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A Review on Health Care Information System

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Abstract: We have Aadhar card, Pan card, driving license like identity proofs for our day-to-day transactions, but we have a major missing feature that is our health card, which manages our day-to-day health history like disease, allergy etc. And the same card is used everywhere in private and public hospitals and clinics, medical stores, laboratories to track your health-related data, which the concerned entity will enter the system. We aim to gather only health related data, so we are not aiming to involve any economical transaction into the system. We are proposing an Environment where all the Medical Reports will be managed by our system and provided to the user through our portal. Managing all Reports, Prescription, Medical History arranged in Time Frame format so it can be accessed easily whenever needed. Only doctors and authorized hospital staff can insert the health reports in the system. Patients can only access the reports in read only mode. This will give Real time information to health authorities so that action can be taken at the right time and thus it can save many people from becoming victims of some viral disease. We aim to gather only health related data, so we are not aiming to involve any economical transaction into the system. The health card will store all the scans, x-rays, prescriptions and other health related documents of a patient. It will also include details of patients' long-term conditions, allergies, etc. The health records can only be edited by authorized staff of a hospital and care system involved in the patient's direct care. This health card will make it easier for doctors to operate under emergency conditions.

Keywords: Health care, data management, prescriptions , medical history.

1. INTRODUCTION

Health Information management involves the practice of maintaining and tracking of important health records of hospitals and their patients. Due to the increased number of population and health concerns, managing health related documents has become boring and a tedious task. Nowadays due to the advancement in technology and increased demand of online applications, and in the current time where everything is being digitized it's not feasible to have Hardcopies of Reports, Prescription, X-rays etc. A good medical record management system could mean the difference between life and death in certain situations. So creating a more sophisticated environment to make information available about the patient is of utmost importance in the medical profession. For a doctor to provide the patient with the best possible care, it is of utmost importance that, all the information past as well as present, about the patient is available to him. So by referring various implemented technologies like storing information using secure cloud storage[1], Data storing using AWS, Data Storing using MySQLyog, creating a secure environment using Blockchain. providing IOT based smart card to user to manage their own health records and medical history using RFID on card to identify it[10], or 12 Digits unique ID has been used[11]

2. METHODS FOR STORING AND SECURING DATA

2.1 AWS:

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing. Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider like Amazon Web Services (AWS).

In this paper [1] AWS Cloud Storage is used to make our data Secure, Reliable and Scalable. In Amazon Elastic compute cloud is a part of AWS service it provides a virtual server that provides flexible IaaS(Information as a Service) environment. An Amazon EC2 instance is a virtual server in Amazon's Elastic Compute Cloud (EC2) for running applications on the Amazon Web Services (AWS) infrastructure. EC2 has 475 instances and they have used it for it security advantages. Amazon Web Services was choice to get advantage of attributes like stay isolated and ensured, selfsaves, self-have modification in condition of equipment breakdown, essentially extending, and prepared on different locales.[2]

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2.2 Blockchain:

Yelena Yesha [3] has demonstrated the use of Hyperledger fabric blockchain which is a modular blockchain framework that acts as a foundation for developing blockchain-based products, solutions, and applications using plug-and-play components that are used within private enterprises. Their approach provides full integration with the cloud orchestration and automation. Hyperledger fabric installation and launch is done automatically as a part of instant EMI and user data scripts [3]. On top of Hyperledger fabric we have used lambda function to invoke transactionis a fast, safe, and scalable blockchain infrastructure project which provides decentralized application. In [4] author proposed Two kinds of blockchains, private and consortium, are constructed by devising their data structures, and consensus mechanisms. A private blockchain is responsible for storing the PHI while the consortium blockchain keeps records of the secure indexes of the PHI. To achieve data security, access control, privacy preservation, and secure search, all the data including the PHI, keywords and the patient identity are public key encrypted with a keyword search. Furthermore, the block generators are required to provide proof of conformance for adding new blocks to the blockchains, which guarantees the system availability.

2.3 NoSQL:

This database provides a mechanism to store and retrieve the data which is not in tabular form.It can also be called nonrelation or distributed data. In the paper [6] as a form of NoSQL they have used Amazon DynamoDB.They are focusing on key value system of NoSQL. Key-value databases are a collection of key-value pairs that are stored as individual records and do not have a predefined data structure. Only way to retrieve the values is by using keys so it needs to be done in strategic manners using standard naming convention. DynamoDB lets you relieve the administrative burdens of operating and scaling a distributed database so that you don't have to worry about hardware setup and configuration, replication, software patching, or cluster scaling.All user data stored in Amazon DynamoDB is fully encrypted at rest. DynamoDB encryption at rest provides enhanced security by encrypting all your data at rest using encryption keys stored in AWS Key Management Service (AWS KMS)

2.4 Other Cloud Storage:

Cloud storage is a data deposit model in which digital information such as documents, photos, videos and other forms of media are stored on virtual, or cloud servers hosted by third parties. Provider's such as Amazon, Google, IBM, Sun Microsystem etc. have provided various cloud storage platform. In the paper [8] author explained model created by NIA, Shows multiple type of cloud storage to be provided on demand drawn from a pool of storage. The data services are applied to individual data elements as determined by data system metadata. Metadata specifies the data requirement on basis of individual data. Another way to store data securely is IPFS. It is a peer-to-peer storage network. Content is accessible through peers located anywhere in the world, that might relay information, store it, or do both. IPFS knows how to find what you ask for using its content address rather than its location. In IPFS data can be accessed only using the SHA-256 hash value stored in base58 format. So without the hash, data is inaccessible[7]

3. METHODS TO ACCESS DATA

3.1 RFID:

Nivedita HR and Asiri J aims to use RFID Module and secured cloud storage. Their module provides accurate, current, and detailed information. Their proposed system provides different portals for each participant like the doctor, user, pharmacist etc. They aim to provide a smart card integrated with RFID technology. RFID stands for Radio Frequency Identification. It comprises for two components tags and readers, uses electromagnetic fields to automatically identify and track tags attached to objects in this case the smart card which will be provided to each patient or user. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. In this system [10] the reader transmits 12 ascii characters out of which 10 are unique card numbers and the last two are XOR operations of previous ten characters. This is one of the technologies we could use and implemented into the smart card to keep the card number of the user safe as it cannot be ready by humans and would need an RFID reader to decipher it

3.2 UID:

UID is a 15-digit code known as the unique identification number (UID) for a person allotted at the time of his birth. With the help of UID a person is recognized all over the world as the code generated contains the person's personal details like his/her country name, state to which he/she belong, gender, age, date of birth etc.

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Data Warehouse is a subject-oriented, integrated, time-varying, non-volatile collection of data in support of the management's decision-making process. Basic definition of Data Warehouse was given by Inmon W. H. in [5] that Data Warehouse is a subject-oriented, integrated, time-varying, non-volatile collection of data in support of the management's decision-making process

The main benefits of assigning UIDs are an increase in efficiency and record keeping. By allowing automated scanning of UIDs, you virtually eliminate human error in entering the UID into a central database system. Since all UIDs are unique, there's less confusion and record duplication within the system.

Abhay kumar Agarwal proposed experimentally in [11] that data from the data warehouses, available at various levels of IDDW, can be retrieved by using UIN of the user.

In another survey paper[9] UID was said to be done in 2 phases, the first being the recording process where UIDAI builds up a centralized database consisting of UID for every citizen and second would be the authentication process The server takes an input and compares it with all the already stored records in the database. If a relevant match is found, then the person is designated to be a genuine citizen. And this UID would be used to identify a citizen.

3.3 API:

API is the acronym for Application Programming Interface, which is a software intermediary that allows two applications to talk to each other. Each time you use an app like Facebook, send an instant message, or check the weather on your phone, you're using an API.

CONCLUSION

Currently, handling hard copies of medical records becomes challenging, This Paper gives active research topics in Cloud Computing, Database management System. This Paper gives a brief review on various methods to store e-health records on Cloud and any other Database. It also provides a brief description of all methods under consideration. To handle hard copy of medical records problems, there are several research directions for oversampling techniques such as RFID, Meta Model and UID. All these techniques can be generalized to solve hard copy of medical records problems.

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