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KASABA BAWADA, KOLHAPUR.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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DY PATIL
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A

Project Synopsis

On

“Cloud Based EHR System”

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1. Introduction:

Information Technology (IT) is playing an increasingly important role in all sectors of economy, healthcare sector being no exception. In fact, the increased role of IT in the healthcare sector has led to coining of a new terminology, "Health Informatics," which deals with the use of IT for better healthcare services. Health informatics applications often deal with the health record of individuals, in digital form, which is referred to as the Electronic Health Record (EHR). An electronic health record (EHR) is more than a digital version of a patient's paper chart. EHRs are real-time, patient-centred records that make information available instantly and securely to authorized users. While an EHR does contain the medical and treatment histories of patients, an EHR system is built to go beyond standard clinical data collected in a provider's office and can be inclusive of a broader view of a patient's care. EHRs can:

- Contain a patient's medical history, diagnoses, medications, treatment plans, immunization dates, allergies, radiology images, and laboratory and test results.
- Allow access to evidence-based tools that providers can use to make decisions about a patient's care.
- Automate and streamline provider workflow.

In our work, we are going to build a centralized cloud-based storage system backed with authorization for users of the system, thus making it convenient for both the patient and hospital to handle their respective clinical data.

2. Literature Survey:

The paper provides a perspective of the challenges faced by medical organizations, problems include to adopt cloud-based electronic medical records services, due to the risk of data breaches and the resulting compromise of patient data. Existing authorization models follow a patient centric approach for EHR management where the responsibility of authorizing data access is handled at the patients' end. This paper suggests us with work to fill this gap in medical field.

3. Need of Work:

Our world has been radically transformed by digital technology – smart phones, tablets, and web-enabled devices have transformed our daily lives and the way we communicate. Medicine is an information-rich enterprise. A greater and more seamless flow of information within a digital health care infrastructure, created by electronic health records (EHRs), encompasses and leverages digital progress and can transform the way care is delivered and compensated. Thus, we can tackle following problems that are currently being faced in this sector:

- **Patient Inconvenience:**

Managing a bunch of reports is really a tedious task for a patient to deal with. So, with the help of this system we can improve health care quality and convenience for patients by:

1. Reducing the need to fill out the same forms at each visit.
2. Convenience of e-prescriptions electronically sent to pharmacist.
3. Patient portals with online interaction for providers.
4. Electronic referrals allowing easier access to follow-up care with specialists.

- **Inconvenience for Hospitals:**

On the other hand, hospitals find it difficult to deal with this physical data for every patient it treats. EHR system can help here by:

1. Providing quick access to patient records from inpatient and remote locations for more coordinated, efficient care.
2. Enhancing decision support, clinical alerts, reminders, and medical information.
3. Performance-improving tools, real-time quality reporting.
4. Legible, complete documentation that facilitates accurate coding and billing.
5. Providing interfaces with labs, registries, and other EHRs.
6. Safer, more reliable prescribing.

- **Diagnostics & Patient Outcomes:**

With EHRs, providers can have reliable access to a patient's complete health information. This comprehensive picture can help providers diagnose patients' problems sooner.

- **Care Coordination:**

Electronic health record (EHR) systems can decrease the fragmentation of care by improving care coordination. EHRs have the potential to integrate and organize patient health information and facilitate its instant distribution among all authorized providers involved in a patient's care.

- **Practice Efficiencies and Cost Savings:**

EHRs can benefit medical practices in a variety of ways, including:

1. Reduced transcription costs.
2. Reduced chart pull, storage, and re-filing costs.
3. Reduced medical errors through better access to patient data and error prevention alerts.

4. Problem Statement:

To securely store Electronic health records (EHRs) over centralized storage for regional analysis and efficient use of health data.

5. Objectives:

- To implement EHR based system.
- To implement and organize cloud, which can be shared among different health organization.
- Provide a secure way to save and access patient information.
- Provide access to authorized users only.
- To improve Patient Care.
- To improve Care Coordination.
- To improve Diagnostics & Patient Outcomes.

6. Proposed Work:

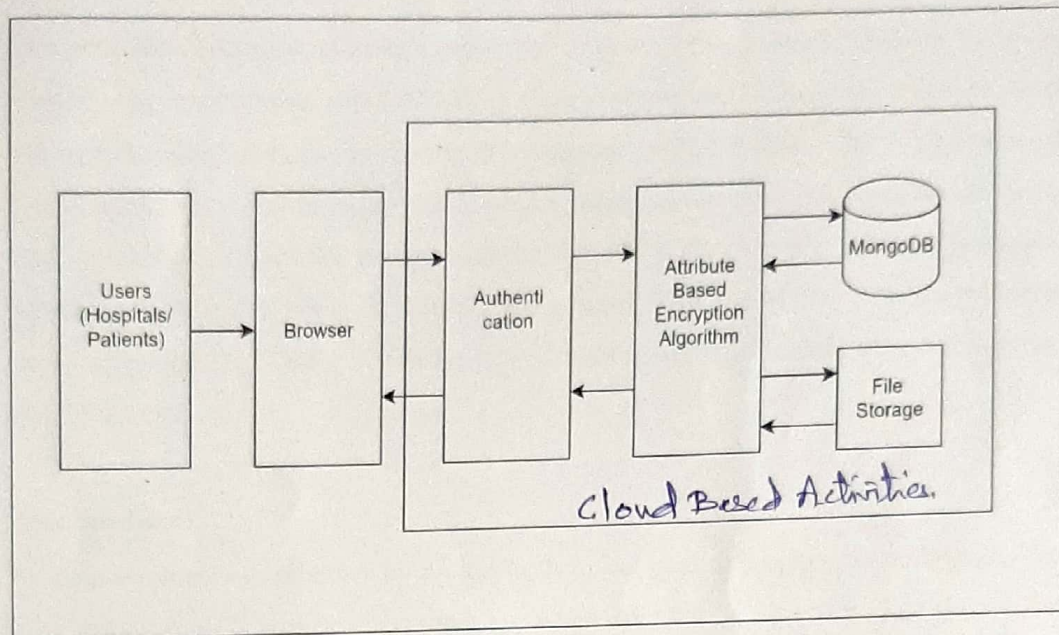


Fig. 6.1: Proposed System Architecture

User Interface:

This module provides users with a secured interface to access their respective data. This user interface will be designed with the technologies like React.js, HTML, CSS, JS and will interact with backend through AJAX API calls.

Encryption:

Every initiated process by the users of system (i.e. patients and hospitals) gets through authorization phase. Processes including:

1. Patient data upload and retrieval by hospitals over cloud.
2. Patient access to its own data.
3. Hospital's access to patient data provided with patient key.

This encryption will be implemented through Attributed based encryption.

Storage:

For centralized storage system, elastic file system (EFS) is used which is a service provided by amazon web service (AWS). Every instance is connected to this centralized storage. Any instance can opt for any other instance with the help of NFS-V4 (Network file system) protocol. For storing data, we are using MongoDB because of its simplicity and scalability. For storing reports and other medical files we are using a file system which is AWS's EFS which is network file system. This file system solution will help us to store reports. This FS will be shared among various Elastic cloud computing (EC2) instances.

Decryption:

With every retrieval, whether by patient or hospital data decryption is processed. The data stored on EFS will be encrypted. So, when hospital or patient makes request for data the data needs to be decrypted. First, we are checking authorization and then we are decrypting that data using algorithm and sending reports back to patients.

Analysis:

Healthcare providers want to make the best possible decision for their patients, and they often need some extra help to do so. Now that the vast majority of providers have adopted electronic health records, they have access to the basic big data that will allow them to engage in clinical analytics. Clinical analytics can be patient-focused, such as using the EHR to compare a diabetic individual's HbA1C readings over the past two years to benchmark data from other non-diabetic patients, using algorithms to create risk scores for post-surgical infections and 30-day readmissions based on vital signs, or using large-scale genomic data to match patients with rare cancers to personalized treatments.

7. Requirements:

- **Hardware requirements:**

Amazon Web Services (AWS)

Database – MongoDB

- **Software requirements:**

Browser - Google Chrome/Mozilla Firefox

Technologies - Node.JS, MongoDB, Express, React.

8. Project Plan:

Sr. No.	Activity	Completion date/month
1.	Project Finalization	July 2019
2.	Synopsis	August 2019
3.	Information gathering for project development	August 2019
4.	Getting started with the project development	September 2019
5.	Planning of the project	September 2019
6.	Modelling	October 2019
7.	Hardware configuration and design	October 2019
8.	Coding	December-January 2020
9.	Testing	February-March 2020
10.	Deployment	March 2020

9. References:

- **Links:**

1. <https://www.ijitee.org>
2. <http://www.researchgate.net/>

- **Paper:**

Authors - Maithilee Joshi, Karuna P. Joshi and Tim Finin.


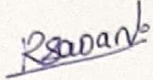

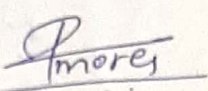
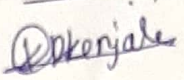
Title - Attribute Based Encryption for Secure Access to Cloud Based EHR Systems.

Conference - 2018 IEEE 11th International Conference on Cloud Computing.

Location - University of Maryland, Baltimore ,County, Baltimore, MD 21250,
USA.


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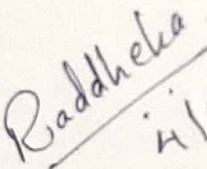
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Date: 4/9/19


Place: Kolhapur


Prof. G.A. Patil

Project Guide


4/9/2019
Prof. R.J. Dhanal

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