

The Energy Efficient Approach for Data Aggregation in Wireless Sensor Networks Based on Sink Mobility

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Abstract - The wireless sensor is the decentralized and self configuring type of network in which no central controller is present. The sizes of the sensor nodes are very small and it is generally deployed on the far places due to which energy consumption is the major issue of wireless sensor networks. To reduce energy consumption of the wireless sensor network, whole network is divided into fixed size clusters and in each cluster, cluster heads are selected on the basis of energy and distance. Through productive network organization every one of the nodes in sensor network can be partitioned into little groups is called clusters. In every cluster has a cluster head and rest nodes are individual from that cluster. Clustering algorithms for wireless sensor networks can be further separated into two principle classifications depending on cluster formation criteria and parameters utilized for cluster head election. In this work, the multiple mobile sinks are deployed which aggregate data from the cluster heads and movement of the base station decided using bee colony algorithm. The simulation of proposed technique is performed in NS2 and results are analyzed in terms various parameters.

Keywords - Mobile sink, LEACH, Energy Efficient

I. INTRODUCTION

The recent enhancements made in the technology involving wireless sensor networks has provided great innovations within the applications that involve it such as the mechanical monitoring, traffic monitoring, cropping, etc. advance creative and productive thoughts are to be generated within this area such that their usage can be more helpful [1]. In the information routing, compression as well as network aggregation, various analyzed methods have been introduced in the recent years. The battery present within the nodes of WSN is of smaller size. Also the nodes are located at really far distances where human is not able to reach. So the major concern within the WSNs is the usage of battery within them. This also affects the overall lifetime of the nodes and thus the deployment of the network [2]. The sizes of various constraints such as battery size, processors, information storing memory and so on are important within these networks [3]. The consumption of energy is required to be advanced

within the networks with the help of various optimization algorithms. Various time constraints are present within the detected and routing information sent across the WSNs. Before any alterations, the information can be utilized by the network. For communicating the information across the network, the energy consumed is more as compared to the other executions. Thus, it is very important to address the energy conservation issue in the WSNs. For sparing the energy of sensor nodes one of the clustering methodology is utilized [4]. Through productive network organization every one of the nodes in sensor network can be partitioned into little groups is called clusters. In every cluster has a cluster head and rest nodes are individual from that cluster. Clustering results in a two-level order in which cluster heads shape the higher level while part nodes frame the lower level. The clustering includes grouping nodes into clusters and choosing cluster heads periodically such that individuals from a cluster can speak with their cluster heads and these cluster heads send aggregated data received from its individuals to a base station. Since the cluster head regularly transmit data over longer separations, they lose more energy compared to part nodes. The clustering procedure is utilized to minimize the energy consumption [5]. By utilizing clustering, it reduces the packet collision and channel contention it increases the network throughput under high load. Clustering enhance the network lifetime of the sensor networks. Lifetime is the essential element to assessing the execution of the sensor networks. Before clustering formation, the clustering algorithms fulfill all conditions for clustering which are necessary for clustering in wireless sensor networks. There are some parameters which are important for whole clustering processor in WSNs, it give more detail about clustering formation. LEACH protocol has some problems in contrast to plane multi -hop routing and static routing, because it prolongs the network lifetime. In this protocol the cluster head is selected randomly, so all the nodes cannot be cluster head [6]. The distribution of cluster heads cannot be ensured. In the cluster all the nodes have same priority to become a cluster head with high or low energy. Therefore, those nodes with less remaining energy may be chosen as the cluster heads which will result that these nodes may die first. RFID (Radio Frequency Identification) is a contactless automatic

identification expertise that is based on radio frequency [7]. There are typically two sorts of RFID according to the power source: active RFID and passive RFID. Active RFID is less advantageous than passive RFID in terms of its tag cost, size, and battery management, but more advantages in term of sensing nature, its nature, sensing rate and sensing distance. RFID is produced so that physical information can be stored and detected for a long time to enhance nature of the framework in addition of fundamental functions.

II. LITERATURE REVIEW

Chae-Seok Lee et al. [8], proposed Reservation Aloha for No Overhearing that is utilized to inform the tag of its viable communication for eliminate overhearing issue .extensive of energy is reduced because of overhearing is ordinarily bigger than consumed powerful communication .to eliminate this issue creator reason calculation (RANO). A tag has information about the time and duration of communication advance since it maintain active mode for kept the sleep mode because of other transmission period. RANO Protocol spare the 60 times energy than another protocol. LI Jian-qi et al. [9], proposed enhanced clustering routing calculation which need to energy efficiency. To begin with, generate cluster head by random competition in the nodes which have advantage in energy; next determine the internal structure of clusters by calculating dynamically snugness coefficient of every cluster, after that, upgrade transmission path between cluster heads through enhanced multi-objective particle swarm calculation. Yu Wang et al. [10], proposed energy productive and delay tolerant cooperative transmission calculation which demonstrate simulations approve that EDTCT outperforms the store-hold up forward way regardless of in E2E sleep dormancy and E2E energy consumption. Specifically, our plan is adaptive to thick network and it works effectively in low-obligation cycled WSNs. Degan Zhang et al. [11], proposed a technique forward aware component (FAF-EBRM).this strategy is utilized for the following hop node chose according to the forward energy thickness and link weight .The FAF-EBRM compared with LEACH and EEUC. The proposed technique adjusts the energy reduction, function lifetime and give great nature of service and reduces the likelihood of progressive node breakdown. Nicolas Gouvy et al. [12], proposed PAMAL (PATH MERGING ALGORITHM) new topographies routing calculation for mobile node .the proposed first routing protocol which is found and uses paths crossing to adapt the topology to reduce the network traffic thusly while still upgrade energy efficiency. The protocol makes the intersection to move far from the destination, getting nearer to the sources, allowing higher data aggregation and energy saving. It enhances the network life time 37% than exiting. Peyman Neamatollahi et al. [13], proposed a half and half clustering approach a cluster

head reduce of its energy, it indirectly informs every other node and clustering is accustomed to beginning of the upcoming round. Clustering is performed on demand. To elaborate the efficiency of proposition, the distributed clustering protocol HEED (Hybrid Energy Efficient Distributed) half and half clustering calculation is utilized as baseline case. Through simulation results, it demonstrates that HCA is roughly 30% more proficient in terms of network lifetime than the other protocol. The main reason is that the clustering is executed on demand.

III. RESEARCH METHODOLOGY

The proposed methodology is represented in a diagrammatic form and described properly below.

Following are the various steps to be followed in this research work:

- i. The wireless sensor network is deployed with the finite number of sensor nodes and deployed network is divided into fixed size clusters using location based clustering.
- ii. The cluster head is selected in each clustering using the technique of LEACH protocol in which node which has maximum energy and least distance to the other nodes is selected as the cluster head. The other nodes in the cluster will aggregate its data to the cluster head.
- iii. The coordinates of the sink is defined as the initial population for the sink movement. The sink will check the signal strength and change its location of the basis of initial population and aggregate the data from where it gets maximum data.
- iv. This step 3 is repeated until required data get aggregated to base station

IV. EXPERIMENTAL RESULTS

The proposed work is implemented in NS2 and the results are evaluated by making comparisons against proposed and existing work in terms of several parameters.

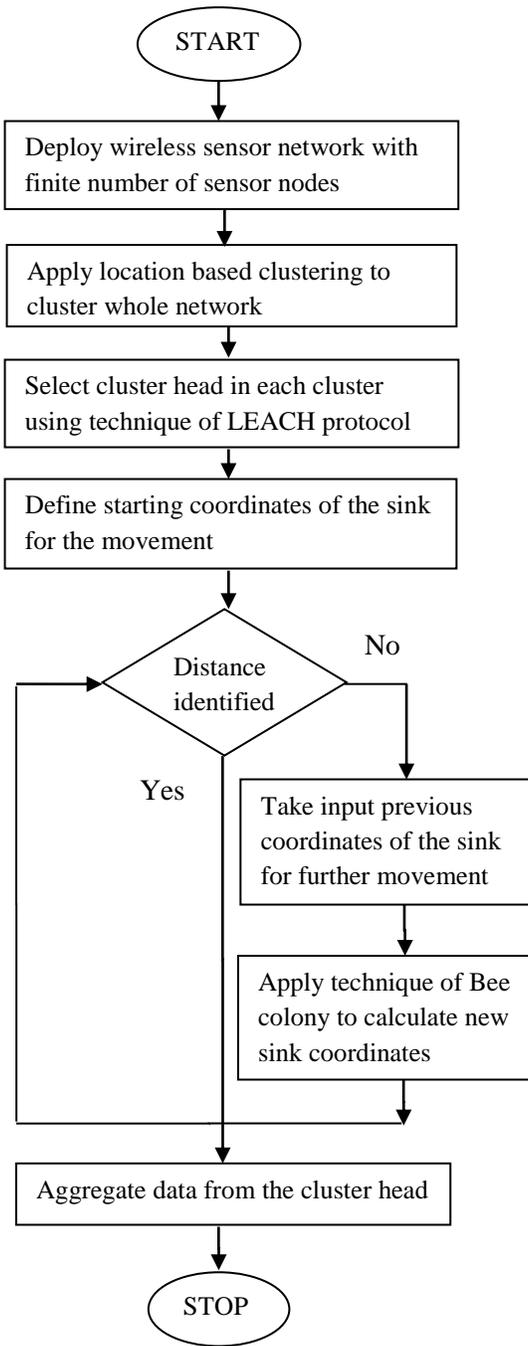


Figure 1: Flowchart of proposed work

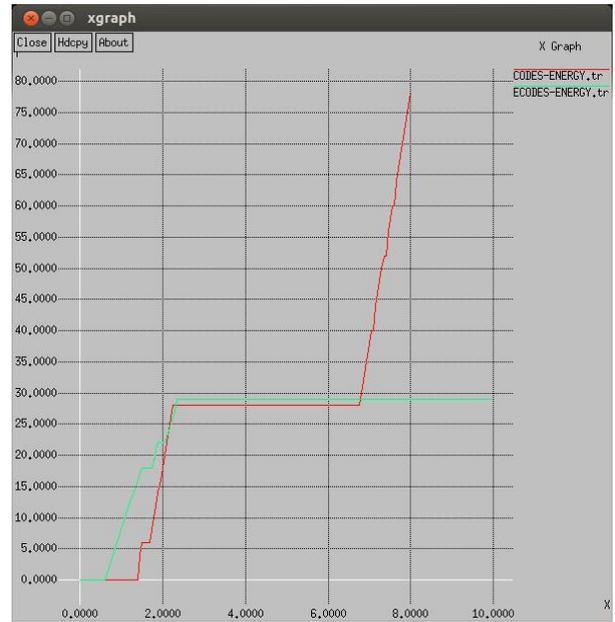


Fig 2: Energy Comparison

As shown in figure 2, the existing and proposed scenario is compared in terms of energy consumption. In the energy graph it is shown that in the proposed scenario is less due to multiple sink deployment in the network.

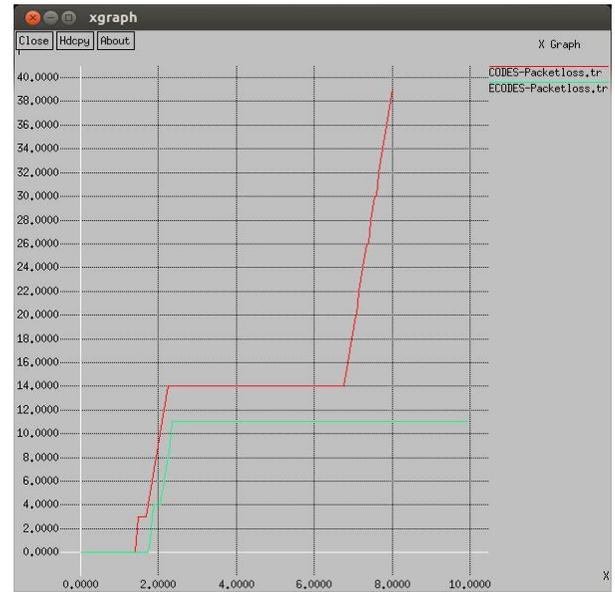


Fig 3: Packet loss Graph

As shown in figure 3, the packet loss of the proposed and existing scenario is compared. Due to sink base station packet

loss is more and when multiple sinks are deployed in the network packet loss is reduced at steady rate in the network.

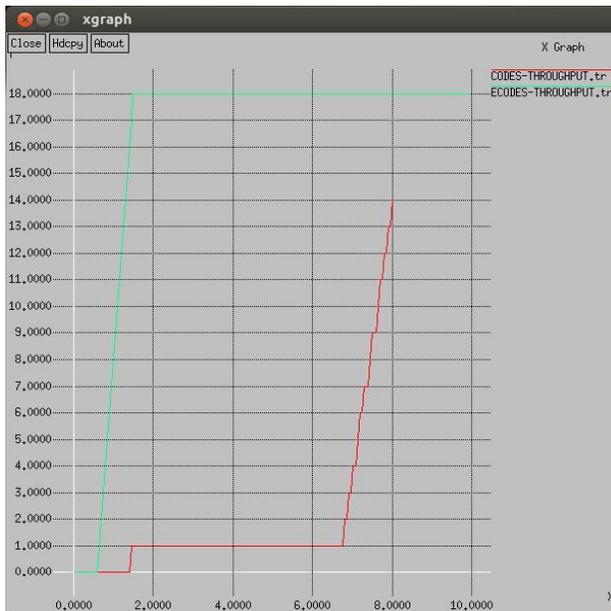


Fig 4: Throughput comparison

As shown in figure 4, the network throughput of the proposed and existing scenario is compared and it is been analyzed that network throughput is increased at steady rate due to multiple sink deployment in the network.

V. CONCLUSION

The aim of the thesis is to develop an energy efficient and .This work aims to identify the performance of existing single sink mobile technique to reduce energy consumption of the wireless sensor network. To do multiple sinks mobile technique of signal strength and bio-inspired technique to move sinks from one location to another. To improve performance of LEACH protocol for data gathering by deploying multiple sinks. The movements of the sinks are depending upon the signal strength and bee colony algorithm. By using the proposed technique performance of LEACH protocol is increased. The performance of LEACH protocol is improved by deploying multiple sinks and movement of the sinks are decided using bee colony. By Applying bee colony with LEACH protocol for multiple sink movement various energy parameters are analyzed and compared with existing algorithm. It is seen that energy consumption of the network is reduced and network is performance is increased. The improvement leads to batter data gathering from cluster heads and throughput of the network increased.

VI. REFERENCES

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