A Proposed Mobile QR Code Life Saver Application

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Abstract: Human lives are highly valued in all societies. People of all ages may experience at some point of their lives medical conditions that need special attention. These conditions may vary from minor to moderate to severe based on the degree and type of condition. However, no matter what the condition is in a state of emergency these conditions may become life threatening if it was not considered by health care professionals. Usually the person involved in an emergency situation informs health care professionals about his medical condition at the time of emergency and in turn health care professionals provide him with the special care that he may need. However, if the patient was unconscious and none of his relatives or close friends are around, health care people find it hard to treat that patient until all information about that patient is available. This may require running medical test which may prolong the delivery of treatment to the patient leading to dire consequences. To solve this problem once and for all, this study proposes the introduction of a mobile QR code life saver application to be used by health care professionals at the time of emergency. The application is based on a QR code technology that is already in place and used globally in many applications including marketing, archiving, asset tracking and document management among others.

Key words: QR code, mobile applications, health care applications, patient, condition, experience

INTRODUCTION

Medical applications have been evolving with the introduction of new technologies to serve both patients and medical personnel in their daily lives and on the job tasks. The first of type of medical lifesaving applications came along with the introduction of the "Flash Disk" or the removable storage device as we now know it (Khedekar and Alvi, 2013). Since, Flash disks were designed to be plug and play, programmers started to build portable health applications that does not relay on the type of operating system nor does it need to be installed on the computer to work (Yeh *et al.*, 2008). This was in the 90's, we are now in the new millennium where handheld devices have become a reality and are widely spread among people in almost all countries. The idea of a mobile application to act as a life saver has been tackled by many programmers and entrepreneurs, since, this type of service generates a considerable amount of revenue (Rouillard, 2008).

Later Bluetooth applications tried to fill this gap but with little success due to technical constraints. Bluetooth as a communication medium depends on whether the patient has his bluetooth service turned on during an emergency (Rouillard, 2008). Some recent applications were developed based on using a QR code to deliver information for health care professionals about the patient's health condition but it was limited to what is stored on the QR code itself thereby limiting the amount of information available for health care professionals (Yeh *et al.*, 2008). The idea was to convert patient medical information into a QR code to be saved as a wallpaper on the phone to be scanned by health care professionals in a state of emergency (Reiser and Bruce, 2008). This system had its limitations and it assumes that the patient has a mobile device on him and this may not be realistic in the case of young children or if the person does not have the mobile phone with him. The patient may lose the phone during the emergency situation.

The researcher does believe the QR code is the answer for this problem and proposes a mobile QR code life saver spplication, however, it is designed in a much more dynamic approach (Rouillard, 2008). One that includes using mobile devices, WiFi, webserver and QR code storage all together. The proposed system is revolutionary in the sense that it can be used by any human being in any age or gender, rich and poor, since the technology is very cheap to the general population and the actual investment is covered by the government's medial departments.

QR CODES

QR codes is a Japanese invention developed by Toyota in the 1990's as a new advanced way to tag auto parts (Rouillard, 2008). Toyota made the technology available for free for everyone to be used as a replacement for the traditional bar code system (Fig. 1). The QR code
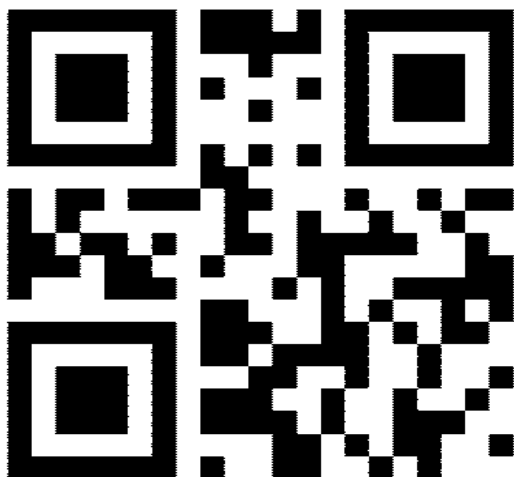
Fig. 1: QR code

logic can store large amount of data and the data can be linked to website URL's, phone numbers, social media accounts, GPS navigation maps and any digital content stored locally or on a webserver.

The logic behind QR codes is fairly simple and does not need any special hardware to be scanned or created. This lead to the fast exposure of the QR code and its wide spread use by most countries that has a saturated mobile phone markets (Aguinaga and Poellabauer, 2012). All the user need to do to read a QR code content is to download a QR code reader to his mobile device from Apple store or Google Play store and open the application, use the phone camera to scan the QR code and the application shall read the code and convert it into text to be read on the smartphone screen or to open a website whichever the case may be.

The QR code technology enabled organizations to link the virtual world to the physical world. Scanning a bar code shall immediately move you from the real world to the virtual world on the cyberspace (Starnberger *et al.*, 2009). Physical content can now have links to the digital content to be displayed through a web browser (Rouillard, 2008). The system can be used in marketing and advertising as well as in asset tracking and storing data and information for expedited retrieval by the end user.

QR CODES MECHANISM

There is a big difference between bar codes and QR codes. Traditional bar codes use a one dimension system that store data for extraction by bar code readers. However, QR codes has two dimensions to store data on a grid as shown in Fig. 2. This two dimensional system
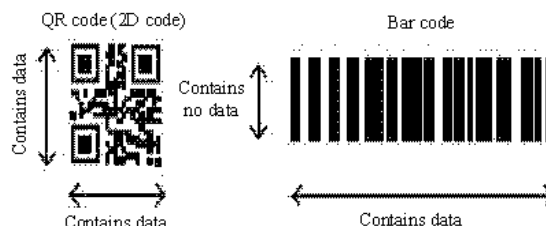

Fig. 2: QR code vs. bar code

enabled the storing of huge amount of information and data on the QR code tag resulting in a new patterns called "code words" by industry and technical experts (Gao *et al.*, 2007). According to industry standards there are >45 different types of barcodes where QR codes are the mostly used globally.

EMERGENCIES AND DRUG USAGE

We have all heard about several cases where emergency personnel provide the wrong drug to the injured person resulting in severe consequences. Treatment errors are very popular all over the health care industry (Shin *et al.*, 2012). It has been recorded that drug errors are affecting 1.5 million persons all over the United States of America alone.

By using QR code systems this problem could be eliminated once and for all. QR codes provide reliable information for early medical responders that shall enable them to provide the right medication to the patient (Chuang *et al.*, 2010). Therefore, this research proposes the use of a QR code system to act as a life saver application in case of emergency.

QR CODE LIFE SAVER SYSTEM

The system is envisioned to utilize the QR code technology in order to deliver reliable and accurate medical records to emergency personnel in a time of emergency. The system shall be based on a cloud server and the database shall store all medical information about each client (Rouillard, 2008). That particular record URL is encoded using a QR code generator system to produce a unique QR code for each client.

The patient medical record shall include details of his medical history, drug sensitivity, medications, special condition and doctor's remarks. The record shall be maintained on a regular intervals and whenever the need arises to do that.

The QR code can then be placed on a bracelet or a ring to be visible to emergency personnel. They shall scan the QR code using their QR code scanner applications

which are available freely over the internet and can be downloaded from Google Play or Apple Store. Once the QR code is scanned it shall redirect the user to the medical record of the patient showing the patient vital information. This method shall eliminate any errors in delivering medications or the proper treatment for the person in need. The most important aspect of this application is its security. Information residing on the cloud shall be edited only by the patient through a user name and a password. No one else has the right to change the patient information without his consent.

CONCLUSION

QR codes life saver application shall provide reliable medical information about patients in a state of emergency for health care professionals and early responders in order to act fast and deliver the need treatment to the patient without jeopardizing his life to dire consequences.

The QR code life saver application shall be available at all times and it can be accessed through mobile phones and devices, since it resides on the cloud. Health organizations and governmental departments must adopt this new and unique way of saving lives. The system coding and testing shall be discussed and revisited in another subsequent study.

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