INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3200 - 3204
RECEIVED : 10.03.2018 PUBLISHED : 11.04.2018
April 11, 2018

EXPLORING RELATED DOMINATING SETS IN FORCE GATHER NETWORKS

S.Anish[1],R.Akash[2],Mr.K.Sankar Ganesh[3]
Department of Computer Science and Engineering
Students[1,2],Assistant Professor[3]
Kingston Engineering College,Vellore,India

ABSTRACT

Duty-cycle scheduling is an effective way to balance energy consumptions and prolong network lifetime of wireless sensor networks (WSNs), which usually requires a connected dominating set (CDS) to guarantee network connectivity and coverage. Therefore, the problem of finding the largest number of CDSs is important for WSNs. The previous works always assume all the nodes are non-rechargeable. However, WSNs are now taking advantages of rechargeable nodes to become energy harvest networks (EHNs). To find the largest number of CDSs then becomes completely different. This is the first work to investigate, how to identify the largest number of CDSs in EHNs to prolong network lifetime. The investigated novel problems are proved to be NP-Complete and we propose four approximate algorithms, accordingly. Both the solid theoretical analysis and the extensive simulations are performed to evaluate our algorithms.

KEYWORDS: wireless sensor networks ,NP-Complete , connected dominating set.

I. INTRODUCTION

WIRELESS Sensor Networks (WSNs) are very popular in the recent years. By deploying sensors in an area, people can observe the physical world in real time with a low cost, and operations such as query and aggregation are available. However, many limitations hinder the development of WSNs. A challenging one is that network lifetime may highly depend on the sensor with the least energy in a WSN. Therefore, many methods focus on balancing energy consumptions of sensors to prolong network lifetime, such as the duty-cycle scheduling techniques.

To apply such techniques, each sensor node has two states, sleeping state and active state, and all the functional modules are turned off when a sensor node is sleeping in order to save energy. Such techniques can dramatically prolong network lifetime, and they require that the active sensor nodes form a Connected Dominating Set (CDS) in order to guarantee connectivity and coverage of the whole network. Connectivity and coverage are the two primary concerns for a WSN to be functional, and techniques such as data mining information retrieving can be guaranteed.

II. EXISTING SYSTEM

To prolong network lifetime, multiple CDSs are expected in a WSN so that they can take turns to serve as virtual backbones. A Connected Domatic Partition (CDP) is a partition of the nodes in a graph into disjoint sets, and eachset represents a CDS of the graph. The work in presents a CDP-based backbone rotation scheme, which aims at designing a distributed algorithm to solve the CDP problem. Based on this work, the authors in proposed a new scheduling method called Virtual Backbone Scheduling (VBS).

III. LIMITATIONS

[1]. The performances of the proposed algorithms are thoroughly analyzed, and extensive simulations are conducted to evaluate our algorithms. The results show that the network lifetime resulted by our algorithms can be prolonged.[2]. Energy harvesting is a way of energy provision. Equipped with energy harvesting devices such as solar panel, wind generator and RF energy harvester, a sensor can harvest energy from the environment.

IV. LITERATURE SURVEY

[1]. Adaptive connected dominating set discovering algorithm in energy-harvest sensor networks:A Wireless Sensor Network consists of a number of sensors. The energy of each sensor is limited which limits network lifetime. There are many existing energy efficiency algorithms to prolong network lifetime. Basically, there are two kinds of methods. One is energy-efficiency management, such as duty-cycling using virtual-backbones. The other one is energy provision, such as energy harvest from the environment. In this paper, we introduce a new problem, CDSEH, to combine these two methods together. We also propose a new standard to define the network lifetime of a WSN. We prove that the CDSEH problem is NP-Complete and propose two approximate algorithms accordingly. Extensive simulation results are shown to validate the performance of our algorithms.

[2]. Curve query processing in wireless sensor networks:Most existing query processing algorithms for wireless sensor networks (WSNs) can only deal with discrete values. However, since the monitored environment always changes continuously with time, discrete values cannot describe the environment accurately and, hence, may not satisfy a variety of query requirements, such as the queries of the maximal, minimal, and inflection points. It is, therefore, of great interest to introduce new queries capable of processing time-continuous data. This paper investigates curve query processing for WSNs as curve is an effective way to represent continuous sensed data. Specifically, a sensed curve derivation algorithm to support curve query processing in WSNs is first proposed. Then, the aggregation operation is employed as an example to illustrate curve query processing. The corresponding accurate and approximate aggregation algorithms are devised accordingly. We demonstrate that the energy cost of the approximate aggregation algorithm is optimal, provided that the required precision is satisfied. The theoretical analysis and experimental results indicate that the proposed algorithms can achieve high performance in terms of accuracy and energy efficiency.

[3]. Approximate holistic aggregation in wireless sensor networks: Holistic aggregation results are important for users to obtain summary information from Wireless Sensor Networks (WSNs). Holistic aggregation requires all the sensory data to be sent to the sink, which costs a huge amount of energy. Fortunately, in most applications, approximate results are acceptable. We study the approximated holistic aggregation algorithms based on uniform sampling. In this paper, four holistic aggregation operations are investigated. The mathematical methods to construct their estimators and determine the optional sample size are proposed, and the correctness of these methods is proved. Four corresponding distributed holistic algorithms are presented. The theoretical analysis and simulation results show that the algorithms have high performance.

V. PROPOSED SYSTEM

The work in proposes a model based on energy harvesting and there may be mobile nodes in a network. The mobile nodes are able to move freely in a network and charge other sensor nodes. However, all of these works ignore the fact that the cost of a single energy harvesting node is high. In our work, we only employ a limited number of energy harvesting nodes in a network

VI. ADVANTAGES

[1]In the first group of simulations, we investigate the advantages of EHNs over non-EHNs through running LMW in these two kinds of networks.[2]The network size increases from 300 to 2000, and the transmission radius of a node is 50m. Both kinds of networks share the same topology, whereas 20% of the nodes are rechargeable in an EHN.

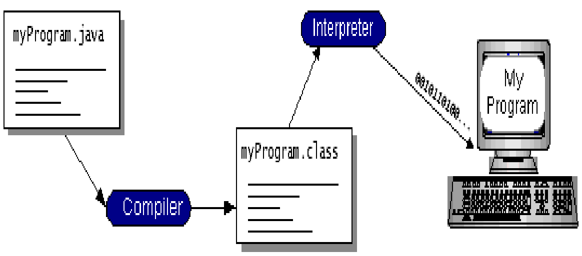
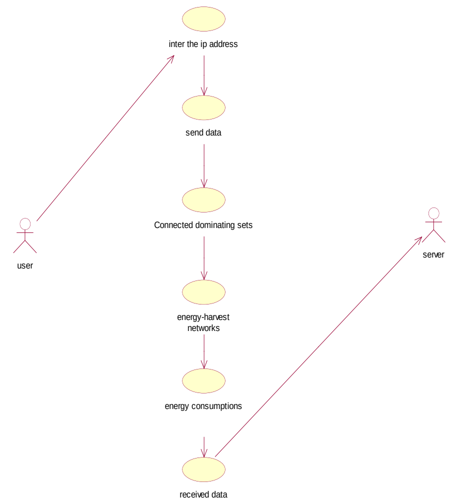


Fig. 1. Architecture Diagram

VII. FEATURES

- The work in proposes a model based on energy harvesting and there may be mobile nodes in a network.
- The mobile nodes are able to move freely in a network and charge other sensor nodes.
- The network size increases from 300 to 2000, and the transmission radius of a node is 50m.

VIII. USE CASE DIAGRAM



IX.CONCLUSION&FUTURE ENHANCEMENT

WSNs expect efficient energy usage to prolong network lifetime. In this paper, we first formulate the EH-CDS problem and prove it is an NP-Complete problem. Then we propose three algorithms for EHNs. The centralized algorithm achieves longer network lifetime than the distributed algorithms. However, the distributed LMW algorithm is more practical and can also achieve long network lifetime. To decrease the communication complexity of the LMW algorithm, we propose an improved LMW algorithm. Furthermore, we formulate an improved version of the EH-CDS problem, named as the EH-CDS-M problem, where the rechargeable nodes can be mobile and can replace non-rechargeable nodes to work. The MRR algorithm is proposed to solve the EH-CDS-M problem. We also prove the correctness of our algorithms and analyze their approximation ratios and complexities. We evaluate our proposed algorithms through extensive simulations. The results show that our algorithms can achieve longer network lifetime than the other existing algorithms.

REFERENCES

[1] T. Shi, S. Cheng, Z. Cai, and J. Li, “Adaptive connected dominatingset discovering algorithm in energy-harvest sensor networks,” in Proc. IEEE INFOCOM, Apr. 2016, pp. 1–9.

[2] S. Cheng, Z. Cai, and J. Li, “Curve query processing in wireless sensornetworks,” IEEE Trans. Veh. Technol., vol. 64, no. 11, pp. 5198–5209, Nov. 2015.

[3] J. Li, S. Cheng, Y. Li, and Z. Cai, “Approximate holistic aggregationin wireless sensor networks,” in Proc. IEEE ICDCS, Jun./Jul. 2015 pp. 740–741.

[4] Z. He, Z. Cai, S. Cheng, and X. Wang, “Approximate aggregation fortracking quantiles and range countings in wireless sensor networks,” Theor. Comput. Sci., vol. 607, pp. 381–390, Nov. 2015.

[5] Q. Chen, S. Cheng, H. Gao, J. Li, and Z. Cai, "Energy-efficient algorithmfor multicasting in duty-cycled sensor networks," Sensors, vol. 15, no. 12, pp. 31224–31243, 2005.

[6] J. Yu, N. Wang, G. Wang, and D. Yu, "Connected dominating sets in wireless ad hoc and sensor networks—A comprehensive survey," Comput. Commun., vol. 36, no. 2, pp. 121–134, 2013.

[7] J. Yu, N. Wang, and G. Wang, "Constructing minimum extended weakly-connected dominating sets for clustering in ad hoc networks," J. Parallel Distrib. Comput., vol. 72, no. 1, pp. 35–47, 2012.

[8] S. Cheng, Z. Cai, J. Li, and H. Gao, "Extracting kernel dataset from bigsensory data in wireless sensor networks," IEEE Trans. Knowl. Data Eng., to be published, doi: 10.1109/TKDE.2016.2645212.

[9] Z. Cai, S. Ji, J. He, L. Wei, and A. G. Bourgeois, "Distributed and asynchronous data collection in cognitive radio networks with fairness consideration," IEEE Trans. Parallel Distrib. Syst., vol. 25, no. 8, pp. 2020–2029, Aug. 2014.

[10] R. Misra and C. Mandal, "Rotation of cds via connected domatic partition in ad hoc sensor networks," IEEE Trans. Mobile Comput., vol. 8, no. 4, pp. 488–499, Apr. 2009.

[11] Y. Zhao, J. Wu, F. Li, and S. Lu, "VBS: Maximum lifetime sleep scheduling for wireless sensor networks using virtual backbones," in Proc. IEEE INFOCOM, Mar. 2010, pp. 1–5.

[12] M. Cardei, M. T. Thai, Y. Li, and W. Wu, "Energy-efficient target coverage in wireless sensor networks," in Proc. 24th IEEE Annu. Joint Conf. IEEE Comput. Commun. Soc., vol. 3. Mar. 2005, pp. 1976–1984.

[13] S. Guha and S. Khuller, "Approximation algorithms for connected dominating sets," Algorithmica, vol. 20, no. 4, pp. 374–387, 1998.

[14] M. Cardei, M. X. Cheng, X. Cheng, and D.-Z. Du, "Connected domination in multihop ad hoc wireless networks," in Proc. JCIS, 2002, pp. 251–255.

[15] W. Wu, H. Du, X. Jia, Y. Li, and S. C.-H. Huang, "Minimum connected dominating sets and maximal independent sets in unit disk graphs," Theor. Comput. Sci., vol. 352, no. 1, pp. 1–7, 2006.