



A Survey on E-Health Care for Diabetes Using Cloud Framework

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Abstract: The recent health care system is data intensive which is to manage effectively in hospital's patients, various professionals like medical practitioners, nurses, allied health professionals, clinics, nursing home, and so on often need to interchange important amounts of information in real time. Cloud based applications especially SaaS plays vital role to offer an on-demand reliable service for health care providers to retrieve electronic health records from different regions, time and working hours. Data mining techniques grants easy access to effectively retrieve and share health records. This paper is focus on a survey analysis of building health care data mining services, disease detection, architecture for clinical support system, efficient data access control, healthcare management application and so on in the latest researches of cloud based health care records maintaining in the hospital with technology and information support. We also have concentrated on pros and cons of cloud based healthcare records access.

I. INTRODUCTION

Text corpus is an effective method to sharing the information over internet. A hospital has an inevitableneeds to share their patients' healthcare data to various health specialist, therapist, psychiatrist and different clinics. In such kind of circumstances, cloud computing is the best choice to hospitals those who can adopt cloud and access any of the best services like SaaS, PaaS, IaaS to store their hospitals sensitive information and also can transact it with the people. Adopting cloud has so many benefits like pay-per-use, access anywhere, anytime, no capital investment, and efficient access and so on. Even though, where there is plenty of good things, security and privacy is challenging yet. Data mining plays a significant role to retrieve data from the cloud and various DM techniques like classification, clustering and so on are used to diagnose the disease. Also data mining is used to share the information over cloud in the efficient manner.

Dingkun Li et al presented Design and Partial Implementation of Health Care System for Disease Detection and Behavior Analysis by Using DM Techniques that is data Mining (DM) techniques such as classification, clustering, association, regression etc. are widely used in healthcare field in recent years to help improve the quality,

efficiency as well as lowering the cost of developing healthcare systems. Especially, with the rapid development of the cloud platform services, which not only reduces the cost (time and expenditure), but also breaks the boundaries of data transactions among different systems and users. Therefore, it provides an effective way to reduce the time, and cost of software development as well as up-to-date services. The designed and partially implemented work in order to provide better services for both patients and health care givers. Cloud computing has greatly changed the way of developing software in many ways, it provides a fast, low-cost, safe and easy way to design new software. The system is designed and developed according to the unobtrusive, easy to deploy, effective, low-cost and real-time principles.

Peng Zhang et al Presented Building cloud-based healthcare data mining services where the linkage between healthcare service and cloud computing techniques has drawn much attention lately. Up to this time, most works focus on IT system migration and the management of distributed healthcare data rather than taking advantage of information hidden in the data. Here to explore healthcare data via cloud-based healthcare data mining services. Specifically, the significant aspect is a cloud-based healthcare data mining framework. Under such framework,



various cloud based healthcare data mining services can be developed, deployed, and provisioned to the general health care industry for knowledge discovery and decision-making support. The frameworks are, 1) population-level healthcare data scattered across disparate local data sources are integrated, which provides abundant data for the data mining process; 2) computational infrastructure and resources can be delivered by cloud computing platforms in a reliable, scalable, and cost-effective manner, which satisfies the computational and financial requirement for building healthcare data mining services; 3) the service development process is modularized, which makes the service development, update, and maintenance easier and faster; 4) the healthcare data mining services are deployed and provisioned to the healthcare practitioners as either cloud applications or web services, which ensures high service accessibility. The data mining service can help the healthcare practitioners to better understand the data, make optimum clinical and administrative decision, and develop data-driven patient-centered healthcare services.

Luis Tabares et al Presented Architectural approaches for implementing Clinical Decision Support Systems in Cloud: A Systematic Review. Clinical Decision Support Systems (CDSS) were explicitly introduced in the 90's with the aim of providing knowledge to clinicians in order to influence its decisions and, improve patients' health care. There are different architectural approaches for implementing CDSS. Some of these approaches are based on cloud computing, which provides on demand computing resources over internet. After primary studies the CDSS architectural components are common. According to the performed review, it is clear that a cloud based approach offers benefits to CDSS implementations. Cloud computing has proved to be a feasible solution to e health, since it is a cost-effective, ubiquitous and elastic model, enabling shared computing resources between healthcare providers and patients the important that an architectural design based on three main components such as a knowledge base, an inference engine or an artificial intelligence component, and an interface to expose the knowledge by means of a service layer (i.e. Web Services, Restful Services) would be a convenient approach to implement alerts and reminders,

knowledge service and diagnostic/treatment CDSS, and apply them for emergency departments, home healthcare services and chronic diseases diagnostic and treatment.

Imad El Ghoubach et al presented Efficient Secure and Privacy Preserving Data Access Control Scheme for Multi-Authority Personal Health Record Systems in Cloud Computing, where the resources are stored in a semi-trusted cloud service provider, it is important to maintain data confidentiality while providing granular, scalable and flexible access control reason, several schemes have been used. A multi-authority attribute based encryption with semi outsourced decryption that is able to provide a scalable and secure data sharing scheme while maintaining a low computational overhead. An efficient secure and privacy preserving data access control scheme for multi-authority personal health record systems able to achieve a lower decryption overhead than DACC by outsourced most of the computation to the proxy server, and achieved both forward and backward security with an efficient revocation process

Valentina Casola et al discussed in the entitled paper of Healthcare Related Data in the Cloud: Challenges and Opportunities addressing the modern healthcare system is data intensive. To care patient's records often need to exchange significant amounts of information in real time. In general, after a patient visits a healthcare provider (such as a general practitioner for an annual physical examination, a nurse practitioner to obtain a flu vaccine, or a radiographer for an x-ray), Patient will likely require additional medical services or attention over a period of time for instance, specialized medical examinations such as magnetic resonance imaging scans, or routine medical examinations such as blood tests, cholesterol checks, and blood-sugar checks. Research opportunities include the design of effective security SLA models that will fulfill specific user requirements, such as data geolocation, and compliance with the relevant legislation.

Harsha S. Gardiyawasam Pussewalage. et al, proposed A Patient-Centric Attribute Based Access Control Scheme for Secure Sharing of Personal Health Records Using Cloud Computing that is Personal health records (PHR) are an emerging health information exchange model, which facilitates PHR owners to efficiently share their



private health data among a variety of users including healthcare professionals as well as family and friends. PHRs are usually outsourced and stored in third-party cloud platforms though, outsourcing private health data raises significant privacy concerns because there is a higher risk of leaking health information to unauthorized parties. So it is important to store PHR data in an encrypted format in third-party cloud platforms to ensure security of health records. There is attribute based access policy to control PHR encrypted files. To access policy while utilizing a proxy re-encryption scheme to facilitate the authorized users to decrypt the required PHR files and a secure and flexible attribute based PHR sharing scheme using cloud computing which satisfies the intended security and privacy requirements also the scheme is resistant against attacks mounted via attribute collusion as well as capable of provisioning on-demand user revocation.

Mr. Khyamling A, et al Authors implemented Cloud based Intelligent Healthcare Monitoring System that is dedicated to help medical fraternity to find health status of vital organs of the patient's body at early stage that support effective treatment by introducing innovative and high quality hand carried noninvasive health care systems and devices. Cloud based Health Care is the integration of cloud computing and health monitoring. The computing device enables the delivery of accurate medical information anytime anywhere by means of internet. The presented a Cloud based Intelligent Healthcare Monitoring System (CIHMS), which can provide medical feedback/assistance to the patient through cloud (if data already available) or hospital. The discussion the simulation of primary health care system on intranet and the multi-disciplinary endeavor such as cloud for healthcare systems that provides greater benefits for patients and hospitals. The introduced a novel cloud computing model that can efficiently compute the data from healthcare devices and dynamically diagnose the disease also, an intelligent way of saving only crucial data.

Anand Sharma et al presented Emerging Applications of Data Mining for Healthcare Management - A Critical Review that is to explore new and emerging areas of data mining techniques used in healthcare management. The applications included in this work are infection control

surveillance, diagnosis and treatment of various diseases, healthcare resource management, customer relationship management, fraud and anomaly detection, healthcare administration, hospital management and public health. It is to find the interesting patterns and knowledge from the huge amount of healthcare data. Although there is huge data accumulated but to collect the data as per our goal is still a daunting task. Where there is privacy issues possible so new algorithms suitable for healthcare data. The extensive analysis of statistical tests as well as data mining models before being implemented. In India, there are three levels of healthcare network namely, Primary secondary, tertiary. It provides an opportunity for data miners to use the huge amount of data. The main task is to integrate data from different sources and then put to use by data miners to achieve the desired results.

Roma Chauhan et al, discussed Cloud Computing for Improved Healthcare: Techniques, Potential and Challenges with the advent of technology the healthcare solutions can be delivered to the intended user by enabling technology solution. The Software as a Service (SaaS) for healthcare is developed to handle readily changing doctor and patient needs across the globe. The method companies have applied SaaS for viable business healthcare model. Cloud based healthcare big data can help in extracting valuable information with data mining techniques. The e-Health Cloud represents an efficient technology solution for several healthcare providers experiencing various concerns of increasing healthcare delivery costs, information sharing, and scarcity of healthcare professionals. It provides an overview of the necessity and utility of big data mining in cloud computing.

Ahmed Ibrahim et al presented A Secure Framework for Sharing Electronic Health Records over Clouds that is Healthcare providers widely use Electronic Health Record (EHR) systems due to their benefits. The developed access control mechanisms and security techniques for such sharing systems. The framework is secure sharing of EHRs over the Cloud among different healthcare providers. The framework ensures the confidentiality, integrity, authenticity, availability and auditability of EHRs. Here Public Key Infrastructure (PKI)



is used to maintain authentication between participating healthcare providers and the EHR sharing cloud. The commitment scheme concept is used to allow authentication between unrelated healthcare providers with no prior trust. The shared EHRs are always encrypted using a symmetric key for confidentiality at all times. The Cloud environment supports scalability, which is a property of the Cloud to scale up or down as needed. This is how the framework minimizes the IT overhead for healthcare providers. The framework addresses the security requirements mentioned in subsection IV and meets the security standards defined in the technical safeguards of the HIPAA security rule.

Manisha et al presented Cloud Computing in Biomedical Applications for Remote Health Monitoring that emphasis on the design features of an autonomic cloud environment that gathers people health data and dispenses this data to a Cloud-based information repository. This aspect of cloud also facilitates analysis on the data using software based services hosted in the Cloud. The handling of hospital data is done either on-line using real time processing which puts high demands on hardware or by post processing after measurement. Here a developed a system in which the logged data from the sensor can be uploaded to the centralized cloud (amazon web services), which keeps a backup of all the recorded data and can be recovered for analysis by the medical professional. As a result, doctors and hospitals do not have to invest in large computing infrastructures designed after capacity planning, thus making more effective use of budgets. The SOAP and REST-based Web services makes these systems not only ubiquitous, but they can also be easily integrated with other systems maintained on the hospital's premises. Finally, cost savings constitute another reason for the use of cloud technology in healthcare. Cloud services are priced on a pay-per-use basis and with volume prices for large numbers of service requests.

Barbara Calabrese et al described Cloud Computing in Healthcare and Biomedicine which is High throughput platforms available in clinical settings or in research laboratories, such as magnetic resonance imaging, microarray, mass spectrometry and next-generation sequencing, are producing an increasing volume of clinical and omics data that poses new issues in terms of secure data

storage, models for data integration and analysis, and high performance computing. In the industry, several issues regarding the security and privacy of data that are particularly important when analyzing patient's data, such as in personalized medicine. This paper reviews main cloud-based healthcare and biomedicine applications; with a special focus on healthcare, biomedicine and bioinformatics solutions and underlines main issues and problems related to the use of such platforms for the storage and analysis of patients data. Supercomputing or Grid Computing can provide the computational power and the storage required in biomedical applications such as medical imaging or electronic medical record. The authors discussed that using a cloud is a more viable option and analyzed some economic and practical aspects of exploiting cloud computing for the in silico drug discovery and they highlight the advantages for small-medium laboratories working in the field of biotechnology.

S. Naisha Sultana et al addressed cloud-based development of smart and connected data in healthcare application that is an Information Integration and Informatics framework for cloud – based healthcare application. The data collected by the Electronic Health Record System need to be smart and connected, so we use informatica for the connection of data from different database. Traditional Electronic Health Record Systems are based on different technologies, languages and Electronic Health Record Standards. Electronic Health Record System stores data based on interaction between patient and provider. There is a development of smart and connected data in healthcare application of cloud and this system is developed by using cloud platform Aneka. Integrated framework allow the development of advanced healthcare application with difference database.

The efficiency of the framework is demonstrated with Health Mapper Applications and Patient Health Records.

Carlos Oberdan Rolimet et al presented a Cloud Computing Solution for Patient's Data Collection in Health Care Institutions that the processes are usually slow and error prone, introducing a latency that prevents real-time data accessibility. The scenario of clinical diagnostics and



monitoring capabilities. The solution is to automate this process by using “sensors” attached to existing medical equipment that are inter-connected to exchange service while the information becomes available in the “cloud” from where it can be processed by expert systems and/or distributed to medical staff. The proof-of-concept design applies commodity computing integrated to legacy medical devices, ensuring cost-effectiveness and simple integration

Sheenal Patel et al presented a Survey of data mining techniques used in healthcare domain that is data mining techniques have the capabilities to discover hidden patterns or relationships among the objects in the medical data. In last decade, there has been increase in usage of data mining techniques on medical data for determining useful trends or patterns that are used in analysis and decision making. Here Various DM techniques such as classification, clustering, association are used to analyses and predict human disease. With the recent rapid rise in the quantity of biomedical data that is gathered by electronic means in critical care and the rampant availability of inexpensive and dependable computing equipment, many researchers has started, or are eager to start, exploring these data. The work thrown light into data mining techniques that is used for medical data for various diseases which are identified and diagnosed for human health.

II. CONCLUSION

The cloud and DM techniques represents an efficient technology solution for several healthcare providers experiencing various concerns of increasing healthcare delivery costs, information sharing, and scarcity of healthcare professionals. The main goal of any healthcare institution is to provide good care treatment to the patients and not to collect the data as per data mining process. The benefits gained cannot be suppressed by issues of trust, privacy, and security. The technical issues that must be addressed before health care providers can fully adopt to Cloud. So, it is very challenging to incorporate data mining and to find the interesting patterns and knowledge from the huge amount of healthcare data. So here we have done a survey analysis about of building health care data mining services, disease detection, architecture for clinical support system, efficient data access control, healthcare management application, various DM techniques to identify and diagnose

disease and so on in the latest researches of cloud based health care data maintaining as text corpus in the hospitals.

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