A Survey On Cloud Computing Based Healthcare System

[1] Telma George, [2] Suma R

[1] P.G Scholar, Department Of Computer Science And Engineering, St Joseph's College Of Engineering And Technology, Palai, India

[2] Assistant Professor, Department Of Computer Science And Engineering, St Joseph's College Of Engineering And Technology,Palai, India

Abstract: The growth in information technology has raised a concern for appropriate technology to handle data with care. Two advanced technologies such as Big data and Cloud computing is a adhering to deal with needs of today's organization. Cloud computing is an emerging technology which provides pathway to share data, resources and applications. Big data analytics are the methods to work and examine large data sets that contain various database. The information technology have great impact on healthcare technologies. However, these new technologies have not only made healthcare data but also much more difficult to handle and process. As healthcare related data are consistently explosive, there are challenges for data management, storage, and processing. This review deals with the study of healthcare systems based on cloud computing.

Keywords:Cloud computing, Big data, Healthcare

I. INTRODUCTION

Cloud computing plays a major role in healthcare data. Healthcare aims to maintain and improve human health via diagnosis, treatment and disease prevention. As motivated by patient care, auditing, administration and requirements to conform to standards and regulations, it generates massive amounts of data, that is big data (bd) every day. Large, more complex and varied structure of data with the difficulties of storing, analyzing and visualizing for processes is termed as big data. Bd has the potential to support many medical and healthcare operations. Cloud computing is the most appropriate architecture for large-scale storage and complex processing as required for bd and bda. Its advantages include flexibility, security, parallel processing, scalability and resources virtualization. The push for bda in healthcare and the increasing importance of cloud services have provided new perspectives to healthcare . More medical data is uploaded to the cloud and these data are shared with healthcare professionals and more analytics is performed on big data medical data storage. Health data can be structured, unstructured or semi-structured. Various health care devices owned by either hospitals or individuals are producing huge amount of health care data. Healthcare aims to maintain and improve human health through diagnosis, treatment and disease prevention.

1.1 Cloud Computing And Healthcare

Cloud computing is defined as a technology which uses the internet and central renote servers to maintain applications and data. Cloud computing when used in healthcare sector reduces the cost of storing, processing and updating with improved efficiency and quality. Obviously, cloud is a good candidate to collect, store and analyse such health care data. However, health care data is very sensitive for its owners, and thus should be well protected on cloud. Figure 1 shows the different types of healthcare data. Traditional healthcare systems mainly include personal and public healthcare services, teaching and research activities. Personal healthcare services are offered at hospitals, homes and different organizations. Public healthcare services involve guidelines for drugs, food and safety policies to maintain a healthy environment. Teaching and research activities are essential for prevention, detection, tracking and treatment of diseases. Integrating it solutions with health care brought a significant benefits by solving issues of human errors , processing large volume of patient's information besides saving papers and storage space and allowing patients ,doctors, hospitals and other healthcare providers to view and share your health information.

Fig. 1. Different types of healthcare data

Integrating cloud computing and health sector solve many issues. For better treatment constant medical supervision of chronic patients or habitants at remote, isolated and underserved locations is needed. In this context, advanced electronic healthcare services are required to be made available through a network anytime, anyplace and to anyone. Cloud computing can be used for storage and processing of huge medical records. If these records will be available at cloud then can be easily shared. Doctors can use these records to track and monitor patient health status. They can also provide suggestion and health alert to their patients. Patients can also view their records. Health sector and social media can be integrated to provide better communication between doctors, patients and health care clinic. The next section describes different cloud based healthcare systems.

II. COMPARITIVE STUDY OF CLOUD BASED HEALTHCARE SYSTEM

J. Wan et al. Presented a cloud-enabled wban architecture and its applications in pervasive healthcare systems[1]. This paper designs cloud-enabled wbans to provide three types of scenarios (home, hospital, or outdoor environment) for ambulatory monitoring, and support a point of care to patients, the elderly, and infants in different environments. The proposed architecture stress the following three important aspects such as the inclusion of communication standards for wbans, the use of hybrid clouds in the mobile cloud computing platform and the authorized social networks for analyzing the trends. This system is composed of main components: wireless body area network(wbans), wired/wireless transmission, cloud services, and users. Wbans collect various vital signals such as body temperature or heart rate information from wearable or implantable sensors. The collected monitored data are processed in the cloud and then selectively transmitted to the users. The medical video streaming using cameras are transmitted to the adjacent routing equipment via wired or wireless transmission and then to the cloud server via the internet. Cloud servers possess powerful vm resources such as cpu, memory, and network bandwidth in order to provide all kinds of cloud services such as automatic diagnosis and alarm, geographical information system (gis) services, location-based services, and medical decision making (mdm). Different users such as hospitals, clinics, researchers, and even patients ubiquitously acquire multiple cloud services by a variety of interfaces such as personal computers, tvs, and mobile phones. This enables the sharing of monitored data to authorized social networks or medical communities to search for personalized trends and group patterns, offering insights into disease evolution, the rehabilitation process, and the effects of drug therapy.

Emotion-aware mobile cloud computing in 5g was developed by m. Chen. He proposed a novel style of applications enabled by emotion-aware mobile cloud computing (emc) in 5g. Emc [2] is design to provide emotion-aware mobile services by recognizing user's emotional changes through cloud computing and big data analysis. Existing healthcare systems only provide care for the users physiological status while emc also takes into account the user's mental status. A. Alamri proposed a affective interaction through wearable computing and cloud technology [3]. To reduce the heavy burden from rapidly growing demands of healthcare service, wearable computing-assisted healthcare has been proposed. Affective interaction through wearable computing and cloud technology (aiwac), which considers the emotional data generated from multiple spaces. The proposed cloud-based approach is to achieve a two goals: hybrid emotional data analysis and dynamic resource perception and allocation.

M.g.r. alam, proposes a cloud based mental state monitoring system for suicide risk reconnaissance using wearable bio-sensors[3]. In this system, wban is used for real life data accusation from patients with mental diseases. As the stress, depression, alcohol misuse and loss of consciousness are the major risk factors among all of the suicide risk carriers, the wban consists of

three types of bio-sensors to measure stress, depression and alcohol consumption levels. Including the sink node the sensors are nine in number. Electro-dermal activity (eda) sensor is used to measure the stress level and emotional state electroencephalography (eeg) sensor is used to measures pivotal brain disorders and sleep disorders, blood volume pulse (bvp) sensor is used to measure blood flow and heart rate variability to monitor emotional state, alcohol consumption and irritation level of the patient. Cloud healthcare agents is responsible for collecting data from patients bans and transfer it to the public clouds healthcare service providers compute as a service of iaas cloud to generate the mental state sequence. The compute as a service of iaas cloud comprises a mental state sequence generator (mssg), which is responsible for generating state sequence based on features supplied by cloud healthcare agent and the features extracted from iaas cloud regarding patients medical and family history. Mssg is modeled through hidden markov modeling and trained over viterbi path counting algorithm. And mssg generates maximum a posteriori mental state sequence using viterbi algorithm. Finally, the cloud healthcare service provider send back the generated mental state sequence to cloud healthcare agent. And cloud healthcare agent then send the current mental status of the patient to corresponding hospital, psychiatrist and sink node of the patients wbans.

The robotics and cloud-assisted healthcare system for empty nester [4] first designs a low-cost and autonomously moving robot platform with mobile multimedia communication and intelligent speech recognition, so as to help empty-nesters realize the communication with their children in other places. At the same time, their children in other places may also know the situation of the elderly people at home via video at any time. Then, the robotic system further integrates various sensor nodes to collect the vital body sign of empty-nesters and the environmental data, and transmit such data to the cloud-assisted health monitoring system via the mobile network. This system is developed by m. Chen, y. Ma, s. Ullah based on the cloud computing platform, an accurate model of the mental status and behavior pattern for the empty nesters is established, facilitating personalized healthcare services for elderly people to enjoy independent and safe life while improving their living quality.

Dananthilakanathan introduces a solution to protecting and analyzing healthcare data stored on cloud. Some enabling technologies and methods[5] are proposed. First security technology to protect health data privacy and enable secure health data sharing on the cloud. Then conduct a simple health care data analysis with existing data analysis techniques and real public health data stored on the cloud. Finally demonstrate the feasibility and usefulness of using the cloud to collect and store health data for secure sharing and data analysis. The works presented by koufi et al. [6] and poulymenopoulou et al. [7] build an emergency medical system in a cloud environment on the basis of personal health records (phrs) and other external systems.

Rashatalal hameed recommended a model of designing flexible e-healthcare management system based on cloud computing and service oriented architecture (soa) [8]. Cloud and soa are becoming ubiquitous nowadays. The introduction of novel concept in iraq, there will be an improved efficiency which is expected to facilitate exchange of health information and at the same time reducing heathcare costs. Also, it increases quality of care and safety for patient by means of enhancement of quality and quantity of information. This model helps to organize records like prescription and reports such as x-ray results in cloud. In addition it eliminates maintaining separate records. The patient management system design concerning with health insurance office gives component establishes the maximum performance for operations of health insurance. The health card has the details of patient identity and refers to the electronic health record. This card is stored in the central database which is stored in a cloud. The cloud architecture provides web-enabled framework which is integrated with activities of doctors, pharmacists, radiologist and laboratory staff. Government work together with its companies and practitioners to develop the complete healthcare system utilize e-health cloud.

Sreekanthrallapalli introduces the impacts of data processing and analyzing large scale healthcare data [9] on cloud computing environment. Cloud computing is a perfect environment for processing healthcare big data. It is secured for sharing sensitive data like patient health information. Various cryptographic techniques can be implemented for having a better framework for secure sharing of information on cloud. Mapreduce can be efficient tool for processing the healthcare data provided the performance can be improved by fine tuning various parameters as discussed. Hadoop clusters can be used for faster parallel processing of the data. Big data in healthcare provides a greater impact on patient by improving the quality of healthcare, giving various options for patient for choosing the right care, right value. Big data can also impact in healthcare by innovations made in biomedicine.

III.   CONCLUSION

in this paper different cloud based healthcare systems are surveyed. Health sector is integrated with cloud computing to get different types of services. Health sector contains huge amount of information. To process and manage this information cloud computing is used. The scalability, adaptability,cost reduction and high performance features of cloud makes it possible to get

health services. It can be easily recognized that several previous works were focused on the analysis of healthcare data or on how to deploy and implement cloud computing for healthcare systems.

REFERENCES

1. j. Wan et al., cloud-enabled wireless body area networks for pervasive healthcare, ieee 2013.
2. m. Chen, y. Zhang, y. Li, s. Mao, and v. Leung, emc: emotion-aware mobile cloud computing in 5g, ieee 2015.
3. m. Chen, y. Zhang, y. Li, m. Hassan, and a. Alamri, aiwac: affective interaction through wearable computing and cloud technology, ieee wireless commun. Mag. 2015.
4. m. G. R. Alam, e. J. Cho, e. Huh, and c. S. Hong, cloud based mental state monitoring system for suicide risk reconnaissance using wearable bio-sensors, in proc. 8th int. Conf. Ubiquitous inf. Manage. Commun., 2014.
5. m. Chen, y. Ma, s. Ullah, w. Cai, and e. Song, "rochas: robotics and cloud-assisted healthcare system for empty nester," in proc. Bodynets, boston, ma, usa, 2013.
6. Koufi, v.; malamateniou, f.; vassilacopoulos, g. Ubiquitous access to cloud emergency medical services, in proceedings of the 10th ieee international conference information technology and applications biomedicine,2010.
7. Poulymenopoulou, m.; malamateniou, f.; vassilacopoulos, g., e-epr: a cloud-based architecture of an electronic emergency patient record, in proceedings of the pervasive technologies related to assistive environments, 2011.
8. Danan thilakanathan, yu zhao, shiping chen, surya nepal, rafael a. Calvo, protecting and analysing health care data on cloud, second international conference on advanced cloud and big data,2014.
9. Sreekanth rallapalli, gondkar rr, uma pavan kumar ketavarapu, impact of processing and analyzing healthcare big data on cloud computing environment by implementing hadoop cluster, international conference on computational modeling and security, 2016.