
QR CODES AND ITS APPLICATION IN BUSINESS

Prof. Sandeep Ponde

Associate Professor,
NCRD's Sterling Institute of
Management Studies,
Navi Mumbai

Dr. Anand Muley

Ph.D. Guide
Rashtrasant Tukadoji
Maharaj Nagpur
University

Dr. R. A. Mankar

HOD, Dept. of Commerce,
J. M. Patel College,
Bhandara

ABSTRACT

Quick Response code is commonly known as "QR codes". It is modern form of Barcode in two dimensional ways. It has very high data storage facility as compared to traditional barcode. A QR code provides the better security than Barcode. Hence now day's numbers of business organizations Marketing of Product, Advertisement, Supply chain Management, Health Care authentication, logistics, agriculture business.

The purpose of paper is to discuss the What QR code, its structure, how QR code is different from barcode, advantage and disadvantages and its application in business.

Keywords: QR code, Security, SCM, Marketing, e-Business.

INTRODUCTION

A barcode is an optical machine readable format of information relating to the object or product. Barcode represented data by varying the width and spacing of Parallel lines, referred to as linear or one dimensional. After research of one and half year Japanese scientist they developed a new code which has better features than the linear barcode. By doing certain technical and geometrical arrangement of dots in rectangle form in 2 dimensions the structure is formed in general referred to as QR code. QR code is a two dimensional digital image that can be easily read , scan by any mobile device camera.

QR code are become very popular than classical barcode in many areas because of its numbers of features like large data storage capacity, encryption technique, dirt and damage resistant, high speed reading ,small size, flexible and 360 degree reading.

This paper is divided into different sections. Section II covers what is QR code and its structure , Section III include Comparison between barcode and QR code. Section IV covers Applications of QR code and Section V is the Conclusion.

ABOUT THE QUICK RESPONSE CODE

Quick Response code is widely known as QR code. The QR (Quick Response) Code is a two-dimensional (2-D) matrix code that belongs to a larger set of machine-readable codes, all of which are often referred to as barcodes, regardless of whether they are made up of bars, squares or other-shaped elements.

QR code system was invented in 1994 by DENSO WAVE a Toyato subsidiary company in Japan. Initially it was designed for automotive industry to track vehicles component during manufacturing at automotive industry. The QR code consists of black and white dots. Black

modules arranged in square grid on white background. The information encoded in QR code can be numeric, alphanumeric, byte / binary and Kanji. QR codes are far more powerful and can contain much more information. While QR Code holds info both vertically and horizontally. It can store up to 4,296 alphanumeric characters, 7089 Numeric data and 2953 binary.



Figure 1. QR code

QR codes are used to store information like Contact information, Calendar events, email id, Phone number, location, SMS, Text, Wi-Fi network and URL. QR code is read by scanner, camera in mobile device and QR code scanner. The use of QR code is free of any license. The QR code is clearly defined and published as per ISO standard.

QR code is a two dimensional i.e. matrix barcode type symbol with a cell architecture arranged in a square. Figure 2 shows the QR code structure. QR codes consist of different areas that are reserved for specific purposes. Finder, separator, timing patterns and alignment patterns comprised function patterns. Function patterns shall not be used for the encoding data. The finder patterns located at three corners of the symbol intended to assist in easy location of its position, size and inclination.

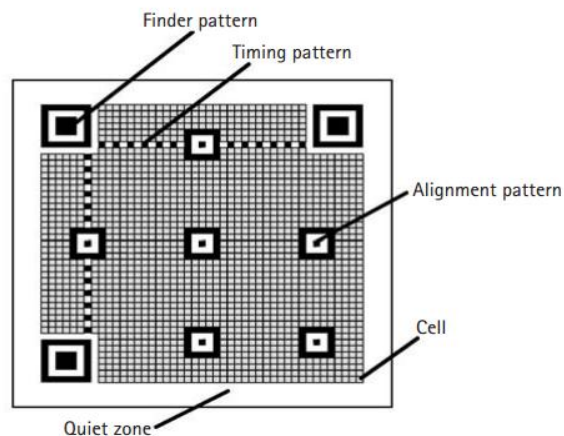


Figure 2: QR Code Structure

COMPARISON BETWEEN BARCODE AND QR CODE

A QR code is a type of bar code. A bar code is one dimensional whereas QR codes are two dimensional. QR codes can hold far, far more data. QR codes can trigger several different types of actions, such as send a tweet, dial a phone number, bookmark a website, download a Vcard, Also, QR codes can be modified with up to a 30% loss ratio, so they can be branded to reflect your business. Following table describes how QR code is better than barcode.














Features	Barcode	QR Code
High Capacity	10-20 digits 0123456789 	Upto 7089 digits(numeric) 01234567890123456789 01234567890123456789 01234567890123456789 01234567890123456789 01234567890123456789 01234567890123456789 
Dirt and Damage resistant	Reading is impossible 30% of the data is dirty or damaged.  	Reading is possible 
Space Size	10 digits numeric (approx.50 mm x 20mm) 	40 digits numeric (approx 5 mm square) 
Reading	Only Horizontal reading 	supports 360 degree high speed reading 
Language Supported	QRコードは漢字・かなを効率よく表現することができます。  Numeric, Alphanumeric, can effectively encode the japanese character Kanji	 Alphanumeric only
Data Arrangement	 Data is stored Horizontally & Vertically	 Data is stored in only Horizontally
Linkability	QR code can be link	Barcode can't link together

Table 1 : Barcode and QR code comparison

From the table following are the advantage and disadvantages of QR code

Advantages of QR code

- QR code is two dimensional and readable at any direction.
- Storage capacity of QR code is up to 4,296 alphanumeric characters.
- It is readable if they are partially damage.
- It is easy to scan with camera based device.
- QR codes are not readable by person.
- QR code can stores data which is stored in one dimensional bar code in one-tenth the space.
- QR code is providing information correctly if it is damage up to 30%.
- It can handle many types of data like numeric, alphabetic.

Disadvantages of QR code

- It is only readable by the machine.

APPLICATION IN BUSINESS

QR Code was originally designed to track automotive components and systems through the manufacturing process and distribution supply chain, it has rapidly spread to virtually every other area where traditional barcodes are used, as well as some entirely new ones.

Typical applications include:

- **Manufacturing**
 - Product traceability
 - Process control
 - Order and time tracking
 - Inventory and equipment management
- **Warehousing and logistics**
 - Item tracking
- **Retailing**
 - Point-of-purchase product identification
 - Sales management
 - Inventory control
- **Healthcare**
 - Medical records management
 - Patient identification
 - Medication tracking
 - Equipment and device tracking
- **Life sciences**
 - Specimen tracking
- **Transportation**
 - Fleet management
 - Ticketing and boarding passes
- **Office automation**
 - Document management

- **Education**
 - Book Review
 - Multimedia content
- **Marketing and advertising**
 - Mobile marketing
 - Electronic tickets, coupons, payments and loyalty programs
 - The newest and most innovative uses of the QR Code are in marketing and advertising

CONCLUSION

This paper gives the outlined about the QR Code, it's structure, how QR code is different from barcode code and it's various application in business. Since QR Codes gain increasing popularity through their use for marketing purposes, Furthermore, many mobile devices (e.g., smart phones) at present are able to decode QR Codes and access the URLs contained in them. QR codes put information at your fingertips with just one click. QR codes can be attached to any print media including brochures, presentations, programs or business cards. Most business owners include their web address on their business card.

REFERENCES

- [1] http://en.wikipedia.org/wiki/QR_code
- [2] QR Code® is a registered trademark of DENSO Wave Incorporated
- [3] Jean-Pierre Lacroix, Shikatani Lacroix. QR Codes whitepaper,2011.[Available]: www.sldesignlounge.com/wpcontent/.../QR-Code-White-Paper.pdf
- [4] Suraj Kumar Sahu, Sandeep Kumar Gonnade : QR Code and Application in India
- [5] International standard ISO/IEC 18004, —Information technology Automatic identification and data capture techniques Bar code symbology QR Code, Reference number - ISO/IEC 18004:2000(E), First edition 2000-06-15.
- [6] Shuji Yokota,GS1 Japan, <http://www.gs1jp.org>
- [7] Kuan-Chieh Liao, —a novel user authentication scheme based on QR-code, Journal of networks, vol. 5, no. 8, august 2010.
- [8] A. Sankara Narayanan, —QR codes and security solutions, International Journal of Computer Science and Telecommunication, Volume 3, Issue 7, July 2012.