Privacy of Medical Big Data in Healthcare Cloud Using Fog Computing Facility with Stegno and Cryptography

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Abstract

In some hospitals, patient details are maintained as a hardcopy like report due to may be of their financial crisis. In most of the hospitals, records are maintained as a hard copy. As a result it will create a large amount of memory, it is so complex that we can't manage such type of data using existing and outdated equipments. In this paper we propose an efficient storage system for patient information. Through this system we are providing a security system for patient and hospital details. Cryptography and steganography are the two main networking techniques that we are going to use. To secure the record; we are implementing an efficient system using cryptography and steganography system. Patient details are stored in cloud for memory management and it will be the easy way to access the data. We are providing permission key to access the patient details. No one can access the information without the knowledge of doctor. So through this a security level is increased by storing data using crypto steganography methods. The proposed methodology is based on cloud storage and cryptographic techniques like image crypto, Fog computing. Patient details play a key role in healthcare, so this system helps the patients and hospitals to easily access the required data without any security breach.

Keywords: Cryptography, Steganography, Fog Computing, Cloud Storag

1. Introduction

Distributed computing is chiefly utilized for putting away the information and to get to the information. The utilization of cloud turned into a fundamental establishment in numerous associations. They are for the most part three sorts of cloud-administration model. They are: PaaS, SaaS and IaaS. Product as a service contains an outsider proprietor who gives equipment and programming over the internet. It is chiefly utilized for improving the presentation of use. Software as a service used to give permit for a product dependent on the membership. Infrastructure as a service gives benefits in on the web and creates elevated level Application Programming Interfaces. First we need to discover the kind of organization in cloud. By and large they are open, private and cross breed. Open cloud offers putting away the information over the web. Private cloud will be

facilitated by the third gathering specialist organization. Half and half cloud permits to move information and applications among private and open mists. Distributed

computing is generally utilized in making local applications. They are likewise utilized in putting away, reinforcement and recuperation of information. Cryptography in cloud gives clients to effectively get to the information and to move the information in cloud services. Many associations understanding the significance of distributed computing. It likewise gives a virtual foundation to the customers.

This foundation enables customers to store and run applications. Many distributed computing foundations don't give security to the untrusted cloud operators. Due to this organizations and associations need to store touchy, classified data, for example, medicinal records, money related records. They are such a significant number of approaches to expand cryptography in cloud information. A few organizations picked encoding the information as opposed to transferring in cloud. It is use full on the grounds that information is scrambled before it goes out from the organization environment. It must be decoded by the approved people who is having unscrambling keys.

In this paper a methodology is developed to protect patients records using decoy file technique with fog computing facility. It ensures that if the attacker steals the information should be of no use. This method generates duplicate file to the attacker as if it is the original data.

2. Literature Survey

This proposed paper deals with the present scenarios of protecting the medical data from attackers. It also explains about the disadvantages that will be produced by the attackers. Due to lack of developing skills so many are facing this issue of how to protect the confidential data [1].

In this paper it deals with the Big Data (BD) that is associated with a new generation of technologies and architectures which can harness the value of extremely large volumes of very varied data through real time processing and analysis [2].

This paper discusses different definitions of health analytics, describes the four stages of health analytics framework and examples in public health [3].

This paper discusses the merging healthcare service where the healthcare professionals can diagnose, evaluate, and treat a patient using telecommunication technology. To diagnose and evaluate a patient, the healthcare professionals need to access the electronic medical record (EMR) of the patient, which might contain huge multimedia big data including x-rays, ultrasounds, CT scans, MRI reports [4].
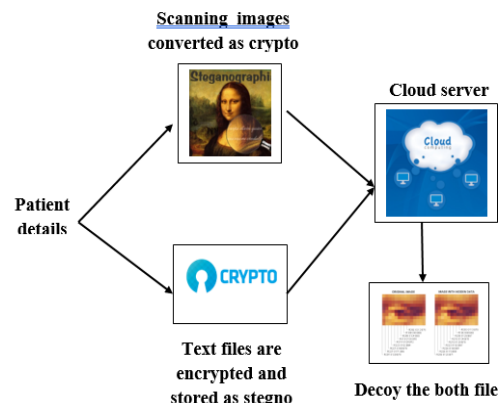
3. Proposed System

Figure 1: System Architecture

By using hardcopies as the reports to save the patient details as well as the hospital details, it is difficult to handle the bulk amount of data as it might be stolen by the hackers. The proposed systems make use of cloud facility in which the hospital management can save the patient details securely. Only the authorized persons having keys can able to open the details.
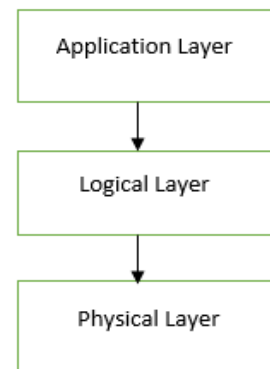
MySql Model

Figure 2: MySql Model

The application layer contains common network services for connection handling, authentication and security. The Logical Layer is where the MySQL intelligence resides, it includes functionality for query parsing, analysis, caching and all built-in functions. The Physical Layer is responsible for storing and retrieving all data stored in "MySQL". Associated with this layer are the storage engines, which MySQL interacts with very basic standard API's.

4. Modules

User Registration

In this module user/ patient have to register their personal information like name, address, mail ID, mobile number, address. And those details will be stored on database. After registration user will get user ID and password to access the application. This is an application to view their hospital report from cloud. To access the hospital records we are creating user Id and password for authentication.

Hospital Server

Server is the main process for every application because it is the only way for communication it will establish the communication between client and corresponding website. In this module we are implementing hospital server to maintain both patient information, doctor information and other hospital details. All doctors have to register their designation and other details same like that other hospital have to register their details on this server. Because patient may change their treatment from one hospital to another that is why hospital will also register their information. Server will maintain all the details and provide details whenever user request for the query.

Stegano Analysis

Steganography is the practice of concealing a file, message, image, or video within another file, message, image, or video. We are hiding the patient's personal information and their report about disease. Every data will be stored as a stegno format when we stored the record as a stegno it will not hacked or theft by any one.

Image cryptography

In our system we are storing the patient scanning report like their x-ray, ECG and other images in encrypted form using ECC algorithm. ECC generates keys through the properties of the elliptic curve equation. It provides reliable keys to access.

Fog Computing

Fog computing is a term created by Cisco that refers to extending cloud computing to the edge of an enterprise's network. Also known as Edge Computing or fogging, fog computing facilitates the operation of compute, storage and networking services between end devices and cloud computing data centers. It is a separate to maintain the decoy information. Here we are decoy the patient information in secure way. Decoy is the process of creating a fake report of patient. For security we are creating this type of record.

Data Access

In this module we are providing accessing feature to the patient as well as hospitals. They will be provided with the password to access the data. If the patient want to change the hospital, the doctor in the second hospital should have the key same as the previous doctor. So the system checks the id and password of the person and if it matches the doctor can able to view the information or it sends a decoy file to the patient.

5. Conclusion

In this paper we came to a conclusion that crypto stegano technique will be more secure for Patient information for that ECC algorithm is used. They can view their information anywhere but by providing to access the data. So security level increased by comparing with existing work. It was found to be cost effective and feasible optimizing the networking techniques. It also reduces the time for searching. It is reliable and secure.

6. Result

Thus the proposed system delivers an efficient way of protecting patient details securely using networking methods like steganography and cryptography. It also ensures that no intruder can penetrate into the system easily. We can say that by using fog computing as the technique it produces the decoy file to draw the attackers' attention from the original file. It also ensures that it provide secure decryption keys to access the data for the users from the cloud.

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