

# Comparitive Study of Bar code & Quick Response Code & its Security Issues

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**Abstract**— In this paper, the main discussion is about the comparative study of bar code technique and the technique QR Code ie Quick response code for the proper monitoring & transferring of data. Bar codes have low reading speed and accuracy. As bar codes became popular and their convenience universally recognized, the market began to call for codes capable of storing more information, more character types, and that could be printed in a smaller space. As a result, various efforts were made to increase the amount of information stored by bar codes, such as increasing the number of bar code digits or layout multiple bar codes. However, these improvements also caused problems such as enlarging the bar code area, complicating reading operations, and increasing printing cost. Quick Response Code recognition using mobile, which is an efficient technology used for data transferring. To solve the problem of low reading capacity and accuracy, QR code is developed. It has high encoding capacity with high reading speed and Code can be readable. QR-code stand for Quick Response Code, which is well known 2 dimensional bar code industrial as it, have high efficiency in accuracy and reading speed. From any direction.

**Index Terms**— Security and Mobile Phone, QR Codes, Barcode, Data Monitoring, Accuracy of data, Security issues.

## 1 INTRODUCTION

THIS Paper highlight on the term the basic role of bar code technique. Bar code is useful for the storing of data or information in proper way. It is used to store data or characters. Bar code is the security of one dimensional (1D) barcodes is lower than 2D barcodes. 1D barcodes are very easy to read by scanning the lines and the spaces. However, 2D barcodes are not easy to read a symbol pattern by human eyes. With regard to readability, 1D barcodes must scan along a single directional. If the angle of a scan line does not fit within a range, the data would not be read correctly. However, 2D barcodes get wide ranges of angles for scanning. Thus, 2D barcodes are readability [1]. The key difference between the two is the amount of data they can hold or share. Bar codes are linear one-dimensional codes and can only hold up to 20 Numerical digits, whereas QR codes are two-dimensional (2D) matrix barcodes that can hold 7,089 numeric characters and 4,296 alphanumeric characters, and 1,817 kanji characters of information [1]. Their ability to hold more information and their ease of use makes them practical for small businesses. QR Codes can contain many different types of information. QR Code is used instead of bar code it is having more data capacity than bar code & efficient than bar code technique. QR code has high speed of detection & accuracy. It is mostly used in automatic identification fields. In order to attempting the different sizes, dirty or damaged & lighting condition of bar code this proposes a novel implementation of quick response code recognition.

QR codes are versatile. It is a two dimensional symbol. Invented in 1994 by Denso-Wave [2].



Fig: 1 QR Code & Bar code contain Information

## 2 BACKGROUND

The conventional Bar code is having the less capacity of maintaining the data as compared to 2 D Bar code & QR code. The QR code is already popular in most aspect than bar code in some of the areas. Bar code is capable of maintaining 20 digits, where as QR code can capable of holding the 7089 characters combined with the diversity, extendibility offered. This makes the use of QR code much appealing than that of Bar codes. Important features of QR code is that they do not need to be scanned from one particular angle. It can be read regardless of their position. Scanners of the QR code are capable of determining the right way to decode the image due to the three specific squares that are positioned at that corners of the symbol & the alignment blocks. In case of mobile phones QR code can maintained SMS, email address, text, URL, contact Information & also maintained the different kinds of information.

### 3 BASIC STRUCTURE OF QR CODE

Each QR Code symbol consists of mainly two regions [10] an encoding region and function patterns. Function patterns consist of finder, timing and alignment patterns which does not encode any data. The symbol is surrounded on all the four sides by a quiet zone border. A QR Code can be read even if it is tilted or distorted. The size of a QR Code can vary from 21 x 21 cells to 177 x 177 cells by four cell increments in both horizontal and vertical direction.

The Basic Structure of quick response code consist of different regions such as

- Quiet zone around the symbol.
- Finder patterns in the corners (FIP)
- Timing patterns between finder patterns (TP)
- Alignment patterns inside the data area (AP)

#### 3.1 Finder Pattern:-

Finder Pattern is in the corner of structure. Finder Pattern can be used for detecting the position of QR Code. The position, size and angle of the QR Code can be determined with the help of the three position detection patterns (Finder Patterns) which are arranged at the upper left, upper right and lower left corners of the symbol. The patterns can be easily detected in all directions.

#### 3.2 Alignment Pattern:-

The alignment pattern consists of dark 5x5 modules, light 3x3 modules and a single central dark module. This pattern is actually used for correcting the distortion of the symbol [3]. The central coordinate of the alignment pattern will be identified to correct the distortion of the symbol.

#### 3.3 Timing Pattern:-

Timing pattern are between the alignment patterns. The timing patterns are arranged both in horizontal and vertical directions. These are actually having size similar to one module of the QR Code symbol. This pattern is actually used for identifying the central co-ordinate of each cell with black and white patterns arranged alternately.

#### 3.4 Quiet Zone:-

It is around the Symbol. This region is actually free of all the markings. The margin space is necessary for reading the

bar code accurately. This zone is mainly meant for keeping the QR Code symbol separated from the external area [4]. This area is usually 4 modules wide.

#### 3.5 Data Area:-

The data area consists of both data and error correction code words. According to the encoding rule, the data will be converted into 0's and 1's. These binary numbers will be then converted into black and white cells and will be arranged. Reed-Solomon error correction is also employed here.

### 4 RELATED WORK

QR Codes are capable of encoding the same amount of data in approximately one tenth the space of a traditional bar code. A great feature of QR Codes is that they do not need to be scanned from one particular angle, as QR Codes can be read regardless of their positioning. QR Codes can be easily decoded with a mobile phone with appropriate software (Kaywa Reader) [5]. Secure communication can also be established using QR Encoding techniques [6]. The term "QR Code" is in reference to "Quick Response". It was developed in 1994 by Denso wave in Japan. QR Codes have already overtaken the conventional bar codes. Because of the capacity of barcode that holding data is very much less compared to the QR Code. QR Code contains data both in horizontal and vertical position. A barcode is an optical machine-readable representation of data relating to the object to which it is attached. Originally barcodes systematically represented data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D). Later they evolved into rectangles, dots, hexagons and other geometric patterns in two dimensions (2D). Although 2D systems use a variety of symbols, they are generally referred to as barcodes as well. Barcodes originally were scanned by special optical scanners called barcode readers. Later, scanners and interpretive software became available on devices including desktop printers and smartphones. Bar code may be linear or matrix (2D) barcode.

A typical barcode can only hold a maximum of 20 digits, where as as QR Code can hold up to 7,089 characters. QR Codes are capable of encoding the same amount of data in approximately one tenth the space of a Traditional bar code. The code consists of black modules arranged in a square pattern with functions such as encoding, image searching, decollating, image allocation and image revision. QR Codes can be easily decoded with a mobile phone with appropriate software. Secure communication can also be established using QR Encoding techniques. QR Codes are now used in a much broader context, including both commercial tracking applications and convenience-oriented applications aimed at mobile phone users (known as mobile tagging). An approach to the detection of QR code is used to people for detection of QR code. It also helps visually impaired people identify objects

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using these QR code as tags. The use of QR codes in helping blind people identify objects is the problem addressed in.

### 5 PROBLEM DEFINITION

In this, we are concentrating on the flaws related to the barcode technique & how it is overcome with QR code. Bar codes have low reading speed and accuracy. As bar codes became popular and their convenience universally recognized, the market began to call for codes capable of storing more information, more character types, and that could be printed in a smaller space. As a result, various efforts were made to increase the amount of information stored by bar codes, such as increasing. Bar codes have become widely popular because of their reading speed, accuracy, and superior functionality characteristics. The market began to call for codes capable of storing more information, more character types, and that could be printed in a smaller space. As a result, various efforts were made to increase the amount of information stored by bar codes, such as increasing the number of bar code digits or layout multiple bar codes. However, these improvements also caused problems such as enlarging the bar code area, complicating reading operations, and increasing printing cost. 2D Code emerged in response to these needs and problems. 2D

Code is also progressing from the stacked bar code method (that stacks bar codes), to the increased information density Matrix method [8]. QR code also has an impact of from attackers.

QR codes are tricky because you cannot weed out the bad from the good by simply looking at the code. Because the vulnerability is practically part of the design, consider downloading an app on your phone which provides a preview to each code before it opens a webpage (e.g.: Inigma) reader. This way, you will have right to refuse the QR code is corrupted. Scan a code and get directed to a login form, always remember never to fill it in for it may be a trap used by criminals to get access to personal information. Legitimate QR codes never asks for personal info.

One particularly interesting use of QR code is to exchange public encryption key information. Public key encryption is a great way to obscure and protect the integrity of data exchanged over a non-secure medium.

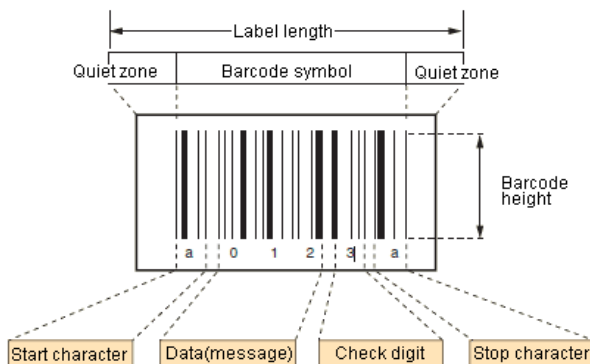


Fig: 2 Basic Information in Bar code

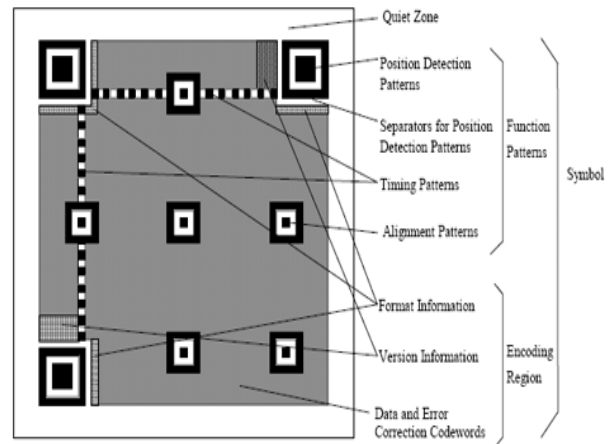


Fig: 3 Structure of QR Code

Error correction functionality	Level L	Approx. 7% of the symbol area restored at maximum
	Level M	Approx. 15% of the symbol area restored at maximum
	Level Q	Approx. 25% of the symbol area restored at maximum
	Level H	Approx. 30% of the symbol area restored at maximum

Fig: 4 Error Correction Functionality of QR Code

The format information records two things: the error correction level and the mask pattern used for the symbol. Masking is used to break up patterns in the data area that might confuse a scanner, such as large blank areas or misleading features that look like the locator marks. The mask patterns are defined on a grid that is repeated as necessary to cover the whole symbol.

### 6 CONCLUSION

In this paper, there is a comparison study of QR code & Bar code is discussed. Some of the problems or anomalies in the Bar code technique are overcome with the QR code technique. Q-R code is 2 dimensional so that information storing capacity is much higher than bar code as well as high capacity of encoding the data & high degree of readability. In general, believe that QR codes have great potential in business media. Some possibilities are discussed in this paper and there are many creative ideas waiting for us to explore. Since QR Codes gain increasing popularity through their use for marketing purposes, we expect that this kind of attack will receive more and more attention by the hacking community in the future. Furthermore, many mobile devices (e.g., smartphones) at present are able to decode QR Codes. Future work will focus on the main issue of the security the data or proper monitoring of the data so as to make system efficient and reliable.



Fig: 5 Sample QR code symbol

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