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Mobile Data Gathering With Load Balanced Clustering and Dual Data Uploading In Wireless Sensor Networks

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Abstract: **A Three-layer framework for mobile data gathering in Wireless sensor Networks, which includes the sensor layer, cluster head layer and mobile collector (called SenCar) Layer. The Framework employs distributed Load Balanced Clustering and Dual Data Uploading which is referred to LBC_DDU scheme. At the sensor layer, a distributed load balanced clustering algorithm is proposed for sensors to self-organize themselves into cluster. The Trajectory Planning for SenCar is optimized to fully utilize dual data uploading capability by properly selecting polling points in each cluster. By visiting each selected polling point, SenCar can efficiently gather data from cluster heads and transport the data to the static data sink.**

Keywords: **WSNs, DDU, LBC, MU-MIMO.**

I. INTRODUCTION

Wireless sensor Networks gains the world-wide attention in recent years due to the advances creates in wireless communication, data technologies and physical science field. The sensing and transmission of knowledge involves an enormous quantity of energy consumption. Sensor Networks are highly distributed network of small, light weighted wireless node deployed in large numbers to monitor the environment by measurs physical components (Temperature, Pressure, and Humidity). Each network consists of 3 Subsystem. They are sensor subsystem, processing subsystem, communication subsystem. Sensor nodes used in various applications such as Military, Chemical Processing, Sensor Networks are highly distributed network of small, light weighted wireless node deployed in large numbers to monitor the environment by measurement of physical components (Temperature, Pressure, and Humidity).Each network consists of 3 Subsystem. They are sensor subsystem, processing subsystem, communication subsystem. Sensor nodes used in various applications such as Military, Chemical Processing, and Disaster relief scenarios. The Load Balance Clustering (LBC) Algorithm is used to achieve the scalability because the sensors form into a cluster the sensor near static sink lose the energy faster than the other sensors. Dual Data

Uploading (DDU) is used to achieve the Mobility for energy saving and uniform energy consumption and is to exploit the Multi User and Multi input and Multi Output Technology for shorten latency and to upload data concurrently which is achieved by using the SenCar because it has two antennas to upload the data concurrently from two cluster heads.

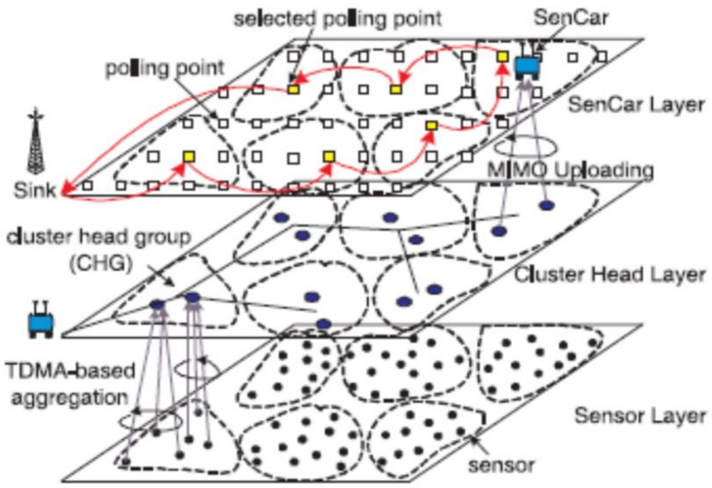
II. EXISTING SYSTEM

There are several approaches have been proposed for efficient data collection. They are dividing into three categories. The First category is the enhanced relay routing, in which data are relayed among sensors. Besides relaying, some other factors, such as load balance, schedule pattern and data redundancy, are present. In Relay Routing scheme, sensors are loss energy rapidly because the sensors transmitting the data to the sink and due to intra aggregation and inter cluster communications in clustering scheme.

III. PROPOSED SYSTEM

In Proposed System a three-layer mobile data collection framework, named Load Balanced Clustering and Dual Data Uploading (LBCDDU).

The main motivation is to utilize distributed clustering for scalability, to employ mobility for energy saving and uniform energy consumption, and to exploit Multi-User Multiple-Input and Multiple-Output technique for concurrent data uploading to shorten latency. In contrast to clustering techniques LBC algorithm balances the load of intra-cluster aggregation and enables dual data uploading. Different from other hierarchical schemes, cluster heads do not relay data packets from other cluster, which effectively alleviates the burden of each cluster *head*. Instead, forwarding paths among clusters are only used to route smallsized identification (ID) information of clusterheads to the mobile collector for optimizing the data collection tour.



The sensor layer is the bottom and basic layer. For generality,we do not make any assumptions on sensor distribution or node capability, such as location-awareness. Each sensor is assumed to be able to communicate only with its neighbors, i.e., the nodes within its transmission range.During initialization, sensors are self-organized into clusters.

Each sensor decides to be either a cluster head or a cluster member in a distributed manner. In the end, sensors with higher residual energy would become cluster heads and each cluster has at most M cluster heads, where M is a system parameter. For convenience, the multiple cluster heads within a cluster are called a cluster head group (CHG), with each cluster head being the peer of others. The algorithm constructs clusters such that each sensor in a cluster is onehop away from at least one cluster head. The benefit of such organization is that the intra-cluster aggregation is limited to a single hop. In the case that a sensor may be covered by multiple cluster heads in a CHG, it can be optionally affiliated with one cluster head for load balancing.

IV. MODULES

i) INITIALIZATION:

The Initialization is done at the sensor layer and using LBC algorithm. The sensor informed the all neighbours within its immediacy. If a sensor has no neighbour exists, it claims itself to be cluster. Otherwise sensor sets its status as tentative and its priority set by the percentage of residual energy.Then it sorts the neighbours with high residual energy as candidate peers.

Algorithm. Phase I: Initialization
1: My. *N* {*v/v* lies in my transmission
range, *v* € S};
2: **if** My.N = ɸ **then**
3: Set *My*.cluster_head to My.id;
4: Set My.status to *cluster*_head*;*

5: **else**
6: My.init_prio Eres/Etot*;*
7: My.cluster_head 0;
8: My.status *tentative*;
9: My.*A* {*v/v* Can_Peers (*N*)}*;*
10: My.prio My.init_prio+ *Σ v My.A*
v.init_prio;
11: My.*B*, My.C ϕ*;*
12: Iter 0;

ii) STATUS CLAIM:

In second phase each sensor claims its status iteratively by updating its local information. The number of iterations is controlled based on the sensor degree. The priority is partitioned into two thresholds τh, τm this is used to declare a sensor as either cluster head or cluster member.

iii) CLUSTER FORMING:

The cluster formation is done by following criteria. The sensor with tentative status or being a cluster member, it arbitrarily choose as the clusterhead from its candidate peers for load balancing Purpose. If no sensor with tentative status then it chooses itself as the cluster head. The re-clustering is performed when the chosen cluster head is running on low battery. The Initialization phase is done by sending re-clustering messages to all sensors. The following algorithm explains about how clustering is done and how they receive packets from the other sensor.

Algorithm: Cluster Formation

1: **if** My.*status=cluster_head* **then**
My.cluster_head My.id;
2: **else**
3: recv_pkt ( );
4: My.*B* Fnl_N (My.*B*);
5: if My.*B* ≠ ϕ *then*
6: My.status *cluster_member;*
7: My.*cluster_head* Rand_one (My.*B)*.id;
8: send_pkt (3, My.id, My.cluster_head,
cluster_member, My.init_prio);
9: **else**
10: My.status *cluster_head;*
11: My.cluster_head My.id;
12: snd_pkt (2, My.id, ID_List (My.*A*),
cluster_head, *My.prio);*

iv) SYNCHRONIZATION AMONG CLUSTER HEADS:

The synchronization Among cluster head is done because to perform data collection by time division.This is done by sending beacon messages to cluster heads in CHG. the message contains the local clock information and initial priority. This is done only when sencar is going to collect data. The following LBC Algorithm is used for synchronization.

Algorithm: Synchronization between cluster heads

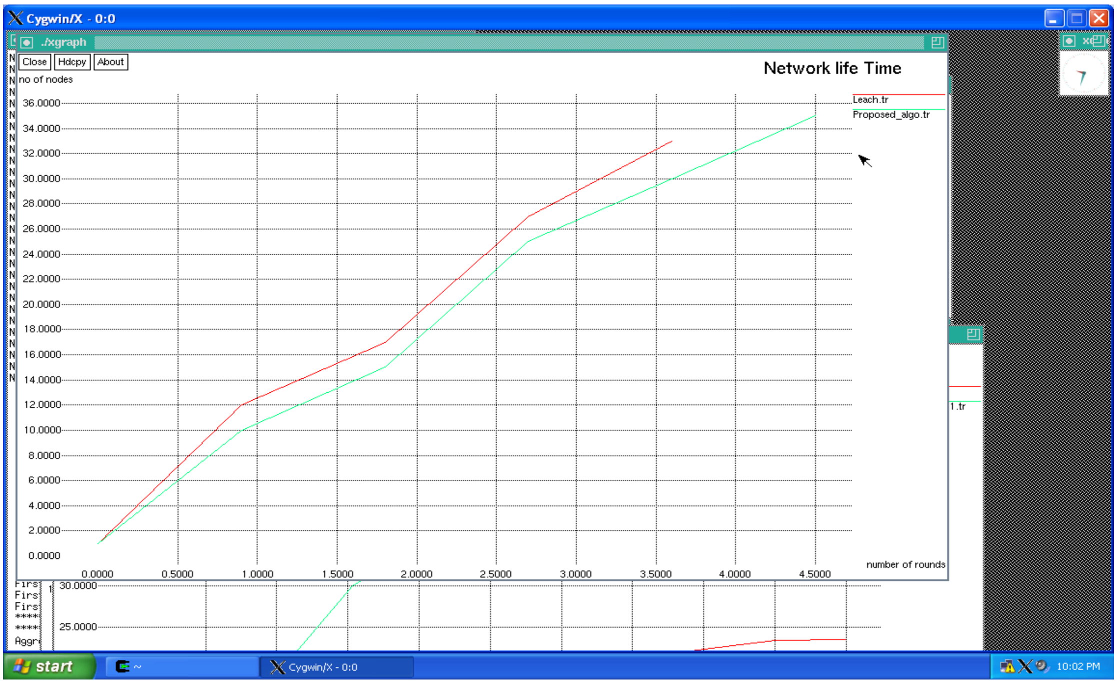
1: **if** My. *status =cluster_head;* **then**
2: send beacon msg with
My.init_prio,My.clock, etc;
3: receive beacon msg b from others nodes in
CHG;
4: **if** *b.init_prio >My.init_prio;* **then**
5: My.clock *b*.clock;

V. PERFORMANCE

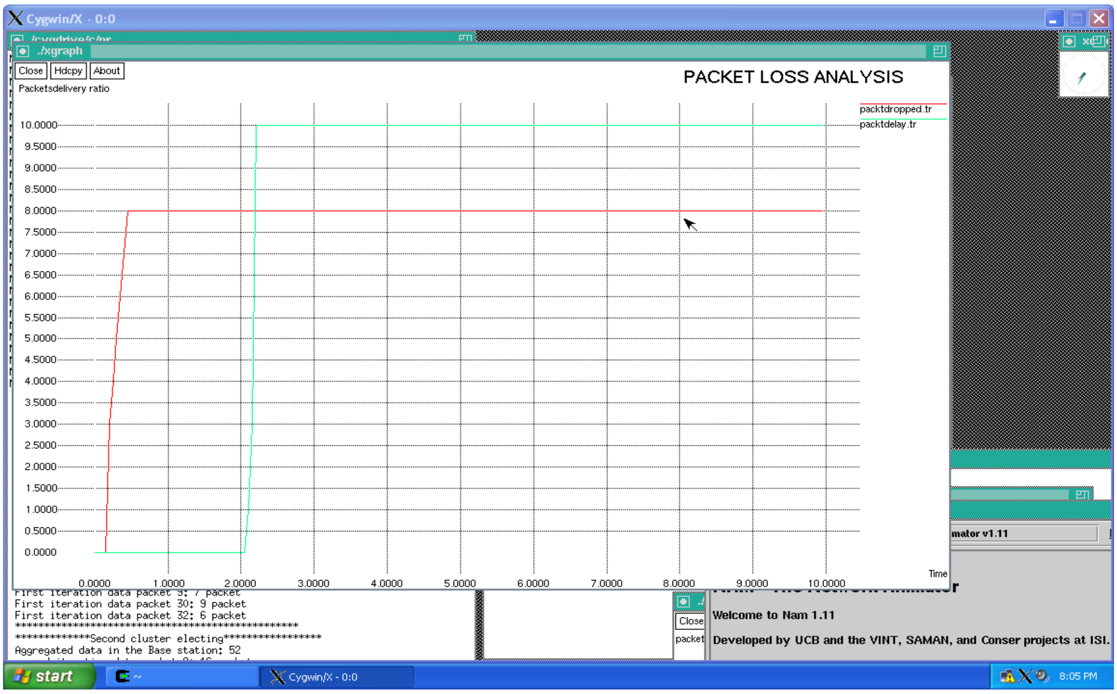
The performance of the proposed framework is reduce the average energy consumption and latency when compare with the other data collection schemes. The MIMO scheme results in least energy consumption so the lifetime of the network also extended, because the sensor sends the data transmission by multi hop fashion. The low latency is achieved because using SenCar the routing. Burden is reduced. The following graph shows that comparison of our proposed technique with many existing techniques like SISO & relay routing, collection tree protocol for energy consumption and evaluation of time.

Network Lifetime:

In this graph shows the life time of the network.



Packet loss analysis:



In the above fig shows the packet loss analysis system the red line shows the packet dropped line.green line shows the possibility of packet loss is greater than the packet dropped.

VI. CONCLUSION AND FUTURE WORKS

The load balanced clustering-dual data uploading framework for data gathering in WSN is proposed in this paper. It consist of sensor layer, cluster head layer and SenCar layer. It employs distributer load balanced clustering for sensor self-organization, adopts collaborative inter-cluster communication for energy-efficient Transmission among cluster Head Groups, uses, dual data uploading for fast data collection, and optimizes sencar's mobility to fully enjoy the benefits of MU-MIMO. Our performance study demonstrates the effectiveness of the proposed framework. The result shows that LBC-DDU can greatly reduce energy consumptions by alleviating routing burdens on nodes and balancing workload among cluster heads.

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