The Survey On Data Transfer techniques in Wireless Sensor Networks

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Abstract— This paper presents the brief study of clustering and data transfer techniques in wireless sensor network. The cluster head selection in clusters depends upon the node energy and probability which is the main concern for enhancement of the life time of a network. Different clustering protocols are designed for better enhancement of the network and reliability of the nodes. This paper gives the brief review on clustering techniques in wireless sensor network.

Keywords: Wireless Sensor Network, clustering, cluster head, LEACH.

I. INTRODUCTION

Recent advancement in micro-electro based technologies the Wireless sensor networks plays an important role during the wireless communication. Wireless sensor node consist of a large and huge number of low cost, small sized, computational, and energy-constrained devices called sensor node. These sensor nodes are used to sense the current situation in the field and are deployed in network service area of wireless. The energy resource is the main concern for nodes during the data transmission. Many protocols are designed to minimize the energy utilization of the nodes by establishing some rechargeable node and some data dividing rules. This paper gives the survey study of all the clustering protocols used in wireless sensor networks and load balancing techniques during the transmission of nodes.

II. LITERATURE SURVEY

[1] This paper presents a load balancing technique using reclustering method in WSN. The load at any node is divided equally and the clustering is done in two levels. The levels are chosen according to some parameters like distance from sink, threshold value and probability factor. The cluster head selected at level 0 will not take part for the selection of new cluster heads at level 1. This method helps to minimize the energy consumption of the CHs and increases network life time.

[2] This paper presents a algorithm in which the number of cluster heads are minimum and these nodes are called super nodes. This selection of the CHs are done by dividing the area into four equal regions called zones and each zone is

independent. The super nodes are selected at the centre of the zones and each zone consider a multilayer communication. The working of the algorithm is based on LEACH protocol and the phases of the protocol.

[3] This paper presents the brief idea of wireless sensor network. This paper helps to understand the working, types, application and protocols of wireless sensor network. The architecture explained in this paper helps to understand the how communication occurred between nodes in different network layers. The communication architecture among the sensor nodes scattered in a sensing field and have a capability of collecting data from the neighbour nodes and send it to the sink as shown in figure 1.
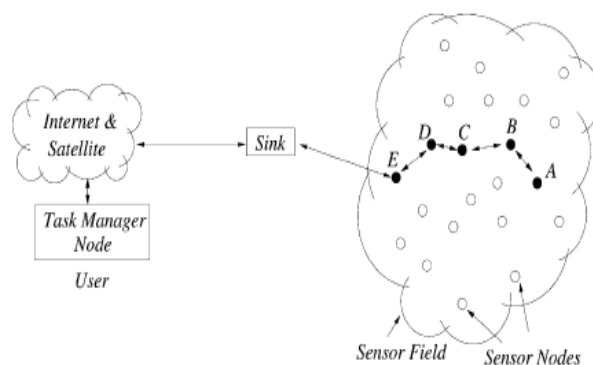

Figure 1: Sensor nodes scattered in a sensor field[1].

Some specified protocols are used during the communication, these protocols depends upon the node

energy, network area, number of nodes in a network, distance of sink and rounds.

[4] This paper proposed a Load Balancing in Zone Based Clustering approach, which is used to balance the load of super nodes regions by dividing the region of super nodes into levels. The nodes are deployed according to their type and are deployed in different regions. The levels according to the super nodes divide into clusters using tree-based concept to optimize Cluster Head (CH) selection using Fuzzy Logic Techniques. This helps in maximum utilization of the network area.

[5] This paper presents a clustering based algorithm and the algorithm is divided into three categories network levelling, clustering and data transmission. The algorithm works in levels and the data transmission occurred in levels, the level 2 collected data by the CHs from the normal nodes are transferred to level1 CHS and the level 1 data is then transferred tom level 0 which is nearer to the sink. This level based transmission of data helps to reduce the energy utilization of the nodes. The algorithm is divided into three parts and the data transmission in phases is shown in figure 2.

1) *Cluster head Seection*
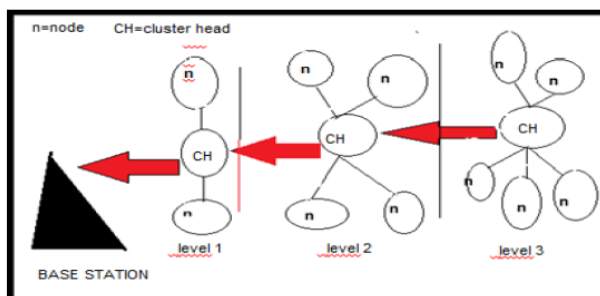2) *Next Cluster Head selection*
3) *Packet sending*

Figure 2: Phases of transmission[5]

[6] In this paper a reclustering and multihop data transmission processes is used for data reporting by sensor node to base station. The main goal of this mentioned proposed method is that the energy should be distributed equally over the sensor nodes which reduces the total energy dissipation. By this method lifetime of the network is enhanced. For the cluster head selection a new threshold has been formulated which is based on the sensor node's remaining energy and the distance from base station.

Wireless sensor network are capable of collecting and processing data even under delicate and difficult situations. Wireless sensor networks consists of many smaller sensor nodes which have restrictions on power, memory and processing capacity and which are distributed on very large area and to be able to control remotely. The most basic and important purpose of wireless sensor networks applications is in data transmission. Power management approaches are required to maintain network lifetime and keep it stable. There are two methods for wireless network lifetime enhancement through routing protocol:
1) Enhancing network lifetime through reducing total energy consumption.
2) Efficient uniform energy distribution among nodes.

There are many issues in designing the sensor network protocols [2]:-

4) *Network Scalability*
5) *Mobality*
6) *Network deployment: This defines the deployment of nodes is either fixed or random.*
7) *Multihop or Single Hop communication: This defines the formatiom of the network.*
8) *Cluster Dynamics: Which defines how unlike parameters of a network are determined.*

III. CONCLUSION

This paper gives the brief study of all the clustering techniques used in wireless sensor networks for the load balancing during the data transmission. The different clustering techniques is either based on level or zone base. This survey helps to give some idea for designing some new techniques based on gateway, forward nodes and for further improving the lifetime of network, by increasing throughput and minimizing data loss.

REFERENCES

[1] Sonia 1*, Deepak Kumar2," Load Dividing and Reclustering technique to Improve the Reliability of Data In a Network", International Journal of Computer Sciences and Engineering, Volume-5, Issue-8, 2019.
[2] Ashim Kumar Ghosh1, Anupam Kumar Bairagi2, Dr. M. Abul Kashem3, Md. Rezwan-ul-Islam1, A J M Asraf Uddin1, " Energy Efficient Zone Division Multihop Hierarchical Clustering Algorithm for Load Balancing in Wireless Sensor Network", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 2, No. 12, December 2011.
[3] I.F. Akyildiz, W. Su*, Y. Sankarasubramaniam, E. Cayirci," Wireless sensor networks: a survey", Elsevier, Computer Networks 38, 393–422, 2002.
[4] M. Shanmukhi, 2G. Nagasatish, "LOAD BALANCING USING CLUSTERING IN WSN WITH FUZZY LOGIC TECHNIQUES", International Journal of Pure and Applied Mathematics Volume 119 No. 14 2018, 61-69.

[5] Shankar Sachdev1, Laxman Yalmar2, Nilesh Gaykhe3, " Energy Efficient Cluster Based Routing Algorithm in Wireless Sensor Networks", IJESC, vol. 6 issue 3, 2016.

[6] 1Jaswant Singh Raghuwanshi,2Neelesh Gupta,3Neetu Sharma, " Energy Efficient Data Communication Approach In Wireless Sensor Networks", International Journal of Advanced Smart Sensor Network Systems (IJASSN), Vol 4, No.3, July 2014.

[7] Jing, Yang, Li Zetao, and Lin Yi. "An improved routing algorithm based on LEACH for wireless sensor networks." Control and Decision Conference (CCDC), 2013 25th Chinese.IEEE, 2013.

[8] Beiranvand, Zahra, Ahmad Patooghy, and Mahdi Fazeli. "I-LEACH: An efficient routing algorithm to improve performance & to reduce energy consumption in Wireless Sensor Networks." Information and Knowledge Technology (IKT), 2013 5th Conference on. IEEE, 2013.

[9] Liu, Yi, Shan Zhong, Licai You, Bu Lv, and Lin Du. "A Low Energy Uneven Cluster Protocol Design for Wireless Sensor Network." Int'l J. of Communications, Network and System Sciences 5 (2012): 86.

[10] Haneef, Muhammad, Zhou Wenxun, and Zhongliang Deng. "MG-LEACH: Multi group based LEACH an energy efficient routing algorithm for Wireless Sensor Network." Advanced Communication Technology (ICACT), 2012 14th International Conference on. IEEE, 2012.

[11] Aslam, M., Nadeem Javaid, A. Rahim, U. Nazir, Ayesha Bibi, and Z. A. Khan. "Survey of extended LEACH-Based clustering routing protocols for wireless sensor networks."In High Performance Computing and Communication & 2012 IEEE 9th International Conference on Embedded Software and Systems (HPCC-ICESS), 2012 IEEE 14th International Conference on, pp. 1232-1238. IEEE, 2012.

[12] Mr. Santosh.Irappa.Shirol, Ashok Kumar. N, Mr. Kalmesh.M.Waderhatti,"Advanced-LEACH Protocol of Wireless Sensor network", IJETT - Volume4 Issue6- June 2013.

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