Health Infomatics Using Multy-Keyword Rank Search Over Cloud

Shubham A. Ahire[1]
Student of BE Information Technology
BVCOE & RI, Nasik, India
University of Pune
ahire.shubh@gmail.com

Gaurav A. Dere[2]
Student of BE Information Technology
BVCOE & RI, Nasik, India
University of Pune
gauravdere199@gmail.com

Mayur D. Mekha[3]
Student of BE Information Technology
BVCOE & RI, Nasik, India
University of Pune
mayur.mekha@gmail.com

Amit S.Wagh [4]
Student of BE Information Technology
BVCOE & RI, Nasik, India
University of Pune
amitwagh29@gmail.com

***Abstract* –** This projects targets on the productivity of the cloud computing technology in health care industry. Health care sector is one of the largest sectors in the world. Health care industry depends mainly on Information Technology to provide best service and accuracy of information to their patients. System deals with the cloud technology to create network between patients, doctors and health care institution by providing applications services and also by keeping the data in the cloud. System define and solve the challenging problem of privacy preserving multi-keyword search over encrypted cloud data by providing searching through index. Through analysis investigating privacy and efficiency guarantee of proposed schemes is given, and experiments on the real world's data set further show proposed schemes indeed introduce low overhead on computation and communication.

***Keywords*-** *cipher text, Health informatics, Encryption, Personal Health Record, Electronic Medical Record.*

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1. INTRODUCTION

Project is based on the existing concepts i.e. Electronic Medical Record (EMR) and Personal Health Records (PHR). EMR is limited to a specific institution or a group of institution while PHR is typically a health records that is initiated and maintained by an individual. Use of cloud servers for the health records is effective system for EMR and PHR. The importance of our project is to provide the security parameters of the patient's data, it differs according to different systems. Our System provides solution for presenting security to data. The Basic concept of our system is electronic format of records; paper-based records were the most common methods of maintaining patient information for most Health care centers. Paper based record is difficult to locate, update and share. EMR is also subject to physical loss and damage. some system were designed to overcome the limitations of paper based records major ally categorized as Electronic Medical Record is EMR System and Personal Health Records is PHR System maintains the records in electronic format and the records is in the possession of the individual. EMR system is more than hospital health care model; this system focuses on how to meet health care provider's needs. While the benefits of EMR and PHR implementation are substantial, achieving them made the health care provider's to make hard choices around capital investments. Another evolving system that provided importance are web enabled systems but this system is of record retrieval, it is mostly dependent onto the unique id provided to each individual.

2. LITERATURE SURVEY

A literature review is summery of research that has been published about a particular subject. It provides some ideas about the current status in terms of what has been done by us, and what we know. It includes suggestions about knowledge and understanding of a particular problem. Cloud computing is the core of our systems and strict privacy constraints being defined for heath record and it should address issues of data privacy and security. Our literature review has major target towards the encryption techniques and various searching techniques. In our system we are using three techniques are used in encrypting in cloud [2].

Techniques of Encrypting In Cloud:

- Attribute Based Encryption (ABE) is fully secure functional scheme. Basically in ABE, key and cipher text are joins with more complex objects as well as access formulas [2].
- Predicate Encryption (PE) is overcome limitation of ABE. It gives inner product between the cipher text and key vectors.

Techniques of Searching In Cloud:

- Search on encrypted data is nothing but to index searching method, is seem to require less construction and working [3].
- Fuzzy Keyword Search provides more effective and practical fuzzy keyword search construction with belong to storage and search efficiency [4] [5].

3. System Overview

System overview shows how the system works to person record files will be searched and manipulated. Given they are preliminary step used to create an overview of a system This can be elaborated. Given figure shows the visualization of data processing.

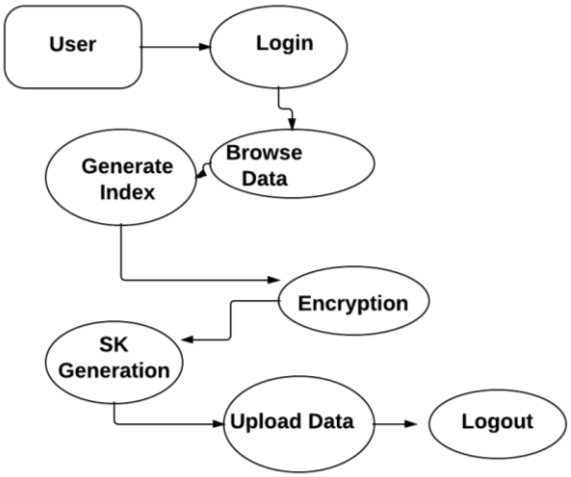

Figure 2: System Overview Diagram

Figure 2 shows how a system works and also shows what kind of data input to and output from the system, where the data will come from, and where the data will stored. It does not show information about the timing of
Processes or information about whether process will operate in sequence or in parallel.

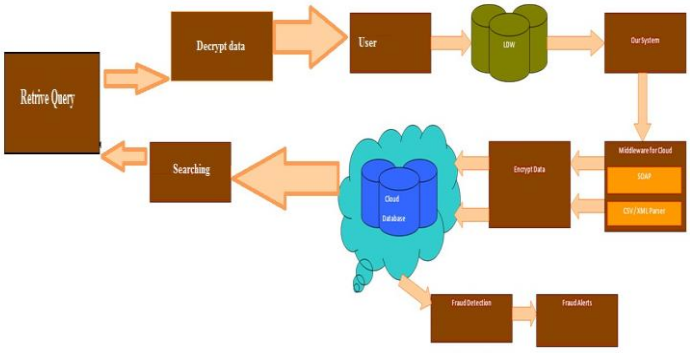

Figure 3: System Architecture Diagram

Figure 3 shows the system architecture of our proposed system. This is our system architecture flow and it shows searching and uploading data over a cloud.

All data is in decrypted format. First the admin decrypt the data from cloud server by entering trapdoor generation query. The user can also handle the whole data. Then data goes to middleware cloud through our system. Middleware cloud is use to handle SOP structure and XML parser. Then finally data goes to cloud server in encrypted format. The cloud servers is also use for fraud detection and fraud alert.

4. Algorithmic Strategy

These are the 3 algorithms used in proposed system:
1. RSA Algorithm
2. Set Up Secret Key Algorithm
3. Build Index Algorithm

1. RSA Algorithm:

1. Choose two distinct prime numbers p and q.
   - For security purposes, the integer's p and q should be chosen at random, and should be of similar bit-length. Prime integers can be efficiently found using a primarily test.
2. Compute $n = pq$.
   - n is used as the modulus for both the public and private keys. Its length, usually expressed in bits, is the key length.
3. Compute $\varphi(n) = \varphi(p)\varphi(q) = (p-1)(q-1) = n - (p+q-1)$, where φ is Euler's totient function.
4. Choose an integer e such that $1 < e < \varphi(n)$ and $\gcd(e, \varphi(n)) = 1$; i.e., e and $\varphi(n)$ are coprime.
   - e is released as the public key exponent.
   - e having a short bit-length and small Hamming weight results in more efficient encryption – most commonly $2^{16} + 1 = 65,537$. However, much smaller values of e (such as 3) have been shown to be less secure in some settings.[5]
5. Determine d as $d \equiv e^{-1} \pmod{\varphi(n)}$; i.e., d is the multiplicative inverse of e (modulo $\varphi(n)$).
   - This is more clearly stated as: solve for d given $d \cdot e \equiv 1 \pmod{\varphi(n)}$
   - This is often computed using the extended Euclidean algorithm. Using the pseudo code in the *Modular integers* section, inputs a and n correspond to e and $\varphi(n)$, respectively.
   - d is kept as the private key exponent.

2 Set Up Secret Key Algorithm:

1. The parties agree on the algorithm parameters p and g.
2. The parties generate their private keys, named a, b, and c.
3. Alice computes g^a and sends it to Bob.

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4. Bob computes $(g^a)^b = g^{ab}$ and sends it to Carol.
5. Carol computes $(g^{ab})^c = g^{abc}$ and uses it as her secret.
6. Bob computes g^b and sends it to Carol.
7. Carol computes $(g^b)^c = g^{bc}$ and sends it to Alice.
8. Alice computes $(g^{bc})^a = g^{bca} = g^{abc}$ and uses it as her secret.
9. Carol computes g^c and sends it to Alice.
10. Alice computes $(g^c)^a = g^{ca}$ and sends it to Bob.
11. Bob computes $(g^{ca})^b = g^{cab} = g^{abc}$ and uses it as his secret.

An eavesdropper has been able to see g^a, g^b, g^c, g^{ab}, g^{ac}, and g^{bc}, but cannot use any combination of these to reproduce g^{abc}.

3. Build Index Algorithm

1. Admin generates binary data vector Di foe every document Fi.
2. Each binary bit Di[j] shows the existence of the corresponding keyword Wj in that document.
3. Every sub index is generated by applying dimension **extending, splitting** and **encrypting** procedures on.
4. These procedure are similar to those above except that the (n+1) entry in is set to 1 during dimension extending.
5. *Finally,* Sub index $I_i = \{M_1^T \vec{D_i}', M_2^T \vec{D_i}''\}$ Is built for encrypte document on Cloud server

5. Implementation Details

Implementation details contain basic modules included in system. Personalized message filtration system includes two modules:

A. *System based application*

System based application is application in which two types of Multi keyword approaches includes are as follows-

1. Upload to Cloud

Upload to cloud consist that the user or doctor stores the particular data of individual patient. Data should be private or secure for uploading purpose. While uploading the data Search Control (Trapdoor) and Access Control (data decryption keys) is share by data owner and data user.

2. Searching Over Cloud

Searching over cloud consist that the user or doctor retrieve the information of individual patient. Data must be secure while searching. Doctor only can see the particular case study of patient not the personal information of patient. While searching the data Trapdoor and data decryption keys are share by data owner and data user.

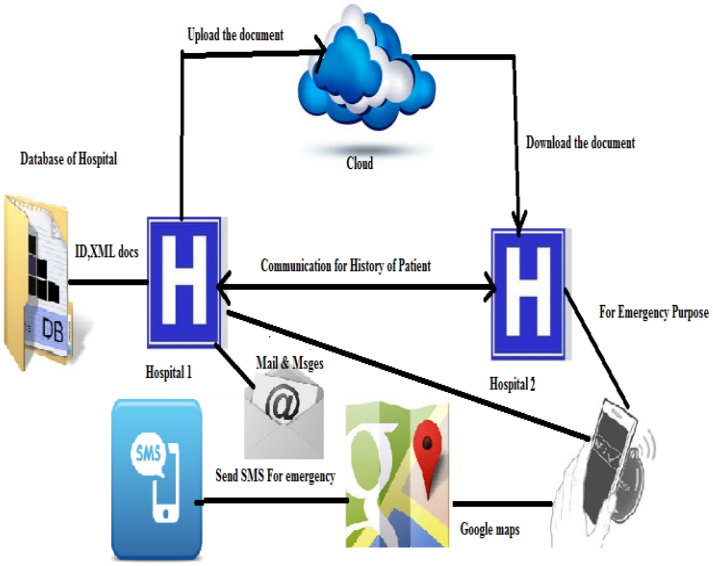

Figure 3.System Flow

Figure 3 shows the flow of searching and uploading the data. Hospital uploads the case studies it can be download by any other hospitals by providing the privacy to patient. For any emergency hospital make e-mail to respective patient. For any emergency hospital makes a personal call. or finds the location over Google maps.

B. *Mobile based application*

Mobile app module is on android base technology. Hence user can decide what he/she want to use. User can access the technology in system or on mobile app. It's totally his/her choice. Also used location access for user's current position. This module totally connects and share information to Google map. In this implementation section system gives reliability to patient or doctor in case of Android based application is supported all the versions of android.

6. Conclusion

Systems solve the problems of multi keyword rank search over cloud and provide privacy to the data. The main benefit of system is user can access data from everywhere. For meeting the challenges of supporting multi keyword

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semantic without privacy breaches, first proposed a basic Multi keyword Rank Search over Encrypted cloud data (MRSE) scheme using secure product computation, and not efficient to improve and achieve privacy.

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Ahire Shubham Ashok he is Engineering student of Information Technology at Brahma Valley College of Engineering And Research Institute, Nasik under University of Pune. His interest in the field of Cloud Computing.

Dere Gaurav Ashok he is student of Engineering student of Information Technology at Brahma Valley College of Engineering And Research Institute, Nasik under University of Pune. Her interest in the field of Cloud Computing.

Mekha Mayur Dilip he is student of Engineering student of Information Technology at Brahma Valley College of Engineering And Research Institute, Nasik under University of pune. Her interest in the field of Cloud Computing.

Wagh Amit Sanjay he is student of Engineering student of Information Technology at Brahma Valley College of Engineering And Research Institute, Nasik under University of pune. Her interest in the field of Cloud Computing.