www.ijiarec.com

ISSN:2348-2079

OCT-2014

International Journal of Intellectual Advancements and Research in Engineering Computations

COMPRESSIVE DATA GATHERING TECHNIQUE BY AVOIDING CORRELATED DATA IN WSN

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ABSTRACT

Wireless sensor network (WSN) is a collection of sensors and limited number of mobile data collectors for data gathering in sensors. In such data gathering scheme, mobile data collectors will travel over the sensing area and collects the data from sensor nodes via short-range wireless communications. Polling points are defined for shortening the moving path of mobile collector. The proposed approach defines tour planning of mobile collectors, which will avoid the sensors producing correlated data within a particular cluster containing a polling point. Also to identify a new optimal polling point which overlooks the same efficiently. The correlated sensors are being checked constantly by spatially correlation method. After identifying the correlated sensors, the new polling points are identified and by avoiding the correlated sensors we will get the optimal polling points. By visiting the new polling points, the tour length of mobile collector is reduced and the number of polling points is also minimized, which extends the network lifetime.

Index terms: Polling point, Mobile data collector, Network Tour Planning, Spatial Autocorrelation.

I INTRODUCTION

The wireless sensor networks (WSN) are a division of ad-hoc wireless networks predictable among a number of sensor nodes deployed over a monitored area. Each sensor node is a low-cost, energy-constrained device capable of sensing its environment and performs simple processing tasks and then transmits sensed data over the wireless medium towards neighbouring sensor nodes. To perform more complicated data processing, data gathering mechanisms are designed and deployed for efficient data collection at one or a small number of reliably powered sink nodes inside the WSN. Sink nodes are dedicated nodes that are responsible for gathering composed data and serve as gateway between the sensor network and the wired or wireless network. While the applications of sensors may be quite different, data packets want to be aggregated at data sink. In a homogeneous network where sensors are organized into a flat topology, since they need to relay many packets from sensors far away from the data collector. As a result, If any of these sensors fail, then other sensors also cannot reach the data collector and the whole network becomes disconnected, but most of the nodes can still survive for a long period. For a large-scale sensor network, using single static data sink to gather data from all sensors is not a good idea. For some applications, sensors are densely deployed and connected, but some of the sensors may be disconnected and cannot forward data to the data sink via wireless links. A mobile data collector is perfectly suitable for such applications. A mobile data collector serves as a mobile "data carrier" and

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links all are separated to sub networks. The moving path of the mobile data collector acts as virtual links between separated sub networks.

To provide a scalable data-gathering scheme for large-scale static sensor networks, we employ mobile data collectors to gather data from sensors. Mobile data collector could be a mobile robot or a vehicle equipped with a powerful transceiver, battery, and large memory. The mobile data collector starts a tour from the data sink, traverses the network, collects sensing data from nearby nodes while moving, and then returns and uploads data to the data sink. Since the data collector is mobile, it can move close to sensor nodes, such that if the moving path is well planned, the network lifetime can be greatly prolonged. Here, network lifetime is defined as the duration from the time sensors start sending data to the data sink to the time when a certain percentage of sensors either run out of battery or cannot send data to the data sink due to the failure of relaying nodes. In the following, for convenience, we use mobile collector to denote the mobile data collector.

II RELATED WORK

In [1], the cluster heads will inevitably consume more energy than other sensor nodes. To avoid the problem of cluster heads failing faster than other nodes, sensor nodes can become cluster heads rotationally. In [2], controlled movement was exploited to improve data delivery performance. Some mobile observers, called message ferries, were used to collect data from sensors. Two variants were studied based on whether ferries or nodes initiate proactive movement.

In [3 , 4], a number of mobile observers, called data *mules*, pick up data directly from the sensors when they are in close range, buffer the data, and drop off the data to wired access points. The movement of mules is modeled as 2-D random walk. In [5], mobile observers traverse the sensing field along parallel straight lines and gather data from sensors. To reduce latency, packets sent by some sensors are allowed to be relayed by other sensors to reach mobile observers. This scheme works well in a large-scale uniformly distributed sensor network. However, in practice, data mules may not always be able to move along straight lines, for example, obstacles or boundaries may block the moving paths of data mules. When only a small number of data mules are available and not all sensors are connected, data mules may not cover all the sensors in the network if they only move along straight lines

In [6], a data-gathering scheme was proposed to minimize the maximum average load of a sensor by jointly considering the problems of movement planning and routing. Based on the assumption that sensors are distributed according to a Poisson process, the average load of a sensor can be estimated as a function of the node density. In [7], several advantages and design issues were discussed for incorporating controlled mobility into the networking infrastructure, and the main focus was on motion/speed control and communication protocol design. In [8], a heterogeneous and hierarchical architecture was proposed for the deployment of WSNs with mobile sinks for large-scale monitoring, where the sensors transmit their sensing data to the gateway nodes for temporary storage through multihop relays and the mobile sinks travel along predetermined trajectories to collect data from nearby gateway nodes. Under this data-gathering paradigm, the capacitated minimum forest problem was studied, and approximate algorithms were devised for instances where all gateways have uniform and arbitrary capacities, respectively.

In [9], an adaptive data-harvesting approach was proposed for mobile-agent-assisted data collection in WSNs inspired by behavioral ecology. By using the marginal value theorem, the entire sensor field was divided into small patches, and the correlated data were gathered from each patch. The mobile agent utilized spatial correlation of the interested data to precisely build the probabilistic model to achieve the optimization for accuracy and resource consumption. In [10] and [11], mobile observers in sensor networks were also considered. The hardware/software implementation of underwater mobile observers was mainly discussed in [10], whereas an algorithm to schedule the mobile observer was proposed in [11], so that there is no data loss due to the buffer overflow. In [12], shows the spatial correlation among data in high in sensor networks but it lags the practical implementation of analyzing the correlated data for transmitting the packets for communication. In [13], shows a grid based spatial correlation clustering method where the entire cluster is equipped in a grid sensor field. However this type of model rarely happens in an original scenario in wireless sensor networks. In [14], proposed a disk-shaped circular cluster, where sensor nodes are grouped into disjoint sets each managed by a designated cluster head which lags the practical shape of a cluster. As most cases the cluster formation are irregular in shape in the spatial domain. Hence in this paper we propose a foundation of distributed clustering algorithm which is much more practical than the previous work done in the spatial domain. In our model, we propose a spatially correlated distributed irregular non overlapping cluster formation in the spatial domain. These distributed irregular cluster formation in the spatial domain is much more practical model in original scenario than the previous literature discussed above.

III PROPOSED APPROACH

In Proposed Approach we define the Tour planning of Mobile Collector by splitting the whole network into Sub network and Identify the Polling points to plan the Tour for Mobile Collector, Here we also concentrating whether there is any Co-relation between any sensors and if we find Co-relation between sensors we try to find the probability of Co-relation between sensors. Here the New Polling Points was been identified by avoiding the Co-related sensors. Our proposed approach was been proven as Effective way of mobile data gathering by Minimizing the Tour length of Mobile Collectors, Extends the Life time of sensors. By introducing the Mobile collector, data gathering becomes more flexible and adaptable to the unexpected changes of the network topology.

ADVANTAGES OF PROPOSED APPROACH

SINGLE-HOP DATA GATHERING

We consider the problem of finding the shortest moving tour of a Mobile Collector that visits the transmission range of each sensor, the positions of sensors are either the polling points in the data-gathering tour or within the one hop range of the polling points. The problem they considered is obtaining the shortest tour of a subset of all cities such that every city not on the tour is within some predetermined distance dist of a city that is on the tour. If the transmission range of each sensor could be modeled as a disk-shaped area, the SHDGP can be simplified to the CSP by setting dist in the CSP equal to the transmission range of sensors. At each stage of the algorithm, a neighbor set of sensors can be covered when its corresponding candidate polling point is chosen as a polling point in the data-gathering tour. The algorithm will terminate after all sensors are covered. The algorithm tries to cover each uncovered neighbor set of sensors with the minimum average cost at each stage, where the "cost" will be formally defined later

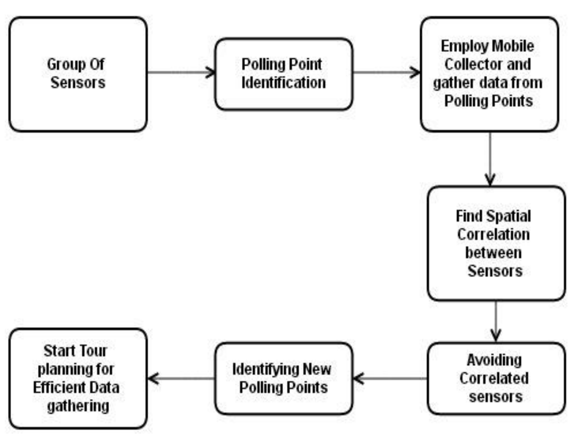


Fig. Proposed approach

S.Arun Kumar, T.VijayaKumar. et al., Inter. J. Int. Adv. & Res. In Engg. Comp., Vol.–02 (05) 2014 [128-133]

DATA GATHERING WITH MOBILE COLLECTOR

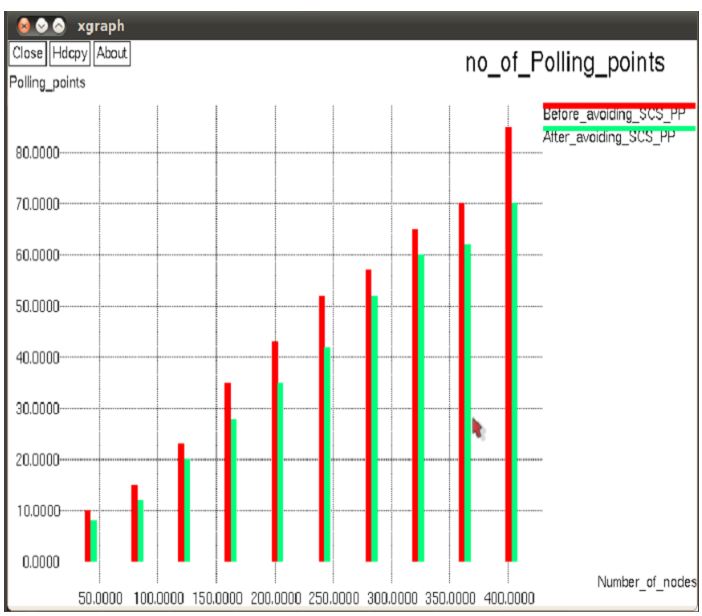
In Data gathering with single Mobile Collector, we proposed a technique with based on integer linear program .To provide a scalable data-gathering, we employ mobile data collectors to gather data from sensors. Mobile data collector could be a mobile robot or a vehicle equipped with a powerful transceiver, battery, and large memory. The mobile data collector starts a tour from the data sink, traverses the network, collects sensing data from nearby nodes while moving, and then returns and uploads data to the data sink. Since the data collector is mobile, it can move close to sensor nodes, such that if the moving path is well planned, the network lifetime can be greatly prolonged. Here, network lifetime is defined as the duration from the time sensors start sending data to the data sink to the time when a certain percentage of sensors either run out of battery or cannot send data to the data sink due to the failure of relaying nodes. In the following, for convenience, we use mobile collector to denote the mobile data collector.

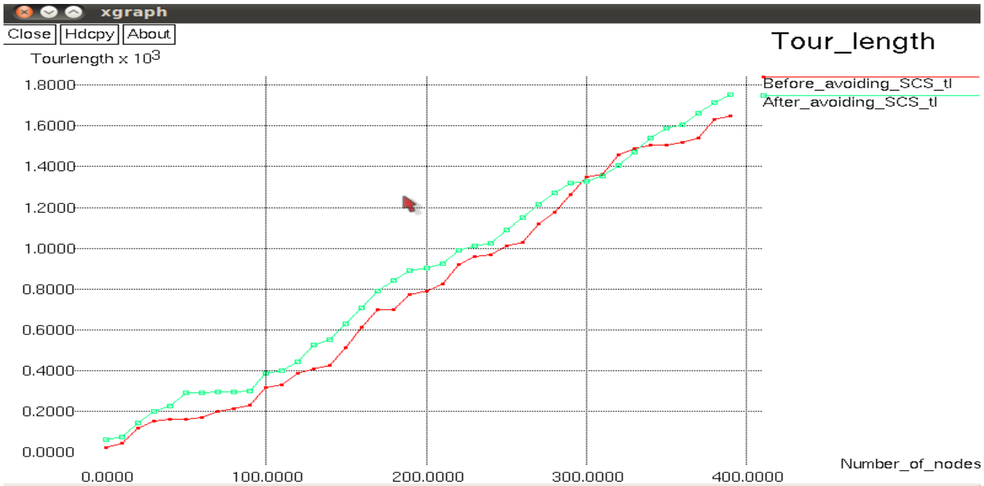
DATA GATHERING WITH MULTIPLE MOBILE COLLECTORS

In our data-gathering scheme with multiple Mobile collectors, only one Mobile Collector needs to visit the transmission range of the data sink. There are some interesting issues here, such as how to relay the packets to the data sink energy efficiently, how to schedule the movement of Mobile Collectors to reduce the packet delay, and so on. Proposed system, we will focus on how to plan the sub- tours of multiple Mobile Collectors to minimize the number of Mobile collectors.

PERFORMANCE EVALUATIONS

Thus based on the simulation method, the proposed approach produces the following results, which show that the tour length of mobile collector and the number of polling points is reduced. This further extends the lifetime of sensor network. The comparison graph is between, with spatially correlated sensors and without spatially correlated sensors.





IV CONCLUSION

The proposed mobile data-gathering scheme is for both small and large-scale sensor networks. We introduced a mobile data collector, called an Mobile collector, which works like a mobile base station in the network. An M-collector starts the data gathering tour periodically from the static data sink, traverses the entire sensor network, polls sensors and gathers the data from sensors one by one, and finally returns and uploads data to the data sink. Our mobile data-gathering scheme improves the scalability and solves intrinsic problems of large-scale homogeneous networks. By introducing the Mobile collector, data gathering becomes more flexible and adaptable to the unexpected changes of the network topology. In addition, data gathering by avoiding the correlated sensors is perfectly suitable for applications, where sensors are only partially connected. For some applications in large scale networks with strict distance/time constraints for each data-gathering tour, we introduced multiple Mobile collectors by letting each of them move through a shorter sub-tours than the entire tour. we also concentrating whether there is any Co-relation between any sensors and if we find Co-relation between sensors we try to find the probability of Co-relation between sensors. Here the New Polling Points was been identified by avoiding the Co-related sensors. Our proposed approach was been proven as Effective way of mobile data gathering by Minimizing the Tour length of Mobile Collectors, Extends the Life time of sensors.

REFERENCES

[1]. W. R. Heinzelman, A. Chandrakasan, and H. Balakrishnan, “Energyefficient communication protocols for wireless microsensor networks,” in *Proc. HICSS*, Maui, HI, Jan. 2000, pp. 1–10.

[2]. W. Zhao, M. Ammar, and E. Zegura, “A message ferrying approach for data delivery in sparse mobile ad hoc networks,” in Proc. ACM MobiHoc, 2004, pp. 187–198.

[3]. R. C. Shah, S. Roy, S. Jain, and W. Brunette, “Data MULEs: Modelling a three-tier architecture for sparse sensor networks,” in Proc. IEEE WorkshopSens. Netw. Protocols Appl., 2003, pp. 30–41.

[4]. S. Jain, R. C. Shah, W. Brunette, G. Borriello, and S. Roy, “Exploiting mobility for energy efficient data collection in wireless sensor networks”. Norwell, MA: Kluwer, 2005.

[5]. D. Jea, A. A. Somasundara, and M. B. Srivastava, “Multiple controlled mobile elements (data mules) for data collection in sensor networks,” inProc. IEEE/ACM Int. Conf. DCOSS, Jun. 2005, pp. 244–257.

[6]. J. Luo and J.-P. Hubaux, “Joint mobility and routing for lifetime elongation in wireless sensor networks,” in Proc. IEEE INFOCOM, 2005, pp. 1735–1746.

[7]. A. Kansal, A. Somasundara, D. Jea, M. Srivastava, and D. Estrin, "Intelligent fluid infrastructure for embedded networks," in Proc. ACM MobiSys, 2004, pp. 111–124.

[8]. W. Liang, P. Schweitzer, and Z. Xu, "Approximation algorithms for capacitated minimum forest problems in wireless sensor networks with a mobile sink," IEEE Trans. Comput., to be published.

[9]. F. Bai, K. S. Munasinghe, and A. Jamalipour, "A novel information acquisition technique for mobile-assisted wireless sensor networks," IEEE Trans. Veh. Technol., vol. 61, no. 4, pp. 1752–1761, May 2012.

[10]. I. Vasilescu, K. Kotay, D. Rus, M. Dunbabin, and P. Corke, "Data collection, storage and retrieval with an underwater sensor network," in Proc.ACM SenSys, 2005, pp. 154– 165.

[11]. A. A. Somasundara, A. Ramamoorthy, and M. B. Srivastava, "Mobile element scheduling for efficient data collection in wireless sensor networks with dynamic deadlines," in Proc. IEEE RTSS, Dec. 2004, pp. 296–305.

[12]. Chongqing Zhang , Binguo wang , Shen Fang , Zhe Li , " Clustering Algorithms for wireless sensor networks using spatial data correlation ", International conference on information and Automation , pp-53-58 ,june 2008.

[13]. Zhikui chen , Song Yang , Liang Li and Zhijiang Xie , " A clustering Approximation Mechinism based on Data Spatial Correlation in Wireless sensor Networks ", Proceedings of the 9th international conferenses on wireless telecommunication symposium -2010.

[14]. Ali Dabirmoghaddam , Majid Ghaderi , Carey Williamson , " Energy Efficient Clustering in wireless Sensor Networks with spatially correlated dara " IEEE infocom 2010 proceedings.