Ilkogretim Online - Elementary Education Online, 2021; Vol 20 (Issue 2): pp. 2987-2993
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.02.317

A Study To Improve Mobile Sink Technology To Extend The Life Of Wsn

Surendra Shukla Department of Computer Science & Engineering, Graphic Era Deemed to be University, Dehradun, Uttarakhand India, 248002, surendrakshukla.cse@geu.ac.in

Sandeep Sunori Department of Electronics & Communication Engineering, Graphic Era Deemed to be University, Dehradun, Uttarakhand India, 248002, sandeepsunori@gmail.com

Abstract:
The use of wireless sensor networks has made it extremely challenging to create the protocols. These networks employ a very exact energy budget. The system can grow to be exceedingly huge thanks to high node densities. Wireless communication between these nodes is possible. Energy is used when the sensor nodes broadcast data or receive data from the network to carry out network task execution. Many tactics, such as clustering methods, have been proposed to lower the energy usage of the network. The mobile sink deployment by the network reduces network overhead. The suggested methods reduce network energy consumption, boost network throughput, and cut down on network delay.

Keywords: Mobile Sink, Sensor Node, Cluster Head, Protocol, Base Station

I. INTRODUCTION

Today's technical advancements are leading to new developments in wireless sensor networks. High node densities have contributed to the ability to make the system incredibly large. Numerous tiny nodes, often known as energy resource-constrained sensor nodes, make up wireless sensor networks. These nodes are capable of wireless communication [1]. Additionally, signal processing tasks are processed using the many computational resources that the networks make available. The size of the network is variable in this type of network. Based on the network's design and the number of sensor nodes that can be used. Depending on how the network is built and for what purposes, different sensor nodes may be made available [2].

Numerous sensor nodes are connected to the networks in a single location. The batteries of so many network nodes cannot be charged at once. The clustering strategy has been shown to be a very effective way to conserve energy [3]. The routing process is the method used to determine the routes that network traffic should take. The routes are chosen using the Ad-hoc On Demand Distance Vector (AODV) reactive distance vector routing protocol. The cluster head and the members are where the routing takes place. Numerous hierarchal routing protocols are used throughout the clustering. As follows:

a. LEACH, One of the first routing protocols is this one. When a node's battery runs out, it is no longer useful to the network [4]. In this kind of protocol, the sensor nodes properly organise themselves into local clusters to produce the cluster head.

b. Hybrid Energy-Efficient Distributed Clustering is referred to as HEED. In wireless sensor networks, the optimal choice of the cluster heads is made using a multi-hop clustering algorithm. Based on the actual distance between the nodes, this is done.

c. TEEN: It is a combination of data-centric protocols and hierarchical clustering [5]. Where time-critical applications are available, these protocols are employed.

d. APTEEN, This entails performing both the tasks of recording periodic data gathers and responding to time-sensitive situations. Its architecture is identical to that of the TEEN.

e. PEGASIS, This is a data-gathering and chain-based algorithm that is optimal [6]. The idea behind this approach is that energy can be converted from nodes rather than straight from clusters.

Mobile Sink Nodes

There is a need to create new architectures as demand for huge wireless networks rises. These nodes' energy usage has to be reduced as well because choosing a network is affected by this component as well [7]. Most networks are not very scalable and can only support a small number of nodes.

MSREEDG model:

This method is based on the topology of a tree network. It is important to extend the network life time [8]. The area that needs to be watched has static sensors and is free of any holes. For this circumstance, the divide and conquer strategy is employed. In order to use this strategy, a number of steps must be taken. The processes to change the cluster include dividing the region into grid cells, dividing the grid based on the cost of data gathering energy, and moving sinks at a cost.

2.LITERATURE REVIEW

In the publication [9], Kebin Liu, et al. (2014) described a progression of fault detectors that allows various hubs to cooperate with one another in a conclusion task. By moving the detector from its current condition to another state in light of neighbourhood confirmations and then passing the detector to different hubs, each sensor can contribute to the discovery. With sufficient evidence, the flaw detector completes the Accept state and produces a final finding report.

In this paper [10], YulongZou et al. (2015) offered a study that examines wireless sensor networks in the presence of eavesdropping attackers. Both sink nodes and sink nodes are present in these networks in large numbers. The most effective sensor scheduling technique includes a sensor with the highest level of confidentiality in the sensor network. This is employed to defend wireless transmissions against eavesdropping attempts. Some closed-form expressions are run in order to provide round-robin scheduling based on the likelihood that an intercept event will occur.

In this study , Dahane Amine et al. (2014) suggested a safe and energy-efficient weighted clustering technique (ES-WCA). It combines five metrics, the behavioural level metre being one of them. The simulation technique is employed to evaluate the effectiveness of this approach. The mobile sensor networks self-organize using the ES-WCA approach. By reducing re-election, this methodology tries to build a virtual topology. Additionally, there is no need to completely recreate the network. Priority should be given to reducing the amount of energy that the nodes use. There is a chance that providing energy saving facilities will reduce the network's redundancy.

This methodology has incorporated all of the requirements into its methodology. In this technique, the Data Collection Tree (DCT) is constructed. It is made based on where the cluster head is located. The Data Collection Node does not participate in the DCT for sensing reasons. It just covers the one task of moving data packets from the cluster head to the sink. Additionally, this plan reduces the energy deplet ion. This technique creates a straightforward tree structure, which aids in minimising traffic and, consequently, the quantity of energy required.

In this paper numerous tree nodes make up the tree. Special nodes called Sub-Rendezvous Points (SRPs) are chosen. When other networks are compared, the findings demonstrate that the TCBDGA is capable of balancing the network's whole load. The energy consumption is also decreased with this technique. The primary issue, which is the hotspot issue, has run its course. Additionally, this technique extends lifetime

In this research , Zhang Bing Zhou et al. (2015) made the claim that it is difficult to schedule mobile sinks in an energy-efficient manner while extending network lifetime. We provide a three-phase energy-balanced heuristic to address this problem. The network region is initially partitioned into grid cells that are the same size geographically. Therefore, when accounting for the energy used for both data collection and sink movement, the amount of energy to be used in each cluster is roughly equal. An experimental evaluation shows that this strategy can lengthen the network and provide an ideal grid cell division in a finite number of rounds.

3. RESEARCH METHODOLOGY

In an effort to make the suggested study more understandable, the research methodology is also presented. The methods used are described sequentially, along with their processes. For a better understanding of the implementation process, a flowchart is also supplied. Summary of the flow chart

- The location-based clustering method is used to partition the deployed wireless sensor network into fixed size clusters with a defined number of sensor nodes.

- The cluster head will receive data gathered from the other cluster nodes.

- This step 3 is repeated until sufficient data get

Algorithm

1. Deploy the network with the finite number of sensor nods
2. Use location-based clustering to divide the entire network into fixed-size segments.
3. For (i=0, i=n, and i++)

If (energy I and distance I are more than energy (i+1) and distance (i+1)

Node=cluster head (i)

End

4. Encourage movement ()
5. Use network information and apply node localization
6. If (location I > location (i+1)) in the data aggregate

4. EXPERIMENTAL RESULTS

Fig 1 Energy Comparison

Figure 1 compares the energy usage of the proposed scenario with that of the current scenario. The energy graph demonstrates that the proposed scenario uses less energy because to the network's multiple sink deployment.

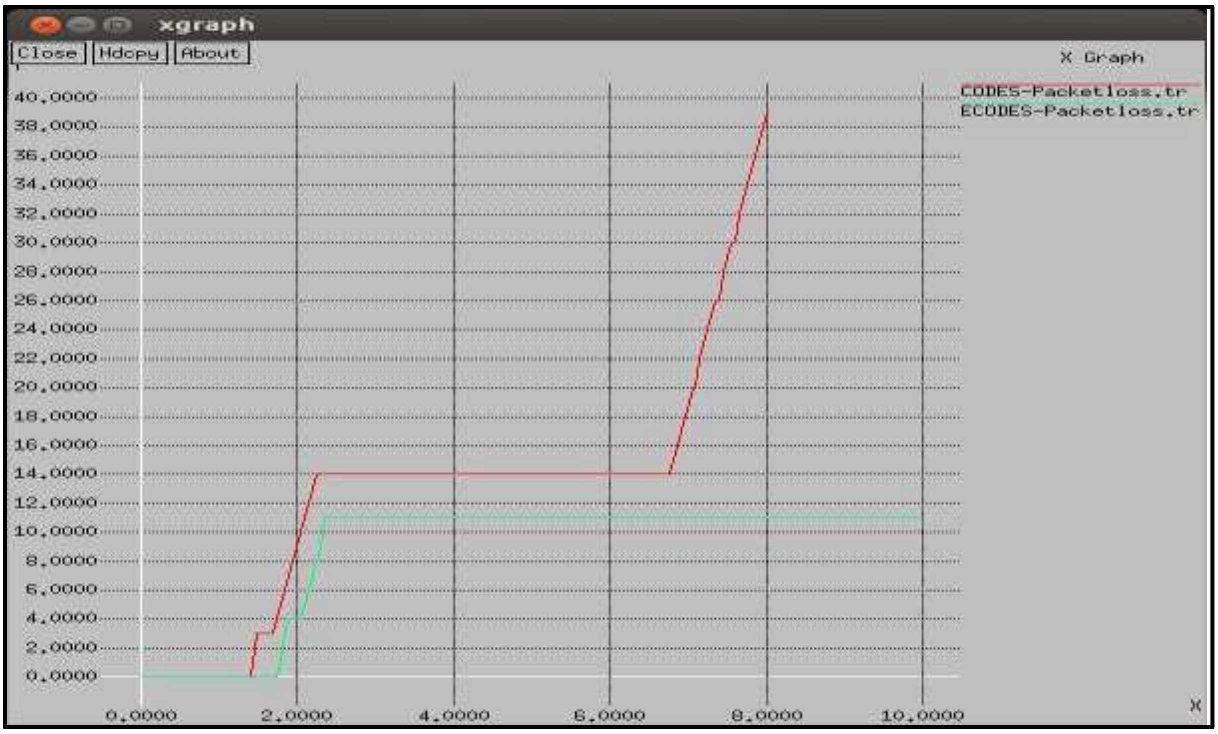

Fig. 2 Packet loss Graph

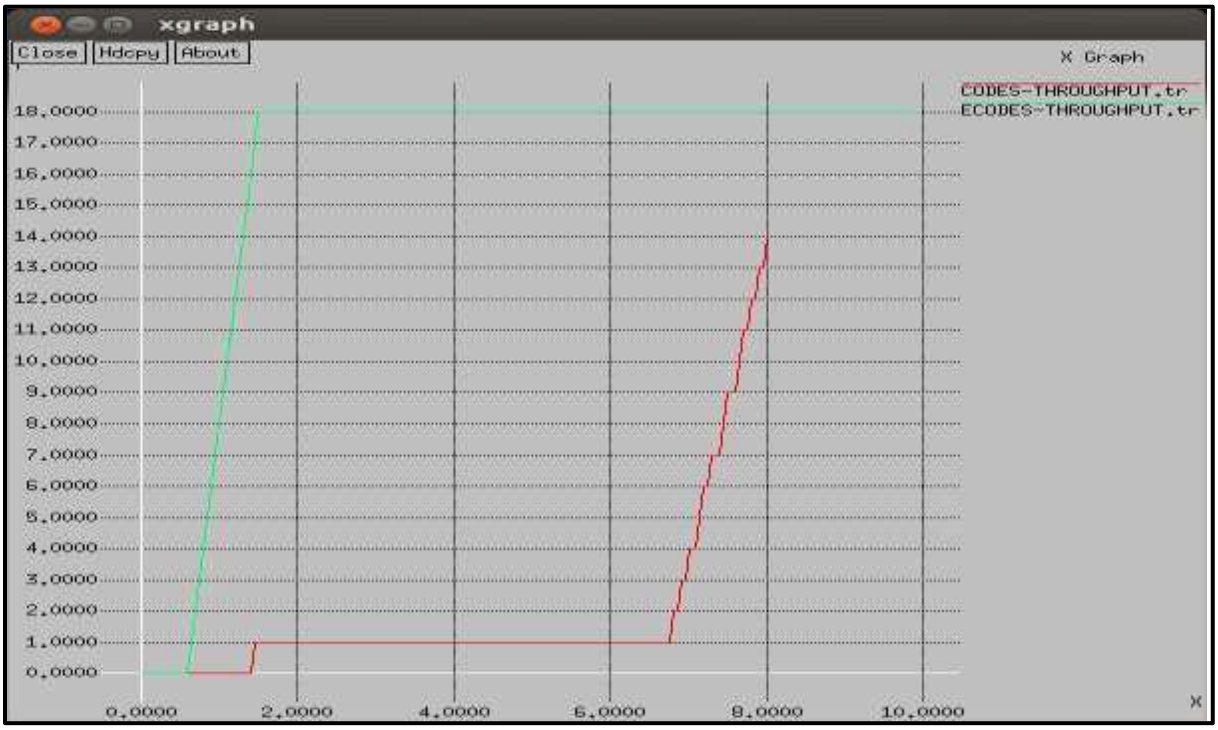

Fig. 3 Throughput comparison

5. CONCLUSION

In order to reduce the energy consumption of wireless sensor networks, this study aims to assess the effectiveness of single sink mobile strategies that are presently in use. A mobile signal strength technique and a bio-inspired technique can be used to transport many sinks from one location to another. The data gathering performance of the LEACH protocol will be enhanced by using a large number of sinks. The sinks' motion is influenced by both the bee colony algorithm and signal intensity. The recommended approach enhances the LEACH protocol performance. The LEACH procedure works better when numerous sinks are used, and a bee colony controls the movement of the sinks. The LEACH methodology and a bee colony are used to examine and contrast the various energy parameters with the existing algorithm. It is clear that the network has a bigger footprint and uses less energy. The improvement leads to improved cluster head data collecting and increased network speed. Analysis shows that the suggested protocol surpasses the current approach and offers greater energy efficiency and longer network lifetime.

References

1. Wang, J., Gao, Y., Yin, X., Li, F., & Kim, H. J. (2018). An enhanced PEGASIS algorithm with mobile sink support for wireless sensor networks. Wireless Communications and Mobile Computing, 2018.
2. Wang, Jin, Yu Gao, Wei Liu, Arun Kumar Sangaiah, and Hye-Jin Kim. "Energy efficient routing algorithm with mobile sink support for wireless sensor networks." Sensors 19, no. 7 (2019): 1494.
3. Saranya, V., S. Shankar, and G. R. Kanagachidambaresan. "Energy efficient clustering scheme (EECS) for wireless sensor network with mobile sink." Wireless Personal Communications 100, no. 4 (2018): 1553-1567.
4. Wang, J., Cao, J., Sherratt, R.S. and Park, J.H., 2018. An improved ant colony optimization-based approach with mobile sink for wireless sensor networks. The Journal of Supercomputing, 74(12), pp.6633-6645.
5. Hung, Tran Cong, Dang Thi Ngoc, Phan Thi The, and Luan NT Huynh. "A moving direction proposal to save energy consumption for mobile sink in wireless sensor network." In 2019 21st International Conference on Advanced Communication Technology (ICACT), pp. 107-110. IEEE, 2019.
6. Habib, M.A., Saha, S., Razzaque, M.A., Mamun-or-Rashid, M., Fortino, G. and Hassan, M.M., 2018. Starfish routing for sensor networks with mobile sink. Journal of Network and Computer Applications, 123,pp.11-22.
7. Irish, Althiya Eby, Sebastian Terence, and Jude Immaculate. "Efficient data collection using dynamic mobile sink in wireless sensor network." In Wireless Communication Networks and Internet of Things, pp. 141-149. Springer, Singapore, 2019.
8. Wang, J., Gao, Y., Yin, X., Li, F., & Kim, H. J. (2018). An enhanced PEGASIS algorithm with mobile sink support for wireless sensor networks. Wireless Communications and Mobile Computing, 2018.

9. Kaswan, A., Singh, V. and Jana, P.K., 2018. A multi-objective and PSO based energy efficient path design for mobile sink in wireless sensor networks. Pervasive and Mobile Computing, 46, pp.122-136.