basis of witness node selection Clone create a copy of node including all data. Witness node is nothing but randomly selected node in WSN. The system detect the clone node and send the information about clone node to the user node. Then user node remove that clone node. For that we obtain the node Id information of sensor nodes .If the same node Id is observed by the witness node then witness node find the clone node. To overcome this drawback we propose star topology.Distributing the network into various levels and areas makes replicate node detection more efficient and the high security is gained of witness nodes which are communicate to the memory .We also work on different mobility structure under different network system. We are using random node for witness. We reduce use of space and energy as well as time by finding the shortest path for message passing.

Index Terms WSN, node replication, , mobility ,Energy consumption ,Security etc

INTRODUCTION

As we know the wireless sensor network have a variety of application. It consists of large number of autonomous sensing devices that are responsible for monitoring the physical and/or environmental conditions such as temperature, humidity, sound, pressure, motion, vibration, pollution etc. of a target area. These network are deployed with less security , because of cost effective sensor deployment sensor nodes are deployed without protection and security ,if they provide the security cost of the system is increasing[1] .Thus the attacker launch the many attacks in wireless sensor network to acquire the critical information from WSN or impair the task of WSN. In the wireless sensor network the attacker is compromise with one node and insert there duplicate data or malicious data that node and create a duplicate node. These copied node are same as a original nodes and behaving same as original nodes.[4] By using the duplicated node attacker can harm to the our whole network and it easy for that One easy solution on this problem is we can remove that sensor but it is uneconomically and very expensive. Therefore there is   need of create a software based solution on these replication attack problem. In existing system ring topology is used they provide a solution but they have several drawbacks [3].That drawback like single point failure and maintenance is also cumbersome. To overcome these drawback i*n our proposed system, we are using the star topology.[2]*
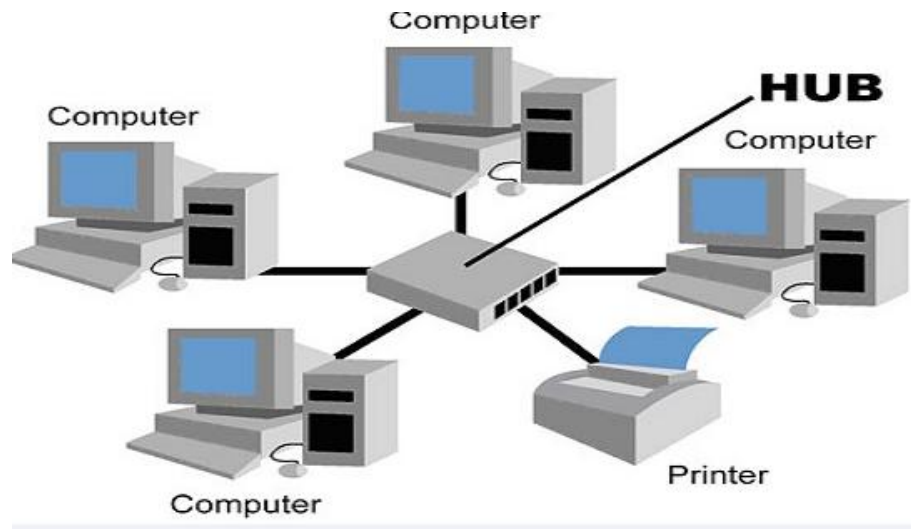
Fig a) .Star topology

The example where there are some nodes are duplicate nodes, some are witness nodes and rest other nodes are sensor nodes
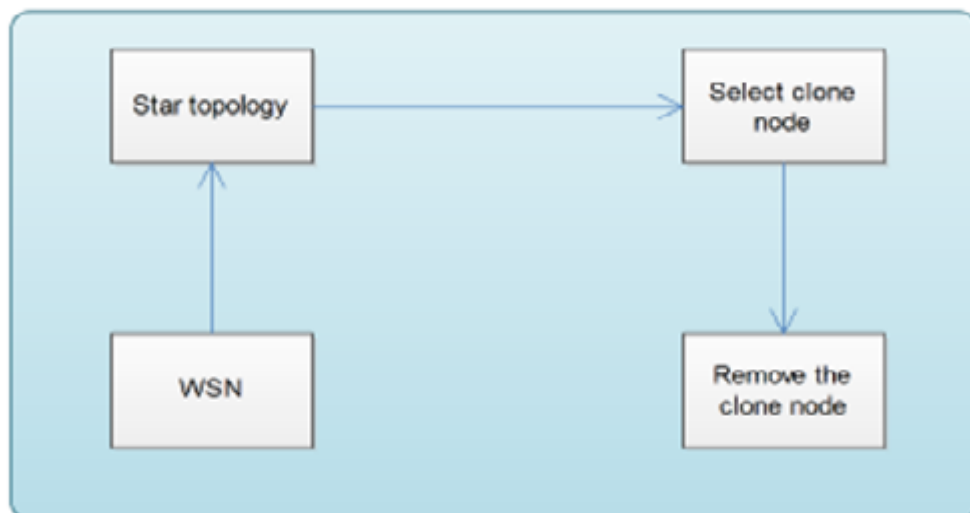

Fig b) Block diagram of System

Working of the system
In the our proposed system we are using the witness node technique to clone detection . So witness selection is very important task in the system.The security of witness is also most necessary think and all sensor node should have a equal priority to be a witness node in the network.The witness node selected with minimum communication cost.. The communication cost is estimated by using *shortest path technique. The selection of witness node and information sender node is random[11]. Witness node are selected randomly. For the user node selection any node from the network is selected as a user node and sending id of that node to the whole network .After an user node decided they come towards the information sender node they are selected randomly any one from the system shown in fig c)[7]. In below fig shows that how witness node and*

information sender node are sending duplicate node information to the user node. We find duplicate node by using randomized algorithm[5]. Firstly the clone detection topology is activated by user node.At the same time each node of the topology creates there list with the id of node.Then node act as a observer node for all list which are created from star topology and start sending information to the witness node.The information of duplicate node is with node id. The witness node detect the duplicate node or same id of node at different location then it send the information about duplicate node to the information sender node and information sender node send to the user node. When user node got information they remove the duplicate node[11].
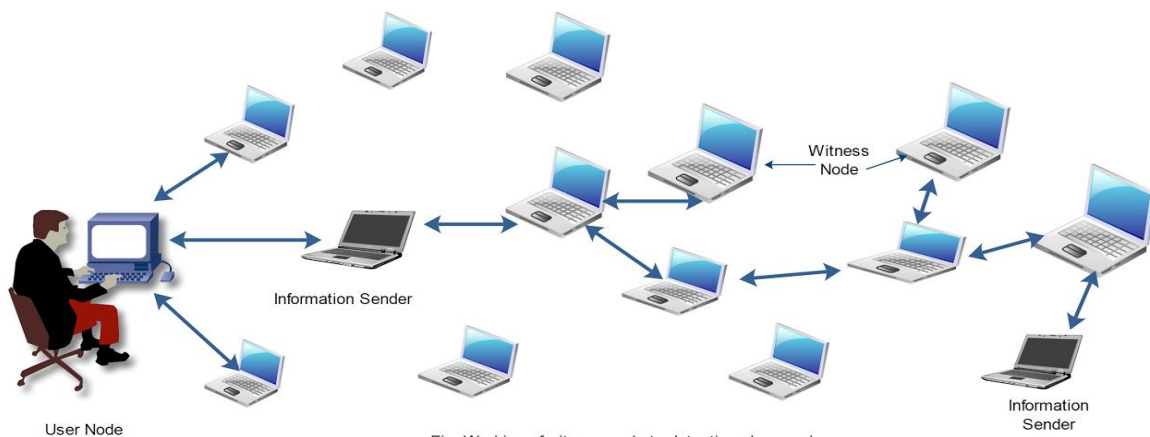
Fig. c) *Working of witness node to detecting clone node*

Advantages
1. Communication cost is less.
2. Provide security
3. Easy to use

Conclusion
In this paper we have presented a distributed witness node to clone detection. We obtained a shortest path for information sending to user node to other node about the clone node. We also tried to remove existing systems some drawback. We also provide the security to witness node and minimize the communication time between user and witness node. We are provided security by encryption decryption of information about duplicate node.

REFERENCES
1. Z. Zheng, A. Liu, L. X. Cai, Z. Chen, and X. Shen, ERCD: An energy efficient clone detection protocol in wsns, in Proc. IEEEINFOCOM, Turin, IT, Apr. 14-19 2013, pp. 2436-2444.

2. R. Lu, X. Li, X. Liang, X. Shen, and X. Lin, GRS: The green, reliability, and security of emerging machine to machine communications, IEEE Communications Magazine, vol. 49, no. 4, pp. 28-35, Apr. 2011.
3. I. F. Akyildiz, W. Su, Y. Sankarasubramaniam, and E. Cayirci, Wireless sensor networks: a survey, Computer Networks, vol. 38, no. 4, pp. 393-422, Mar. 2002.

4. A. Liu, J. Ren, X. Li, Z. Chen, and X. Shen, Design principles and improvement of cost function based energy aware routing algorithms for wireless sensor networks, Computer Networks, vol. 56, no. 7, pp. 1951-1967, May. 2012.

5. T. Shu, M. Krunz, and S. Liu, Secure data collection in wireless sensor networks using randomized dispersive routes, IEEE Transactions on Mobile Computing, vol. 9, no. 7, pp. 941-954, Jul. 2010.

6. J. Li, J. Chen, and T. H. Lai, Energy-efficient intrusion detection with a barrier of probabilistic sensors, in Proc. IEEE INFOCOM, Orlando, FL, USA, Mar. 25-30 2012, pp. 118-126.

7. R. Brooks, P. Y. Govindaraju, M. Pirretti, N. Vijaykrishnan, and M. T. Kandemir, On the detection of clones in sensor networks using random key predistribution, IEEE Transactions on Systems, Man, and Cybernetics, vol. 37, no. 6, pp. 1246-1258, Nov. 2007.

8. J W. Naruephiphat, Y. Ji, and C. Charnsripinyo, An area- based approach for node replica detection in wireless sensor networks, in Proc. IEEE TrustCom, Liverpool, UK, Jun. 25-27 2012, pp. 745-750.

9. M. Zhang, V. Khanapure, S. Chen, and X. Xiao, Memory efficient protocols for detecting node replication attacks in wireless sensor networks,inProc.IEEEICNP,Princeton, NJ,USA,Oct.13- 162009, pp. 284-293.

10. T. Bonaci, P. Lee, L. Bushnell, and R. Poovendran, Distributed clone detection in wireless sensor networks: An optimization approach, in Proc. IEEE WoWMoM, Lucca, IT, Jun. 20-23 2011, pp. 16

11. *Khan WZ, Aalsalem MY, Saad NM (2015)Distributed Clone Detection in Static Wireless Sensor Networks: Random Walk with Network Division. PLoSONE 10(5): e0123069. doi:10.1371/journal.pone.0123069*