A Technique to improve the performance of Wireless Sensor Network using Coordinate based Mobile Sink

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Abstract: The wireless sensor networks are the self configuring and decentralized type of network. In this type of network sensor nodes sense environmental conditions like temperature, pressure etc. The various techniques are proposed so far to reduce energy consumption of wireless sensor network. Among these proposed technique mobile sink is the efficient technique of energy efficiency. In this work, mobile sink technique is improved in which multiple sinks are deployed in the network. In this work, multiple sink gather network data from the cluster heads. The simulation result shows the network energy consumption, packet loss is reduced, network throughput is increased at steady rate.

Keywords: Mobile sink, LEACH, Base station, clustering, Cluster head, AODV

I. INTRODUCTION

Today with the expansion in innovation, remote sensor systems are creating with new redesigns. The one of a kind properties of these systems have made their inclusion exceptionally normal in verging on each field. The remote planning of the conventions has turned out to be extremely because of the association of remote sensor systems. There is utilization of a fine vitality spending plan in these systems. The inclusions of high hub densities have given the office of making the framework extremely tremendous[14]. The remote sensor systems comprise of various little hubs which are additionally called as vitality asset obliged sensor hubs. They are also called Clusters [1]. The correspondence of these hubs should be possible remotely. There is likewise the handling of sign errands which is done through the different computational assets gave by the systems. There are considerable measures of sensor hubs accessible in a remote sensor system [12]. In clustering, the measure of the system is not settled. The sensor hubs accessible in the system depend on how the system is built and for what purposes it is developed. In regions, for example, military fields and other remote zones, the remote systems have been spreading a considerable measure throughout the years. The natural checking of all such fields has been popular. The systems have a considerable measure of sensor hubs connected inside one single range. The battery driving is connected to all these systems for the accessibility of the systems at all times. Likewise it is unrealistic to charge the batteries of such a large number of hubs in the systems. Along these lines, different procedures have been creating to give the vitality utilization of hubs in a simple way. The grouping procedure has turned out to be much proficient technique in sparing vitality. The procedure of picking the ways along which the system movement is to be sent is known as the steering procedure.

Various protocols are used in the networks. A responsive separation vector directing convention named as Ad-hoc On Demand Distance Vector (AODV) is utilized for deciding the courses. The K implies calculation and the AODV convention are included to frame K-AODV directing convention. The steering happens in the middle of the group head and the individuals. The aberrant correspondence between the base station and the group individuals is finished. A multi-jump correspondence strategy is taken after if the base station is a long way from the group head. The parcels are exchanged starting with one bunch head, then onto the next as per the separation. Which bunch has less separation to be secured is favored. At that point the data is sent to the base station ahead. Through this procedure the parcels achieve the base station. The data sent to the base station is required for the investigation. The K_AODV steering convention improves the exhibitions of the effectively existing convention procedures. The LEACH convention gives irregular turn of the bunch heads through the system [6]. Through this approach, the battery of the considerable number of hubs is spared. Battery of no single hub gets drained. HEED is a multi-bounce bunching calculation which is utilized for the proper choice of the group heads in the remote sensor systems. This is done on the premise of the physical separation between the hubs. TEEN is a crossover of the various leveled bunching and also information driven conventions. These conventions are utilized where the time-basic applications are accessible. At the point when there are quick changes saw in the system ,these conventions are responsive [15]. EECS the applicants give their lingering vitality subtle elements to their neighboring competitors, on which calculation of the

choice depends. In the event that any hub is such that it doesn't discover more leftover vitality than its own, it is chosen as the group head [10].

In LEACH, the choice of group head is done on the premise of the determination of hubs which have minimum separation from their bunch heads. Here EECS gives the plan of figuring the separation of the groups from the base station. PEGASIS is an ideal chain-based and information gathering calculation. The idea of this calculation is that the change of vitality should be possible shape the hubs and not straightforwardly from the bunch [15]. A chain structure is shaped which comprises of the considerable number of hubs and the information collection is done all through the chain.

A. Objectives

Main objectives of the study are:

- To study and analyze various sink techniques for WSN.
- To propose an improvement in data aggregation based technique for mobile sink.
- The proposed technique will be based on biological technique for mobile sink.
- . To implement and compare existing technique with proposed technique in terms of energy, throughput, efficiency.

B. Problem Statement

Hot spots formed near the sink which causes major problems in wireless sensor network. The other problem in the wireless sensor network is the formation of energy holes.

Sensor node near the sink depletes energy at faster rate than other sensor nodes because that node forward all the data generated by other nodes which are far away from the sink. Therefore that node near to the sink dies faster than others. Result of faster dyeing of sensor node near to the sink decreases the lifetime of network. Scheduling of duty cycle is designed for sensor nodes with the help of which some sensors are put itself in sleep mode to save energy. During putting itself into sleep mode, sensing job of other sensors does not affect.

Battery energy of sensor nodes is balanced by using various routing algorithms. Energy of sensor nodes is saved by using mobile sensors by adjusting their locations. This would help to increase the lifetime of the network.

II. LITERATURE REVIEW

ZhangBing Zhou, et al,"An Energy-Balanced Heuristic for Mobile Sink Scheduling in Hybrid WSNs", 2015 IEEE

The study in this paper proposed a three-phase energy-balanced heuristic. The network region is firstly divided into grid cells with the same geographical size. These grid cells are assigned to clusters through an algorithm inspired by the k-dimensional tree algorithm, such that the energy consumptionof each cluster is similar when gathering data. These clusters are adjusted by (de)allocating grid cells contained in these clusters, while considering the energy consumption of sink movement.

Mobile sinks are similar in energy consumption for both data gathering and sink movement. Consequently, the network lifetime is prolonged[1].

Yulong Zou, et al**,"** Intercept Behavior Analysis of Industrial Wireless Sensor Networks in the Presence of Eavesdropping Attack", 2015The study in this paper includes the breaking down of remote sensor systems while listening stealthily assailants are included. These systems comprise of various sink hubs and also sink hub [2]. The data which is detected by the sensors put in the district is sent to the sink hub by means of remote connections. The mystery limit corrupts on an abnormal state in the commercial ventures because of the nearness of the metallic erosions and hardware obstructions present in these situations. A sensor that contains most noteworthy mystery level is incorporated into the sensor system through the ideal sensor booking strategy. This is utilized for the insurance of remote transmission from the listening in assaults. This hub with most astounding mystery level sends the data to the sink. For giving round-robin booking some shut structure expressions are executed by the likelihood of event of a capture occasion.

Fangxin Chen, et al," A survey on Energy Management in Wireless Sensor Networks," 2012 The survival of a system is absolutely reliant of the lifetime which is the length of the vitality manages in the systems administration hubs. The issue that has been worried in remote sensor systems is the preservation of vitality to expand the lifetime of a system [5]. In this article, there is a legitimate correlation between every one of the strategies that have been advanced for the preservation of the vitality. The strategies are mostly identified with supplying the vitality and sparing the accessible vitality. The vitality is expended all through the procedure from different hubs. There are numerous emerging methods that have been going for monitoring the vitality of the hubs. The protection of vitality as assignment has thought of strategies that can exhaust alternate components moreover. As per the elements that are predominantly required in various fields, the procedures are received.

Moshaddique Al Ameen et al," Security and Privacy Issues in Wireless Sensor Networks for Healthcare Applications", 2010 There is expansion being used of the remote systems in medicinal services fields. In methods that include heart rate and pulse observing and numerous others, there has been use of remote systems. Remote Body Area Networks (RBAN) has been created for the ranges which have developing utilization of the sensor innovation. The most

concerning territory of the remote systems are the security and protection of the systems [11]. The digital law standards ought to be required in the framework and appropriate consideration ought to be taken of them for giving better results.

Chi-Tsun Cheng, et al**,"** A Delay-Aware Data Collection Network Structure for Wireless Sensor Networks", 2010 There are a great deal of sensor hubs set in the system for the get-together of information from certain area. The remote sensor hubs use batteries for staying alive. For giving most extreme lifetime to the hubs, least measure of vitality utilization turns into a concerning variable. This will augment the lifetime of a sensor hub. There are numerous systems being advanced for sparing vitality in the remote sensor systems. Here another methodology known as postponement complete information accumulation methodology is proposed [7]. The postponement in the information accumulation in a system is to be maintained a strategic distance from through this methodology.

Xiaofeng Han, et al," Fault-Tolerant Relay Node Placement in Heterogeneous Wireless Sensor Networks", 2010 There is commonly a need to place transfer hubs in the system for enhancing the system availability in remote sensor systems. In these sorts of systems the sensor hubs comprise of various transmission radii [8]. A fractional adaptation to internal failure transfer hub is set up for the organization of least number of hand-off hubs. Between each pair of sensor hubs, a vertex disjoint way is built up. There are additionally present two diverse sorts of ways for correspondence which are found because of the distinctive transmission radii present. There are two-ways which have remote interchanges are available in both the bearings and single-route ways in which stand out way ways are found.

Euisin Lee, et al," Communication Model and Protocol based on Multiple Static Sinksfor Supporting Mobile Users in Wireless Sensor Networks", 2010 A remote sensor system contains clients, sinks and various sink hubs inside it. The clients use legacy systems for social event data from the sinks. Here, there is an association between the different static sinks and the legacy systems [9]. There is a division of the sensor field into various numerous sinks. There is a sharing of information and questions through the legacy systems. High throughput is given by the various sinks by dispersed information gathering alongside low inactivity by giving short-bounces to conveying information. The remote clients get the information through the legacy system by means of numerous static sinks. Amassed information is gotten by the versatile client through the closest static sink when the client moves around. As for the vitality utilization, information conveyance proportion and defer elements this strategy has demonstrated preferable results over the effectively accessible methods.

III. MOBILE SINK NODES

As there is expansion sought after of the substantial remote systems, there is a need to grow new designs. For guaranteeing that, there is accessibility of remote systems in the fields that are intrigued, there is a need to enhance the effectively existing instruments which can deal with the developing number of hubs. The vitality utilization of these hubs ought to likewise be less in light of the fact that this is additionally an essential component which impacts the determination of system. The majority of the systems are constrained to taking care of just little number of hubs and are very little adaptable. There can be the utilization of various portable base stations in the bigger systems which can be connected as an answer for such issues. They ought to be set inside the detected zone for successful results [13].

Another system has been advanced which includes the Mobile Sink Based Reliable and Energy Data Gathering for the WSNs. Because of a few snags, the development of a sink can come to end. Because of this reason the sink moves in an arbitrary way. Once in a while, the sink doesn't know about the topology of the system as it changes haphazardly. So for the estimation of the following position of the sink, a one-sided irregular walk model is utilized. At the point when the estimation of the ideal way is trailed by the strategy, a transmission system is advanced, which is dependable when contrasted with the other proposed procedures [3]. The dependability of the hubs can likewise be ascertained through this technique. In the event that there is huge number of lost parcels in a specific zone of the specific system, the interruption time increments. This declines the dependability of the framework. The quantity of lost parcels can be ascertained by the deciphering period of the information.

While adjusting the workload of the mixture WSNs, the booking method required ought to be productive. The system life time ought to be delayed. There are no openings in the district which is to be observed furthermore comprises of static sensors. A gap and vanquish hypothesis in utilized for this circumstance. There are various strides which are to be followed in this strategy [4]. The area that is to be checked is broken into lattice cells which have the size relative to the correspondence range of the sensors. The span of the lattice cells are same however they contrast in the quantity of static sensors they have. Because of this reason there may be a distinction in the measure of vitality that is required to accumulate information from the system through portable sinks. The matrix cells are separated into various framework cells because of such reasons.

IV. PROPOSED TECHNIQUE

The proposed methodology will be based on sink relocation in wireless sensor to increase lifetime of the

networks. The whole network will be divided into fixed size clusters and in each cluster heads will be selected. The data of nodes in cluster will be aggregate data to its cluster head. The proposed technique will be based on some assumptions. Under first assumption, sink knows location of all sensor nodes. The sink will move to cluster head where it wants to take data and it will get location from the stored location of cluster head. The Sink node will adjust its location according to signal strength. The locations get its best position when maximum numbers of cluster heads are in the range of sink. In this work, we will propose the equation that will calculate signal strength of them and to judge that how many cluster heads are in the range of sink. The movement of sink will be decided using technique of bee colony optimization.

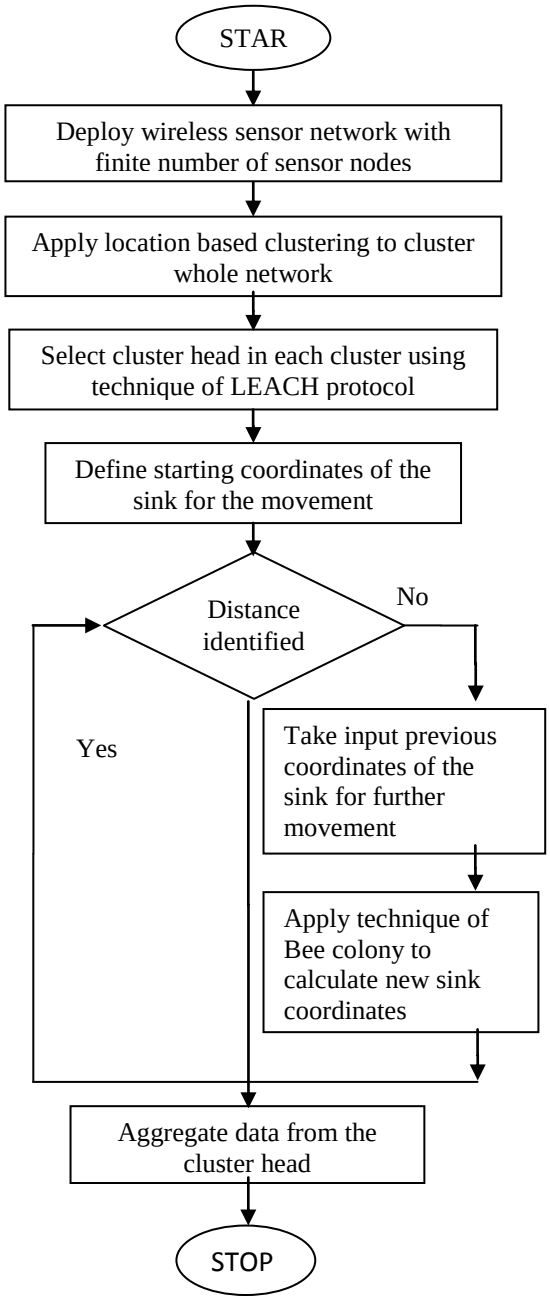

Fig 1: Flowchart of proposed technique

V. RESULTS

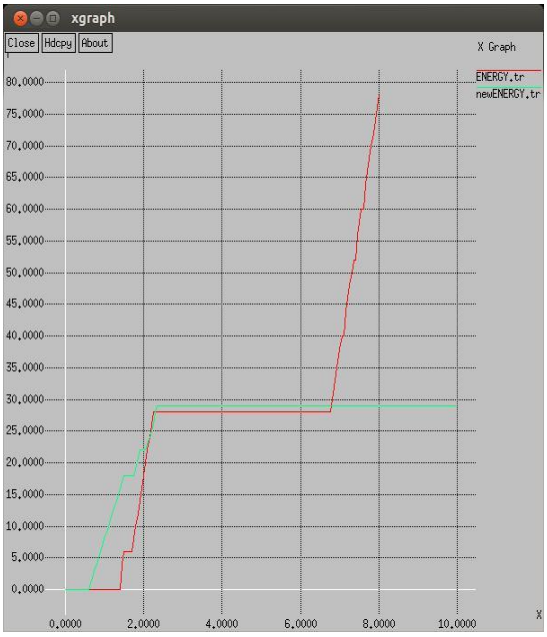

Fig 1: Energy Comparison

As shown in figure 1, the existing and proposed scenario is compared in terms of energy consumption. In the energy graph it is shown that in the proposed scenario, Energy Consumption is less due to multiple sink deployment in the network

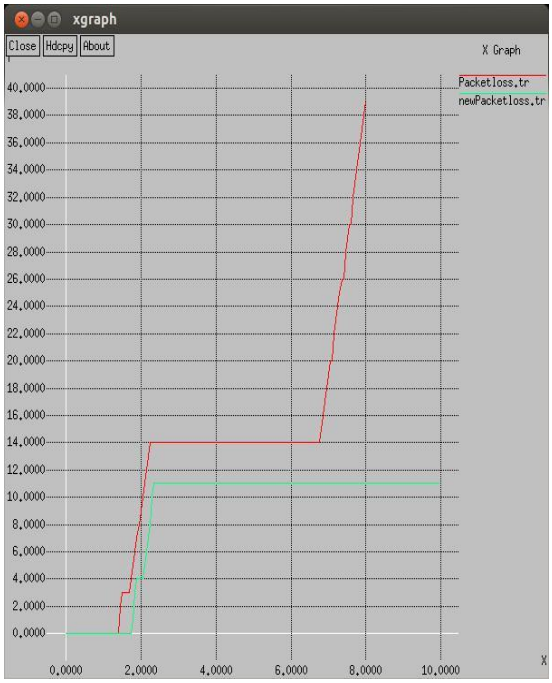

Fig 2: Packet loss Graph

As shown in figure 2, 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.

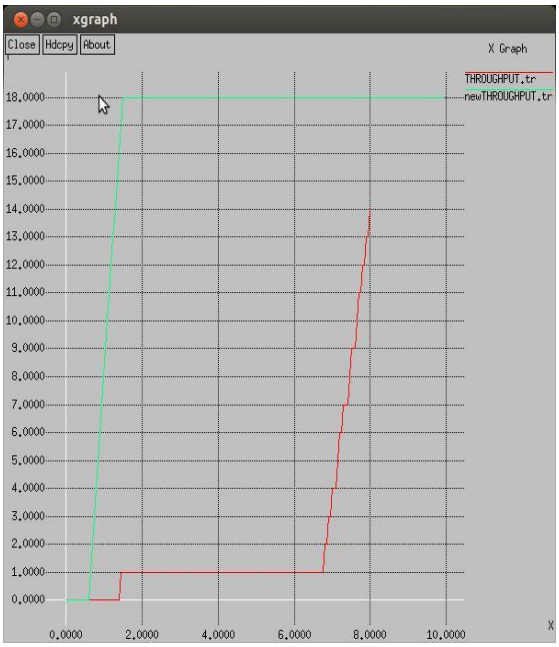

Fig 3: Throughput comparison

As shown in figure 3, 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.

VI. CONCLUSION

The wireless sensor network is the type of network which is used to sense environmental conditions. The whole network is divided into fixed size clusters and in each cluster, cluster heads are selected on the basis of LEACH protocol.

In this work, multiple mobile sinks are deployed in the network which gather network data from cluster heads. The performance of the network is analyzed in terms of throughput, energy and packet loss.

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