

Efficient WSN through Blackhole Identification and Elimination

Merlin Mary James*, Vinodh P Vijayan, Neena Joseph, Neethu Maria John

Department of CSE, Mangalam College of Engineering, Kerala, India

ABSTRACT

Some wi-fi sensor community is historically is used to acquire information shape remote/unmanned vicinity. Always cognizance on community insist on precisions facts collection. Traditionally all sensor network layout deal with demanding situations like insurance, lifetime and routing related troubles. Due to the huge spread software of sensor community, it is commenced the use of in many important application like defence, atomic reactor, national security and many others. Wherein data safety turn out to be vital than other parameters. Blackhole assault is one of the attack assault that could spread the device with unsuitable information, as a result the complete machine come to be out of date. A consider rating primarily based blackhole assault identity can be implemented and affected nodes can be recognized. Eliminating such black hole nodes from network can also increase routing overhead but it constantly beautify throughput of community since the community bring any fruitful records.

Keywords—Blackhole Identification, classification, throughput, routing overhead

Article Info

Publication Issue :

Volume 3, Issue 8

November-December-2018

Page Number : 454-459

Article History

Received: 05/08/2018

Accepted: 20/10/2018

Published: 30/11/2018

I. INTRODUCTION

Incredible growth in data era can cause technology of massive volume and kind of information. In this decade, there may be massive boom inside the statistics which gives to upward push of recent generation called massive statistics. Based on an IDC file prediction, the worldwide records volume will develop exponentially from four.Four zettabytes to 44 zettabytes among 2013 and 2020. By 2025, IDC predicts there can be 163 zettabytes of statistics. It could be very hard to save, examine and system this huge amount of data the use of the cutting-edge

strategies due to the fact it's far produced from excessive speed, rather dynamic, significant extent and severa varieties of facts. Big Data speaks to new studies in records processing and examination and exceptional utilizations of companies are revolving around it [5].Big statistics was firstly related to 3 key principles: extent, range, and speed the discern 1 indicates those 3 function of huge facts..Numerous industrial ventures present strict requirements at the best parameters of the assembling method of the goods. Data approximately operating conditions and production machines should be amassed constantly manner. To make sure the right running and series

records from diverse machines, there may be want for the gathering of real time facts. Gathering of actual time records is one of the foremost venture. As a solution to problem wi-fi sensor network (WSN) is added. Wireless sensor community is applied for amassing extraordinary spatially dissipated facts from an collection of surroundings via committed sensors to display and managing at a crucial area [7].

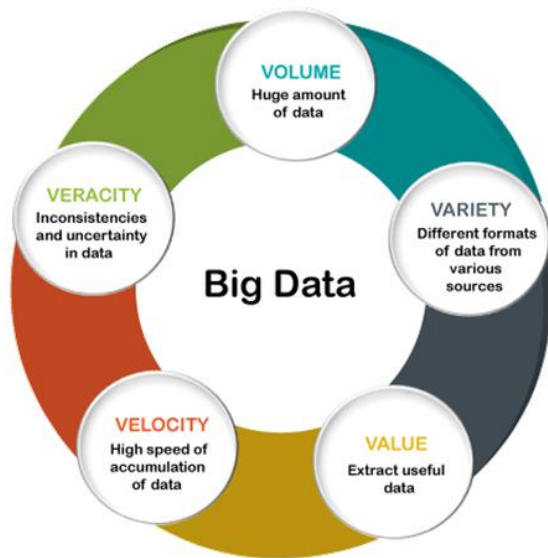


Figure 1: Big Data

Gathering of actual time statistics from surroundings and sending the information to a valuable base station for processing. There were many style of sensors which can be used for transmitting the sensed facts together with proximity sensors, humidity sensors, thermal sensors, magnetic sensors, function sensors, flow sensors, etc. [1]. A WSN framework consolidates records via data aggregation for gateway that allows far flung tracking [6]. For an powerful tracking and sensing coverage of sensor may be very important however this coverage adversely affect the life of a sensor . It very critical to transmit the facts to base station with full authentication. There had been many intruders are there to penetrate and collect the records which can be despatched thru the community.

BACKGROUND

Increasing community length poses full-size information series demanding situations, for what worries sampling and transmission coordination as

well as community lifetime. In this approach each node autonomously takes a choice approximately the compression and forwarding scheme to decrease the wide variety of packets to transmit [1, 2]. Energy performance and power balance are essential factors in wireless sensor networks.

Flow partitioned unequal clustering routing (FPUC) algorithm to acquire higher energy efficiency and strength balance [3]. FPUC consists of levels: clustering and routing. In the clustering section, the opposition radius is computed consistent with the node density and the space from sensor nodes to the sink. The sensor nodes that have extra residual electricity and large overlapping degree have better opportunity to be selected as cluster heads. In the routing segment, each cluster head first finds the gateway nodes and then distributes the data flow to each of its gateway nodes depending on residual energy. In the routing protocols which might be specifically designed for the programs used by sensor networks, the limited to be had strength of the sensor nodes has been taken into consideration if you want to extend the life of the networks [4]. Wireless sensor networks (WSNs) are increasingly more being deployed in safety-critical packages.

II. PROPOSED SYSTEM

In the network the main goal is to transmit the records to the base station with full authenticity. The community is divided into clusters and every cluster carries a sub cluster head (SCH). The sub cluster head selection purpose to lessen the strength consumption and increase the existence time of a community. If few sub-cluster nodes are heavily loaded, it leads to faster electricity intake and to get everyday depletion of energy so it's far essential to pick the sub cluster head very nicely. The distance among the normal infant nodes and the sub cluster head performs a prime element in power intake.

In the network, the SCH nodes sends hello packets to all of the nodes which might be gift inside the surrounding region and the nodes send returned the

acknowledgement. TDMA MAC scheduling approach is added here to avoid collision. TDMA MAC scheduling technique is introduced here to avoid collision. According to the receipt of an acknowledgment all SCH nodes compare the distance between itself to the child nodes with the threshold distance. At the end of the distance calculation, each SCH nodes sends the message to the concerned child nodes, which are link with it. If the child receives more than one number of copies then it will randomly select the SCH node which it has to coordinate.

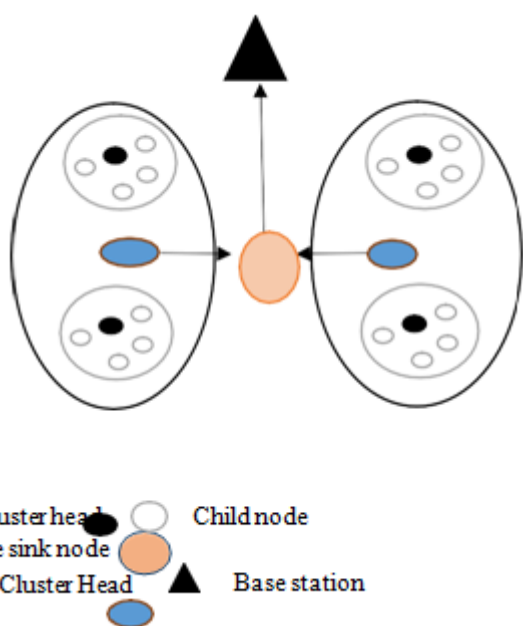


Figure 2: Architecture of System

Along with the network, the balanced load idea is applied to SCH nodes, in which the balanced load SCH is fashioned in every clusters consistent with the figure 2 shortest distance among the SCH nodes and the child nodes and the space is calculated using the equation 1. Mobile Sink Nodes (MSN) is introduced to acquire the facts from the SCH and it will switch it to the MCH node.

$$\text{DISTANCE (SCH, CH)} = \sqrt{\text{SCH}_i(x,y) - \text{CN}_j(x,y)} \quad (1)$$

Where $i = 1, 2, 3, \dots, 10\%$ of the total nodes

$j = 1, 2, 3, \dots, 80\%$ of the total nodes SCH – sub cluster head

CN – child node

Once the cluster is formed, the next aim is to transmit the data to the base station. Child node will transmit the information to the sub cluster head. The sub cluster head node cannot able to transfer the information directly to the major cluster head due to the distance. To address this issues mobile sink nodes are introduced. The Mobile sink node will act because the intermediate between the sub cluster head and the essential cluster head. It moves from one vicinity to any other and collects the records from the sub cluster head and transmits that to the fundamental cluster head. Each sub cluster includes one or greater cell sink nodes consistent with the quantity of child nodes gift within the sub cluster head. If any of the cell sink performance is reduces in that case that sub cluster head will get the help of the neighbour sub cluster head's cell sink node to transfer the facts to the cluster head.

Data which might be to ship from baby node and the base station had to get hold of the identical records which are sent. To provide the information authenticity HMAC is used. ECC set of rules and SHA-5 set of rules is combined to offer dual authentication especially to pay attention the integrity and confidentiality. If an outsider get into the network and get get entry to to a node then that node is known as as black hollow node. The node acted according to the need of the intruder. During the transmission of records to the destination through the malicious node and that node both unload the statistics or transmit fake facts. Before transmitting information to a node the sending node will despatched a request and after receiving the acknowledgement that records is despatched to that node, if it's far a malicious node then it can take extra time to send acknowledgment. Along with time of acknowledgment the accept as true with price is also considered to hit upon malicious node.

Trust in a node explain approximately the scienarity of the node. For a malicious node, the agree with value could be very different from different node for this reason it's far feasible to stumble on the malicious node.

III. RESULT ON DISCUSSIONS

Testing is carried out on the standard NS2 platform and AODV is the routing protocol is used. The below desk indicates the typical configuration used in NS2 to trace file. Based on those configurations the network is simulated. Various configuration used for simulation is indicated inside the table 1.

Table 1: Configuration of NS2

Network Parameter	Value
Antenna type	Omni antenna
Channel	Wireless Channel
Routing Protocol	AODV
Energy unit	Joule
Queue type	Drop Tail
Address type	Hierarchical

Figure 3. shows that after the identification of blackhole node the throughput is improved considerably.

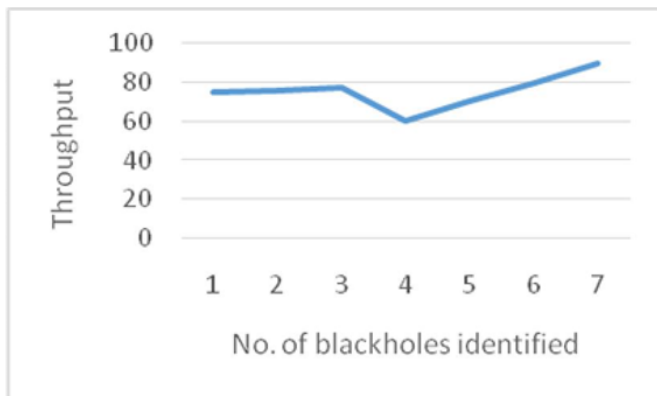


Figure 3: Throughput

The figure 4 indicate that as the number of black nodes are identified then the routing overhead is increased. Once the black node is identified then that node is dropped hence it is necessary to find a reroute for the data transmission.

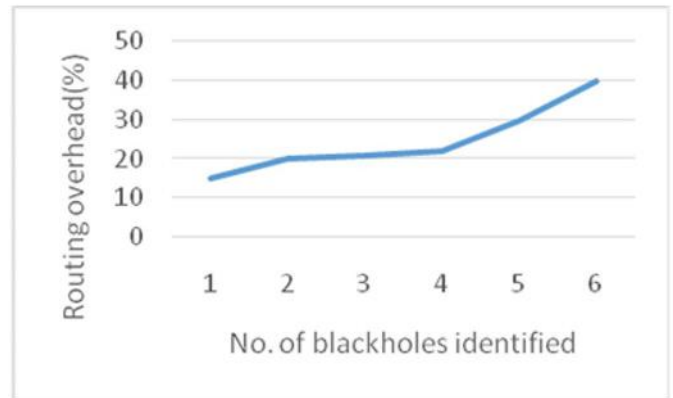


Figure 4: Routing overhead

Figure 5 shows due to the identification of black nodes the unnecessary data transmission can be avoided and thus can improve the energy efficiency.

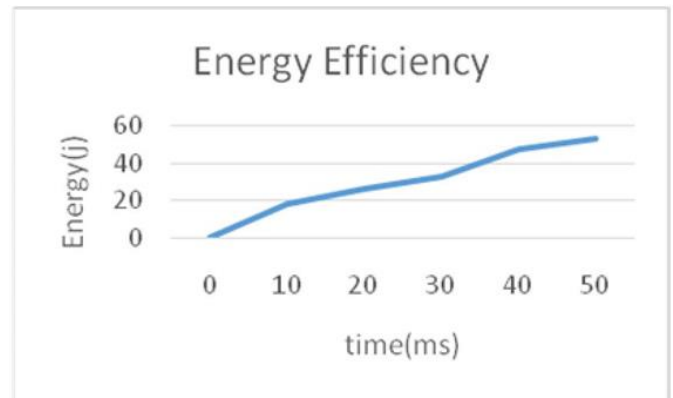


Figure 5: Energy Efficiency

IV. CONCLUSION

Black hollow detection the use of category and removal the use of threshold primarily based approach improves the overall performance of the machine in terms of security and throughput. The massive wide variety of false statistics produced by way of black node continually flood the community but on the same time it adversely have an effect on the overall performance of the community. As the path with black node is removed, the requirement of latest path arises and such dynamic routing set of rules constantly yield slightly excessive routing overhead. As the black nodes are removed the average power utilization of the networks advanced on the equal time due to the removal of false records, the

packet delivery ratio and throughput over a instances additionally improved.

V. REFERENCES

- [1]. Shalli Rani, Syed Hassan Ahmed, Rajneesh Talwar, and Jyoteesh Malhotra, "Can Sensors Collect Big Data? An Energy Efficient Big Data Gathering Algorithm for WSN", IEEE Transactions on Industrial Informatics Volume: 13, Issue: 4 , Aug. 2017,Page(s): 1961 – 1968<https://doi.org/10.1109/TII.2017.2656899>
- [2]. C. Caione, D. Brunelli, and L. Benini, "Distributed compressive sampling for lifetime optimization in dense wireless sensor networks", IEEE Trans. Ind. Informat. vol. 8, no. 1, pp. 3040, Feb. 2012.<https://doi.org/10.1109/TII.2011.2173500>
- [3]. J. Peng, X. H. Chen, and T. Liu, "A flow-partitioned unequal clustering routing algorithm for wireless sensor networks", Int. J. Distrib. Sensor Netw., vol. 2014, 12 pp., 2014,Article ID 875268 <https://doi.org/10.1155/2014/875268>
- [4]. A. E. Tmer and M. Gndz, "Energy- efficient and fast data gathering protocols for indoor wireless sensor networks", Sensors, vol. 10, pp.80548069, 2010.<https://doi.org/10.3390/s100908054>
- [5]. S.Rani, S.H.Ahmed, "Multi-hop Routing in Wireless Sensor Networks An overview, taxonomy and research challenges", ISBN. 978-981-287730-7, 2016<https://doi.org/10.1007/978-981-287-730-7>
- [6]. Nikolaos A Pantazis, Stefanos A Nikolidakis and Dimitrios D Vergados, "Energy Efficient Routing Protocol in Wireless Sensor Network: A survey", IEEE Communications Surveys & Tutorials, Vol. 15, 2013. <https://doi.org/10.1109/SURV.2012.062612.00084>
- [7]. Mandeep Thakur,Amninder Kaur, "Blackhole Attack Detection Techniques in WSN: A Review",International Journal of Advanced Research in Computer Science and Software Engineering, Volume 7, Issue 4, April 2017 <https://doi.org/10.23956/ijarcsse/V7I4/0225>
- [8]. Sachin Lalar,Monika,Arun Kumar Yadav, "Effect of Black Hole Attacks on Wireless Sensor Networks"Internationa Journals of Advanced Research in Computer Science and Software Engineering Volume-7, Issue-7 <https://doi.org/10.23956/ijarcsse/V7I7/0189>
- [9]. Yuxin Liu, Mianxiong Dong, Member, Kaoru, Ota, Anfeng Liu, "ActiveTrust: Secure and Trustable Routing in Wireless Sensor Networks"IEEE Transactions on Information on Forensics and Security, Vol: 11 Sept. 2016, Page(s): 2013 – 2027<https://doi.org/10.1109/TIFS.2016.2570740>

Authors Profile

Ms.Merlin Mary James working as an Assistant Professor in Mangalam College of Engg,Kottayam,Kerala.Masterof Engineering in Computer science and Engineering (M.E CSE) from:Anna University Chennai.Bachelor of Technology in Computer Science and Engineering (B.Tech-CSE) from MG University, kerala.Her Area of interest Cloud Computing,Networking,Artificial intelligence .

Mr. Vinodh P Vijayan, Head of Department, Computer Science, Mangalam College of Engineering, Kottayam, India has completed Bachelors Degree in Electronics and Communication Engineering, Post graduation in Computer Science Engineering His area of interest includes Soft Computing, Robotics, Bio-inspired computing, Fuzzy systems.

Ms.Neena Joseph working as an Assistant Professor in Mangalam College of Engg,Kottayam,Kerala.Masterof Engineering in Computer science and Engineering (M.E CSE) from:MS University Chennai.Bachelor of Technology in Computer Science and Engineering (B.Tech-CSE) from MG University, kerala.Her Area of interest Theory of Computation,Machine learning,Artificial intelligence .

Ms.Neethu Maria working as an Assistant Professor in Mangalam College of Engg,Kottayam,Kerala.Masterof Science in Computer science and Engineering (M.Sc CSE) from:Anna

University Chennai.Master of Engineering in Computer Science and Engineering (M.Tech-CSE) from Anna University, Kerala.Her Area of interest Neural Network,Cloud computing,Artificial intelligence .

Cite this Article

Merlin Mary James, Vinodh P Vijayan, Neena Joseph, Neethu Maria John, "Efficient WSN through Blackhole Identification and Elimination", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 3 Issue 8, pp. 454-459, November-December 2018.

Journal URL : <https://ijsrcseit.com/CSEIT12283127>