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Survey on medical data gathering using big data and cloud computing

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ABSTRACT

Cloud computing as a technology has helped to integrate large sets of data that can be accessed from anywhere. Big data is a collection of the large data set or data modules. Integrating Cloud Computing with Big Data has served many purposes and can also be used for future advances. The major advantage of integrating these two technologies helps in accessing large sets of data on a global platform. Integrating Hospital data sets present in form of Big Data with the Cloud Computing platform helps in instant access to patient information by the doctor. This helps the doctor to serve the patient sitting back even in a different hospital. The medicine dose details are given by the doctor to the patient which can be checked by the pharmaceutical person. Medicine availability is monitored by the pharmaceutical person who also dispatches the prescribed medicine to the patient.

Keywords: *Cloud computing, Big data, Dropbox, Hadoop.*

1. INTRODUCTION

This survey tries to give a clear picture of the currently available system of Hospital and how the integration of Big Data and Cloud Computing can help in the Hospital Migration advancement. The distributed system of Cloud helps in simplifying the large-scale available bio medical data. The accurate and early prediction of disease is a helpful parameter in controlling the spread of common health abnormalities. Proper health check-up is essential at regular intervals to avoid any emergency situations. With the constant growth of population all over the world, the risk of life long diseases is also increasing at a rapid pace. This over population has resulted in less availability of hospital services to the needy. This creates a problem in serving the patients that need emergency services. Reports claim that many patients that needed emergency service had to wait for long hours and few even left without any treatments. The survey paper helps in integrating different hospitals together for better service for the large crowd of patients. Predicting health issues of the patients by the doctor are sometimes patient specific and needs special care; as patient with high heart rate at frequent interval may be a patient of high blood pressure but a patient with a constant heart rate above 100 is a patient of Tachycardia. Such correlation is patient-specific are need to be examined as such. The accurate prediction of health issue can be better understood by the doctor using past and present medical record.

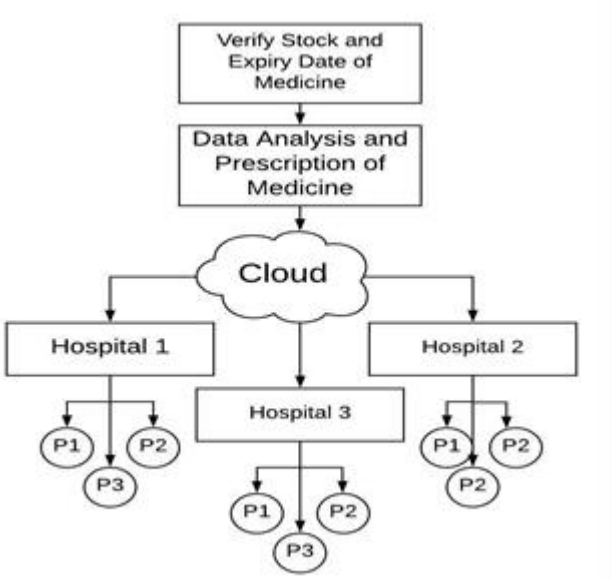

Fig. 1: Data flow diagram for cloud and big data integration

The primary focus of the survey is to integrate different hospitals together in order to better present the medical data of a large crowd of patients to different doctors available at different hospitals. Cloud Computing provides a stage for easy access to these biomedical data that are organized and well-structured according to patient registration number using the Big Data concept. Big Data is also used to allocate the unattended patients to available doctors in different hospitals.

2. LITERATURE SURVEY

2.1. Analysis of Long-term Abnormal Behaviours for Early Detection of Cognitive Decline

Several researchers have proposed methods for the automatic recognition of abnormal behaviors with early detection of diseases. This paper introduced LOTAR, a behavioral analysis system coupling machine learning techniques and data mining methods. Medical methods designed in consideration with cognitive neuro science research guide the recognition of short and long-term abnormal behavior. In particular, historical behavior analysis for long-term anomaly detection. Obtained results help in long-term monitoring of cognitive health.

2.2. Diagnosis of ECG arrhythmias in wireless tele cardiology

Studies of medical remote monitoring of home have taken a great leap in wireless communication technology. The account of these studies as helped old aged people and physically challenged in order to adapt to the surrounding environment and build up on their capabilities. It is important to manage patient data between medical personnel with the safety insurance of critical edge people. Furthermore, there is an urgent need for speed diagnosis of the patient and distinguishing it with reports of another patient. It is focused on a mobile terminal (MIDlet) for monitoring a patient in a non-hospital area. This article provides an economical wireless communication with the application of algorithm with an integrated mobile network which helps the doctor analyze the ECG reports.

2.3. A Review of Steganography using Medical Signal

Usage of e-health assistance is picking up the pace in the recent few years. One of the examples of e-health application is a remote cardiac monitoring system. To overcome cardiac arrest, it is important to diagnose the symptoms on time. Therefore, a periodic check on such situation is helpful in gathering the medical information and examining it to overcome any expected abnormality. The hospitals lack the amenities to achieve this aim. Cloud services thus play an important role in such situations. Cloud services are less used due to its security and accuracy of the diagnosis issues. In this paper, to achieve strong privacy protection, two steganography technique are proposed. Both promise precise results in terms of security and distortion measurement. There is a slight difference of 1% in actual and watermarked ECG signal. The watermarked ECG signal is used for diagnosis, this data is accessible only by authorized personal having the security information.

2.4. Fuzzy-NNARX based Tool for Monitoring and Predicting Patients Conditions using Selected Vital

In this paper, fuzzy logic(FL) and recurrent neural network(RNN) is used for defining and forecasting of patient clinical record. FN and RNN are used to define an Artificial Intelligent(AI) tool. The first phase of the tool considering the Fuzzy system is used for the analysis of the current state of the patient. This helps in training of the artificial neural network. In the second phase, two Elman networks Multi Input Single Output(MISO), two Elman networks Multi Input Multi Output(MIMO), two auto-regressive neural networks with exogenous inputs (NNARX) are evaluated with and without pruning. The fuzzy model agrees with almost

99.76% times with the expert reports. After the careful examination of six proposed networks, the NNARX model offered the highest overall accuracy(OA) of 99.82%, whereas the other models showed a decrease of up to 35%. Finally, a group of thirty patients was analyzed using the proposed smart software with Fuzzy-NNARX solution where an OA of 99.25%, the sensitivity of 99.62%, and a specificity of 99.83% was used. Frequent such tests with higher prediction periods (10, 30 and 60 seconds) show a slight decrease in OA reaching up to 94.58%. However, the OA remained above 94% in most of the cases. For the proposed system, NARX network showed a better result than the Elman network when considered for non-linear dynamic systems. Results depict that the Fuzzy-NNARX model has very good accuracy and can be used on a large scale for predicting the patient health and prescribing medicine.

2.5. Online Anomaly Detection in Wireless Body Area Networks for Reliable Healthcare Monitoring

In this article, a lightweight approach is used for online detection of faulty measurements by examining the data collected wirelessly from the patient. Smartphones are used as a base station for to perform sequential data analysis and considers the constrained resources of the smartphone, such as processing power and storage capacity. The major objective of the proposed system is to raise an alarm system when the patient is in an emergency and to ignore or discard faulty alarms raised by improper measurements or by the improper functioning sensors. This helps to reduce unnecessary healthcare intervention that not only matters to the patient but also the concerned staff. This is applied on the real physiological dataset to examine real-life situation. The proposed system helped in accurately predicting the health issue and dismantling the false situation alarm. The processing speed and the simplicity helped in adopting the system on a real-time basis. This allows medical support to the patient at a time when it is actually needed

2.6. Hidden Markov Models for Speech Recognition

Hidden Markov model for speech recognition has gained its popularity in the recent few years in terms of its usage and number of papers published considering it as its base. The inherent statistical framework has helped this system gain its height. Training algorithms for estimating the parameters of the models from finite training sets of speech data is also one of the major factors when this model is considered. The overall implementation of the recognition system is also very simplified for the ease of user. In this article, we address the role of statistical methods as applied to speech recognition. Theoretical and practical issues are considered that are yet unsolved in terms of their importance.

3. LITERATURE OVERVIEW

After having an overview of various papers, there is an urgent need to improve the medical functionality. Medical data compromises of a huge amount of information that needs to be analyzed and handled systematically. In order to safely handle and analyze the data, various technologies need to be integrated and used in an efficient manner. In this case, the initial documentation is performed by the patient. And as per the patient condition, medicines are prescribed by the doctor.

4. PROPOSED MODEL

Our model has many salient features on top of all the pervious capabilities of this program as it runs Hadoop in the background which has the capability of generating faster results also it is capable of migrating all the data of the patients to a different hospital so that if there is an over flow of patients in a certain hospital no time is wasted in actually going to a different hospital and just by shearing the data a lot of time can be saved also our model runs a dropbox update system that after every update into the local database updates all the data into the cloud so that all the data is available to any authorized person anywhere at any time to save data we have features that allow the program to save all the updates in one database so that the method can be continuously monitored so that both the data can be saved by transferring less data and protecting by uploading data into a personal dropbox also with a combination of cloud and Hadoop we have made it possible to connect all the hospitals in a city and keep their data in a single data base so that we can provide max output in the form of convenience to the patients.

5. FUTURE ENHANCEMENT

In future enhances there can be many additions to this project to make it even more easy for the patient's that are capable of taking readings directly from the patients. The patient can register the vital parameters such as blood pressure and pulse rate using IoT. These data will be submitted to the doctor directly and the doctor can prescribe the medicine considering the parameters submitted by the patient.

6. CONCLUSION

The survey proposes hospital migration facility for patients that encounter absence of doctor at a particular hospital. Hidden Markov model is used for continuous monitoring of patient health. The cloud computing part is used to integrate various hospitals into a single shareable platform. Big data is used in the background to find and assign the available doctor to the unattended patients. The model also simplifies the work of healthcare units and patients by assign jobs to the available staffs and helping

patients with quick service respectively.

7. SCOPE

The paper currently focuses on the integration of cloud computing and big data to serve as a platform to overcome the difficulties faced at hospitals due to enormous rush. With the advancement in the field of cloud computing, this concept can be used by the patients directly from home; wherein different medical readings can be read by the sensors directly from patient's home. These medical readings shall be shared with the doctors through the cloud and the prescribed treatment can be performed if possible or else the medical staff could directly attend the patient.

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