QR BASED EMERGENCY INFORMATION ACCESS IN MEDICAL FIELD

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Abstract – *Health monitoring has become the most important factor in today's medical era. A communication information disconnect exists between healthcare providers, care recipients and family caregivers. Poor communication synchronization of follow-up treatments, lab results, prescribed medication between providers, patients and their caregivers exists during transitions of care. For example, a patient's primary care physician and caregiver may not be notified during a hospital discharge process. As a result, poor coordination of care can lead to an increase in medical costs, negative patient care outcomes or risk of hospital readmissions. This design implements a personal health card to access general medical data with the use of QR (Quick Response) code technology. The use of QR code technology integrated with a mobile messaging application is suggested as a potential solution in improving communication and sharing of data between healthcare providers, caregivers and care recipients. It is also helps in emergency. By using QR code, it is possible access patient health information during emergency such as accident, heart-attack, etc.*

Key Words: QR Code Technology, Medical Records, Health Monitoring.

1. INTRODUCTION

QR or Quick Response Codes are a type of two dimensional barcode that can be read using Smartphone's and dedicated QR reading devices, that link directly to text, emails, websites, phone numbers and more. When an emergency happens, whether it's a heart attack or hurricane, it's critical that medical service providers have access to health information for anyone who needs assistance. While you can't predict when an emergency may happen, you can be prepared. Make sure that key health information is up to date, accurate and handy. 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.

2. EXISTING SYSTEM

The existing system used only within the hospital. The medical reports are shared within different departments and with patients of that hospital in the form of QR code. This is specific to certain hospitals. Patient can retrieve only information that is provided by hospital.

This system focuses on sharing the health reports within the 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

Proposed system consist of 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 TECHNOLOGY

A QR code is a type of first designed in 1994 for the automotive industry in Japan. A barcode is a machine-readable optical label that contains information about the item to which it is attached. In practice, QR codes often contain data for a locator, identifier, or tracker that points to a website or application. A QR code uses four standardized encoding modes (numeric, alphanumeric, byte/binary, and kanji) to store data efficiently; extensions may also be used. The Quick Response system became popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. Applications include product tracking, item identification, time tracking, document management, and general marketing. A QR code consists of black squares arranged in a square grid on a white background, which can be read by an imaging device such as a camera, and processed using Reed–Solomon error correction until the image can be appropriately interpreted. The required data is then extracted from patterns that are present in both horizontal and vertical components of the image. QR codes have become common in consumer advertising. Typically, a smartphone is used as a QR code scanner, displaying the code and converting it to some useful form (such as a standard URL for a website, thereby obviating the need for a user to type it into a web browser). QR code has become a focus of advertising strategy, since it provides a way to access a brand's website more quickly than by manually entering a URL.

4.1 QR CODE REPRESENTATION

Figure 1 QR Code

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. 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 popular with technology companies which require a ready-made, low-cost and customizable operating system for high devices. 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. Android is a mobile operating system based on a modified version of the Linux kernel and open source software, designed primarily other for touchscreen mobile devices such as smartphones and tablets. Android is developed by a consortium of developers known as the Open Handset Alliance and commercially sponsored by Google. It was unveiled in 2007, with the first commercial Android device launched in September 2008. It is free and open source software. Android has been the best-selling OS worldwide on smartphones since 2011 and on tablets 2013. As of May 2017, it has over two billion monthly active users since, the largest installed base of any operating system, and as of March 2020, the Google Play Store features over 2.9 million apps. The current stable version is Android 10, released on September 3, 2019.

6. SYSTEM ARCHITECTURE

The architecture of the system is simplified and represented in the figure 2. This schematic representation of the architecture shows the processes, services and related activities that happen in the entire 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. 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 PHP

PHP is the web application programming language we used for our server side development. PHP is a general-purpose scripting language that is especially suited to server-side web development, in which case PHP generally runs on a web server. Any PHP code in a requested file is executed by the PHP runtime, usually to create dynamic web page content or dynamic images used on websites or elsewhere. It can also be used for command-line scripting and client-side graphical user interface (GUI) applications. PHP can be deployed on most web servers, many operating systems and platforms, and can be used with many relational database management systems (RDBMS). Most web hosting providers support PHP for use by their clients. It is available free of charge, and the PHP Group provides the complete source code for users to build, customize and extend for their own use. PHP acts primarily as a filter taking input from a file or stream containing text and/or PHP instructions and outputting another stream of data. Most commonly the output will be HTML, although it could be JSON, XML or binary data such as image or audio formats. Since PHP 4, the PHP parser compiles input to produce bytecode for processing by the Zend Engine, giving improved performance over its interpreter predecessor. Originally designed to create dynamic web pages, PHP now focuses mainly on server-side scripting and it is similar to other server-side scripting languages that provide dynamic content from a web server to a client. PHP has also attracted the development of many software frameworks that provide building blocks and a design structure to promote rapid application development (RAD).

6.4 JSON

JSON (JavaScript Object Notation) is an open standard file format, and data interchange format, that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and array data types (or any other serializable value). It is a very common data format, with a diverse range of applications, such as serving as a replacement for XML in AJAX systems. JSON is a language-independent data format. It was derived from JavaScript, but many modern programming languages include code to generate and parse JSON-format data.

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.

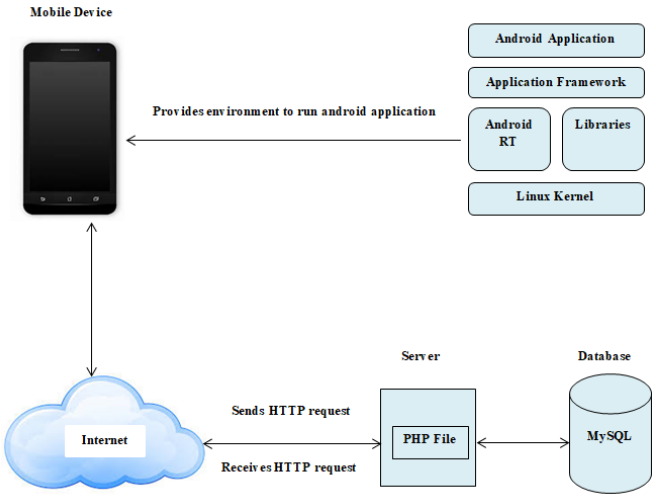

Figure 2. System Architecture

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.

7. 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

8. REFERENCES

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