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A SCALABLE ONLINE DYNAMIC MONITORING SYSTEM

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Abstract: Context aware monitoring is an emerging technology that provides real-time personalised health-care services and a rich area of big data application. In this paper, we propose a approach to track continuously monitor the Health Records in an unstructured format. The Proposed model facilitates the analysis of big data inside the cloud environment. It first mines the trends and patterns the data of an individual patient with associated probabilities and utilities that knowledge to learn proper abnormal condition. The large amount of data is generated in Ambiant Assisted Living System using AES algorithm. The Proposed technique monitors patient's Lab report such as BP, Diabetes etc. If the Patient's report identified as a abnormal then the patient will get warning SMS.

I.INTRODUCTION

An ambient assisted living (AAL) system consists of heterogeneous sensors and devices which generate huge amounts of patient-specific unstructured raw data everyday. Due to diversity of sensors and devices, the captured data also have wide variations. A data element can be from a few bytes of numerical value (e.g. HR = 72 bpm) to several gigabytes of video stream. For example, if we assume a single AAL system generates 100 kilobytes data every second on average then it will become 2.93 terabytes in one year. If any system targets to support say, 5 million patients, then the data amount will be 14 exabytes per year Even if a healthcare system targets to analyse only continuous ECG of cardiac patients in real-time inside the cloud environment then it will produce around 7 Petabytes data everyday from 3.5 million patients [6]including these dynamically generated continuous monitoring data, there are also huge amounts of persistent data such as patient profile, medical records, disease histories and social contacts. If we want to store all these data and patient histories to predict any future abnormality accurately, then the representation of data will be in zetabytes in a few years. Such concerns necessitate the development of cloud-based assisted healthcare infrastructure. Efficient processing of this large volume of medical, ambient and media data using computational power of cloud infrastructure, extraction of right context information , finding the correlations among different contexts for inferring knowledge, and prediction of a state using those inferred observations to deliver proper situation-aware services, are some primary challenges in the development of context aware monitoring applications.

According to IBM data scientists, big data can be characterized in four dimensions: volume, variety, velocity, and veracity ("the 4 V's"). Our model also satisfies these four V's because the context-aware data we are referring to have massive variations (e.g. health data, activity data), is large in volume several petabytes), continuous in terms of velocity and accurate to satisfy veracity. Such data also have great value and high impact on future healthcare infrastructure. The predictive analyses over large historical data provide robust solutions for disease prevention. This also simplifies the tasks of healthcare professionals and doctors by assessing the causes of any anomalous situation at an early stage and improving the quality of life of a patient.Traditional solutionsfor personalized AAL systems depend on standalone applications that run on a local server or a handheld device. These applications solve only specific cases. The amount of information gathered from a personalized AAL system is so massive that it is almost impossible to store and manipulate them for knowledge-discovery in a mobile device. Furthermore, the growing ageing population and chronic diseases, particularly in Australia and other western nations, increase the demand for a common platform that is capable of handling many patients simultaneously and maintaining the personalized knowledge of every user. This necessitates the initialization of such big data-centric context-aware applications on. An important feature of remote monitoring applications is to identify the abnormal conditions of a patient accurately and so send appropriate alerts to the care givers. In traditional systems, situations are classified by generalized medical rules orfuzzy rules which are not always applicable for every kind of patient. These systems cannot sense the future at an early stage. In some monitoring systems,when a patient feels unwell he/she needs to press a wearable panic button to notify a response centreabout the emergency. Some systems try to understand a patient's discomfort level and the seriousness of the condition by asking automated sets of questions. Such systems can generate many false alarms to the monitoring centres; this is not desirable. The flexibility of using low-cost cloud platforms such as Amazon web service (AWS), Windows Azure and Google cloud has added greater advantage to learn of true abnormal situations by storing and analysing every past and current event of a patient,and generate personalized rules Such an individualized rule-mining process also promotes the inference of more generalized medical rules for a particular patient category. In a home healthcare system, a typical

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architecture involves body sensors, ambient and smart sensors, devices, actuators and software services that collect data from a target user who lives alone and has some kindof disability. The data is collected continuously at different times of the day and also, in some cases, on a demand basis. The data can be physiological (e.g. heart rate, blood pressure, ECG), environmental conditions (e.g. humidity, room temperature) that affect a patient's health condition and activities related to a patient's behaviour (e.g. sleeping, eating, toileting) that can be inferred by processing data from sensors,cameras, RFIDs etc. Some data can be captured from persistence storage such as a patient's profile (e.g. the patient has heart disease), recognized patterns (e.g. patient wakes up between 7-7:30 a.m., smokes fivetimes per day on average), historical (e.g. patient had a heart attack two years ago) and medical records(e.g. last tested white blood cell count 7746). The definition of context varies according to the purpose of the application domain. In our model, contextmeans any high level user-specificinformation obtained directly or inferred from raw sensor data.Generally, the aggregated contexts are sent to a monitoring centre (e.g. doctor, nurse, hospital) for decisionmaking about the patient's condition. In effecting our goal, we take this one step further by incorporating patient-specific intelligence that constantly learns from collected data and interprets new incoming data using that gained knowledge just as a medical expert would. This also allows doctors to make decisions with greater knowledge, to monitor chronic deterioration in a patient's condition, or to assess the patient's response to treatment. The identification of a patient's abnormal condition can warn the patient by activating a local device (e.g. medication reminder), or send an emergency message to the monitoring centre. Overall, our innovative learning technique on a massive volume of context data advantage of cloud computing.

II.EXISTING SYSTEM

Analysing large amount of data generated in ambient assisted Living (AAL) Systems and Stored in cloud repositiories faster and existing techniques are not capable to handle such big data. Its very difficult analyzing and monitoring patient details it's not provide accuracy of the details.so In each AAL system, different contexts are sampled in different time intervals in multiple domains. To represent a domain, its information and context space difficult and also limited storage space.

DISADVANTAGES OF EXISTING SYSTEM:

- Analysing and Monitoring Big data is difficult.
- Not Acuuracyand Efficiency.

III.PROPOSED SYSTEM

Proposed model facilitates analysis of big data inside a cloud environment. It first mines the trends and patterns in the data of an individual patient with associated probabilities and utilizes that knowledge to learn proper abnormal conditions. The outcomes of this learning method are then applied in context-aware decision-making processes for the patient. A use case is implemented to illustrate the applicability of the framework that discovers the knowledge of classification to identify the true abnormal conditions of patients having variations in blood pressure (BP) and heart rate (HR). The evaluation shows a much better estimate of detecting proper anomalous situations for different types of patients. The accuracy and efficiency obtained for the implemented case study demonstrate the effectiveness of the proposed model.

ADVANTAGES OF PROPOSED SYSTEM:

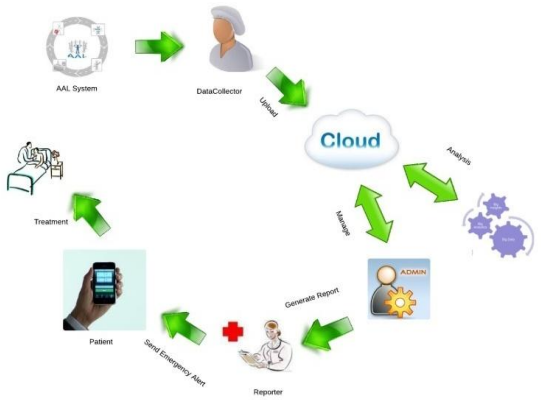
- It analysis of big data inside a cloud environment
- Monitoring and analyzing big data and produce result effectively.
- It shows functionality of the System and detecting proper anomalous situation for different types of patients.

OUR OBJECTIVE:

Context-aware monitoring is an emerging technology that provides real-time personalised health-care services and a rich area of big data application. In this paper, we propose a knowledge discovery-based approach that allows the context-aware system to adapt its behaviour in runtime by analysing large amounts of data generated in ambient assisted living (AAL) systems and stored in cloud repositories. This proposedmodel facilitates analysis of big data inside a cloud environment. It first mines the trends and patterns in the data of an individual patient with associated probabilities and utilizes that knowledge to learn proper abnormal conditions. The outcomes of this learning method are then applied in context-aware decision-making processes for the patient. A use case is implemented to illustrate the applicability of the framework that discovers the knowledge of classification to identify the true abnormal conditions of patients having variations in blood pressure (BP) and heart rate (HR). The evaluation shows a much better estimate of detecting proper anomalous situations for different types of patients. The accuracy and efficiency obtained for the implemented case study demonstrate the effectiveness of the proposed model.

IV.ARCHITECTURE DIAGRAM

The architecture diagram of the proposed system that described above is as follows:



MODULES:

The above system has mainly five modules they are

1. Authentication and Authorization
2. Patient Report to be Stored in Cloud.
3. Patient Profile and Appointment
4. Analysing Big Data in Cloud
5. Generate Report and Send Emergency Alert

AUTHENTICATION AND AUTHORIZATION

In this module the DataCollector have to register first, then only he/she has to access the data base. After registration the Data Collector can login to the site. The authorization and authentication process facilitates the system to protect itself and besides it protects the whole mechanism from unauthorized usage.The Registration involves in getting the details of the users who wants to use this application.

PATIENT REPORT TO BE STORED IN CLOUD

In this module, DataCollector Upload the report in cloud repositories and stored in the Local System. The report(ECG,HR,BP) Store to the real Cloud Storage (In this application, we use Dropbox). While uploading Unstructured raw data every day. Due to diversity of sensors and devices, the captured data also have wide variations. A data element can be from a few bytes of numerical value (e.g. HR = 72 bpm) to several gigabytes of video stream .

PATIENT PROFILE AND APPOINTMENT

You can make an appointment with a particular patient by clicking the Add Appointment button from any page of their patient profile. Select the date and time of the potential appointment, and select the practitioner and location from the dropdown menu. Choose the fee in order to set the duration, If the appointment time is available, a green Available message appears; if the appointment time is not available, select a different appointment time. Click the Save button to save the appointment to the calendar and then add other information to the appointment (such as referrals and claiming information) where required.

ANALYSING BIG DATA IN CLOUD

A number of use cases in healthcare are well suited for a big data solution. Some academic- or research-focused healthcare institutions are either experimenting with big data or using it in advanced research projects. Those institutions draw upon data scientists, statisticians, graduate students, and the like to wrangle the complexities of big data. In the following sections, we'll address some of those complexities and what's being done to simplify big data and make it more accessible. Beyond improving profits and cutting down on wasted overhead, Big Data in healthcare is being used to predict epidemics, cure disease, improve quality of life and avoid preventable deaths. With the world's population increasing and everyone living longer, models of treatment delivery are rapidly changing, and many of the decisions behind those changes are being driven by data. The drive now is to understand as much about a patient as possible, as early in their life as possible – hopefully picking up warning signs of serious illness at an early enough stage that treatment is far more simple (and less expensive) than if it had not been spotted until later.

GENERATE REPORT AND SEND EMERGENCY ALERT

Now-a-days healthcare industry is growing enormously due to the increase in elderly population and decline in birthrate. A healthcare becomes a big issue due to lack of availability of expert doctors. Due to this issue there is a paradigm shift from need based health monitoring to preventive health monitoring service. Keeping in view this scenario we are proposing a health care system which will be integrated with cloud computing. That will make system capable of generating EMR i.e. Electronic Medical Records of patients which will play a beneficial role for patient's diagnostic and rapid improvement process as well as for medical practicing doctors who need vast medical cases for their own study purpose. This system will keep track of patient's health in a timely manner and generate a alert when the patient's vital parameters crosses the normal value. The major data will be transferred to the cloud storage that can be accessed by registered expert doctors and Patient.

V.FUTURE WORK

In future, we intend to extend the model with more context domains.There have been several studies about the contextaware approach for assisted healthcare. The works are differentiated by: context-aware platforms for supporting continuous care activity monitoring cloud-based healthcare and personalized care.The context-aware systems that are developed using rule-mining and data mining only. All these contributions have motivated us to develop this cloud-enabled system with big data. The unique advancement of our model is to learn userspecific anomalies accurately in an assisted living system and take immediate context-aware actions. The robust learning methods reduce unnecessary false alerts to the monitoring system.

VI.CONCLUSION

In this work, we have presented a generalized framework for personalized healthcare, which leverages the advantages of context-aware computing, remote-monitoring, cloud computing, machine learning and big data. Our solution provides a systematic approach to support the fast-growing communities of people with chronic illness who live alone and require assisted care. The model also simplifies the tasks of healthcare professionals by not swamping them with false alerts. The system can accurately distinguish emergencies from normal conditions. The data used to validate the model are obtained via artificial data generation based on data derived from real patients,preserving the correlation of a patient's vital signs with different activities and symptoms. The stronger relationship between vital signs and contextual information will make the generated data more consistent and the model will be more accurate for validation. The experimental evaluation of our system in cloudmodel for patients having different HR and BP levels has demonstrated that the system can predict correct abnormal conditions in a patient with great accuracyand within a short time when it is properly trained with large samples. In future, we intend to extend the model with more context domains.

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