HEALTH MANAGEMENT SYSTEM USING QR-CODE

[1]Ashwini A.Shejul, [2]Madhuri R.Thete, [3]Nita A. Shinde, [4]Mohini M.Tupe

[1] *Student, Computer Engineering, SRES COE Kopargaon, Maharashtra, India*
[2]*Student, Computer Engineering, SRES COE Kopargaon, Maharashtra, India*
[3] *Student, Computer Engineering, SRES COE Kopargaon, Maharashtra, India*
[4] *Student, Computer Engineering, SRES COE Kopargaon, Maharashtra,India*

ABSTRACT

Now a days every product contain a bar-code nothing but the information of the product. Bar-code and quick response code are used to provide the information about the product. If any user wants information then it needs to be decrypt. In this paper we are use this bar-code ad quick response codes for encrypting and decrypting the patient's Personal Health Record. For this we use a secure algorithm technique that is AES algorithm.AES stands for AsynchronouEncryption Standard. Paper contains three modules LabSeq-P , LabSeq-L ,LabSeq-D where P stands for Patient and L stands for Laboratory and D stands for Doctor. Patient get the details in JSON(JavaScript Object Notation)format .In this Patient's medical data is exchange between mobile phone and Electronic Health Records(EHR).

Keyword: - *Medical data, Encryption, Decryption, JSON, EHR, Bar-Code, QR-Code, AES.*

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1. INTRODUCTION

The traditional way to provide medical and laboratory reports to the patient in paper form. So there is difficult to collect the whole history of patient's data in integrated form. When patient have many health systems providers then it is difficult to manage all history of patient. In this situation patient's Electronic Health Record is not available. Here the patients who have regularly new reports they can integrate their all reports history and can bring when he or she have to consult with doctor. As we found Personal Health Record as a mobile application. So it can offer many health related data storage. In today's world mobile phones are used in many medical applications. Sometimes some techniques are merge into a single technique. For example the systems like emergency cases, ECG, Body Weight Control are the techniques which are merge into it. Often medical data and records are integrate automatically as convenient to the user [1].

Coming new laboratory reports are store into in database in order to keep all data in the proper order. The result like blood and urine analysis reports are available in paper format so lots of operation are done on that data to store that report in the computer system. It is very time consuming process [2].

2. BACKGROUND

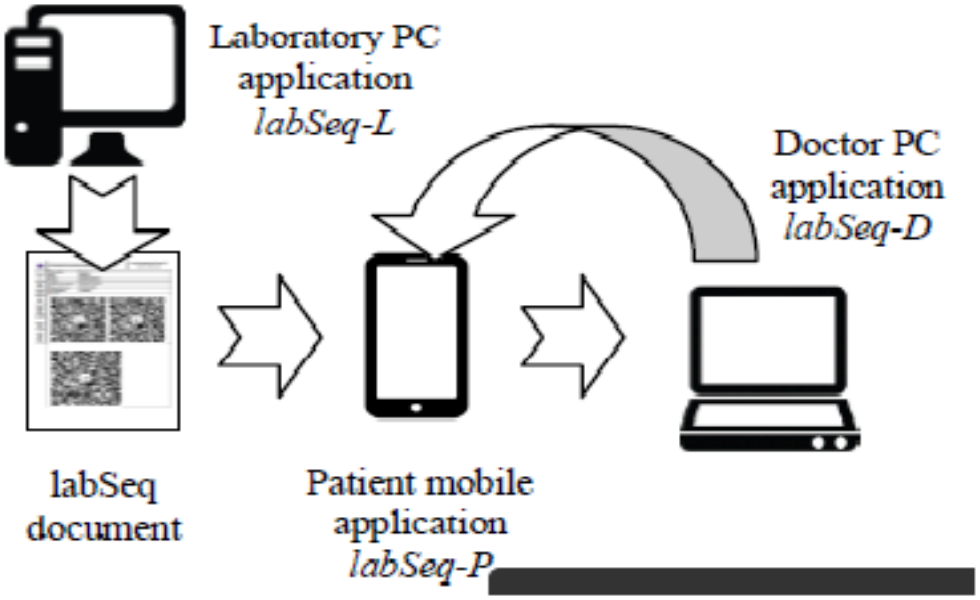
This exchange of medical data using QR-code is a multistage process. First, the laboratory report is produced by using QR-code with the help of laboratory test results. Laboratory reports within the QR-Code can be present in encryption. Then patient having the mobile phone scans the QR-code and store in local database. Newly added data is combine with previous data. Finally, entire data in the local database can transfer to the information system of the healthcare professional persons using JSON format.This entire process can build in LabSeq system and is defined in following sections.

A. LabSeq System Overview

In this system different laboratory test reports are provide to the patient. By using these data reports are directly imported to the patient's mobile. So it will help to patient that there is no need to everytime take the reports in the paper form Because all the data is available in his mobile in secure form. The experimental system have three nodes or models to cover all the transmission and functionality.

1.)QR Code Representation

QR codes, abbreviated from Quick Response and it is very popular and it is started to be used from the year 2011.



The main objective is to transfer the data from documents to smart phone. Our smart phones are equipped with camera, and hence to convey the message through QR code has become more popular.The QR code is a two dimensional barcode that is designed to be scanned by a smart phone camera.

2.) AES Encryption

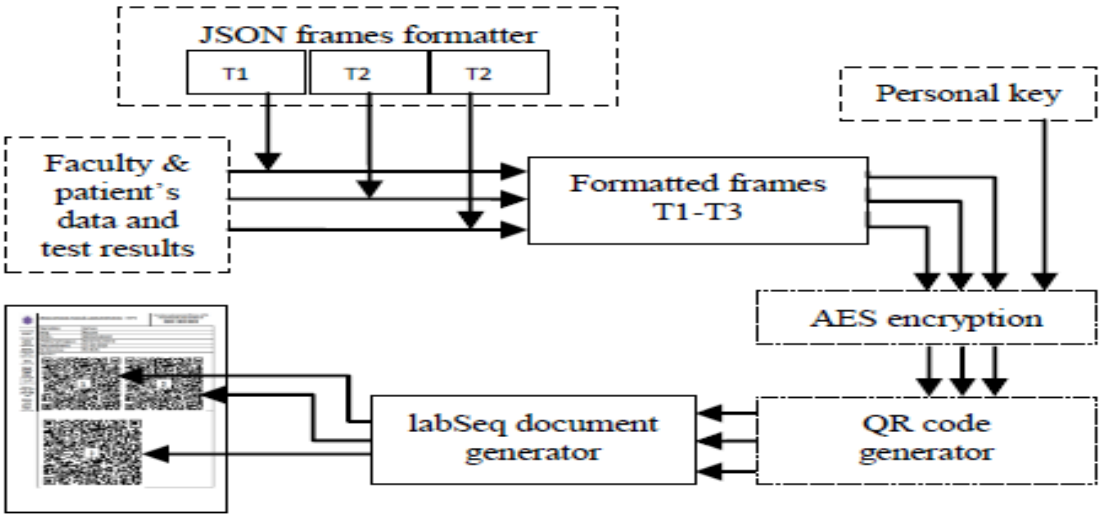
AES algorithm encrypts the medical data upto 128bits.Patient who want their laboratory report first of all he have to take the personal key during its first visit in the laboratory. So at that time patient having labSeq-p application to encrypt and decrypt the data and load into in database.

3.) Medical Data Frame Format

A single document contains three groups of QR-Code.Each and contain labSeq document. JSON frame formatted contains three types that are T1-T3. QR-Code having a number which is visible to read and it is available in the sequence. It helps to prevent from mixing of data. The neighbouring QR-code which contains pair of fields from same code is used to check that they are from same data set.The data frames in all three QR patterns is used to generate the JSON format. It makes easy to load data in Android based smart phone.

4) Labseq document generation

A sheet contain patient's identifier on left side and other faculty information. In the middle of the page there is QR1,QR3 and at the bottom of the page there is QR3. Scanning order of QR code is indicated by the number in the middle of the page. Below fig shows how the labseq document is formatted.



3. IMPLEMENTATION

This labSeq software is developed using Java language software. Laboratory and doctor application are created using NetBeans. And mobile application is programmed in Eclipse. Quick Response code generation is done using QRGen library and ZXing library to read the QR code.AES encryption is done using java cryptography. The functionalities of following tools are required to compose and handle the secure and capture documents. This tools stand as a complete component of labseq system.

A.Laboratory document generation application:LabSeq-L

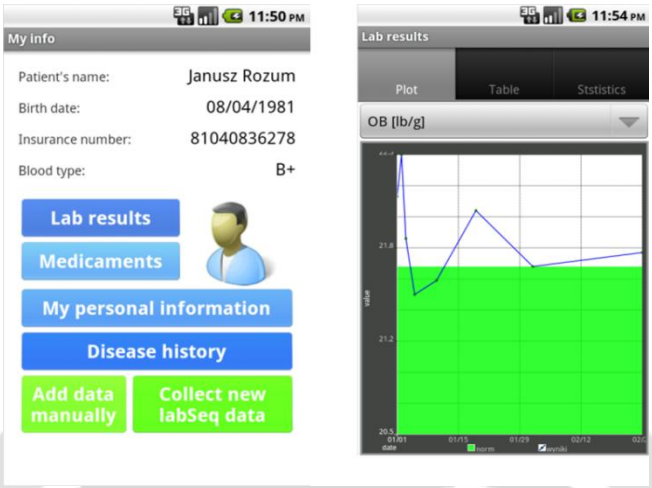
Labseq-L setup contain clear user interface which is easy to handle and local JDBC Apache database connection. To handle this system, laboratory operator has totype in patient's ID into the system. Afterwards, the proper data is found and document is generated. Test results document could be printed or sent through email directly to a patient.

B.Mobile Application for patient's: Labseq-P

Its main feature is loading and interpreting ciphered labSeqdocuments. In the patient's menu there are two options to add new patients results data, simple way is to do it manually and the second wayis to scan data from proper dothis lab-seq uses *SQLite* for data base.Through this we can view the documents results in graphical way, and his can be done by plotting the series using the Android plot library. For graphical representation it take the reference range and also shows the primary statistics of the data which is slected.

C.Doctor PC Application:Labseq-D

The interaction between doctor and patient is based on physician's application's capabilities of commenting the resultsThe application can also interpret labSeq documents presented in overt form, as a QR code and enciphered with AES algorithm, when a doctor has received encryption key from a patient and sending information back to a patient.



4. CONCLUSIONS

Though we conclude that the labSeq system provide patients to know the information of their Personal Health Record. So patient will get their laboratory reports quick and in secure form. It will helpful for them to reducing their time to go to the laboratory for taking the reports and also maintaining all history of reports. Patients will definitely get benefit of this system and every patient which having smart phone can easily download the app and use it.

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BIOGRAPHIES

Name- Ashwini Anil Shejul
College- SRESCOEKopargaon

Name- Madhuri Rajaram Thete
Phone – 7756826911
College-SRES COE ,Kopargaon,Maharashtra.