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Improving Services of TDMS Through High Performance Computing

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Abstract - Now *a day's web computing and mobile computing systems are running on real time database services where their data can change continuously and expand rapidly. The increasing complexity and the continuously growth of the websites of tele-healthcare challenging applications make it difficult to manage the database to the database administrative staff. We build an integrated web data services it has high performance of response time for Tele-health application systems. Our main aim will be on to decrease care problems like distance, travel, and time limitations etc and increase care admissions. We proposed an approach to manage different medical databases in the telemedicine system. In order to effectively and efficiently manage, display and search database information. We define an information for doctor as well as patient as a concise of data set of their medical data or information from each visit. There are different methods for accessing various types of medical record or reports will be provided, also we will design two web-based services, high quality data and display for many medical services. We implement integrated approach based on websites clustering, data fragmentation and intelligent data distribution. These techniques reduce the amount of data transfer among different websites during applications execution. It reduce cost of communications during application processing and increase applications response time and throughput.*

Key Words: Distributed Database Management System, Fragmentation, Allocation, Clustering, Network Sites.

1. INTRODUCTION

Telemedicine system include in hospital care management. Telemedicine applications are method to improve the quality of the delivered sanitary assistance. This system plays an important role in enabling healthcare services like telemedicine to serve inaccessible areas where there are few medical resources. The main aim of telemedicine system is to move the medical services to patient rather than patient move to the medical services. Telemedicine is the use of information technology and the communication to provide hospitalization from a distance. It eliminate care difficulties like distance, travel, time etc. and can improve access to medical services that would often not be consistently available in distant rural area. It provides the service in critical case and in emergency situation also. In this system each and every design of function and feature represented in hospital grade medical art. This system is all in vertical integrated techniques telemedicine video conferencing system. It provides an easy and global access to the patient data without having the person interact with the system. It include the different kind of patient information such as ECG, heart rate , temperature etc. Recently, many of the researchers have focused on designing of the telemedicine database management system that satisfy the certain performance levels. Designing and developing fast, efficient, and reliable incorporated techniques that can handle huge number of medical transactions on large number of web healthcare. we propose an approach to manage different medical databases that is to improve the performance of the system, we use the different techniques such as data fragmentation, websites clustering, and data distribution computing services. These together works like as a new web telemedicine database management system approach. This new approach intends to increase system throughput, reliability, and data availability and decrease data communication.

2. LITERATURE SERVEY

2.1 An Adaptable Vertical Partitioning Method in Distributed Systems

J. Son and M. Kim Vertical partitioning is a process of generating the fragments, each of which is composed of attributes with high affinity. The concept of vertical partitioning has been applied to many research areas, especially databases and distributed systems, in order to improve the performance of query execution and system throughput. However, most previous approaches have focused their attention on generating an optimal partitioning without regard to the number of fragments finally generated, which is called best-fit vertical partitioning in this paper. On the other hand, there are some cases that a certain number of fragments are required to be generated by vertical partitioning, called n-way vertical partitioning in this paper. The n-way vertical partitioning problem has not fully investigated. In this paper, we propose an adaptable vertical partitioning method that can support both best-fit and n-way vertical partitioning [7].

2.2 Rough Clustering of Sequential Data

Name of paper	Year	Advantages	Disadvantages
An adaptable vertical partitioning method in DS	2003	Support both best-fit & n way partitioning method	The n-way vertical partitioning problem has not fully investigated
"Rough Clustering of Sequential Data, by P. Kumar, P. Krishna, R. Bapi, and S. Kumar	2007	High reliable because each site is considered in multiple clusters	Poor due to redundant data in multiple sites
WTDMS by Hafez fauad Microelectronic, Cairo, Egypt	2014	Can be applied to real life problems	Low efficiency and effectiveness
Designing High Performance Web-Based Computing Services to Promote Telemedicine Database Management System	2015	maximal locality of query evaluation and minimization of communication cost	

A new indiscernibility-based rough agglomerative hierarchical clustering algorithm for sequential data. In this approach, the indiscernibility relation has been extended to a tolerance relation with the transitivity property being relaxed. Initial clusters are formed using a similarity upper approximation. Subsequent clusters are formed using the concept of constrained-similarity upper approximation wherein a condition of relative similarity is used as a merging criterion. We report results of experimentation on msnbc web navigation dataset that are intrinsically sequential in nature. We have compared the results of the proposed approach with that of the traditional hierarchical clustering algorithm using vector coding of sequences. The results establish the viability of the proposed approach. The rough clusters resulting from the proposed algorithm provide interpretations of different navigation orientations of users present in the sessions without having to fit each object into only one group. Such descriptions can help web miners to identify potential and meaningful groups of users.

2.3 Web-Based Database Management

To Support Telemedicine System by Hafez Fouad Microelectronics Dept., Electronics Research Institute, Cairo, Egypt. The transfer of the medical care services to the patient, rather than the transport of the patient to the Medical services providers is aim of the project. This is achieved by using web-based applications including Modern Medical Informatics Services which is easier, faster and less expensive. The required system implements the suitable informatics and electronics solutions efficiently for the Tele-medicine care. We proposed an approach to manage different multimedia medical databases in the telemedicine system. In order to be effectively manage, search, and display database information, we define an information package for both of doctor and patient as a concise data set of their medical information from each visit. The methodology for accessing various types of medical records will be provided, also we will design two web-based interfaces, high-quality data and display for many medical service purposes. Maintaining the Integrity of the Specification.

2.4 Designing High Performance Web-Based Computing Services to Promote Telemedicine Database Management System

Ismail Hababeh, Issa Khalil, (2015) Many web computing systems are running real time database services where their information change continuously and expand incrementally. In this context, web data services have a major role and draw significant improvements in monitoring and controlling the

information truthfulness and data propagation. Currently, web telemedicine database services are of central importance to distributed systems. However, the increasing complexity and the rapid growth of the real world healthcare challenging applications make it hard to induce the database administrative staff. In this paper, we build an integrated web data services that satisfy fast response time for large scale Tele-health database management systems. Our focus will be on database management with application scenarios in dynamic telemedicine systems to increase care admissions and decrease care difficulties such as distance, travel, and time limitations. We propose three-fold approach based on data fragmentation, database websites clustering and intelligent data distribution. This approach reduces the amount of data migrated between websites during applications' execution; achieves cost effective communications during applications' processing and improves applications' response time and throughput. The proposed approach is validated internally by measuring the impact of using our computing services' techniques on various performance features.

3. PROPOSED SYSTEM

The aim of the project is to move the medical services to the patient rather than moving patient to the medical services. This web system used in healthcare services like telemedicine to provide inaccessible areas where only few medical resources available. In this project we can develop a web based system in which a doctor does the patient registration and give him/her the prescription but case where the patient requires the special medical consultation which is available at a distance. The doctor send request to the online doctor about the special medical consultation and online doctor approves the request and provides special consultation online. System also maintains patient health care records. The clustering is done according to the patient details, doctor details and condition of the patient. The fragmentation and clustering is done in order the search patient and doctor details efficiently and in real time. In our proposed system we develop a fragmentation computing service technique by dividing 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. Data distribution is mainly used for improve the distributed database system performance. This is technique reduces the data transferred and accessed through different websites and accordingly reduces the communications cost. In the proposed system we 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.

3.1 Architecture

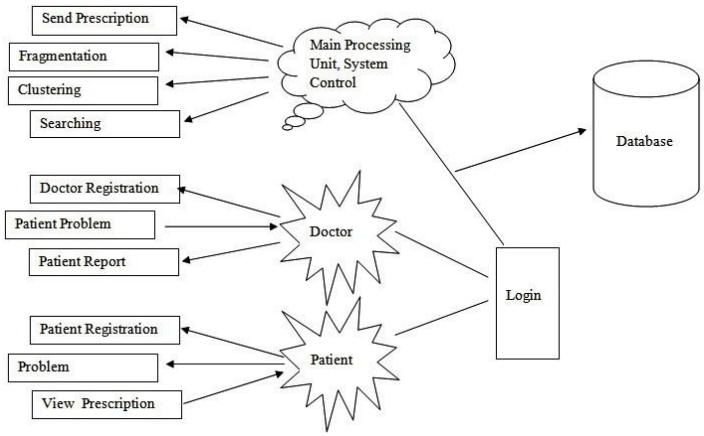

Fig no.1: System architecture.

3.2 Modules Descriptions

Web Architecture and Communications System Model
In the first module, the telemedicine approach is designed to support web database provider with computing services that can be implemented over multiple servers, where the data storage, communication and processing transactions are fully controlled, costs of communication are symmetric, and the patients' information privacy and security are met. We propose fully connected sites on a web telemedicine heterogeneous network system with different bandwidths; 128 kbps, 512 kbps, or multiples. In this environment, some servers are used to execute the telemedicine queries triggered from different web database sites. Few servers are run the database programs and perform the fragmentation clustering- allocation computing services while the other servers are used to store the database fragments. Communications cost (ms/byte) is the cost of loading and processing data fragments between any two sites in WTDS. To control and simplify the proposed web telemedicine communication system, we assume that communication costs between sites are symmetric and proportional to the distance between them. Communication costs within the same site are neglected.

Fragmentation and Clustering

Telemedicine queries are triggered from web servers as transactions to determine the specific information that should be extracted from the database. The main issue in the fragmentation is distribution of data clusters. Grouping the distributed sites into clusters that will helps to reducing the communication cost between sites and distributed database system. Transactions include but not limited to: read, write, update, and delete. To control the process of database fragmentation and to achieve data consistency in the telemedicine database system, IFCA fragmentation service

technique partitions each database relation according to the Inclusion-Integration-Disjoint assumptions where the generated fragments must contain all records in the database relations, the original relation should be able to be formed from its fragments, and the fragments should be neither repeated nor intersected. The logical clustering decision is defined as a Logical value that specifies whether a website is included or excluded from a certain cluster, based on the communications cost range. The communications cost range is defined as a value (ms/byte) that specifies how much time is allowed for the websites to transmit or receive their data to be considered in the same cluster, this value is determined by the telemedicine database administrator.[4]

4. ALGORITHM

Clustering: We introduce a high speed clustering service based on the least average communication cost between sites. Clustering is used for the grouping of networking sites and discovers the distributions on large web database system. Grouping distributed network sites into clusters is used for the reducing the extra communication cost between network sites and distributed database system. Network sites are used to manage the data and allow data transparency to users of the database. Clustering coefficients are used to probabilities that discover the shortest path between any two neighbors. The parameters used to control the input/output computations for generating clusters and determining the set of sites in each are computed as follows:

- Communications cost between sites CC(*Si, Sj*) = data creation cost + data transmission cost between *Si, Sj*.
- Communication cost range CCR (ms/byte) which is determined by the telemedicine database system administrator.
- Clustering Decision Value (*cdv*):

$$cdv(S_i,S_j)=\{1:IF\quad CC(S_i,S_j)\le CCR\wedge i\neq j \text{ and } 0:IF\quad CC(S_i,S_j)>CCR\vee i=j$$

Cluster, otherwise they are assigned to different clusters. If site Si can be assigned to more than one cluster, it will be considered for the cluster of the least average communication cost based on this clustering service, we develop the clustering algorithm as following:[1]

Input: Matrix of communication cost between sites CC(Si,Sj)
CCR: communication cost range; N: List of WTDS sites;
Output: CDV(Sn,Sn) Clustering Decision Values Matrix
Step 1: For I = 1, N.size(), do steps (2) - (8)
Step 2: For J = 1, N.size(), do steps (3) - (7)
Step 3: If I ≠ J AND CC(Si,Sj) <= CCR, go to step (4)
Else, go to step (5)
Step 4: Set 1 to both CDV(Si,Sj) and CDV(Sj,Si) , go to step 6
Step 5: Set 0 to both CDV(Si,Sj) and CDV(Sj,Si)
Step 6: End IF; Step 7: End For; Step 8: End For; Step 9: Stop

Fragmentation: Data fragmentation is based on the data records generated by executing the telemedicine SQL queries on the database relations. The fragmentation service generates disjoint fragments that represent the minimum number of data records. Fragmentation technique partitions each dataset relation into data set records that guarantee data inclusion, integration and non overlapping. The proposed fragmentation Service architecture is described through Input-Processing-Output phases Depicted in Fig.2 [1]

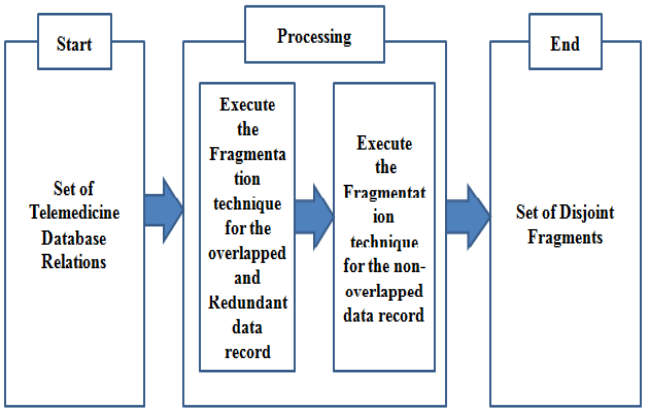

Fig no.2 Data Fragmentation Service architecture

Based on this fragmentation service, the global database is partitioned into disjoint fragments. The fragmentation process is described step by step in the following algorithm,

Step 1: Set 1 to I; K = F.size()
Step 2: Do steps (3-18) until I >F.size()
Step 3: Set 1 to J
Step 4: Do steps (5-16) until J > F.size()
Step 5: If I ≠ J and ∃ Fi , Fj ∈ F go to (6)
Else, Add 1 to J and go to step (15)
Step 6: If Fi ∩ Fj≠ Ø do steps (7-14)
Else, Add 1 to J and go to step (14)
Step 7: Add 1 to K
Step 8: Create new fragment
Fk= Fi ∩ Fj and add it to F
Step 9: Create new fragment
F_{k+1} *= Fi-Fk and add it to F*
Step 10: Create new fragment
F_{k+2} *= Fj- Fk and add it to F*
Step 11: Delete Fi
Step 12: Delete Fj
Step 13: Set F + 1 to J
Step 14: End IF; Step 15: End IF
Step 16: Loop
Step 17: Add 1 to I
Step 18: Loop
Step 19: Add 1 to R
Step 20: Loop

5. CONCLUSION AND FUTURE WORK

In this work, we proposed a new approach to promote WTDS performance. Our approach includes three enhanced computing services techniques namely, data fragmentation, database websites clustering and intelligent data distribution. That will help to improve the medical health care records. We implement these techniques to solve the, data availability between different web servers, handling failure etc. From anywhere it can be used to access an maintained the medical health care records easily. As a future work we plan to implement our approach for the **Digital India** to improve the medical facilities. We intended to introduce a more secure plan over the cloud. India is the first country to start a hospital train, called Life Line Express. It has benefited over 6,00,000 rural Indians So it is easy to reduce the communication cost and improve Tele-health.

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