Emergency Information Access using QR Code Technology in Medical Field

P. Deepika , Sushanth. B , Tarun Kumar. S. P, Vignesh. M

Software Engineering, Information Technology, Easwari Engineering College, Chennai, Tamil Nadu, India

ABSTRACT

Health monitoring has become the most important factor in today's medical era. During the time of emergency, it would be difficult for the physicians to know the past health history of the victim to proceed with further treatments .This project presents a health monitoring system where a person himself/herself can enter their own health and emergency information into our servers and it can be accessed by anyone using the QR code technology at the time of an emergency. The system is implemented in the android operating system which is the most widely used operating system all over the world. This system helps to keep track on the individual's health information, henceforth giving a way for the physicians to access the information during the time of emergency. This not only saves the life of the victim but also helps the physicians to work at ease.

Keywords : Health Monitoring, QR Code Technology, Medical Records

I. INTRODUCTION

Road safety is one issue that needs special attention as there's one death reported every 4 minutes on the streets of India, also, India holds the highest number of deaths due to road accidents. Nearly 5 lakh road accidents were reported in 2013 in which more than 1 lakh people lost their lives. A large chunk of the victims were aged between 30 and 44 years. The major deaths are due to the delay in the start of treatments of patients admitted in the hospitals. This is mainly due to the lack of previous medical information of the patient. As they do not know the medical information of a patient the hospitals cannot proceed with any major treatment but just the first aid. Our project focuses on providing the medical information of a person at the case of emergencies.

The objective of this project is to develop a system where a person can enter his/her medical information. The system mainly focuses on the ability to quickly access information in case of any emergency. The users will be able to see the details of the person who needs any kind of medical attention. The system provides the information of the person, which includes his recent medical records and also personal details

Table 1.1 Analysis of accidents that had occurred in India.

Years	Total Accidents	Accidents involving death and personal injury	Number of persons killed
2008	825561	106994	5007
2009	950 120	104212	4236
2010	1 053 346	111121	4323
2011	1 106 201	116804	4045
2012	1 228 928	131845	3835
2013	1 296 634	153552	3750

II. METHODS AND MATERIAL

2. Existing System

The Existing Systemis used for basic hospital management services and health care. The medical and lab reports are shared within various departments of the hospital and with the patients in the form of QR codes. The existing system [3] is specific to only

certain hospitals, that is, the patient can only retrieve medical records provided by a specific hospital.

This system focuses mainly on the sharing of reports within a hospital organisation. Hence at any medical emergencies, when a person is admitted to another hospital, the retrieval of his previous medical records becomes difficult.

3. Proposed System

We are creating an Android application, which uses a login form to authenticate the user into his personal account where he provides all the personal details and information of his medical records. The details are then saved in the database and a QR code is generated which contains the required details of the user. In the case of emergencies, the QR code can be scanned and the details stored in the database are retrieved. This saves the time to start the treatment of a patient admitted at an emergency. This saves time taken to complete all medical procedures in order to start operating the patient. It is also a safe and secure data storage and retrieval. By applying this method, it not only saves the life of the victim but also helps the physicians to work at ease.

4. QR CODE TECHNOLOGY

QR code[1], abbreviated from Quick Response Code, is the trademark for a type of matrix barcode or two-dimensional barcode. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to efficiently store data; extensions may also be used.A QR code consists of black modules (square dots) arranged in a square grid on a white background, which can be read by an imaging device (such as a camera, scanner, etc.) and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data are then extracted from patterns that are present in both horizontal and vertical components of the image.

Figure 1. QR code

4.1 QR code representation

Nowadays, when smart phones equipped with cameras are very common, conveying message via QR code has become popular. As the aim was to transfer data from a document to a mobile phone in a feasible way it was a rational choice to apply this standard to our purposes. This standard of graphical data representation, established in 1994, can hold even 2953 Bytes on a 177 by 177 modules pattern. It possesses an attribute in encoding data resistant for slight code distortions. There were set up four error correction levels and the higher the level, the less is storage capacity. [5] The levels L, M, Q and H allow retrieving the whole message when up to 7, 15, 25 and 30% respectively of the QR image is destroyed. The priority was in getting as much space for data as possible, not particularly in damage resistance. That is why the level L was acclaimed as sufficient.

5. ANDROID

Android is a software stack for mobile devices that includes an operating system, middleware and key applications. Android is a software platform and operating system for mobile devices based on the Linux operating system and developed by Google and the Open Handset Alliance. It allows developers to write managed code in a Java-like language that utilizes Google-developed Java libraries, but does not support programs developed in native code. Android's source code is released by Google under open source licenses, although most Android devices ultimately ship with a combination of open source and proprietary software, including proprietary software developed and licensed by Google. Initially

developed by Android, Inc., which Google backed financially and later bought in 2005, Android was unveiled in 2007[5] , along with the founding of the Open Handset Alliance a consortium of hardware, software, and telecommunication companies devoted to advancing open standards for mobile devices.

Android is popular with technology companies which require a ready-made, low-cost and customizable operating system for high devices. Android's open nature has encouraged a large community of developers and enthusiasts to use the open-source code as a foundation for community-driven projects, which add new features for advanced users or bring android to devices which were officially, released running other operating systems[7]. The operating system's success has made it a target for patent litigation as part of the so-called "Smartphone" between technology companies.

6. System Archecture

The architecture of the system is simplified and represented in the figure b. This schematic representation of the architecture shows the processes, services and related activities that happen in the entire system. This is a consolidated representation of what happens at what point of time in which device in the system.

6.1. Client side process:

We used android for our client side development. Android smart phone runs with the help of android framework, which provides environment to run the application in mobile devices. [6] Android framework consists of Application framework, Libraries, Android runtime, Applications and Linux Kernel. Android runtime provides the environment to run the application performing all those inbuilt activities to run the application.

6.2 .Working of rest api:

REST API provides the interface the interface for android to connect with the server side. REST is a set of principles describing how standards can be used to develop web applications. Its main purpose is to anticipate on common implementation issues and organize the relationship between logical clients and

servers. When implementing REST over HTTP, the logical REST client is typically a web browser and the logical REST server is a web server.

6.3. JSON:

JSON is a lightweight data format used in place of XML. JSON is used to store and send data through HTTP protocol. As we use REST API to connect the client and server, we send the JSON data through HTTP request and response methods. It uses human readable form to transmit data over network. We can store JSON data in array format. In our proposed project, we are storing the user details securely using the JSON encrypt and decrypt method. JSON allow us to overcome the cross domain issue.

6.4. PHP:

PHP is the web application programming language we used for our server side development. We can simply the mix the PHP with HTML language. Using ZEND Framework, we developed PHP programming language.

6.5. Database:

As we are using PHP as our server side, we need database to store data. MySQL database is the best database, which supports PHP programming language well.
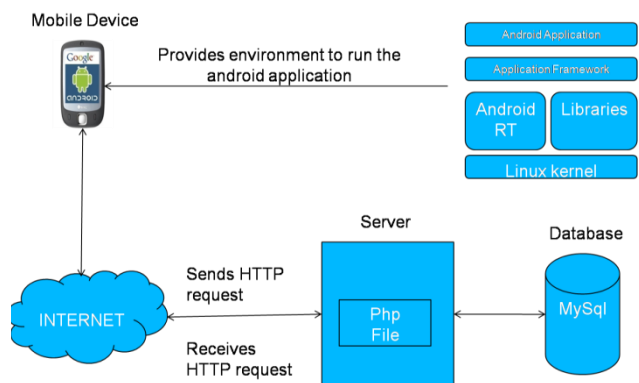

Figure 2. System Architecture

6.6. Overall process working:

Android is our client side system which has android application framework, it provides environment to run the application. Client side needs to connect with server side, so we used REST API to provide an

interface for android to connect with PHP using SLIM framework. REST API offers HTTP request and response method. JSON is used instead of XML to transmit data from client to server side.

In server side process, PHP acts as the web application provider and MySQL is the database we use to store the user details. We send JSON data through HTTP response and request method.

III. FUTUREENHANCEMENT

Our Idea can be further more enhanced by bringing in hospitals their selves adding the information of a patient into our servers. Similarly, the information provided by the user can be verified by the nearby hospitals. The medinfo profile IDs can be added to the ID cards of major institutes and organisations.

IV.CONCLUSION

In this paper, we have presented the concept of sharing emergency information through QR codes. The customer has to enter all his personal and medical information by him/herself. Consumer will be more loyal towards the service provider. The QR code can be scanned through any QR code scanner app across any platforms. Hereby, we ensure that the number of deaths due to accidents will be reduced.

V. REFERENCES

[1] Czuszynski, K., Ruminski, J,2014, "Interaction with medical data using QR- codes", Seventh International Conference on Human System Interactions (HSI), pp. 101-105.

[2] Dimitris Tychalas, Athanasios Kakarountas, 2010, "Planning and development of an electronic health record client based on the android platform", 14th Panhellenic Conference on Informatics, pp. 3 - 6.

[3] Hung-Ming Chen, Yong-ZanLiou, Shih-Ying Chen, Jhuo-Syun Li, 2013, "Design of mobile healthcare service with health records format evaluation", IEEE 17th International Symposium on Consumer Electronics, pp. 257 – 258.

[4] Liu Y, Yang J, and Liu M,2008, "Recognition of QR- code with mobile phones," in Control and Decision Conference. CCDC 2008. Chinese. IEEE, 2008, pp. 203–206.

[5] Mohamed Amine Ben Yahmed, Mohamed Amine Bounenni, ZeinebChelly, Amir Jlassi, 2013, "A New Mobile Health Application for an ubiquitous information system", 6th Joint IFIP Wireless and Mobile Networking Conference, pp. 1 - 4.

[6] Mungyu Bae, Suk Kyu Lee, SeunghoYoo and Hwangnam Kim, 2013,"FASE: Fast authentication system for E-health", Fifth International Conference on Ubiquitous and Future Networks, pp. 648 – 649.

[7] SudhaG, GanesanR,2013,"Secure transmission medical data for pervasive healthcare system using android", International Conference on Communications and Signal Processing, pp. 433 – 436.