International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 06 | June 2020 www.irjet.net p-ISSN: 2395-0072

QR Code Based Secure Medical Prescription System

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Abstract - —*QR* Code or the Quick Response Code is the most dominant form of storing and exchanging information between devices. The use of QR codes have now spread well beyond its use in marketing and education. It is seen around the home as well. It's a type of matrix Bar Code and has more capacity than UPC Codes. QR Code is widely used in applications like product tracking, item identification, time tracking, document management, and general marketing. Typically scanned and interpreted by camera enabled smartphone, but also can be interpreted or generated by any camera device implemented with QR decoding logic. Prescription of medicines can be made safer with QR codes by limiting the use of prescription, for this we use the concept of Web Tokens which expired the medical prescription on timely basis with the number of times the medicines are bought. The system provides a platform that can bring a revolutionary change in prescribing of the drugs so that many of the societies issues like illegal drug trafficking, drug over dosage, kidnapping, etc. can be erased on a major scale.

Key Words: QR Code, QR Decoding, Prescription, Web Tokens

1. INTRODUCTION

QR Code or the Quick Response Code provides a rapid, easy, convenient, accurate and automatic data collection method. With the increasing application ad popularization of wireless communication and mobile devices technology, two-dimensional barcode technologies have been employed worldwide. QR Code is widely used in applications like product tracking, item identification, time tracking, document management, and general marketing. Typically scanned and interpreted by camera enabled smartphone, but also can be interpreted or generated by any camera device implemented with QR decoding logic. Prescription of medicines can be made safer with QR codes by its ability to store and encrypt data digitally.

JSON Web Token (JWT) is a standard used to create access tokens for an application. A JWT is cryptographically signed (but not encrypted) hence using HTTPS is mandatory when storing user data in the JWT, so there is a guarantee we can trust it when we receive it, as no middleman can intercept and modify it, or the data it holds, without invalidating it. This architecture proves to be very effective in modern Web Apps.

2. PROBLEM STATEMENT

India is second most populated country in the world. Hence the problem faced by India is also greater and one among those problem is wrong usage of medicines available at drug stores. The medicines which should be taken under the consultation of a physician are bought using a fake or by reusing the older prescription. Further these medicines are put in wrong use like drug over dosage, drug trafficking, kidnapping, murdering and other criminal activities. Currently there are no accurate solution to prevent these kind problems in India. So we are going to develop an application which can prevent these kind of problems in future and help in making India safer.

The idea of this project is to change the current handwritten medical prescription into a secure QR code prescription to prevent the misuse of prescriptions by the general public and society. This idea may help the society to prevent various problems like drug over dosage, drug trafficking, kidnapping, medicine-without-prior-consultation and other criminal and illegal activities which is the prominent problem faced by any country.

3. LITERATURE REVIEW

Mohamad Ali Sadikin and Septia Ulfa Sunaringtyas [1] in the paper "Implementing Digital Signature for the Secure Electronic Prescription Using QR-Code Based on Android Smartphone" discusses how Secure Electronic Prescription (SEP) application design is intended to combine given services, such as confidentiality, authentication and non-repudiation. The implementation of digital signature in this research can prevent archive thievery. Electronic prescribing is simply an electronic way to generate and transmit

prescriptions and prescription related information using electronic media between a prescriber and dispensing pharmacy.

Sara A. Al-Doweesh, Felwah A. Al-Hamed, and Amr Alasaad [2] in the paper "Innovative Algorithm for Arabic Text Encoding in Quick Response Code" explains that QR has greater storage capability as compared to other 2D codes. The algorithm is very flexible and can be used after slight modification to encode any languages other than Arabic

M. Filipovic Tretinjak [3] in the paper "The Implementation of QR Codes in the Educational Process" explains about QR code that can contain information such as URL links and text. They are mostly used in healthcare (e.g. medical records management, patient identification). QR codes was easy once the appropriate software was installed on their mobile device.

Rizal Mohd Nor, Noor Azizah MohamadAli, Khairul Azmi, Ahmad Marzuki, Leilanie Mohd Nor and Mohar Yusof Kulliyyah [4] in the paper "A Mobile Medicine Adherence Application With Intake Validation Using QR Code" explains the impact of medication adherence is proven to affect hospitalization risk and healthcare cost. The mobile application that can help track medication intake, as well as remind, inform and warn users about the medication that they are taking.

4. EXISTING METHOD

- Existing procedure for generating a medical prescription is to write it manually by the doctor on a piece of paper one by one.
- Then the written prescription is given to the patient to get prescribed medicines.
- The prescription is taken to the drug store by the patient, where a pharmacist will go through it and provide the medicines prescribed.
- The patient can get the medicines any number of time using the same prescription.
- Once the prescription is lost the patient has to go to the doctor once again for a new prescription.

All these points clearly indicate that the existing method of handwritten prescription is not efficient enough in terms of security and reliability. It is also problematic since the written prescription can be lost or stolen. In this case the patient has to visit the doctor again for a new prescription and pay the doctor for the visit.

5. PROPOSED SYSTEM

The main aim of our proposed system is to provide a platform that can bring revolution in prescribing drugs so that many of the societies issues like illegal drug trafficking, drug over dosage, etc. can be erased on a major scale. The system incorporates a centralized token issuing system that both issues and verifies the encrypted tokens which are the base of our project in securing prescription data. The prescriptions are stored as document objects in the cloud and a unique identifier issued by the cloud storage is encrypted and encoded to QR code set to some validity.

The drug prescribers (doctors) will be working on the prescription console which sends the prescription to document cloud and get the encrypted QR which will then be issued to the drug recipient. The patient has the privilege to study the drug details via recipient application. The privilege to view QR encoded cloud data is for lifetime. The drug issuing outlet can decode and issue the drug as prescribed only until QR expiry.

The usage of both Web Tokens and QR Code provides a double layer security to the prescription which will help in prevention of misusing the medical prescription in wrong hands. It also increases accuracy in prescription. Patient will have more control on knowing the details and all aspects of prescribed drug.

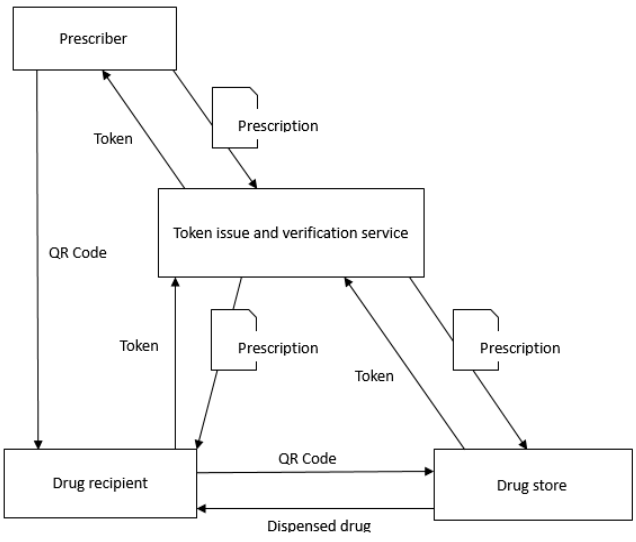

Fig. 1. Data Flow Diagram of System.

Figure 1: Shows how the Prescriber (Doctor) will generate a Prescription for the patient (Drug Recipient) and encrypt it will be encrypted Token issue and Verification Service. The Token string will be converted into a QR Code and will be given to the patient by the Prescriber. That QR Code will be given to the Drug Store where the pharmacist decrypt the QR Code to get the Token string which will be passed on to the Token issue and Verification Service, which in Return displays the Prescription. Later the prescribed drug will be dispensed to the patient.

6. CONCLUSION

The paper summarizes the current issue and drawbacks in the traditional method of medical prescription used all over India. The paper also discusses about the features of QR code and Web Tokens technologies used to make this system safe and secure. This system is brought up to eradicate all those kind of illegal and harmful activity by digitalizing and applying constraints to the prescription using QR code and Web Tokens to secure and limit the usage of medical prescription. This system also provides information of drug outlet to anyone using the android application. By eradicating the traditional methods, this system brings revolutionary change in the field of prescribing medicine.

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