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MOVEABLE INFORMATION GROUPING WITH LOAD IN WIRELESS SENSOR NETWORKS

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***Abstract*— Nowadays wireless sensor network are liked due to monitoring the presence of situation in many applications like industrial, environmental sensing, health care etc. Energy capability is a crucial view in wireless sensor networks to overcome this problem the efficient technique of clustering is used to achieve more data transmission, long network lifetime, less time consuming process, minimize energy utilization. In this paper propose multi cluster head groups, multi cluster heads via Load Balanced Clustering and Dual Data Uploading and sencar. It is responsible to maintain the energy and data transmission from each sub node. In each cluster head collect data and energy level form sub nodes then transmit to the cluster group head. Here Multi User-Multi input multi output(MIMO) is used for multi data transmission to the sink, each nodes connected their cluster heads and sending packet to the sink via cluster heads and group heads. Sink assign Id to each node for identification purpose which node transmit data. Although the transmission of inter cluster, each cluster head group data is gathered by SenCar then transport the data to the static data sink. Sencar is the mobility of mobile nodes used to update the energy in which the node have low energy. If sencar . has low energy then it is energized by sink is the base station controls the entire network .As the Simulation results exhibit that the proposed load balanced clustering maintains the energy level as well as more data-gathering to increase the network life time.**

***Index Terms*— Wireless Sensor Network, Multi Cluster Head and Cluster Head Group (CHG) , Energy Capability , Sencar.**

I. INTRODUCTION

THE proliferation of the implementation for low-cost, low-power, multifunctional sensors has made wireless sensor networks (WSNs) a prominent data collection paradigm for extracting local measures of interests. In such applications, sensors are generally densely deployed and randomly scattered over a sensing field and left unattended after being deployed, which makes it difficult to recharge or replace their batteries. After sensors form into autonomous organizations, those sensors near the data sink typically deplete their batteries much faster than others due to more relaying traffic. When sensors around the data sink deplete their energy, network connectivity and coverage may not be guaranteed. Due to these constraints, it is crucial to design an energy-efficient data collection scheme that consumes energy uniformly across the sensing field to achieve long network lifetime [3]. Furthermore, as sensing data in some applications are time-sensitive, data collection may be required to be performed within a specified time frame. Therefore, an efficient, large-scale data collection scheme should aim at good scalability, long network lifetime and low data latency. Several approaches have been proposed for efficient data collection in the literature. Based on the focus of these works, we can roughly divide them 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 also considered. The second category organizes sensors into clusters and allows cluster heads to take the responsibility for forwarding data to the data .Clustering is particularly useful for applications with scalability requirement and is very effective in local data aggregation since it can reduce the collisions and balance load among sensors. The third category is to make use of mobile collectors to take the burden of data routing from sensors. Although these works provide effective solutions to data collection in WSNs, their inefficiencies have been noticed. Specifically, in relay routing schemes, minimizing energy consumption on the forwarding path does not necessarily prolong network lifetime, since some critical sensors on the path may run out of energy faster than others. In cluster- based schemes, cluster heads will inevitably consume

II. RELATED WORK

Relay routing is a simple and effective approach to routing messages to the data sink in a multi-hop fashion. Cheng et al devised a coordinated transfer schedule by choosing alternate routes to avoid congestions. Wu et al. Studied the construction of a maximum-lifetime data gathering tree by designing an algorithm that starts from an arbitrary tree and iteratively reduces the load on bottleneck nodes. Xu et al.studied deployments of relay nodes to elongate network lifetime. Gnewali et al. evaluated collection tree protocol (CTP) via testbeds. CTP computes wireless routes adaptive to wireless link status and satisfies reliability, robustness, efficiency and hardware independence requirements. However, when some nodes on the critical paths are subject to energy depletion, data collection performance will be deteriorated. Another approach is to allow nodes to form into clusters to reduce the number of relays. Heinzelman et al. proposed a cluster formation scheme, named LEACH, which results in the smallest expected number of clusters. However, it does not guarantee good cluster head distribution and assumes uniform energy consumption for cluster heads. Younis and Fahmy further proposed "HEED," in which a combination of residual energy and cost is considered as the metric in cluster head selection. HEED can produce well-distributed cluster heads and compact clusters. Gong et al. considered energy efficient clustering in lossy wireless sensor networks based on link quality. Amis et al. Addressed d-hop clustering with each node being at most d hops away from a cluster head. In these cluster-based schemes, besides serving as the aggregation point for local data collection, a cluster head also acts as a scheduler or controller for in-network processing. Zhang et al considered efficient scheduling of cluster heads to alleviate the collisions among different transmissions. Gedik et al. and Liu et al. explored the correlation of sensing data and dynamically partitioned.

III. EXISTING SYSTEM

Several approaches have been proposed for efficient data collection in the literature. Based on the focus of these works, we can roughly divide them 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 also considered.

The second category organizes sensors into clusters and allows cluster heads to take the responsibility for forwarding data to the data sink. Clustering is particularly useful for applications with scalability requirement and is very effective in local data aggregation since it can reduce the collisions and balance load among sensors.

The third category is to make use of mobile collectors to take the burden of data routing from sensors.

A. Drawbacks of Existing System

In relay routing schemes, minimizing energy consumption on the forwarding path does not necessarily prolong network lifetime, since some critical sensors on the path may run out of energy faster than others.

In cluster-based schemes, cluster heads will inevitably consume much more energy than other sensors due to handling intra-cluster aggregation and inter-cluster data forwarding.

Though using mobile collectors may alleviate non-uniform energy consumption, it may result in unsatisfactory data collection latency.

IV. PROPOSED SYSTEM

The proliferation of the implementation for cheap, low power, multifunctional sensing elements has created wireless sensor networks (WSNs) a outstanding information assortment paradigm for extracting native measures of interests. In such applications, sensors are typically densely deployed and arbitrarily scattered over a sensing field and left unattended once being deployed, that makes it tough to recharge or replace their batteries. once sensors kind into autonomous organizations, those sensors close to the information sink usually deplete their batteries a lot of quicker than others attributable to additional relaying traffic. once sensors round the information sink deplete their energy, network property and coverage might not be secured. attributable to these constraints, it's crucial to style an energy-efficient information assortment theme that consumes energy uniformly across the sensing field to attain long network time period. moreover, as sensing information in some applications are time-sensitive, information assortment is also needed to be performed inside a fixed time-frame. Therefore, AN economical, large-scale information assortment theme ought to aim at smart measurability, long network time period and low information latency. many approaches are planned for economical information assortment within the literature. supported the main target of those works, we will roughly divide them into 3 classes.

A. Advantages of Proposed System

We propose a three-layer mobile data collection framework, named Load Balanced Clustering and Dual Data Uploading (LBC-DDU).

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 (MU-MIMO) technique for concurrent data uploading to shorten latency. The main contributions of this work can be summarized as follows.

First, we propose a distributed algorithm to organize sensors into clusters, where each cluster has multiple cluster heads.

Second, multiple cluster heads within a cluster can collaborate with each other to perform energy efficient inter-cluster transmissions.

Third, we deploy a mobile collector with two antennas (called SenCar in this paper) to allow concurrent uploading from two cluster heads by using MU-MIMO communication. The SenCar collects data from the cluster heads by visiting each cluster. It chooses the stop locations inside each cluster and determines the sequence to visit them, such that data collection can be done in minimum time.

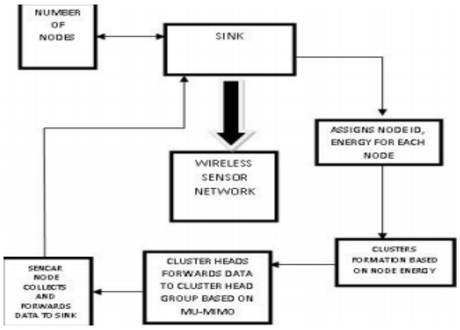

Fig1.Proposed system architecture

V. IMPLEMENTATION

A. Initialization Phase

In the initialization phase, each sensor acquaints itself with all the neighbors in its proximity. If a sensor is an isolated node (i.e., no neighbor exists), it claims itself to be a cluster head and the cluster only contains itself. Otherwise, a sensor, say, si, first sets its status as "tentative" and its initial priority by the percentage of residual energy. Then, si sorts its neighbors by their initial priorities and picks neighbors with the highest initial priorities, which are temporarily treated as its candidate peers. We denote the set of all the candidate peers of a sensor by A. It implies that once si successfully claims to be a cluster head, its up-to-date candidate peers would also automatically become the cluster heads, and all of them form the CHG of their cluster. si sets its priority by summing up its initial priority with those of its candidate peers. In this way, a sensor can choose its favorable peers along with its status decision.

B. Status Claim

In the second module, each sensor determines its status by iteratively updating its local information, refraining from promptly claiming to be a cluster head. We use the node degree to control the maximum number of iterations for each sensor. Whether a sensor can finally become a cluster head primarily depends on its priority. Specifically, we partition the priority into three zones by two thresholds, th and tm (th> tm) , which enable a sensor to declare itself to be a cluster head or member, respectively, before reaching its maximum number of iterations. During the iterations, in some cases, if the priority of a sensor is greater than th or less than tm compared with its neighbors, it can immediately decide its final status and quit from the iteration.

We denote the potential cluster heads in the neighborhood of a sensor by a set B. In each iteration, a senor, say, si, first tries to probabilistically include itself into si:B as a tentative cluster head if it is not in already. Once successful, a packet includes its node ID and priority will be sent out and the sensors in the proximity will add si as their potential cluster heads upon receiving the packet. Then, si checks its current potential cluster heads. If they do exist, there are two cases for si to make the final status decision, otherwise, si would stay in the tentative status for the next round of iteration.

C. Cluster Forming

The third module is cluster forming that decides which cluster head a sensor should be associated with. The criteria can be described as follows: for a sensor with tentative status or being a cluster member, it would randomly affiliate itself with a cluster head among its candidate peers for load balance purpose. In the rare case that there is no cluster head among the candidate peers of a sensor with tentative status, the sensor would claim itself and its current candidate peers as the cluster heads.

D. Synchronization among Cluster Heads

To perform data collection by TDMA techniques, intracluster time synchronization among established cluster heads should be considered. The fourth phase is to synchronize local clocks among cluster heads in a CHG by beacon messages. First, each cluster head will send out a beacon message with its initial priority and local clock information to other nodes in the CHG. Then it examines the received beacon messages to see if the priority of a beacon message is higher. If yes, it adjusts its local clock according to the timestamp of the beacon message. In our framework, such synchronization among cluster heads is only performed while SenCar is collecting data. Because data collection is not very frequent in most mobile data gathering applications, message overhead is certainly manageable within a cluster.

VI. CONCLUSION

In this paper, we have proposed the LBC-DDU framework for mobile data collection in a WSN. It consists of sensor layer, cluster head layer and SenCar layer. It employs distributed load balanced clustering for sensor self-organization, adopts collaborative inter-cluster communication for energy-efficient transmissions among CHGs, 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 results show that LBC-DDU can greatly reduce energy consumptions by alleviating routing burdens on nodes and balancing workload among cluster heads, which achieves 20 percent less data collection time compared to SISO mobile data gathering and over 60 percent energy saving on cluster heads. We have also justified the energy overhead and explored the results with different numbers of cluster heads in the framework. Finally, we would like to point out that there are some interesting problems that may be studied in our future work. The first problem is how to find polling points and compatible pairs for each cluster. A discretization scheme should be developed to partition the continuous space to locate the optimal polling point for each cluster. Then finding the compatible pairs becomes a matching problem to achieve optimal overall spatial diversity. The second problem is how to schedule MIMO uploading from multiple clusters. An algorithm that adapts to the current MIMO-based transmission scheduling algorithms should be studied in future.

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