

A Literature Survey on Adaptive Approach for Mobile Wireless Sensor Network with Dynamic Cluster Head Selection

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Abstract: Wireless Sensor Networks (WSN) is the key resource of perception and is widely used trends now a days. In wireless sensor network clustering, Efficient clustering and proper Cluster Head (CH) selection schemes are required, in order to improve energy saving of sensor nodes. In this paper, Dynamic CH Selection Method (DCHSM) is used where CHs are selected dynamically to solve the problem of the unreasonable cluster head selection that may lead to the overlapping coverage and unbalanced energy consumption in the cluster communication. By comparing it with the other existed algorithms, Here the network lifetime is increased by 50%, higher than that of Low Energy Adaptive Clustering Hierarchy (LEACH), and increased by 30%, higher than that of Distribute Energy -Efficient Clustering Algorithm (DEEC). The survival time of the network is longer than that of energy-balanced deterministic clustering algorithm and adaptive energy optimized clustering algorithm. The effectiveness of the network energy consumption, and it has the longest network lifetime which can be achieved.

Keywords: WSN, Cluster Head, DCHSM, DEEC, LEACH, AODV, TDMA.

I. INTRODUCTION

Wireless Sensor Network (WSN) has some great advantages such as flexible communication and arrangement, low power consumption and low cost. As the world is moving towards digitalization technology, The wireless mode of communication makes the network so updated with the current expectations. This wireless modes comes with ad hoc nature, ensures the communication while the objects are making movement. WSN is generally composed of hundreds and thousands of distributed mobile sensor nodes, these sensor nodes organize themselves into a network. The nodes which are in network should be handled properly to get good performance of the network. This could be achieved with the help of the clustering mechanism on nodes which are belonging to ad hoc network. Although sensor nodes are designed with low energy consumption in mind, they can survive for only a very limited lifetime energy consumption of the network can be effectively reduced while the sensor nodes are organized in the form of clusters.

II. RELATED WORKS

The real world scenario demands the communication to happen on the way. This has been driving force to fine-tune the efficiency of the ad hoc network. The researches about the energy consumption and coverage of the Ad hoc sensor network have made a certain progress, but the energy efficiency and stability are still not satisfactory. The reference [1] shows Works about sensor network coverage with longest survival time and low power consumption are mainly analyzed and a Dynamic Cluster Head Selection Method for wireless sensor networks (DCHSM) [5]. The redundant nodes which have death priority but do not affect the performance of network coverage are selected as the first kind of cluster head nodes. After the death of the first kind of nodes, the survival time estimation algorithm is used to choose a new class of cluster head nodes based on the ratio of the residual energy and the average energy of the network nodes. The author in the reference [2] tells that clustering techniques improve energy saving in WSN by increasing the network lifetime. In order to improve energy saving of sensor nodes, efficient clustering and proper CH selection techniques are required. Distributed clustering technique is utilized to implement Low energy adaptive clustering hierarchy (LEACH) [4][6][7] algorithm. In LEACH algorithm, CH nodes are elected based on predetermined probability. The reference [3] shows that AODV protocol does well as long as the network size has been confined to certain extent. When it crosses the boundary there will be a fall in performance has been experienced. This can be avoided with the advent of some supportive mechanisms on top of the ad hoc network which utilizes AODV as a routing protocol. The author in the reference [4] tells that Low Energy Adaptive Clustering Hierarchy (LEACH) [2][6][7] is one of the popular energy conservation mechanisms that dynamically forms the cluster and assign the cluster head that directly sends the aggregated data to sink.

The reference [5] shows one of the method to minimize energy consumption in Wireless Sensor Network is cluster based technique [2]. Once the nodes are categorized into clusters, CHs and cluster members (non CHs) are identified. The non CH members are responsible only to sense the area. CH collects the information from all the non CH members in its cluster. After this, the data is processed and send to the BS or to the sink. Since only CHs sends the data to sink directly, the distance of data transmission is minimized, due to which the energy consumption is reduced in WSN. A DCHSM [1] is proposed for CH selection. At first, the clustering area is divided with the help of Voronoi Diagram. The author in reference [6] has discussed the LEACH protocol in details. LEACH (Low Energy Adaptive Clustering Hierarchy) is the first hierarchical cluster-based routing protocol for wireless sensor network. In LEACH [2][4][7], the nodes organize themselves into local clusters. A dedicated node selected as cluster-head (CH) which is responsible for creating and manipulating a TDMA (Time Division Multiple Access) schedule and aggregating the data coming from different non CH member nodes and sending it to the BS or to the sink node. The reference [7] tells about the LEACH. LEACH [6][2][4] is dynamic because the job of cluster-head rotates. Because cluster heads are chosen randomly. The chosen Cluster Head node sets up a TDMA schedule for data transmission within the cluster. TDMA Schedule prevents collision among data messages and energy conservation in non cluster-head nodes. The reference [8] focuses on LEACH [6][4] (Low-Energy Adaptive Clustering Hierarchy), a communication protocol for sensor networks. The operation of LEACH is divided into rounds. Each of these rounds consists of a set-up and a steady-state phase. During the set-up phase cluster-heads are determined and the clusters are organized. During the steady-state phase data transfers to the base station or sink occurs. This paper presents an improvement of LEACH'S cluster-head selection algorithm.

III. CONCLUSION

This literature study shows the role of clustering the ad hoc networks. A Dynamic Cluster Head Selection Method for wireless sensor networks (DCHSM) is proposed in this paper by analyzing the sensor network energy consumption. This study overcomes the disproportion of the energy consumption, reduces energy consumption and extends the life time of the network. This clustering mechanism on ad hoc network clearly improves the performance of the network which is clear based on the existing research works and their results.

REFERENCES

- [1] Dongyao Jia, Huaihua Zhu, Shengxiong Zou, and Po Hu "Dynamic Cluster Head Selection Method for Wireless Sensor Network" IEEE SENSORS JOURNAL, VOL. 16, NO. 8, APRIL 15, 2016.
- [2] Aniji John and K. Vinoth Babu "Two Phase Dynamic Method for Cluster Head Selection in Wireless Sensor Network for Internet of Things Applications" IEEE WiSPNET 2017 conference.
- [3] S. Thirumurugan " A Literature Review on Clustering Mechanisms in Ad Hoc Network" IJARCSSE Volume 7, Issue 5, May 2017.
- [4] Praveen Kumar K.V, M.K Banga, Udaya Rani V, B.M Thippeswamy, K.R Venugopal " EBDRA: Energy Balanced Dynamic cluster Routing Approach for WSN" IEEE International Conference On Recent Trends In Electronics Information Communication Technology, May 20-21, 2016, India.
- [5] Aniji John, Anagha Rajput, Vinoth Babu K "Dynamic Cluster Head Selection in Wireless Sensor Network for Internet of Things Applications" proceeding of IEEE ICIEEIMT 2017.
- [6] Fuzhe Zhao, You Xu, Ru Li, Wei Zhang "Improved Leach Communication Protocol for WSN" International Conference on Control Engineering and Communication Technology, 2012.
- [7] Lalita Yadav, Ch. Sunitha "Low Energy Adaptive Clustering Hierarchy in Wireless Sensor Network (LEACH)" (IJCSIT) Vol. 5 (3), 2014.
- [8] M. J. Handy, M. Haase, D. Timmermann "Low Energy Adaptive Clustering Hierarchy with Deterministic Cluster-Head Selection".