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COVID Vaccination Detection Using QR Code

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ABSTRACT

Now these days, a QR code is applied in different application streams related to marketing, security, academics etc. Day by day more people are getting aware of this technology and use it accordingly. The popularity of QR code grows rapidly with the growth of smartphone users and thus the QR code is rapidly arriving at high levels of acceptance worldwide. Identification of objects and places in the real world is very important, and QR (2-D printing) code is useful to store identifiers of them. Any camera cell phone device capture function can read content from a barcode tag directly

Key Words: Machine Learning, Reed Solomon Method, Quick response code(QR),Mobile application scanner, Smartphone.

INTRODUCTION

In this project we generate QR Code using python to detect which person is vaccinated or not and how many doses he was taken. QR code is a type of matrix bar code or two-dimensional code that can store data information and designed to be read by smartphones. QR stands for "Quick Response" indicating that the code contents should be decoded very quickly at high speed. The code consists of black modules arranged in a square pattern on a white background. The information encoded may be text, a URL or other data.

Types of QR Codes:

1. **QR model 1 and 2:**

QR Codes are categorized into five broad categories. The original QR Code is QR Code Model1, a code capable of coding 1,167 numerals with its maximum version being 14 (73 x 73 modules). QR Code created by improving Model 1 so that this code can be read smoothly even if it is distorted in some way. QR Codes that are printed on a curved surface or whose reading images are distorted due to the reading angle canbe read efficiently by referring to analignment pattern embedded in them. This code canencode up to 7,089 numerals with its maximum version being 40 (177 x 177 modules).

2. **Micro QR Code:**

A major feature of Micro QR Code is it has only one position detection pattern, compared with a regular QR Code that require a certain amount of area because position detection patterns are located at the three corners of a symbol.

3. **Logo QR Code:**

The Logo QR Code is a novel type of QR Code created to enhance visual recognizing-ability by blending it with letters and pictures in full color.

4. **iQR Code:**

iQR Code is a matrix-type 2D code, allowing easy reading of its position and size. This code allows a wide size range of codes from ones smaller than the traditional QR Code and Micro QR Code to large ones that can store more data than these. This code can be printed as a rectangular code, turned-over code, black- and-white inversion code or dot pattern code (direct part marking as well, leaving a broad range of applications in various areas.

5. **Encrypted QR code:**

Encrypted QR Code is a type of QR Code equipped with reading restricting function. This can be used to store private information and to manage a group which is capable of accessing QR Code information. Basically, an encrypted QR Code is a QR Code, which contains encrypted data.

STRUCTURE OF QR CODE

Each QR Code symbol shall be built of square modules arranged in a regular square array and shall consist of function patterns and encoding region. And the whole symbol shall be surrounded on all four sides by a quiet zone border[4] [5]. Function patterns are the shapes that must be placed in specific areas of the QR code to ensure that QR code scanners can correctly identify and orient the code for decoding.

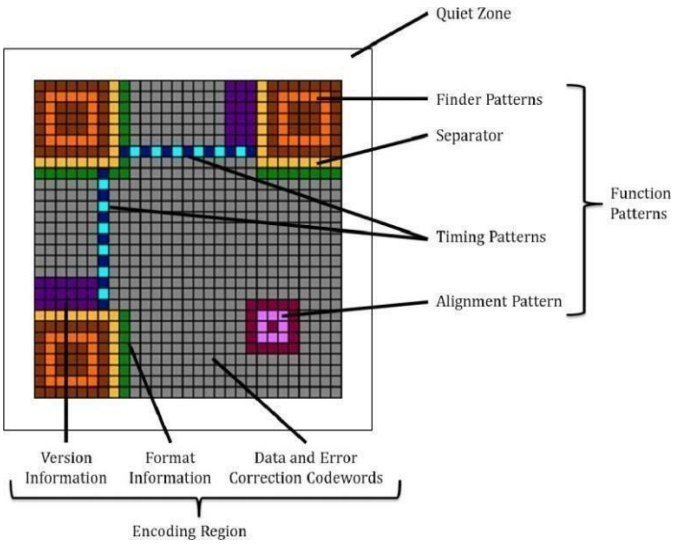


Fig. Structure of QR code

OBJECTIVE

To decoded information at high speed using any device like Mobiles phones and any QR Code scanner. To check how many doses taken by that particular student. To check student is fully vaccinated or not. So we generate the QR codes for covid vaccination detection.

MOTIVATION

Students have need to carry various documents for their personal identification. QR codes is two dimensional barcodes that stores the huge amount of data. It must be decoded at high speed using any handheld device like phones. So, the students no need to carry various documents for their personal identification aswell as vaccination detection.

ALGORITHM

Reed Solomon Method :

Basically, the Reed Solomon method is an algorithm that all QR code readers have built-in standard. It allows QR codes to be scanned even if a certain amount of the QR code is covered up or blocked. Reed–Solomon codes are able to detect and correct multiple symbol errors. By adding t = n k check symbols to the data, a Reed–Solomon code candetect (but not correct) any combination of up to t erroneous symbols, or locate and correct up to t/2 erroneous symbols at unknown locations. There are two basic types of Reed–Solomon codes – original view and BCH view – with BCH view being the mostcommon, as BCH view decoders are faster and require less working storage than original view decoders.Today, Reed–Solomon codes are widely implemented in digital storage devices and digital communication standards, though they are being slowly replaced by Bose–Chaudhuri–Hocquenghem (BCH) codeseed–Solomon coding is very widely used in mass storage systems to correct the burst errors associated with media defects.Almost all two-dimensional bar codes such as PDF-417, Maxi Code, Data matrix, QR Code, and Aztec Code use Reed–Solomon error correction to allow correct reading even if a portion of the bar code is damaged. When the barcode scanner cannot recognize a bar code symbol, it will treat it as an erasure. Reed–Solomon coding is less common in one-dimensional bar codes, but is used by the PostBar symbology.The Reed–Solomon code is actually a family of codes, where every code is characterised by three parameters: an alphabet size q, a block length n, and a message length k, with k ¡ n q. The set of alphabet symbols is interpreted as the finite field of order q, and thus, q must be a prime power. In the most useful parameterizations of the Reed–Solomon code, the block length is usually some constant multiple of the message length, that is, the rate R = k/n is some constant, and furthermore, the block length is equal to or one less than the alphabet size, that is, n = q or n = q1.[citation needed]

MATHEMATICAL MODEL

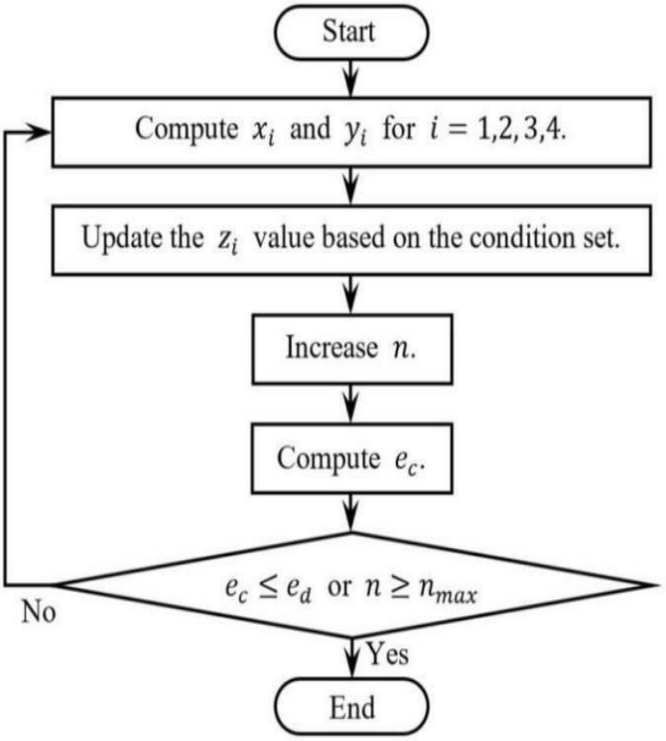


Fig. Flowchart of the numerical computation

The QR Code has 3 main co-ordinates are x, y and z & the 4 vertices p1 to p4 as the object point.

Step1:-
First we have to compute the xi and y i forI=1,2,3,4.

We compute the xi and yi for I=1,2,3,4 using following equation (zi)
Where,

xi and yi represent the QR code image points x and y co-ordinates respectively and xi, yi &zi respectively represent the x, y and z co-ordinates of QR code vertices and the F is focal length.

Step2:-
Then zi for i=1,2,3,4 is updated at each iteration using following equation

,for i=1,2,3,4; j=1,2,3,4,5,6

Where,

k = updating coefficient

n = number of iterations

ej = condition error

for i=1,2,3,4

zi(n)= old value zi(n+1)= old value increased by 1

Step3:-
Compute ec:-
The sum of absolute convergence error ,ec is defined as the absolute sum of the current zi(n) minusthe previous zi(n-1) as per following equation.

Step4:-
The sum of the absolute convergence error ec which is used for comparison with the desired sum of the absolute convergence error ed .In the meantime, to avoid an infinite looping state, the maximum number ofiterations, n max is set .The computation will exit the l.

LITERATURE SURVEY

A literature review is a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. Literaturereviews use secondary sources, and do not report new or original experimental work.

1. **Paper name:** QR Code Generator and Detector using Python

Author: Mr. B.Naga Raju,1.N.Venkatesh,2 G.Dhana Lakshmi,3 N.Sai Chand
This system can create QR of different versions.we consider a QR Code to be successfully. Precise localization is anecessary but not sufficient condition for successful decoding.

2. **Paper name:** Certificate Authentication Using QR Code and Smart Phone

Author: International Journal of Emerging Technologiesin Engineering Research (IJETER)
In this paper, QR Code on the degree certificate and by introducing the smart phone application which will read the digital data from the QR Code.In future we can add GUI elements to the QR code like images, audioetc.

3. **Paper name:** QR Code Security and Solution

Author: Sukhjeet Kaur
In this paper we outlined to believe that QR codes have great future in online marketing business media.Also, this paper can be provided as the first step for the readers to search out the exciting topic of mobile learning.

4. **paper name:** An Introduction to QR Code Technology

Author: Sumit Tiwari
In this paper, we studied QR code technology, its benefits, application areas, and its impact on marketing and technological world.Due to its features like high data storage capacity, fast scanning, error correction ,direct marking and ease of use.

5. **paper name**: Aadhaar Card: Challenges and Impact on Digital Transformation

Author: Raja Siddharth Raju1, Sukhdev Singh1, 2, Kiran Khatter1,
This paper presents a brief review on Aadhaar card, and discusses the scope and advantages of linking Aadhaar card to various systems. Further we present various cases in which Aadhaar card may pose security threats .The objective of this section is to highlight the scope and advantages of linking Aadhaar card to various systems. The government of India has been linking the Aadhaar card with various government schemes such as for cooking gas subsidies, house allotments, school scholarships, admission into remand and welfare houses, passports, e-lockers (eg. Digilocker), for archiving documents, bank accounts under PMJDY (Prandhan Mantri Jan Dhan Yojana), provident funds account,

pensions, driving license, insurance policies, loan waivers and many more Recently it has also been made mandatory for ATM Cash Transaction railway reservation and applying PAN (Permanent Account Number) card, and filing income tax returns

PROPOSED SYSTEM

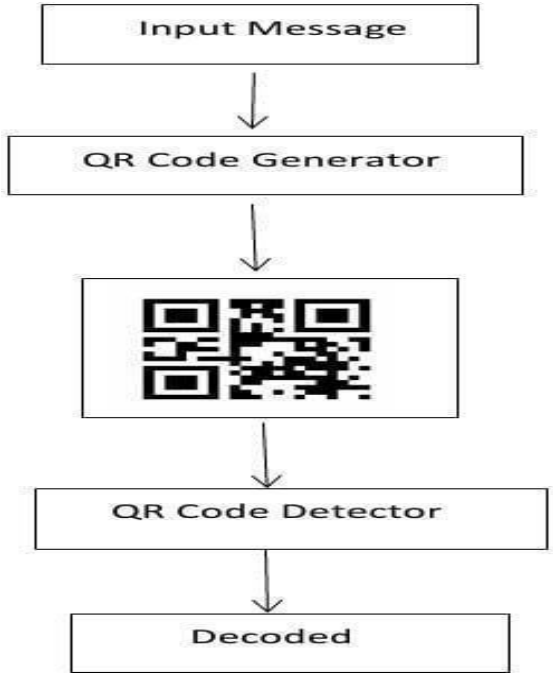
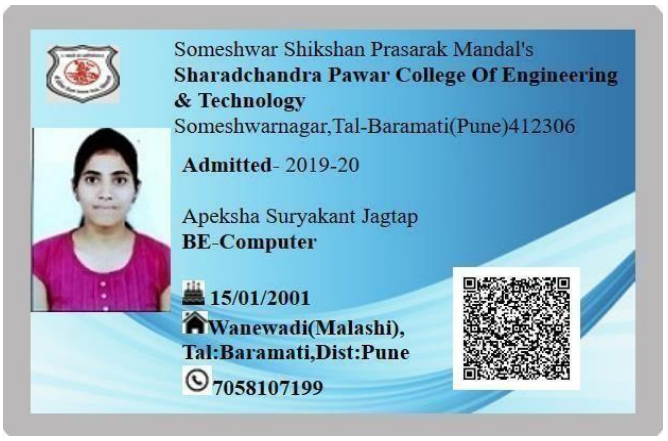
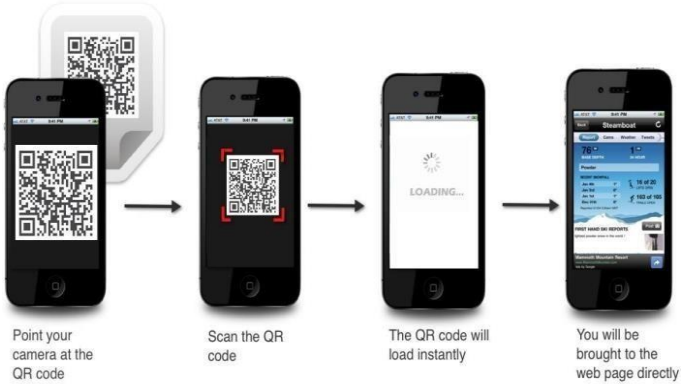


Fig. Proposed System Architecture

SNAPSHOTS





CONCLUSION

The purpose of this project is to detect the student is vaccinated or not and how many dose he was taken and the students need not to carry any documents for their personal identification as well as vaccination detection .It provides information quickly than standard barcode .It also provides single source of verification.

FUTURE SCOPE

As we all know that in the last few years, the corona crisis has hit our country and during that time it was very important to vaccinate and check how many people have been vaccinated. Also, entry was not allowed anywhere without checking whether vaccination was done or not and people need to carry their vaccination certificate. If something like this happens in the future, we can use this method to check it. It gives a faster result and the people does not need to carry their vaccination certificate.

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