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Data gathering with load balanced clustering and dual data uploading in wireless sensing networks

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ABSTRACT:

In this paper, a three-layer framework is proposed for mobile data collection 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 as LBC-DDU. 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. In contrast to existing clustering methods, our scheme generates multiple cluster heads in each cluster to balance the work load and facilitate dual data uploading. At the cluster head layer, the inter-cluster transmission range is carefully chosen to guarantee the connectivity among the clusters. Multiple cluster heads within a cluster cooperate with each other to perform energy-saving inter-cluster communications. Through inter-cluster transmissions, cluster head information is forwarded to SenCar for its moving trajectory planning. At the mobile collector layer, SenCar is equipped with two antennas, which enables two cluster heads to simultaneously upload data to SenCar in each time by utilizing multi-user multiple-input and multiple-output (MU-MIMO) technique. 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. Extensive simulations are conducted to evaluate the effectiveness of the proposed LBC-DDU scheme. The results show that when each cluster has at most two cluster heads, LBC-DDU achieves over 50 percent energy saving per node and 60 percent energy saving on cluster heads comparing with data collection through multi-hop relay to the static data sink, and 20 percent shorter data collection time compared to traditional mobile data gathering.

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.

DISADVANTAGES 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.

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.

ADVANTAGES OF PROPOSED SYSTEM:

- ✓ In contrast to clustering techniques proposed in previous works, our algorithm balances the load of intra-cluster aggregation and enables dual data uploading between multiple cluster heads and the mobile collector.
- ✓ Different from other hierarchical schemes, in our algorithm, cluster heads do not relay data packets from other clusters, which effectively alleviates the burden of each cluster head. Instead, forwarding paths among clusters are only used to route small-sized identification (ID) information of cluster heads to the mobile collector for optimizing the data collection tour.
- ✓ Our work mainly distinguishes from other mobile collection schemes in the utilization of MUMIMO technique, which enables dual data uploading to shorten data transmission latency. We coordinate the mobility of SenCar to fully enjoy the benefits of dual data uploading, which ultimately leads to a data collection tour with both short moving trajectory and short data uploading time.

SYSTEM ARCHITECTURE:

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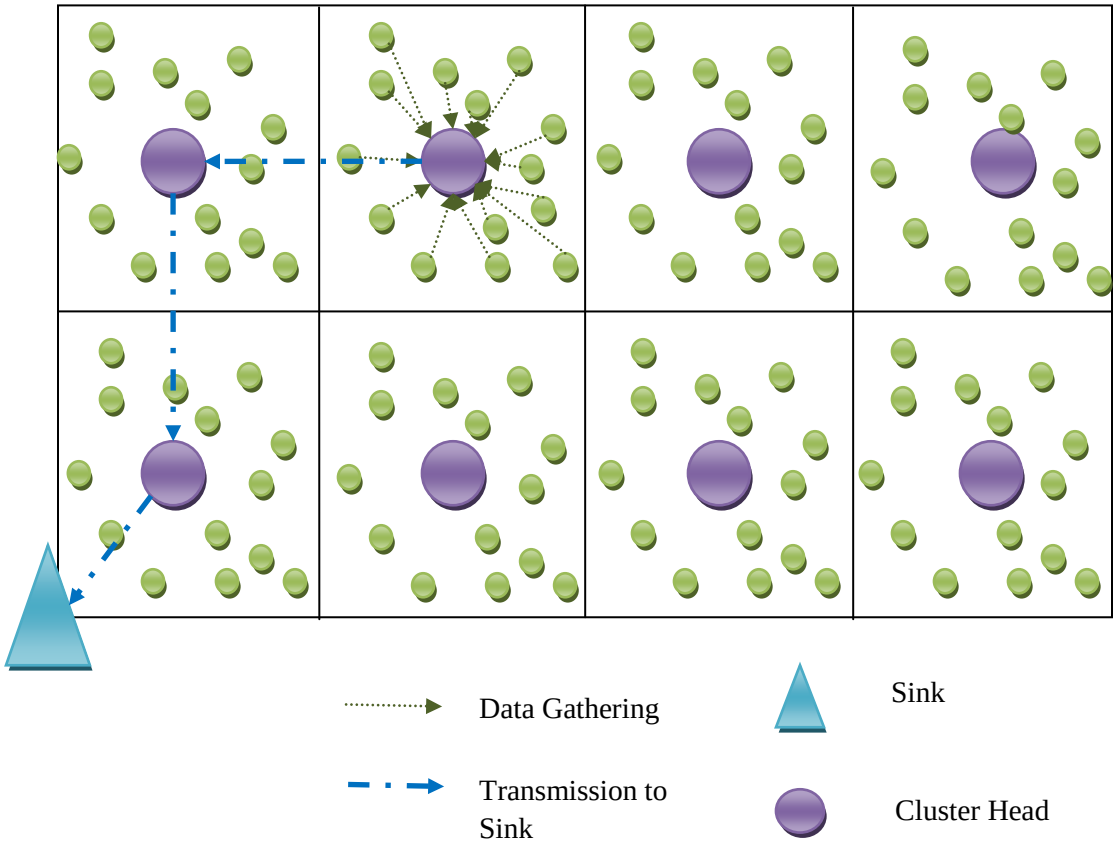

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INTRODUCTION

THE rapid growth and continuous change of the real world software applications have provoked researchers to propose several computing services' techniques to achieve more efficient and effective management of web telemedicine database systems (WTDS). Significant research progress has been made in the past few years to improve WTDS performance. In particular, databases as a critical component of these systems have attracted many researchers. The web plays an important role in enabling healthcare services like telemedicine to serve inaccessible areas where there are few medical resources. It offers an easy and global access to patients' data without having to interact with them in person and it provides fast channels to consult specialists in emergency situations. Different kinds of patient's information such as ECG, temperature, and heart rate need to be accessed by means of various

client devices in heterogeneous communications environments. WTDS enable high quality continuous delivery of patient's information wherever and whenever needed. Several benefits can be achieved by using web telemedicine services including: medical consultation delivery, transportation cost savings, data storage savings, and mobile applications support that overcome obstacles

related to the performance (e.g., bandwidth, battery life, and storage), security (e.g., privacy, and reliability), and environment (e.g., scalability, heterogeneity, and availability). The objectives of such services are to: (i) develop large applications that scale as the scope and workload increases, (ii) achieve precise control and monitoring on medical data to generate high telemedicine database system performance,

(iii) provide large data archive of medical data records, accurate decision support systems, and trusted event-based notifications in typical clinical centers In this work, we address the previous drawbacks and propose a three-fold approach that manages the computing web services that are required to promote telemedicine database system performance. The main contributions are: _ Develop a fragmentation computing service technique

by splitting telemedicine database relations

into small disjoint fragments. This technique generates the minimum number of disjoint fragments that would be allocated to the web servers in the data distribution phase. This in turn reduces the data transferred and accessed through different websites and accordingly reduces the communications cost. _ Introduce a high speed clustering service technique that groups the web telemedicine database sites into sets of clusters according to their communications

cost. This helps in grouping the websites that are more suitable to be in one cluster to minimize data allocation operations, which in turn helps to avoid allocating redundant data.

RELATED WORK

Many research works have attempted to improve the performance of distributed database systems. These works have mostly investigated fragmentation, allocation and sometimes clustering problems. In this section, we present the main contributions related to these problems, discuss and compare their contributions with our proposed solutions.

TELEMEDICINE IFCA ASSUMPTIONS AND DEFINITIONS

Incorporating database fragmentation, web database sites' clustering, and data fragments computing services' allocation

techniques in one scenario distinguishes our approach from other approaches. The functionality of such approach depends on the settings, assumptions, and definitions

that identify the WTDS implementation environment, to guarantee its efficiency and continuity Fragmentation Computing Service To control the process of database fragmentation

and maintain data consistency, the fragmentation technique partitions each database relation into data set records that guarantee data inclusion, integration and non-overlapping. In a WTDS, neither complete relation nor attributes are suitable data units for distribution, especially when considering

very large data. Therefore, it is appropriate to use data fragments that would be allocated to the WTDS sites. Data fragmentation is based on the data records generated by executing the telemedicine SQL queries on the database relations. The ragmentation process goes through two consecutive internal processes: (i) Overlapped and redundant data records fragmentation and (ii) Non-overlapped data records fragmentation.

CONCLUSION

In this work, we proposed a new approach to promote WTDS performance. Our approach integrates three enhanced computing services' techniques namely, database

fragmentation, network sites clustering and fragments allocation. We develop these techniques to solve technical challenges,

like distributing data fragments among multiple web servers, handling failures, and making tradeoff between data availability and consistency. We propose an estimation model to compute communications cost which helps in finding cost-effective data allocation solutions. The novelty of our approach lies in the integration of web database sites clustering as a new component of the process of WTDS design in order to improve performance and satisfy a certain level of quality in web services.

We perform both external and internal evaluation of our integrated approach. In the internal evaluation, we measure the impact of using our techniques on WTDS and web service performance measures like communications cost, response time and throughput. In the external evaluation, we compare the performance of our approach

to that of other techniques in the literature. The results show that our integrated approach significantly improves services requirement satisfaction in web systems. This conclusion requirees more investigation and experiments. Therefore, as future work we plan to investigate our approach on larger scale networks involving large number of sites over the cloud. We will consider applying different types of clustering and introduce search based technique to perform more intelligent data redistribution. Finally, we intend to introduce security concerns that need to be addressed over data fragments.

REFERENCES

[1] J.-C. Hsieh and M.-W. Hsu, "A Cloud Computing Based 12-Lead

ECG Telemedicine Service," BMC Medical Informatics and Decision

Making, vol. 12, pp. 12-77, 2012.

[2] A. Tamhanka and S. Ram, "Database Fragmentation and Allocation:

An Integrated Methodology and Case Study," IEEE Trans.
Systems, Man and Cybernetics, Part A: Systems and Humans, vol. 28,
no. 3, pp. 288-305, May 1998.
[3] L. Borzemski, "Optimal Partitioning of a Distributed Relational
Database for Multistage Decision-Making Support systems,"
Cybernetics and Systems Research, vol. 2, no. 13, pp. 809-814, 1996.
[4] J. Son and M. Kim, "An Adaptable Vertical Partitioning Method in
Distributed Systems," J. Systems and Software, vol. 73, no. 3,
pp. 551-561, 2004.
[5] S. Lim and Y. Ng, "Vertical Fragmentation and Allocation in Distributed
Deductive Database Systems," J. Information Systems,
vol. 22, no. 1, pp. 1-24, 1997.
[6] S. Agrawal, V. Narasayya, and B. Yang, "Integrating Vertical and
Horizontal Partitioning into Automated Physical Database
Design," Proc. ACM SIGMOD Int'l Conf. Management of Data,
pp. 359-370, 2004.
[7] S. Navathe, K. Karlapalem, and R. Minyoung, "A Mixed Fragmentation
Methodology for Initial Distributed Database Design,"
J. Computer and Software Eng., vol. 3, no. 4, pp. 395-425, 1995.
[8] H. Ma, K. Scchewe, and Q. Wang, "Distribution Design for
Higher-Order Data Models," Data and Knowledge Eng., vol. 60,
pp. 400-434, 2007.
[9] W. Yee, M. Donahoo, and S. Navathe, "A Framework for Server
Data Fragment Grouping to Improve Server Scalability in Intermittently
Synchronized Databases," Proc. ACM Conf. Information
and Knowledge Management (CIKM), 2000.
[10] A. Jain, M. Murty, and P. Flynn, "Data Clustering: A Review,"
ACM Computing Surveys, vol. 31, no. 3, pp. 264-323, 1999.
[11] Lepakshi Goud, "Achieving Availability, Elasticity and Reliability
of the Data Access in Cloud Computing," Int'l J. Advanced Eng.
Sciences and Technologies, vol. 5, no. 2, pp. 150-155, 2011.
[12] Y. Huang and J. Chen, "Fragment Allocation in Distributed Database
Design," J. Information Science and Eng., vol. 17, pp. 491-506,
2001.
[13] P. Kumar, P. Krishna, R. Bapi, and S. Kumar, "Rough Clustering
of Sequential Data," Data and Knowledge Eng., vol. 63, pp. 183-199,

2007.
[14] K. Voges, N. Pope, and M. Brown, "Cluster Analysis of Marketing
Data Examining Online Shopping Orientation: A comparison of
K-means and Rough Clustering Approaches," Heuristics and Optimization
for Knowledge Discovery, H.A. Abbass, R.A. Sarker, and C.
S. Newton, eds., pp. 207-224, Idea Group Publishing, 2002.
[15] A. Fronczak, J. Holyst, M. Jedyank, and J. Sienkiewicz, "Higher
Order Clustering Coefficients," Barabasi-Albert Networks, Physica
A: Statistical Mechanics and Its Applications, vol. 316, no. 1-4,
pp. 688-694, 2002.
[16] M. Halkidi, Y. Batistakis, and M. Vazirgiannis, "Clustering Algorithms
and Validity Measures," Proc. 13th Int'l Conf. Scientific and
Statistical Database Management (SSDBM), 2001.
[17] A. Ishfaq, K. Karlapalem, and Y. Kaiso, "Evolutionary Algorithms
for Allocating Data in Distributed Database Systems," Distributed
and Parallel Databases, vol. 11, pp. 5-32, Kluwer Academic Publishers,
2002.
[18] C. Danilowicz and N. Nguyen, "Consensus Methods for Solving
Inconsistency of Replicated Data in Distributed Systems," Distributed
and Parallel Databases, vol. 14, pp. 53-69, 2003.
[19] R. Costa and S. Lifschitz, "Database Allocation Strategies for Parallel
BLAST Evaluation on Clusters," Distributed and Parallel Databases,
vol. 13, pp. 99-127, 2003.
[20] S. Menon, "Allocating Fragments in Distributed Databases," IEEE
Trans. Parallel and Distributed Systems, vol. 16, no. 7, pp. 577-585,
July 2005.
[21] N. Daudpota, "Five Steps to Construct a Model of Data Allocation
for Distributed Database Systems," J. Intelligent Information Systems:
Integrating Artificial Intelligence and Database Technologies,
vol. 11, no. 2, pp. 153-68, 1998.
[22] Microsoft SQL Server Available from: <http://www.microsoft.
com/sql/editions/express/default.mspx>, 2012.
[23] MySQL 5.6 <http://www.mysql.com/>, 2013.
[24] OPNET IT Guru Academic, OPNET Technologies, Inc. <http://
www.opnet.com/university_program/itguru_academic_edition/>,
2003.
[25] J. Hauglid, N. Ryeng, and K. Norvag, "DYFRAM: Dynamic Fragmentation

and Replica Management in Distributed Database Systems,"
Distributed and Parallel Databases, vol. 28, pp. 157-185, 2010.
[26] Z. Wang, T. Li, N. Xiong, and Y. Pan, "A Novel Dynamic Network
Data Replication Scheme Based on Historical Access Record and
Proactive Deletion," J. Supercomputing, vol. 62, pp. 227-250, Oct.
2011, DOI: 10.1007/s11227-011-0708-z. Published online.

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