# Quick Response Code Implementation in Society 

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#### Abstract

-the purpose of this review paper is to explore and analyze the methods for generating and scanning of Quick Response (QR) codes. Quick Response codes are 2-D Matrix code that is used to encode and decode information. QR codes can enclose information such as text, URL links. The different types of the QR code and their basic structure are discussed. The practical analysis performed to examine how actually QR Codes works. Quick Response Code is a special feature of any device which gives machine vision capability to the device that is protect by human vision. It has number of advantages which makes it more usable are also discussed. The conclusion of the research are, QR code is the modernization of product or personal identification freely by hiding information to other and to connect multiple identity at a single domain..


Keywords - QR Code, URL, 2-D BAR Code Matrix, Mobile Code.

## I. INTRODUCTION

The Quick Response (QR) Code is a recent involvement of digital technology with print media. The Format of QR code looks like a 2-D Matrix Barcode. Basically, the Mobile Codes available today are 2D and 1D barcodes which works under internet on Mobiles. Mobile phones today with good configuration added Camera make it possible to read Mobile Codes as Code Scanner or Reader due to recent advancements in imaging technology. It combines both hardware modeling as well as image processing techniques.

Table 1: Three Common Types of Mobile Codes [1]

| Example |  |  |  |
| :---: | :---: | :---: | :---: |
| Symbol | QR | DATAMATRIX | EAN-13 [EAN/UPC] |
| Data | http://www.openm obilealliance.org | http://www.openm obilealliance.org | 5901234123457 |

Table 1 is an example of Mobile Codes available today, where QR and Data Matrix codes are 2D symbol and the EAN-13 code is a 1D symbol. These codes are generated by specific algorithms that encode data such that it form a structure of types to which it belongs. The features of Mobile Codes are as follows:
a. Web Operation: When a mobile camera pointed to an advertisement or any print media using Code Scanner application, the user's mobile phone will quickly move to a webpage for more detailed information about the product.
b. Short Message Service: Mobile Codes can contain a SMS message which will send to a designated Mobile number after scanning operation by mobile.
c. Dial Number: Making call automatically by just scanning code is possible through featured Mobile Codes.
d. Business Card: By just scanning code it is possible to save contact information into mobile phone.

Whereas, QR code uses four encoding modes that is Numeric, Alphanumeric, Binary/byte, Kanji. As name implies, it provide outputs or responses very quickly.

Table 2: Data Characters per Symbol [5]

| Sr. No. | Encoding Mode | Maximum Capacity |
| :---: | :---: | :---: |
| 1. | Numeric | 7089 digits |
| 2. | Alphanumeric | 4296 characters |
| 3. | Binary | 2953 |
| 4. | Kanji | 1817 |

The merits of QR Code are:

- It has greater storage capacity.
- The variety of data that can be hide in QR code are:

| $\circ$ | Plain Text |  |  |
| :--- | :--- | :--- | :--- | :--- |
| $\circ$ | URL |  |  |
| $\circ$ | SMS |  |  |
| $\circ$ | E-mail |  |  |
| $\circ$ | Contact Information (Phone Number, |  |  |
|  | Address, etc) |  |  |

- QR Codes Scanning is possible through different platforms by developing decoding application.
- User can reach at Virtual stores by Scanning QR Codes.
- It can be use to make online payments by hiding payment details (Intermediate payment channel, Account Information, etc)
- Websites can traverse user to login form or a specific page to access data.
- Encryption

Applications Areas of QR Codes are:

- Product Tracking (Manufacturer to Customer)
- Item Recognition (Company Name, Product ID, Date of Manufacture, Date of Modification, Date of Expiration, Availability)
- Time Tracking (Recording Time of Process)
- Document Management (Mange Data of Different File to a Centralize Place)

QR Codes have rapidly gained international popularity and found widespread adoption, especially in Japan where it's ability to encode Kanji symbols by default makes it is especially suitable. [1] [2]

## A. History

QR Code invented by Denso Wave in 1994. It uses as a registered trademark by Denso Wave for tracking product. Denso Wave promoted the widespread use of QR codes, by providing QR code tutorial at www.qrcode.com. QR codes as a quick, easy method to tracking their vehicles and auto parts. QR codes have been used on large scale in marketing campaigns since the early 1990s in order to create an interaction with a consumer. Denso Wave made an extensive use of this technology because of their potential in the auto industry. The QR code first came into the market as a commercial product in 2011 when the telecommunications industry was on hike. Today QR Code has become popular due to new technology with Smartphones. [3]

## B. How QR code is different from bar code?

1. QR codes have hundred times more storage capacity then the BAR code.
2. It stores information on both axes as horizontal and vertical.
3. BAR code is only 1-Dimensional But QR Codes is two dimensional matrix.
4. Standard linear barcodes can only hold up to 20 alphanumeric digits, but QR codes can hold up to 7,089 numeric characters and up to 4,296 alphanumeric characters value of data.
5. Readable from any direction in $360^{\circ}$. [2] [8]

## C. Standards of QR Code

QR Code is standardized based on respective national standards or international standards. It was approved as an international standard in June 2000.

Table 3: QR Code Standards [4]

| October, 1997 | Approved as AIM International <br> (Automatic Identification Manufacturers <br> International) standard (ISS - QR Code) |
| :---: | :---: |
| March, 1998 | Approved as JEIDA (Japanese <br> Electronic Industry Development <br> Association) standard (JEIDA- <br> 55) |
| January, 1999 | Approved as JIS (Japanese <br> Industrial Standards) standard (JIS <br> v nsin) <br> Jpproved ISOO ISO international <br> standard (ISO/IEC18004) |
| November, 2004 | Micro QR Code is Approved as JIS <br> (Japanese Industrial Standards) <br> standard (JIS X 0510) |
| December 2011 | Approved by GS1, an international <br> standardization organization, as a <br> standard for mobile phones |

## II. BASIC STRUCTURE OF QR CODES

QR barcode have square layout made up of equal spaced square modules. As per the size of QR code a certain number of finder patterns are included in the code in order to provide help in scanner decoding. The standard precisely has 40 versions (sizes) of the QR code from the smallest 21 x 21 up to $177 \times 177$ modules in size.

QR Code involves encoding sections and function patterns, namely: finder, separator, timing patterns, alignment patterns, Function patterns, Data and error correction codeword, Format information and Version information. The boundary of QR Code is surrounded by the quiet zone border. The QR Code ranges from 21 X 21 cells to 105 X 105 cells. Each cell encodes one bit and increase by Degree of four cells.
QR Code 2005 symbols has version 1 to version 40.

Figure 1: Version Structure of QR code [5]


[^0]
## A. Different types of regions of QR Code Structure

a) Encoding region: The Code must be square for the scanner to distinguish a QR Code. In this black and white checkered pixel patterns appear to be a small crossword puzzle but certain structures can be identified. A number of additional elements make certain that the information is read correctly.
b) Positioning Markings: Positioning Marking defines the area where the Code is printed.
c) Alignment Markings: This is a additional element which is help in orientation and located in the lower right hand corner.
d) Timing Pattern: These are lines, which is helpful for the scanner to determine how large the data matrix is and detect the position of each cell in the QR code
$e)$ Version Information: It gives The QR Code version that is being used. There are approximately 40 different QR Code versions. It deals with marketing purposes.
f) Format Information: It has the information about the error tolerance, the data mask pattern \& make it easier to scanning of Code.
g) Data and Error Correction Keys: It is a pattern which shows the actual data.
h) Quiet Zone: Quiet zone differs the QR Code from its surroundings. It is spacing. The quiet zone is areas that calculate the print size of QR code on any printed media.


Figure 2: Basic Structure of QR code [5]

## III. TYPES OF QRCODES [6]

## A. QR Model I

QR model 1 Code is capable of coding 1,167 numerals with their maximum version being 14 which has $73 \times 73$ modules.


Figure 3:. QR code Model 1[7]

## B. QR Model 2

This type of QR Code is improved of Model 1 so this code is easy to read when it is distorted in some way. These codes are printed on a curved surface or their images are
distorted due to the reading angle can be read efficiently by describing to an alignment pattern. This code can be coded up to 7,089 numerals with version being 40 has 177 x 177 modules.


Figure 4: QR code Model 2[7]

## C. Micro QR Code

Micro QR Code has only one position detection pattern, and it is require only two-module wide margin around a symbol. This pattern of Micro QR Code allows smaller areas for printing.


Figure 5: Micro QR Code [7]

## E. iQR Code

iQR Code is a 2D matrix-type code allowing easy reading of its position and size. This code allows a wide size range of codes. This code can be in print as a rectangular or square code, turned-over code, black-and-white inversion code or dot pattern code . iQR Code provide a wide range of applications in various areas.

| iQR Code | iQR Code <br> (Rectangular type) |
| :---: | :---: |
|  |  |

Figure 6: iQR Code [7]

## F. SQRC

SQRC is a type of QR Code capable of reading restricts function. It is used to store private information and manages company's confidential information.


Figure 7: SQRC [7]

## G. LogoQ

LogoQ is a modern type of QR Code which enhances visual recognisation by letters and pictures in chock-full colour.


Figure 8: LogoQ [7]

## IV. GENERATION OF QRCODE

The QR code generation is easier than any other code due to available many free services. The online free service provider is http://www.qrstuff.com. It is used for research to check QR code functionality. The information added is as follows:

1. College Name: Maharishi Arvind College of Engineering and Research Center.
2. Address: Sirsi, Jaipur
3. Principal: Dr. Vinod Kumar
4. Phone:0141-2240823,91-8696906814
5. Email:macercjaipur@gmail.com,principalmacerc@gmail. com
6. Website:www.macerc.org
7. College Logo:

There are three way to generate QR code at trustthisproduct.com i.e. Static, Dynamic, and for Business.

Table 4: Types of QR Code [8]

| Static | Dynamic | For Business |
| :--- | :---: | :---: |
| Static QR <br> Code is a <br> code here <br> data can not <br> changed <br> without new <br> one. | This QR <br> equivalent to <br> static QR | Business OR Code <br> Code which <br> links with a <br> web page |
| There is no <br> need of marketing <br> information, data about <br> nlace, goods, complete <br> internet <br> product <br> information, advertising <br> material etc. |  |  | | Display data |
| :--- |
| can be changed |
| during the |
| scanning |$\quad$| Genreating QR Code |
| :---: |
| in business requires to |
| register on free online |
| website. |


|  | process,withou <br> t alter QR <br> Code it self |  |
| :--- | :--- | :--- |



Fig. Dynamic QR Code

Steps to Generate QR Code:

1. First open the QR Code Generator
2. Then Select the QR Code type

Static QR Code
Dynamic QR Code
QR Code for Business
3. Then Select which type of Static QR Code generate Like Text, Business Cards, SMS, E-Mail Message, Wi-Fi Access
4. Then a dialog box or a form will appear. Thereafter one can enter any type of text or information respectively.
5. Then click on "Create QR Code"
6. Then personal QR Code will automatically be generated.
7. Then download the code in any require format.

## V. QR CODE SCANNER

For Scanning the QR Code, We follow the following steps:

1. Scanning the QR Code must have require a QR -code reader app such as "QR droid" for Android phones, "Red Laser" for iOS and "QR code Scanner Pro" for Blackberry on our tablet or Smartphone.

## 2. Launch the QR app

3. Then camera will be activated automatically.
4. After activation of camera Line up the QR code with the camera and hold our device steadily until the QR app beeps, showing all the information stored by the code. Some apps will also activate our web browsers and redirect we to a designated link containing the information stored in the code.

## VI. PRESENT APPLICATION

A recent implementation of QR codes is India's 'Aadhar' project that gives a UID number to the citizens of India much like the Social Security Number (SSN) in USA. Another first in Indian aviation (Jet Airways) uses QR codes in their products and services.

UID stands for Unique Identification also known as Aadhar Card. It is initiated by the Govt. of India for Indian citizen.

UID also tends for user of computer system for a specific purpose.

Aadhar Card carries the color photograph which has two sets of barcode.

- Linear (12 digit Unique Number in barcode format with the sign imprinted.)
- Matrix(OR Codes)

Information of the occupant is stored in a matrix which is also known as QR code, because it's capacity is too large (Approx. 600 characters) to store more data.

It contains occupant's name, address, name of parents or guardian, D.O.B, age and gender.
What's app web is a mobile application. It is another latest work in the field of QR code. By the help of QR code we can send audio, video, images faster through computer.

## VII. CONCLUSION

By this paper the conclusion is that QR code store the more information than BAR code. QR Code stores the information matrix form which stores the information on both axes horizontally or vertically. QR code has many advantages like, QR codes are free to generate and free to Scanned. More secure than the BAR code, It is store many types of information. In addition, on the basis of the characteristics description of QR Code, the applications of QR Code in WatsUpWeb, UID, and the benefits of using QR Code for companies are explored and analyzed. Thus we have also generated the QR Code of College data where we are embedded the details of the college like College Logo, Principal's name, college mail address, postal address, etc..

QR codes can store contents such as text, URL links, automatic SMS messages, or any other information that can be well-established in a two-dimensional barcode. This programmed data can be decoded by scanning the barcode with a mobile device that is equipped with a camera and QR reader software. Although QR codes are very flexible and have been around for over eighteen years, their use in many fields.
like medical ,business, education, security are still in its infancy.

## VIII. REFERENCES

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[^0]:    4. QR Code has error correction capability but Bar Code doesn't have.
