Rare Disease Detection and Alerting System to the Health Department

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Abstract- A great decline in human population is encountered due to the late diagnoses of many rare diseases but such diseases can be controlled if the government gets to know that the disease is being spread. The main aim of the proposed system is to ensure that the Health Department gets to know that such diseases vigorously affect a particular area and also the drug that works effectively on such cases. Here a cloud platform is used for wide range of data access and encryption/decryption mechanisms are used for securing confidential data.

Keywords-CU: Content utility

I.INTRODUCTION

Cloud computing being an internet based computing is used for a wide range of data across the globe. The proposed system uses cloud as its base so that the data can be used on wider access .The proposed system has various authentication techniques for security purposes. In Cloud Computing, the users use the web browsers as an interface, while the software and data are stored on the remote servers and hence it is device independent. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources.

In this model the identification numbers of registered doctors are stored in the cloud and they can access the patient details ubiquitously[2]. The patients are registered with a unique identification number in the cloud. Their medical records are stored in it along with the prescriptions given by the doctor who treated him/her by using a desktop or mobile application which is accessible by registered doctors. By this way the fake doctors can be identified and most importantly the contagious diseases such as dengue, malaria, etc can be identified. On identifying the disease intimation will be given to the government health care centre by which they can take appropriate preventive measures in the area where the patient resides.[6]Data Encryption schemes are applied so that data stored in a secure way so that the data is not misused by attackers or misusers. This provides a reliable way of accessing the data so that only authenticated users will be able to access the data.

II.LITERATURE SURVEY

In the paper, HealthCare Monitoring and Alerting System Using Cloud Computing, the architecture consists of a filtering system using smart phones which takes the user's health records and maintains it regularly retained to a particular patient [3]. If any changes are observed in the user's health the

4

symptoms are intimated to the doctor in the regional hospital and the data gets automatically stored in the cloud running an EMR (Electronic Medical Record)[2].

Using big data analytics, the healthcare industry historically has generated large amounts of data, driven by record keeping, compliance & regulatory requirements, and patient care.While most data is stored in hard copy form, the current trend is toward rapid digitization of these large amounts of data. Driven by mandatory requirements and the potential to improve the quality of healthcare delivery meanwhile reducing the costs, these massive quantities of data (known as 'big data') hold the promise of supporting a wide range of medical and healthcare functions, including among others clinical decision support, disease surveillance, and population health management.

The paper Health Monitoring and Management Using Internet-of-Things (IoT) Sensing[1] with Cloud-based Processing involves health care monitoring system retained to a particular area[3] and does not involve a wider range of access of medical record access.It uses IoT sensors to collect all the medical records from a particular patient and stores in a platform that cannot be used on a wider range . [4] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for.

The paper HealthCare Monitoring and Alerting System Using Cloud Computing invokes health care and monitoring system but the thing is that it does not have the adequate data that is required for the intimation purpose and the lack of data is a major thing that has to

be considered retained to a particular patient [3]when it comes to the health record management and intimation system[2].

The Survey paper on Effective in-Home Health Monitoring System[3] gives way of storing the data with regards to a particular patient and does not involve a wider range of data access over a large platform.There are not many measures that are taken for intimation purpose due to the lack of data[2].

The Secure Mobile Health Monitoring Using Cloud Storage uses Boneh Fraklin for encryption purpose where when the user has a master key he has an access to all the sensitive data.When tha data retained to a particular patient [2] is stored there has to be measures taken to store the data in a secure manner

The Patient health management system using e-health monitoring architecture has a system where the medical records of the patient is retained[2] to a particular doctor and not accessed world wide. This does not have a wide range of data access where the doctors can access it ubiquitously.This involves remote storage of data where it is used for an instance and not for analytics using IoT sensors[1].

III. METHODOLOGY

The main concept of the proposed system is to provide reliable environment for the doctors as well as the Government Corporation to detect rare diseases which is now identified as an aftermath. The proposal also allows the detection of fake doctors as the doctor would be able to log in only with his valid identification number. This simple step of feeding information into the cloud can ensure that the Health Department knows about the disease that is being spread in the particular region and the medicines can also be known if it is one of the way to get rid of the disease.
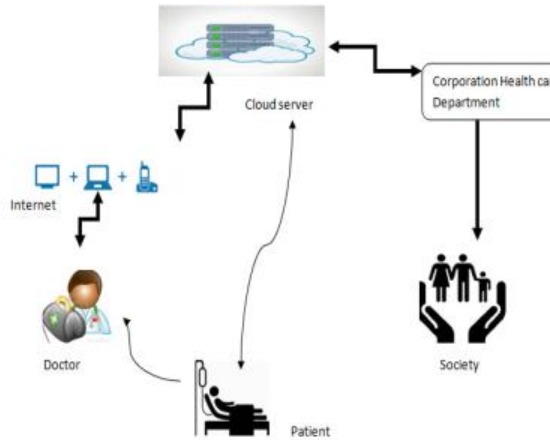
5

ARCHITECTURE

Fig III.1 Architecture of proposed system

This involves a registered medical practitioner to log in and feed the information which on result of classification according to the patent levels gets intimated to the Health department.It has various levels of authentication that ensures data to be secured on a wide range.

IV.PROPOSED ALGORITHM

The algorithm is designed so as to classify the particular data and intimate to the health department and also measures are taken to encrypt the data and store in the cloud platform so that the data is safe and secure. The cobweb clustering is an incremental clustering algorithm, which builds a taxonomy of clusters without having a predefined number of clusters.The clusters are represented probabilistically by conditional probability where $P(A=v|C)$

with which attribute A has value v , given that the instance belongs to class C. CU attempts to maximize both the probability that two instances in the same category have attribute values in common and the probability that instances from different categories have different attribute values. The pseudocode is as follows

cobweb(root,record)
//inserting record
if(root(children))=false
child=copy(root)
newintstance(record) //adds record
else insert(record,root)
for child in root
calculate CU to insert(record, child)
set best1, best2 children w. best CU.
end for
if newinstance(record) yields best CU then
consider newinstance(record)
else if merge(best1, best2) yields best CU then
merge(best1, best2)
COBWEB(root, record)
else if split(best1) yields best CU then
split(best1)
COBWEB(root, record)
ElseCOBWEB(best1, record)
end if
end

One of the main aim of the proposed system is to provide a secured storage of data in the cloud platform. The algorithm that is being used for both encryption and decryption purpose is Blowfish which has optimised access and has less time to encrypt and decrypt the data. It is a symmetric block encryption algorithm where it encrypts 64 bits of data at a time. It make use of simple addition,XOR and lookup table with 32 bit operand to process the data in a secured manner. It follows fiestel network consisting of 16 rounds. In data encryption mechanism it converts 64bit plaintext into ciphertext. The pseudocode as follows

Divide x element into two 32-bit halves as xL and xR
check with the number of rounds
For i <=16
  xL = xL XOR Pi
  xR = func F(xL) XOR xR
Swap the left and right element (i.e xL and xR)
//Undo the last swap //
Swap xL and xR value
xR = xR XOR p17

6

$xL = xL$ XOR $p18$
Recombine the value of xL and xR.

Data Decryption mechanism is exactly the same as encryption ,except the p-array values from p1 to p18 are used in the reverse order.

V.IMPLEMENTATION AND RESULTS

The project can be implemented in the cloud platform with system configuratations 8 vCPU Intel Xeon processor,16 GB RAM memory and 200 GB SSD disk.

Fig V.1 Web interface

This is the web interface of the proposed system where the log in.admin credentials and registration facilities are provided.

Fig V.2 Intimation interface

This figure shows the Health department interface where the intimation is provided .The data are provided security features by performing encryption and decryption where the data is encrypted and stored further retrieved on decryption basis. This provides only authenticated users to access the sensitive information.The data are decrypted before sending an intimation to the Health department.

VI. CONCLUSION

The proposed system provides a frame work for quick and seamless way for the government to get to know about the places that are affected by rare diseases using big data analytics using a cloud platform. The cloud permits a facility of fast Internet access and analysis only to the authenticated users and the government. The ultimate goal of the proposed framework is to provide the government a reliable environment where in the government would get to know the places that are being affected by such rare diseases.

VII.FURTHER ENHANCEMENTS

The system can be enhanced using sensor based health condition monitoring system with IoT as base where IoT gateways collects data from all sensors and stores in cloud providing total automated system for monitoring patient's health. Health survey among population and its analysis can be done to provide prevention measures and better nutritional guidance to society.

REFERENCES

[1] MoeenHassanalieragh, Alexpage, Tolga Soyata :2015 IEEE International Conference on Services Computing Health Monitoring and Management Using Internet-of-Things (IoT) Sensing with Cloud-based Processing: Opportunities and Challenges

[2] Jubi Rana, Abhijeet Bajpayee International Journal on Recent and Innovation Trends in Computing and communication ISSN: 2321-8169. Volume: 3 Issue: 2 102–105 HealthCare Monitoring and Alerting System Using Cloud Computing

[3] International Journal of Computer Applications (0975 – 8887) Volume 68– No.7, April 2013 A Survey on Effective in-Home Health Monitoring System

[4] Christo Ananth, S.Shafiqa Shalaysha, M.Vaishnavi, J.Sasi Rabiyathul Sabena, A.P.L.Sangeetha, M.Santhi, "Realtime Monitoring Of Cardiac Patients At Distance Using Tarang Communication", International Journal of Innovative Research in Engineering & Science (IJIRES), Volume 9, Issue 3,September 2014,pp-15-20

[5] 2nd International Symposium on Big Data and Cloud Computing (ISBCC'15) A Survey Of Big Data Analytics in Healthcare and Government

[6] Srijani Mukherjee, Koustabh Dolui, Soumya Kanti Datta Patient health management system using e-health monitoring architecture