A Survey on Cluster Based Data Dissemination with Mobile Sink For wireless Sensor Network

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Abstract—**Wireless sensor network (DWSN) is a set of two or more terminals with wireless connections each node can be moved in a definite sensor network region. In the cluster based WSN, we decide a head node which are completely responsible for data transmission and acting as a head nodes among all nodes. Other nodes can capable to collect data but does not transmit data without permission of header node. We are also using mobile sink which reduces the energy loss of sensor node, Due to the movable property in the network area we called it also Dynamic wireless sensor network. In cluster based data dissemination using mobile sink we reduce the network conjunction as well as improve network life cycle. In WSN using clustering If a node wishes to pass on the data to the other node in the wireless sensor network it wait for the mobile sink.**

Keywords — Wireless Sensor Networks (WSN), Mobile sink , Cluster node, Network Lifetime.

I. INTRODUCTION

Now a day's wireless technology play very important role for fast data transmission as well as for data communication. In the WSN every cluster node has a transceiver for communicate into sink, has a micro organizer for dealing out the data and for sensing the data. Sensor node having very limited amount of energy and also they are lost more energy for others data transmission. In cluster based system we make group of nodes in which a node act as a head node is capable to take all data transmission decision to sink, which is help for maintaining energy of whole nodes. Due to the changeable characteristics of the sink, sink leave the collecting data to its appropriate objective.

1. Types of wireless Sensor Network

We can classify the wireless sensor network according the quantity of sink use, cluster use and energy saving in the wireless Sensor network we can classify it by various categories wireless sensor network i.e. first with cluster nodes and second without cluster nodes.

We further classified both categories in two ways i.e. first WSN with clustering using single sink and Second one is by the use of multiple sink in the wireless sensor network. When we will talk about cluster based it means that we are making a group of multiple nodes in which one nodes act as a head node and rest of all nodes are act like follower node, also when we think about the concept of sink in the Wireless sensor Network it has more fault and error free..When we think about more sinks in the wireless sensor network it has wide range of coverage as compare to the single.
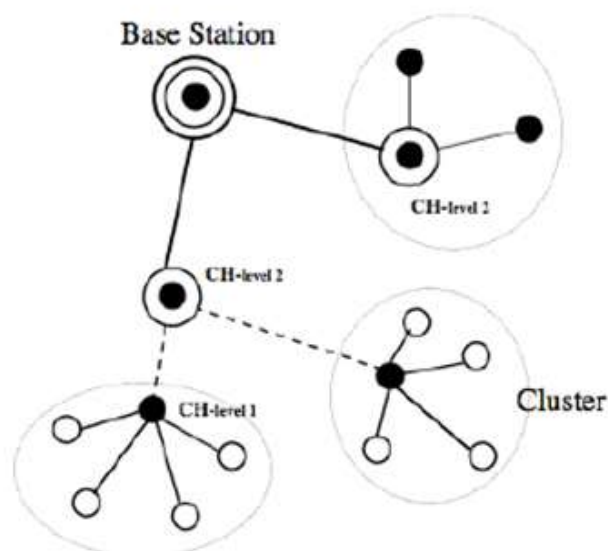

Figure 1: Cluster Based WSN.

2. Application of WSN

In today scenario wireless technology are used each and every field, there are few field in which we can use the wireless sensor network.

1. **Disaster relief operations.**

2. **Spot monitoring.**

3. **Biodiversity mapping.**

4. **Ecological monitoring.**

5. **Intelligent buildings.**

6. **Air quality monitoring.**

7. **Machine surveillance.**

8. **Monitoring quality of water.**

9. **Earthquake detection.**

10. **Medicine and health care.**

11. **Agriculture.**

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12. Tracking the location

3. Characteristics of WSN

Lifetime: Lifetime is the most hopeful feature in the wireless sensor network. In the wireless sensor network each node having their own battery which is useful for their survival in the network, when node engage any of the movement like data processing , sensing , or transmitting or receiving the data it uses their battery as an energy.

Data originality: In the data it should be ensured that we are using only new data rather than old one .Data originality insure that we are using latest data.

Elasticity: Sensor network should be elastic; it can frequently adapt any changes in node density and topology.

Authentication: One of the most important features of WSN is authentication, because in WSN there are many fake packet travels in the networks.

Protection: When we think over protection in the wireless sensor network then we need to protect only the programming code of the node.

Data Collection: In wireless sensor network when we think about the data collection then we are trying to consume less energy of the node which is also helpful for network lifetime.

II. EVOLUTION

In 2002, Jason Lester Hill design System Architecture for Wireless Sensor Networks they present an operating system and three generations of a hardware platform designed to address the needs of wireless sensor networks. Their operating system, called TinyOS uses an event based execution model to provide support for fine grained concurrency and incorporates a highly efficient component model. TinyOS enables us to use a hardware architecture that has a single processor time shared between both application and protocol processing. They show how a virtual partitioning of computational resources not only leads to efficient resource utilization but allows for a rich interface between application and protocol processing. This rich interface, in turn, allows developers to exploit application specific communication protocols that significantly improve system performance.

In 2005, Daniele Puccinelli and Martin Haenggi studied about Wireless Sensor Networks: Applications and Challenges of Ubiquitous Sensing, in which Sensor networks offer a powerful combination of distributed sensing, computing and communication. They lend themselves to countless applications and, at the same time, offer numerous challenges due to their peculiarities, primary the stringent energy constraints to which sensing nodes are typically subjected. The distinguishing traits of sensor networks have a direct impact on the hardware design of the nodes at at least four levels: power source, processor, communication hardware, and sensors. Various hardware platforms have

already been designed to test the many ideas spawned by the research community and to implement applications to virtually all fields of science and technology. They are convinced that CAS will be able to provide a substantial contribution to the development of this exciting field.

In 2006, Ossama Younis, Marwan Krunz, and Srinivasan Ramasubramanian, University of Arizona Studied about Node Clustering in Wireless Sensor Networks: Recent Developments and Deployment Challenges in which The large-scale deployment of wireless sensor networks (WSNs) and the need for data aggregation necessitate efficient organization of the network topology for the purpose of balancing the load and prolonging the network lifetime. Clustering has proven to be an effective approach for organizing the network into a connected hierarchy. In this paper they highlight the challenges in clustering a WSN, also discuss the design rationale of the different clustering approaches, and classify they proposed approaches based on their objectives and design principles and further discuss several key issues that affect the practical deployment of clustering techniques in sensor network applications.

In 2006 Dirk WESTHOFF, Joao GIRAO, Amardeo SARMA describes security solutions for collecting and processing data in Wireless Sensor Networks (WSNs). Adequate security capabilities for medium and large scale WSNs are a hard but necessary goal to achieve to prepare these networks for the market. They include an overview of security and reliability challenges for WSNs and introduce a toolbox concept to support such a framework.

In 2007 Prabhudutta Mohanty, Sangram Panigrahi Nityananda Sarma, Siddhartha Sankar Satapathy they explored explored general security threats in wireless sensor network and made an extensive study to categorize available data gathering protocols and analyze possible security threats on them.

In 2008 Zoran S. Bojkovic, Bojan M. Bakmaz, and Miodrag R. Bakmaz deals with some security issues over wireless sensor networks (WSNs). A survey of recent trends in general security requirements, typical security threats, intrusion detection system, key distribution schemes and target localization is presented. In order to facilitate applications that require packet delivery from one or more senders to multiple receivers, provisioning security in group communications is pointed out as a critical and challenging goal. Presented issues are crucial for future implementation of WSN.

In 2009, Dilip Kumar, Trilok C. Aseri and R.B. Patel, they proposed EEHC: Energy efficient heterogeneous clustered scheme for wireless sensor networks in which there has been a growing interest in wireless sensor networks. One of the major issues in wireless sensor network is developing an energy efficient clustering protocol. Hierarchical clustering algorithms are very important in increasing the network's life time. Each clustering algorithm is composed of two phases,

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the setup phase and steady state phase. The hot point in these algorithms is the cluster head selection.

They study the impact of heterogeneity of nodes in terms of their energy in wireless sensor networks that are hierarchically clustered. They assume that a percentage of the population of sensor nodes is equipped with the additional energy resources. They also assume that the sensor nodes are randomly distributed and are not mobile, the coordinates of the sink and the dimensions of the sensor field are known. Homogeneous clustering protocols assume that all the sensor nodes are equipped with the same amount of energy and as a result, they cannot take the advantage of the presence of node heterogeneity. Adapting this approach, they introduce an energy efficient heterogeneous clustered scheme for wireless sensor networks based on election probabilities of each node to become a cluster head according to the residual energy in each node. Finally, the simulation results demonstrate that our proposed heterogeneous clustering approach is more effective in prolonging the network lifetime compared with LEACH.

In 2010, Bager Zarei, , Mohammad Zeynali and Vahid Majid Nezhad proposed a novel Cluster Based Routing Protocol in wireless sensor network in which (CBRP) for prolong the sensor network lifetime. CBRP achieves a good performance in terms of lifetime by balancing the energy load among all the nodes. In this protocol first they Cluster the network by using new factors and then construct a spanning tree for sending aggregated data to the base station which can better handle the heterogeneous energy capacities. Simulation results show that CBRP can remarkably extend the network lifetime and amount of data gathered.

In 2010 Amar Adnan Rasheed M.S., Northeastern Dr. Rabi N. Mahapatra In their dissertation, they consider a number of security schemes for WSN (wireless sensor network) with MS. The schemes offer high network's resiliency and low communication overhead against nodes capture, MS replication and wormhole attacks. They propose two schemes based on the polynomial pool scheme for tolerating nodes capture: the probabilistic generation key pre-distribution scheme combined with a polynomial pool scheme, and the Q-composite generation key scheme combined with a polynomial pool scheme. The schemes ensure low communication overhead and high resiliency. For anti MS replication attack scheme, they propose the multiple polynomial pools scheme that provides much higher resiliency to MS replication attack as compared to the single polynomial pool approach. Furthermore, to improve the network resiliency against wormhole attack, two defensive mechanisms were developed according to the MS mobility type. In the first technique, MS uses controlled mobility. They investigate the problem by using a single authentication code from sensor networks to verify the source of MS beacons, and then they develop a defensive approach that divides the sensor network into different authentication code's grids. In their second technique, random mobility is used by MS. They explore the use of different communication channels available in the sensor hardware combined with polynomial pool scheme.

In 2011 A. LAKSHMI S.V. MANISEKARAN DR.R.VENKATESAN in this paper they propose novel energy efficient algorithm FDPCA for Wireless Sensor Networks (WSN). However, energy consumption is one of the major drawbacks in most of the Wireless Sensor Networks. Parameters like End to End Delay and Received Signal Strength Indicator (RSSI) are considered in exercising the influence on transmit power. These parameters are fuzzified and optimal transmission power levels are selected. The throughput for both DPCA and FDPCA are compared. High throughput is obtained by using FDPCA. In their first phase, the parameters are calculated. They proposed algorithm can effectively save energy without degrading the throughput of the network and reduce the energy consumption of the network. Their experimental results demonstrate that the proposed algorithm significantly overtake previous method, in terms of throughput.

In 2012, Dervis Karaboga, Selcuk Okdem and Celal Ozturk proposed Cluster based wireless sensor network routing using artificial bee colony algorithm in which many novel architectures, protocols, algorithms, and applications have been proposed and implemented. The efficiency of these networks is highly dependent on routing protocols directly affecting the network life-time. Clustering is one of the most popular techniques preferred in routing operations. In this paper, a novel energy efficient clustering mechanism, based on artificial bee colony algorithm, is presented to prolong the network life-time. Artificial bee colony algorithm, simulating the intelligent foraging behavior of honey bee swarms, has been successfully used in clustering techniques. The performance of the proposed approach is compared with protocols based on LEACH and particle swarm optimization, which are studied in several routing applications. The results of the experiments show that the artificial bee colony algorithm based clustering can successfully be applied to WSN routing protocols.

In 2013, Mian Ahmad Jan and Muhammad Khan, A Survey of Cluster-based Hierarchical Routing Protocols in which Wireless Sensor Networks consists of small miniaturized Sensor nodes which collect data from their environment and route to a central Base Station. Due to their resource constraint nature, various routing protocols have been design to reduce the consumption of energy of the nodes. In this paper they have presented a brief survey of Cluster-based Hierarchical routing protocols. These protocols organize the nodes into small groups known as Clusters. One node per Cluster is elected as Cluster Head (CH) in each round to transmit the data to the Base Station. CHs are either selected by the desire node itself or by the Base Station. They presented a comparison among these clustering protocols in Section based on various features which highlights their transmission mode and selection algorithms for CHs.

In 2014, Naveen Sharma and Anand Nayyar Review of Cluster Based Energy Efficient Routing Protocols for Wireless Sensor Networks. In recent times wireless sensor networks have grown enormously and become progressively

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attractive in wide variety of applications because of their low cost, small in size, self-organizing behavior in harsh environments. Routing is a vital technology in WSN. There are many routing protocols like: location based, multipath, data centric, mobility based, hierarchical routing, hybrid routing etc. Clustering is used to prolong the lifetime of the wireless sensor networks. Clustering is the process where sensing area is divided in groups to balance the energy level of sensor nodes known as clusters. An Optimal Clustering technique can reduce the energy consumption in WSN and increase the lifetime of the network. Energy is the main consideration when they analyze routing protocols for WSN. In this paper they present the study of different clustering based energy efficient routing protocols of wireless sensor networks and compared them on various parameters.

III. CONCLUSION AND FURTHER DEVELOPMENT

In current scenario wireless technology is going to utilize in all over the world for fast communication of the end user. The importance of the wireless sensor network in our daily life has been discussed in these papers, we have discussed the different types of the wireless sensor network and we have also discussed about the various clustering based WSN and the advantages of these technologies over the wired technology. We have also studied various papers related to above topic.

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