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Mobile Data Gathering and Dual Data Uploading Using Gateways

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Abstract: In this paper, we are going to propose a three-layer framework for mobile data collection in wireless sensor networks, which includes the sensor layer, cluster head layer, and Data Collector layer. The framework employs distributed load balanced clustering and dual data uploading. The objective is to achieve good scalability, long network lifetime and low data collection latency. At the sensor layer, a distributed load balanced clustering (LBC) algorithm is proposed for sensors to self-organize themselves into clusters. We are going to use clustering algorithm which uses two cluster heads which supports dual data uploading. In the cluster head layer we are going to select two cluster heads and transmit the data to the Data collector layer, which is responsible for sending the data to the base station using gateways. The simulation results show the performance of the system.

Keywords: Data Collection, Clustering, Load Balancing.

I. INTRODUCTION

Remote Sensor Networks (WSN) is the procedure where in we convey the hubs arbitrarily in a specific limit and gather the information stastistic of that specific spot. Here in this anticipate we are sending sure number of hubs in the system artist utilizing the NS2 instrument. We characterize the limit of the hubs inside which the hubs are haphazardly scattered. Here in our venture we are utilizing wsn to exchange the information from every sensor to the sink. Sink is the one which accumulates or contains every one of the information which is sent by the hubs conveyed in a specific limit. There are different methods for social occasion information, to be specific, hand-off steering techniques, bunch head development, versatile sensors, and so forth. In this paper we are making utilization of hub hand-off steering, group head and the portals to exchange the information to the sinks from the sensors. Portable information social event is the procedure of get-together the information from the different scattered hubs or sensors. To outline, let us take up a situation where in we convey certain number of hub in a timberland keeping in mind the end goal to assemble data of the environment. Once the information are gathered by the sensors, we have to assemble the information from every sensor into a specific point where we can investigate the information. Thus, we have to accumulate the information.

Double information transferring is the strategy to exchanging the information. We make utilization of two recieving wires/omni reception apparatuses where in the information can be transferred at the same time, by doing this we can transfer the information parallel from the sensors to the bunch head. The upside of this is we can diminish the measure of time expended in social occasion the information.

Load adjusted grouping is another procedure through which we can productively exchange the information to the sink. In this, we will make bunches taking into account the extent indicated. Presently in every group we are going to pick two bunch heads. In the past papers, one and only group head would be picked. Subsequently the general obligations of that specific bunch were set on single group head. In opposite, we have proposed a strategy where in we are going to pick two bunch head inside every group. In this manner by doing this, when the work load on a specific bunch head is more, it will be taken up or exchanged to another group head. The consequence of this is we can keep up the vitality levels of group head, which thus builds the productivity and versatility component. The group head is picked in view of the vitality level of sensors. The sensors with the most noteworthy energies will be chosen as the group head.

Entryway is the basic hub which is available in the middle of the way of group head and the sink. By making utilization of passages we can decrease time contrasted with the instance of portable gatherer, which devours time to go to every single bunch head to gather information.

In conclusion, in this paper we are utilizing a 3 layered model design which is proficient method for social affair the information.

Objective

The goal is to accomplish

1) great adaptability: As we are making utilization of two group head in this proposed framework, when the quantity of hubs builds, the framework can deal with the heap.
2) Long system lifetime: By partitioning the entire conveyed into groups and picking two bunch heads helps us to build the longitivity of system vitality.

Low information gathering idleness, ease and low powers are alternate elements which are accomplished in this paper.

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II. RELATED WORK

A. Data collection techniques

The information accumulation method is utilized to gather the total information from the sensor hub to the sink hub. The fundamental goal of the information gathering procedure is to diminish the deferral and enhances the system's lifetime. There are different strategies used to gather the information from source hub to sink hub. To begin with, every one of the sensors are static and afterward the system is considered as static system. The static sensor hub advances the information to the sink by one or more bounces [3]. Thus, the sensor found closer to the sink gets drained soon. Second, the chain of command type of information gathering. The hubs can be arranged into lower layer and higher layer. The hubs in the lower level layers are homogenous sensor hubs. The hubs in the higher layer are more intense than the hubs in the lower layer. The higher layer hubs are called as group heads. The progressive system topology is likewise called as groups. Third, Mobile Collector is utilized to gather the information occasionally. A versatile information onlooker is utilized to gather the information powerfully. The hubs that can be found nearer to the information onlooker can transfer the information specifically. The hubs that can be situated far from the spectator can forward the information by handing-off [3]. Single Hop Data Gathering issue (SHDGP) and portable Data Gathering are the two methodologies that can be utilized to build the lifetime of the system. Single Hop Data Gathering Problem (SHDGP) is utilized to accomplish the uniform vitality utilization. The portable Data Gathering calculation is utilized to locate the negligible arrangement of focuses in the sensor system. It serves as information get-together focuses for portable hub. A. Single Hop Data Gathering Problem (SHDGP) A Mobile information Collector can be spoken to as MCollector. M-Collector is a gadget outfitted with intense handset and high battery power. It gathers the information straightforwardly from the sensor hub while it meanders in the detecting field. By diminishing the visit length of the M-gatherer, the lifetime of the sensor system can be drawn out. The M-gatherer visits the information in the transmission scope of every sensor, keeping in mind the end goal to locate the briefest moving visit. The sensor hubs speak to the surveying focuses or the hubs in one-jump scope of M-authority (see Fig. 1).

By accepting that the M-authority moves at altered rate, then the time utilization of the M-gatherer can be generally assessed by utilizing the visit length. On the off chance that the M-gatherer goes in the most brief way, it comes about the information accumulation in most limited time. Along these lines, the clients can gather the a la mode information. This issue is alluded as the single bounce information gathering issue, or SHDGP. The area of each sensor hub can went to one by one by utilizing the M-gatherer. The issue is lessened to Traveling Salesman Problem (TSP) [5]. The principle goal of the TSP is to locate the most brief separation (cost) visit that visits each hub in the system atleast once. The sensors with settled transmission force are conveyed in vast region that can be utilized as a part of utilizations, for example, war zone observation and environment checking.

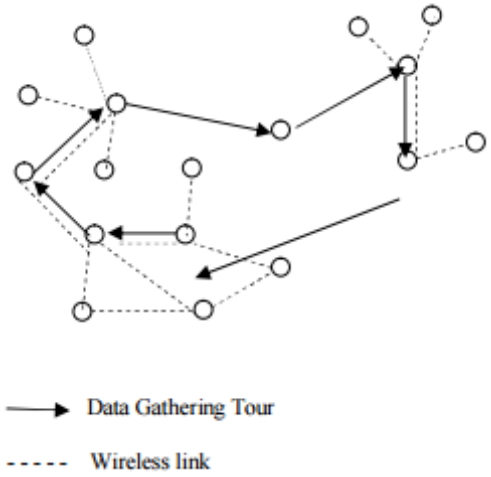

Figure 1: Mobile Data Collection in Single Hop

The sensor hubs that survey the information straightforwardly to the Mcollector in single bounce are called as Polling Points [1] [2]. The surveying point transmits every one of the information in its transmission range. M-gatherer after gathers the surveyed information from the surveying point, it moves to the following surveying point. The M-authority must cross all the surveying focuses in the system lastly achieves the static information sink. For instance, consider an arrangement of surveying focuses as P = {p1, p2, p3 … pn} and static information sink as S. The visit length of the Mcollector can be meant as S → p1 → p2 → p3 → … . → pn → S. The issue is to locate the ideal voyage through the M-authority and how to discover the surveying indicates and arrange visit those surveying focuses. M-authority needs to distinguish the surveying focuses and additionally its areas before begins its information gathering visit. The neighbor set of a point characterized as the arrangement of sensors. It can transfer the information straightforwardly to the M-gatherer [2].

Every sensor in the neighbor set must have no less than one surveying point to transfer the information in single bounce. All the sensor hubs ought to be secured while joining the neighbor sets of all the surveying focuses in the system. It is difficult to discover the neighbor set of an obscure point unless the M-gatherer cross towards the surveying point and test the remote connection between the M-authority and the sensor hub or spot the sensor at specific area and recognize its one-jump neighbor while finding the neighbor stage. It is conceivable to test the limited number of focuses and its relating neighbor sets and select the surveying focuses as hopeful surveying focuses [2]. In the event that the one-bounce neighbor of every sensor is known, the position of the sensor can be a hopeful surveying point. An arrangement of sensors, an arrangement of hopeful surveying point, the beginning stage and completion purpose of the M-gatherer visit and the neighbor set of applicant surveying point ought to be known not the surveying focuses and decide the grouping

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of visits among the surveying focuses. The above method is utilized to minimize the aggregate separation of information social occasion voyage through the Mcollector.

B. Mobile Data Gathering

The primary target of the versatile Data Gathering procedure is to diminish the general travel time of the portable hub furthermore decrease the bundle delay. Portable Collectors are called as SenCars [6]. To accomplish the uniform vitality utilization, we join the SDMA method alongside SenCar. This system embraces a joint methodology of Space Division Multiple Access and versatility [4]. The SDMA system contains various radio wires that assistance for simultaneous information transferring to a SenCar. There are two cases in particular single SenCar and different SenCar [8]. For a solitary SenCar, the primary target is to lessen the aggregate information gathering time. It incorporates the voyaging time of the SenCar and the transferring time of sensors to the SenCar. This issue is alluded as versatile information gathering with SDMA (MDG-SDMA). For multi-SenCar, the detecting field is partitioned into a few territories. Every territory is having a SenCar [8]. It primarily concentrates on adjusting the information gathering time on various areas. This issue is alluded as portable information gathering with various SenCars and SDMA (MDG-MS). The versatility implies conveying two or more SenCars in a detecting field that gathers information from different sensors at specific area by means of single-jump transmissions. There are three points of interest for the use of versatile components in the detecting field. In the first place, the non-uniform vitality utilization can be lessened among the sensors. The sensor can transfer the information specifically to the SenCar instead of sending the information in multi-bounce transmission. Second, it is appropriate for associated system and in addition detached system. The way of the SenCar can be considered as virtual connections among isolated sub systems [8]. Third, the voyage through the SenCar can be unsurprising. It is helpful for acquiring the ideal visit length of the SenCar.

1) Mobile Data Gathering with a Single SenCar and SDMA procedure (MDG-SDMA): A SenCar is outfitted with two radio wires and all the sensor hubs are furnished with single recieving wire are conveyed in the detecting field. The sensor hubs that survey the information specifically to the SenCar in single jump are called as Polling Points [8]. Scope territory is characterized as the plate molded zone focused at the surveying point with the sweep equivalent to the sensor transmission range. The Neighbor set is framed by the sensors in the scope zone of the surveying point. Despite the fact that the sensors may situate at scope territory of different surveying focuses, every sensor hub should be surveyed just once amid an information gathering visit, it is connected with one and only surveying point. On the off chance that two sensor hubs are good, the perfect pair to be planned to transfer the information at the same time. A SenCar need not to be gone by all the surveying focuses in the detecting field. The surveying focuses on the visit must cover the whole sensors in the detecting field. These surveying focuses are called as chose surveying focuses.

The SenCar arrives the chose surveying focuses and gathers information from all the related sensors. At that point moves to the following chose surveying point et cetera. The moving voyage through the SenCar comprises of number of chose surveying focuses. The chose surveying focuses are associated by utilizing straight lines. For instance, consider an arrangement of chose surveying focuses as P = {p1, p2, p3 … pn} and static information sink as DS. The visit length of the SenCar can be signified as DS → p1 → p2 → p3 → … . → pn → DS. The issue is to locate the ideal voyage through the SenCar and how to discover the surveying indicates and arrange visit those surveying focuses. A progression of issues should be explained. To start with, the SenCar must have the capacity to figure out if the two sensors are perfect or not. Second, the SenCar should gather the information as quick as would be prudent. It ought to recognize the most extreme number of perfect sets. This can be formalized utilizing the coordinating issue as a part of a similarity chart [8]. The vertex speaks to sensor and two vertices are adjoining each other, then the sensors are said to be perfect. In chart hypothesis, Matching is characterized as an arrangement of vertex-disjoint edges in the diagram relates to a gathering of good combines. The SenCar can gather the information in the spot that has more perfect sensors. Consequently, the information can be gathered in shorter time. To minimize the season of information transferring, the SDMA strategy is utilized. To drag out the moving visit, the SenCar may need to visit some particular areas [8]. Consider the arrangement of surveying focuses as Ƥ. The subset of Ƥ can be signified as Ƥ'. By going by the Ƥ', all information can be gathered in least time. The surveying focuses in Ƥ' are known as chose surveying focuses. 2) Mobile Data Gathering with Multiple SenCars and SDMA method (MDG-MS): The single SenCar takes a long information gathering visit to gather the information. To maintain a strategic distance from this issue, numerous quantities of SenCars can be sent with SDMA method to gather the information in the subareas. If there should arise an occurrence of MDG-MS, the detecting field is separated into number of non-covering subfields. Each subfield is having a SenCar.

Each SenCar can forward the gathered information to another SenCar etc. At long last, the information achieves the static information sink. The SenCar advances the information once it gathers every one of the information in the area or likewise advances while they are proceeding onward the ways aside from at the season of SenCars are speaking with its related sensors. Two sensors in the perfect pair would transfer the information to the SenCar at the same time. On the off chance that the sensor is secluded, it would transfer the information to the SenCar independently. The Sensor goes to rest mode once it finishes the procedure of information social event in its district. It comes about the ideal information gathering visit by accomplishing the system's lifetime and minimizing the information gathering dormancy [8]. This

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issue is alluded as Mobile Data Gathering with Multiple SenCars and SDMA procedure. To adjust the information gathering time among the diverse areas, the chose surveying focuses and their related sensors ought to be legitimately divided. The Region-Division and Tour Planning calculation is utilized to locate the short information gathering time by considering the entire detecting field in the single SenCar [8]. By considering the heaviness of the surveying point and gap them into various districts in light of the weight.

III. PROPOSED WORK

A. Algorithm

Step 1: Define the boundary for deployment of sensors by making use of x and y co-ordinates.

Step 2: Creating, Deploying and connecting the nodes within the boundary.

Step 3: Setting up of topology.

```
# Creating Topology
set topo [new Topography]
set val(rp) DSR
$topo load_flatgrid $val(x) $val(y)
# Creating GOD(General Operation Director) Object
create-god $val(nn)
# Parameters
Phy/WirelessPhy set bandwidth_ 2e6
Phy/WirelessPhy set Pt_ 0.1818
Phy/WirelessPhy set freq_ 914e+6
```

Step 4: Creating the clusters. By giving the certain range.

Step 5: Selecting the cluster heads based on the energy levels.

```
int energy_level;
cluster1.node_rep[]=energy_consumption;
cluster1.node_rep[]=energy_level;
if (cluster1.node_rep[]=max_energy_level)
        {
                select clusterhead1=cluster1.node_rep-
>max_energy_level;
currentCHMAC_ = MAC_802_11msg*data;
                sendMyDataToBS();
                return;
              cluster1.node_rep++;
        }
```

Step 6: Generating the traffic. In wireless sensor networks we make use of UDP protocol. We need create a UDP agent and then attach UDP agent to the node.

```
set udp [new Agent/UDP]
  $ns_ attach-agent $node $udp
```

Then we have to set and generate the traffic under the guidance of UDP protocol. So we have to attach traffic traffic generator to the UDP protocol.

```
set cbr [new Application/Traffic/CBR]
$cbr attach-agent $udp
```

Step 7: Start the network animator and analyse the data.

B. System Architecture and Modules

We propose a three layer mobile data collection framework with Load Balanced Clustering (LBU) and Dual Data Uploading (DDU) and Multi-User Multiple-Input and Multiple-Output (MU-MIMO) technique for concurrent data uploading to shorten latency.

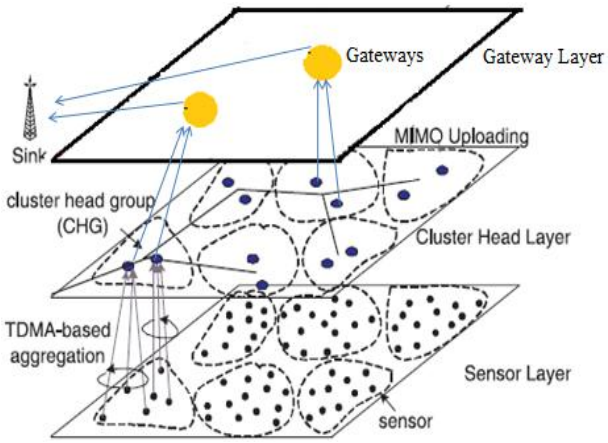

Figure 2: Three Layer Architecture for Mobile Data Collection

We divide them into three categories shown in Figure 2 those are Sensor Layer, Cluster Head Layer and the Gateway Layer.

In Sensor Layer we randomly deploy the nodes along X-axis and Y-axis and organize sensors into clusters, the clusters formed based on the sensing range .Where each cluster has multiple cluster heads and The node which has higher energy is chosen as cluster head.

In Cluster Head Layer multiple cluster heads within a cluster can collaborate with each other to perform energy efficient inter-cluster transmissions and the cluster Heads collects the data from the all the clusters and transforms the data to the sink through Gateway.

In the Gateway Layer it collects the data from the all the cluster heads and the data will be transformed to the sink. Hence all the data will be gathered at sink and no data will be lost.

The modules are Topology Creation, Traffic Generation using Agents, Cluster-Head Selection, Transfer of Data from Nodes to Sink, Analysis of throughput and performance of the system.

In topology creation we randomly deployed the nodes along the x and y-axis. and we set the X-axis and Y-axis boundary value, based on the sensing range we organize the nodes into clusters and from which cluster head collects the data.

In Traffic Generation first we create the simulator object and we attach the node to UDP protocol and the CBR agent to the sink and we attach source node, CBR agent and sink using UDP protocol.

In Cluster Head Selection, the node which has higher energy is chosen as cluster Head and and suppose if two nodes has same energy, here the node which is nearer to the gateway is chosen as Cluster Head. There are two Cluster Heads will be formed based on sensing range

In Transfer of data from nodes to sink, Cluster Head collects the data from the clusters and data will be transformed to sink using Gateway and at the sink all the data will be gathered, since we are using Gateways the data will not be lost.

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In the last module Analysis of throughput and performance of the system, we plot the graphs and compare the throughput and performance of the system with the other existing systems.

IV. RESULTS

This section is going to give experimental setup and snapshots of our project.
For our experiments we have considered 30 nodes which are shown in Figure 3 given below. We have used ns-2.35 for simulating our experiments.

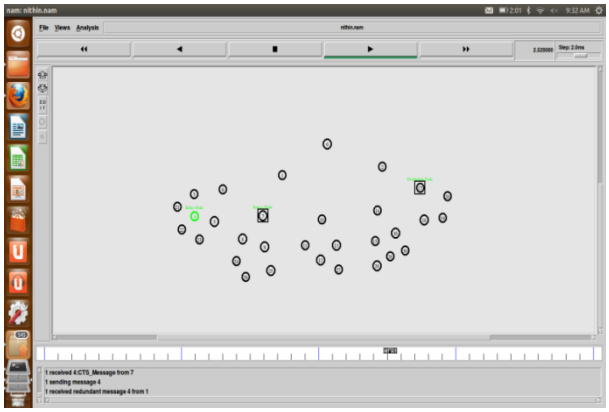

Figure 3: The nodes deployment

The Figure 4 clearly shows the improvement in network lifetime for transferring of data from nodes to sink using dual data uploading mechanism.

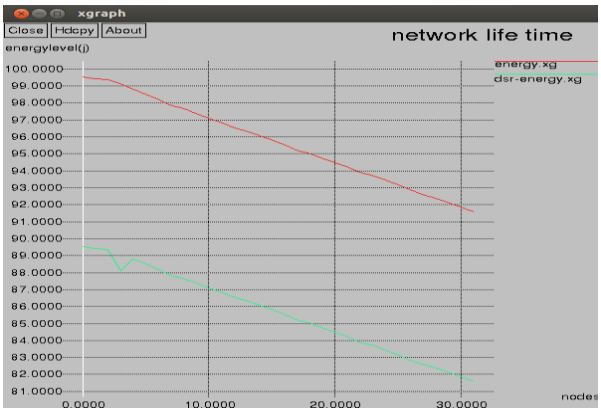

Figure 4: Graph showing Improvement in Network Lifetime using the proposed system

V. CONCLUSION

In this paper, we have proposed the LBC-DDU structure for portable information gathering in a WSN. It comprises of sensor layer, group head layer and Gateway layer. It utilizes disseminated load adjusted bunching for sensor self-association, receives communitarian between group correspondence for vitality proficient transmissions among CHGs, utilizes double information transferring for quick information accumulation, and enhances Gateway to completely appreciate the advantages of MU-MIMO. Our execution study exhibits the viability of the proposed system. The outcomes demonstrate that LBC-DDU can enormously diminish vitality utilizations by lightening steering troubles on hubs and adjusting workload among group heads, which accomplishes 20 percent less information accumulation time contrasted with SISO portable information gathering and more than 60 percent vitality saving money on bunch heads. We have likewise supported the vitality overhead and investigated the outcomes with various quantities of bunch heads in the structure.

REFERENCES

[1] Miao Zhao and Yuanyuan Yang, "Bounded Relay Hop Mobile Data Gathering in Wireless Sensor Networks," IEEE Trans. On Computers, vol. 61, no. 2, Feb. 2012.
[2] M. Ma and Y. Yang, "Data Gathering in Wireless Sensor Networks with Mobile Collectors," Proc. IEEE Int'l Symp. Parallel and Distributed Processing (IPDPS), 2008.
[3] M. Ma and Y. Yang, "SenCar: An Energy-Efficient Data Gathering Mechanism for Large-Scale Multihop Sensor Networks," IEEE Trans. Parallel and Distributed Systems, vol. 18, no. 10, pp. 1476-1488, Oct. 2007.
[4] J. Luo and J.P. Hubaux, "Joint Mobility and Routing for Lifetime Elongation in Wireless Sensor Networks," Proc. IEEE INFOCOM,2005.
[5] A.A. Somasundara, A. Ramamoorthy, and M.B. Srivastava, "Mobile Element Scheduling with Dynamic Deadlines," IEEE Trans. Mobile Computing, vol. 6, no. 4, pp. 395-410, Apr. 2007.
[6] D. Bote, K. Sivalingam, and P. Agrawal, "Data Gathering in Ultra Wide Band Based Wireless Sensor Networks Using a Mobile Node," Proc. Fourth Int'l Conf. Broadband Comm., Networks, and Systems (BroadNets), Sept. 2007.
[7] X. Xu, J. Luo, and Q. Zhang, "Delay Tolerant Event Collection in Sensor Networks with Mobile Sink," Proc. IEEE INFOCOM, 2010.
[8] M. Zhao, M. Ma, and Y. Yang, "Efficient Data Gathering with Mobile Collectors and Space-Division Multiple Access Technique in Wireless Sensor Networks," IEEE Trans. Computers,vol. 60,no. 3,pp. 400-417, http://doi.ieeecomputersociety.org/10.1109/TC. 2010.140, Mar. 2011.
[9] W.C. Cheng, C. Chou, L. Golubchik, S. Khuller, and Y.C. Wan, "A Coordinated Data Collection Approach: Design, Evaluation, and Comparison," IEEE J. Selected Areas in Comm., vol. 22, no. 10, pp. 2004-2018, Dec. 2004.
[10] A. Manjeshwar and D.P. Agrawal, "Teen: A Routing Protocol for Enhanced Efficiency in Wireless Sensor Networks," Proc. IEEE Int'l Parallel and Distributed Processing Symp., Apr. 2001.
[11] A. Scaglione and S.D. Servetto, "On the Interdependence of Routing and Data Compression in Multi-Hop Sensor Networks," Proc. ACM MobiCom, 2002.
[12] Kurose, J.F., and Ross, K.Computer Networking: A Top-Down Approach Featuring the Internet. Addision-Welsley Longman Publishing Co.,Inc,. Boston,MA, USA,.
[13] K.Dantu, M.Rahimi, H.Shah, S.Babel. A.Dhariwal, and G.S. Sukhatme, :Robomote: Enabling mobility in sensor networks," in IEEE/ACM Fourth International Conference on Information Processing in Sensor Networks (IPSN/SPOTS), Apr. 2005.