

Patient Controllable Health Monitoring System

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Abstract: E-healthcare systems are very popular now but face security constraints. The distributed m-healthcare systems allow significant patient treatment by sharing personal health information among healthcare providers. The challenge it faces is to ensure the security of the patients identity as well as the data. Patients can decide which physician can access their information as well as set their physician. Based on this idea we are devising a new technique where the patient can self-control their data and develop a system where all of the patient's health information is stored in a secured database, the data will be available only to the patient, his/her specific physician and the consultant in case the case is transferred to the consultant, it supports secure and efficient data transfer and data retrieval

Keywords: Database, Authentication, Security and privacy, distributed system, healthcare

I. INTRODUCTION

We live in a digital age where data should be accessible at the click of a button as well as data should be secured and not tampered with. In this fast moving urban life medical ailments are on the rise and monitoring these ailments have become a priority. Due to the busy lifestyle people do not have the time to go to hospitals for regular check-up. To solve this problem we have a system that will help the patients monitor the ailments at home and let the doctor review your report online and give the necessary feed-back. We are developing a system where all of the patient's health information is stored in a secured database. This data will be available only to the patient, his/her specific physician and the consultant (if there is one). The system also supports secure and efficient data transfer and data retrieval, with only user and his/her specified physicians and consultants able to access the given data. The given project is meant for easy access to patients who can access their records from everywhere and at the same time limit the people who can access their files. The aim is to develop a simple system available to all.

II. LITERATURE SURVEY

In [1] author says that Database security is very important in today's world and it has received a great deal of attention since a very long time starting from data security for System R and Ingres to access control models to multilevel database systems.

In[2] the author mentions that over the years various encryption schemes have been developed in order to protect the databases. The paper discuss the importance of database encryption and makes an in depth review of various database

encryption techniques and compares them on basis of their merits and demerits.

In [3] the author has thrown light on how E-healthcare systems has been very popular and is used in health condition monitoring, disease modeling early intervention, and evidence-based medical treatment by medical text mining and image feature extraction, but faces security and privacy issues. In the paper, a secure and efficient privacy-preserving dynamic medical text mining and image feature extraction scheme PPDM in cloud-assisted e-healthcare systems is proposed

In [4]the author through this paper is putting forward a novel authorized accessible privacy model (AAPM).Patients can authorize physicians by setting an access tree supporting flexible threshold predicates. Then based on it, by devising a new technique of attribute-based designated verifier signature, a patient self-controllable multi-level privacy-preserving cooperative authentication scheme (PSMPA) realizing three levels of security and privacy requirement in distributed m-healthcare cloud computing system is proposed. The directly authorized physicians, the indirectly authorized physicians and the unauthorized persons in medical consultation can respectively decipher the personal health information and/or verify patients' identities by satisfying the access tree with their own attribute sets.

III. SYSTEM ARCHITECTURE:

This system aims at developing a system where all of the patient's health information is stored in a secured database, the data will be available only to the patient, his/her specific physician and/or consultant and it supports secure and efficient data transfer and data retrieval.

The main goal I of this system is to develop a secure system with all the patient's information which can be available all the time at a click of a button. The main objectives are to provide efficient medical treatment to patients by sharing the required health related information among the healthcare providers. Secondly give distributed access to the health record. Last to allow the doctor to have access to the patient's record, which helps in monitoring their ailments.

The scope of the system is to improving the security of database and medical information. Our system provides a mechanism user can check the integrity of their data which is stored in database. Secondly, making medical data now available to be accessed at the click of a button to the patient as well as the authorized doctor. The outcome of the project will be that the authorized doctor/consultant will be able to see the patient's medical report and prescribe medication. The advantages of the system are as follows

- Task of accessing and updating the medical data is automated, thus saving a lot of time and energy.

- Visit to hospitals can be reduced due to continuous monitoring at home .
- A check on the patients health attributes can be maintained and tracked in case of emergency.
- Doctor can notify patient in case of an emergency.

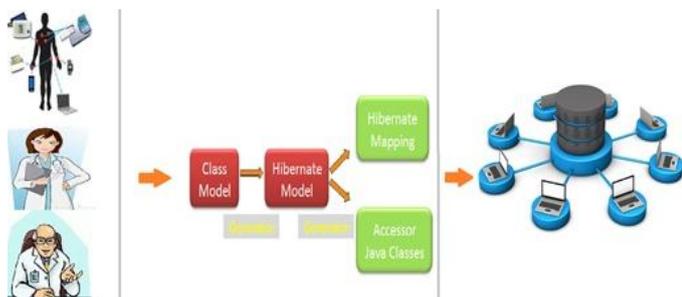


Fig 1. System Design

The user (patient/doctor/consultant) have to login through their specific user id and password. After successful login patient inputs data through the hardware provided and data gets stored in the database. The hardware readings will be stored in the database .

The doctor/consultant can view the patients readings and prescribe the required medication through online prescription. The doctor can also send notification to the patient about his/her availability.

IV. DATA FLOW MODEL:

Description:

Profile Selection:

There are options of either a doctor login, consultant or patient login.

Sign In:

Bothe the doctor and patient will have to sign in with a correct user id and password. Only after successful authentication can the sign in the system.

Patient:

- The patient will provide input using the hardware and sensors.
- The prescribed medication can be viewed by the patients.

Doctor/Consultant:

The doctor has to give the right credentials to login and view the patients report.

Database: This is where the data of the patient and doctors are kept . All requests are serviced from it.

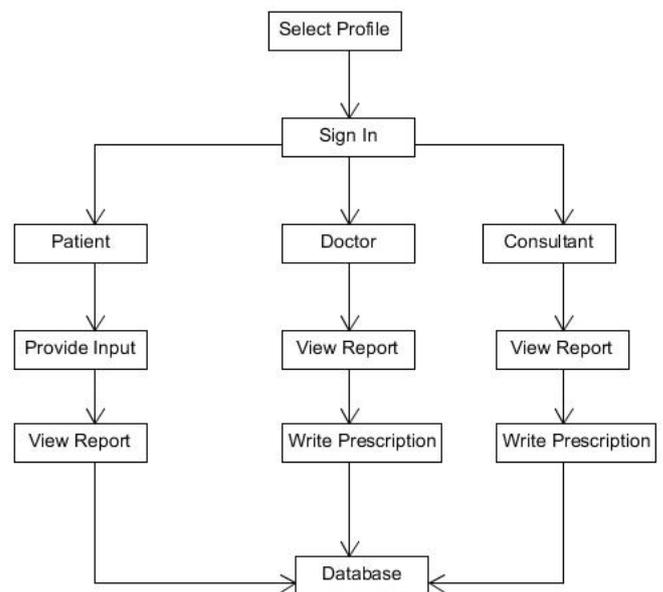


Fig 2. Data Flow Diagram

V. MATERIALS AND METHODS

The system requirements will be a raspberry pi model B along with some medical sensors. These sensors could be limited to what the patient requires monitoring for i.e his/her ailments.

The sensors could be blood pressure, temperature, air flow ,galvanic ,heart pace monitoring ,diabetes checking device etc. These sensors can be connected to the raspberry pi and interfaced with the system having network connectivity. For security it must be ensured the channel is secure , any encryption technique can be used. Once the patient log's into his account and sends the data via hardware, the data is available for his/her specific doctor to evaluate .The doctor can see the report and prescribe the required medication and treatment procedure can be specified .In case the doctor requires expert advice on a particular case he can transfer the case to the consultant . The consultant can view the report and prescribe the treatment required .The patients can download the prescription advised by the doctor/consultant from the nearest pharmacy. This system helps in monitoring of the ailments at home without having to go to the hospital for simple procedures. This is possible for simple monitoring of ailments that is normally done by the patient weekly or monthly.

The hardware required for this system:

- Raspberry Pi 2 Model B
- e-Health Sensor Shield V2.0 for Raspberry Pi
- Raspberry Pi to Arduino Shields Connection Bridge
- Body Temperature Sensor
- Airflow Sensor (Breathing)
- Galvanic Skin Response Sensor
- Pulse and Oxygen in Blood Sensor (SPO2)
- Blood Pressure Sensor.

The constraints of the system are as follows:

- Connectivity Affected due to failure in network
- The sensors not reading the data properly
- Data from sensors not sent to the database due to connectivity failure.

- The battery life of the sensors may get exhausted.
- If the sensor cape on the raspberry pi does not work due to compatibility issue

The outcome or result of this system the patient or doctor will get to view the report of the patient that has been updated with real time data coming from the sensors at the patients end.

VI. CONCLUSION:

A system is developed where all of the patient's health information is stored in a secured database. This data will be available only to the patient, his/her specific physician and/or consultant at the click of a button. Unlike most prior works, the new scheme further supports secure and efficient data transfer and data retrieval, with only user and his/her specified physicians and consultants able to access the given data. Extensive security and performance analysis shows that the proposed scheme is highly efficient and resilient, malicious data modification attack, and even server colluding attacks, with backup available at all the time. This system will help the patients monitor their health without the need to make monthly appointments and meet the doctor, as now the patients can use the medical sensors to check their health which can be monitored by their doctors and consultant. This will avoid having the patients carry their report for every test as now they have a centralized access to their record.

VII. FUTURE SCOPE

The system can extend to include a digital valet where the patient can purchase the medicines online by submitting the prescription to the online pharmaceutical retailer. Also care must be taken that every prescription is digitally signed by the doctor along with a unique id given to this certificate to avoid any fraudulent purchase.

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