ECONOMICAL ANALYSIS OF DD-LEACH, TL-LEACH AND LEACH PROTOCOL

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ABSTRACT

Wireless sensor networks (WSN's) depend on different asset obliged nodes with restricted vitality, range, memory and computational power it is important to monitor battery vitality in order to amplify the life time of the given WSN deployment. In any WSN application measured information is accumulated at standard interims and the same is sent to the Base station (BS) by utilizing neighbouring nodes. The basic LEACH based data aggregation approach is extended further for improved energy efficiency. This work deal with two different second-level hierarchical protocols, namely, Two-level LEACH(TL-LEACH) and Directed Diffusion LEACH (DD-LEACH) and a comparison of the same.

Keywords: Leach, DD-Leach, TL-Leach

I.INTRODUCTION

Wireless Sensor Networks (WSN's) are being composed of tiny sensors with limited energy. The responsibility of delivering packets and implementing is done by network layer. Network organization roughly divided into four main categories: Hierarchical routing, Flat routing, Data Centric and Tree Based protocols. PEGASIS is the most energy efficient tree-based protocol. In Hierarchical based routing, a particular region are viewed as a system rather than individual nodes of sensor nodes. Rumor routing techniques come under tree based approach in terms of energy efficiency, they lag behind PEGASIS model. A research in WSNs has concentrated on creating routing protocols which should be energy efficient. It is a tremendous challenge to design routing protocols for applications of WSNs, which are mobility centric and energy efficient; because of network topology is often being changed. The clustering concept offers more benefit than the other flat based routing protocols .Hierarchical routing protocols have greater scalability and being more energy-aware WSNs. Nodes play various roles in the network and arranged into clusters in the hierarchical-based routing. The sensor nodes in a network organized themselves into groups in relation or metrics is known as clustering. Each cluster/group has a leader known as a cluster head (CH) and other member nodes (MNs) that are ordinary. The cluster heads can be arranged into hierarchical levels. A Flat routing protocol it locates a path to the sink, hop by hop, making use of flooding, when a node needs to transmit data. In

TRUPTI GHATIKAR, SHWETHA

networks that transmit data are relatively small, flat routing protocols are effective And they do not scale to large and dense networks.LEACH (Low Energy Adaptive Clustering Hierarchy) is proposed by W.B.Heinzeman. It uses single hop routing. It transmits the data directly to the CH.(cluster head). a hierarchical protocol it divides the network into cluster . Each cluster has an elected sensor node which act as cluster Head. The cluster head node is responsible for managing communication among member nodes of the cluster. LEACH was proposed for communication of holes arguments.The major types of communication holes are energy and routing holes.The energy hole problem is a key factor in WSN it disturbs the lifetime of network.The basic LEACH is based on data aggregation approach which is extended further for improvement of energy efficiency. The work deal with two differentsecond-level hierarchical protocols, namely, Two-level LEACH(TL-LEACH) and Directed Diffusion LEACH (DD-LEACH).LEACH protocol architecture is used is a single-hop protocol it's all sensors can pass on their input directly to sink for wider applicability, hierarchical clustering can be used by forming hierarchical clusters It will help the users achieving scalability and saving a energy. In case of massive WSNs, the number of levels used in the hierarchical implementation of LEACH protocol can be increased. The technique of forming hierarchical clusters is effective in system lifetime. The number of improvements on LEACH protocol has been taken up by many researchers that is, multi-hop LEACH that introduces multi-hop transmission of information between the cluster-head nodes and their sink. To eliminate the need of long distance transmission by cluster head node the hierarchical designs of LEACH and LEACH-DD protocol have been developed. First cluster heads are selected and then second out of these cluster heads some super cluster heads are selected which processes the data received from cluster heads. At the top level, super clusters are formed having super cluster head nodes. These super cluster head nodes are receiving the sensed data being gathered by cluster head nodes and transmitted the aggregated data finally to the base station (BS). An improve in the overall energy efficiency of the network.(Hybrid multi-hop LEACH). A computer simulation was employed to obtain the results.

1.1 Directed Diffusion Leach (DD-LEACH)

Data generated by nodes is represented by its <ATTRIBUTE • VALUE>tuple. The user's query is passing from the BS to each of the nodes in the WSN. Directed diffusion consists of several elements: interests, data messages, gradients, and reinforcements.
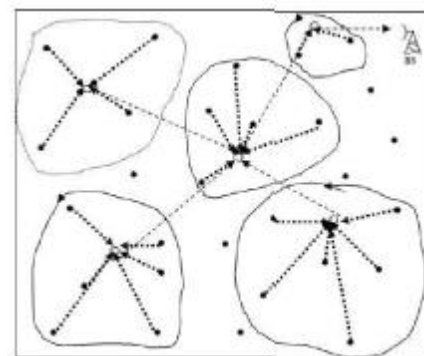

Fig 1.1:Network Topology for DD-Leach protocol

1.2 Two - Level Leach (TL-LEACH)

In LEACH, the BS is directly connected to every CH node needs to communicate. Only very few CH nodes can be in close proximity to the BS. nodes need to increase The power levels so as to reach the BS causing further energy drain. In order to extend the lifetime of the WSN, it is need to reduce the number of nodes communicating to the BS directly.
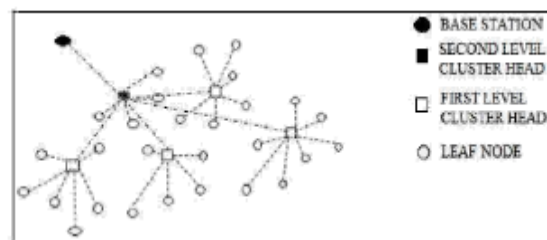

Fig 1.2: Two level hierarchical Comparison

II.LITERATURE SURVEY

David Braginsky and Debora ah Estrin[1]: describes the establishing a global coordinate system for geographic routing. There is need for delivering queries to events in the network, and large costs associated with both flooding the query. The Rumor

Routingalgorithm gives a good method for delivering queries to events in large networks under a wide range of requirements. a geographic structure exists in the data, geographic coordinates and geographical routing can be used effectively to reduce interest and data propagation of the overhead.

O. Younis and S. Fahmy. Heed [2]:paper builds on the work by giving detailed description and analysis of low-energy adaptive clustering hierarchy (LEACH), an application-specific protocol architecture for wireless micro sensor networks. LEACH employs the techniques to achieve the design goals randomized, adaptive, self-configuring cluster formation of the node.

M. Yu, J.H. Li, and R. Levy [3]:describes the design of several types of sensor network protocols can be done by the clustering method requires efficiency of the nodes energy, scalability of protocol, long network lifetime, and load balancing the a protocol is providing single cluster layer, recursive application protocol uses the bottom-up cluster formation which achieved for multi-level hierarchies Currently checking cluster size and multi-hop power-awarerouting model for sensor networks.

Tiago Camilo, Jorge S Silva, O Boavida[4]: accessing the use of adhoc routing protocols in mobile WSN.proposed efficient clustering algorithm that works with mobility of nodes time leads to energy efficiency. algorithm termed as fast and easy , it has good performance which generates non-overlapping clusters, method is applicable to multi-hop wireless networks.

ChalermekIntanagonwiwat, Ramesh Govindan and DeboahEsin[5]:explains integrate mobility into WSN is delegating someone all the sensors and collect their data. The main advantage of architecture is the dramatic gain in energy consumption, since there is no need to adopt a protocol that is responsible to forward the data from the excited sensor to the sink node. Each sensor only communicates with the responsible element of collecting the data, reducing the communication path to one unique hop.

Joanna Kulik, Wendi Heinzelm and haribalakrishna, [6]: Directed diffusion has the potential energy efficiency and robust and dissemination in dynamic sensor networks, the characteristic for minimizing the per node configuration.

III.EXISTING SYSTEM

Due to the energy constraints in sensor nodes, energy-efficient data aggregation protocols are used to save the node energy and enhance the network life cycle. Deploying additional sensor nodes in the network reduce the resource constraints but increase the rate of data redundancy.WSN are designed using infrastructure network and infrastructure less network. Infrastructure network gives the position and connectivity attributes of the sensor nodes, but lacks the flexibility in network design.Infrastructure less network system gives the flexibility in network design, but the position and connectivity attributes of the sensor nodes keep varying in the network.WSNs are constrained in energy and memory resources. Hence, energy-efficient protocols are the primary goal in the design of sensor networks.

IV.PROPOSED SYSTEM

The primary attributes considered in the design of data aggregation protocols are energy, latency, cluster size and data rate. In proposed system, we present a novel approach to classify the energy-efficient data aggregation protocols based on structure, search-based and time-based approaches. Analysis for structure-free, structure-based, distance and time-based data aggregation protocols are given in detail. Simulation results indicate that the energy and throughput rate are improved in the cluster-based data aggregation protocols as compared to the structure-free, time-based or search-based data aggregation protocols.Sensor networks are designed using tree-based, cluster-based and hybrid-based network topologies. In sensor network, the nodes are grouped into clusters. The Cluster Head (CH) node within each cluster controls andcoordinates thenodesand interacts with the neighboring CH nodes in the network.Energy conservation in sensor networks is based on duty cycle data-driven and mobility-based methods. Duty cycle methods use synchronous and asynchronous MAC protocols to

TRUPTI GHATIKAR, SHWETHA

save the node energy. Data driven methods use in-network processing, data aggregation and Hierarchical sampling methods to save the node energy. Mobility based methods use mobile sink nodes to collect data from the source node and save the node energy.

Data Rate – Data rates vary with respect to latency, network traffic conditions and heterogeneous nodes present in the network. Synchronization methods are used to increase the data transfer rates in the network.In cluster-based protocols, the conflicting clusters are assigned different time slots to transmit the data packets and avoid signal interference and collisions in the network.Simulation results indicate that the energy and throughput rate are improved in the cluster-based data aggregation protocols as compared to the structure-free, time-based or search-based data aggregation protocols.

CONCLUSION

Wireless sensor networks are important and in use in technology, due to it's range of applications. WSN is the only most suitable and easy way of doing. Routing is the main expensive operation for nodes energy consumption. This paper proposed new routing protocol known as LEACH . Our proposed DD-LEACH and TL-LEACH addresses energy efficiency. both LEACH protocols conserve energy through clustering the DD-LEACH has less energy consumed then the TL-LEACH but it has the increased latency . where the TL-LEACH can be used longer period o time where the time will not be elapsed.

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TRUPTI GHATIKAR, SHWETHA