



World Scientific News

An International Scientific Journal

WSN 41 (2016) 193-199

EISSN 2392-2192

Reversible Data Hiding with QR Code Application

V. Revathi

Department of Information Technology, Hindusthan College of Arts and Science, Coimbatore, India

E-mail address: revathidotv@gmail.com

ABSTRACT

The technique reversible data hiding with the application associated with the Quick Response codes. QR codes are random patterns, which can be commonly observed on the corner of posters. The goal of QR codes aims at convenience oriented applications for mobile phone users. People can use the mobile phone cameras to capture QR code and corresponding to the QR code can be accessed instantly. To develop Quick Response Codes are a type of two-dimensional matrix barcodes used for encoding information. It has become very high storage capacity. The present QR is a combination of strong encryption algorithm and data hiding in two stages to make the entire process extremely hard to break. Here, the secret message is encrypted first and hide it in a QR Code. The QR code is that carry meaningful information in the vertical direction as well as the horizontal, hence the two-dimensional term. By carrying information in both directions, QR code can carry up to several hundred times the amount of data carried by an ordinary bar codes. With the aid of our reversible data hiding technique, the QR codes can be hidden into the original image, and considerable increase in embedding capacity can be expected. Then, the QR code could get vanished and the original image would be recovered to retain the information conveyed therein.

Keywords: Barcode, Quick Response code, Data Hiding

1. INTRODUCTION

A QR code (abbreviated from Quick Response code) is a type of matrix barcode (or two-dimensional code) designed for the industry. The code consists of black modules arranged in a

square pattern on a white background. The QR codes can hold up to 7100 characters of data, Additionally, the QR codes hold characters, numbers, symbols text, and control codes. The information encoded can be made up of any kind of data (numeric, alphanumeric, byte / binary). QR Codes in that the data is stored in both directions and can be scanned vertically and horizontally.

Additionally, when damaged, the QR code can still recover from 30 to 35% of the damaged data, words, or symbols, making the QR code far superior in the capabilities or restoring data, or recovering information which has been lost or damaged for any reason.

QR codes can be read anytime, anywhere with mobile phones. QR Scanner that can read and decode data from a QR code. With a mobile phone camera, and QR scanner software install into our system, it is actually easier to decode such QR codes

2. PROBLEM DEFINITION

Many of the products contains the shelves are EAN-13 or EAN-8 format, referred to as a 1D barcode, readable by all laser barcode scanners. These barcodes are simple in their structure and simply contain a string of numbers which are usually placed underneath the barcode. If the EAN-13/8 barcode is damaged, the user can input the barcode into a POS for example and the result is the same.

That number is typically assigned to a product or piece of stock information, generated automatically by the stock control software or assigned manually as stock arrives into the warehouse. Many manufacturers and distributors still manage inventory on log sheets and with index card systems. It was a tried and true method for years, but in today's world of speed and error free work and should not rely on your employees always getting the number right.

The advantage of the barcode scanner is that it reads what is there. There is no way the scanner can transpose numbers or recognize the number 0 as a letter o or a number 1 with a letter l. There are many human error elements that lead to duplicate work because of errors and the barcode scanner prevents the errors of transposing and misreading number and letter characters. Barcode scanners are usually perceived to the rough environment that customers may think, there is no way to automate

2. 1. ONE DIMENSIONAL BARCODE

Many of the products contains the shelves are EAN-13 or EAN-8 format referred to as a 1D barcode, readable by all laser barcode scanners. These barcodes are simple in their structure and simply contain a string of numbers which are usually placed underneath the barcode. Many manufacturers and distributors still manage inventory on log sheets and with index card systems. There are many human error elements that lead to duplicate work because of errors and the barcode scanner prevents the errors of transposing and misreading number and letter characters. Scanners are usually perceived to the rough environment that customers may think, there is no way to automate.

Barcodes are one dimensional numeric codes, and they are capable of hold up to 20 characters (small amount of data is stored). When the barcodes are damaged, they are not capable or reading any data and they cannot be used to scan. They form a barcode that can be scanned using a dedicated hardware barcode scanner only. When using barcodes, the exact position has to be perfect, otherwise they will not scan.



Figure 1. Organization Process Form

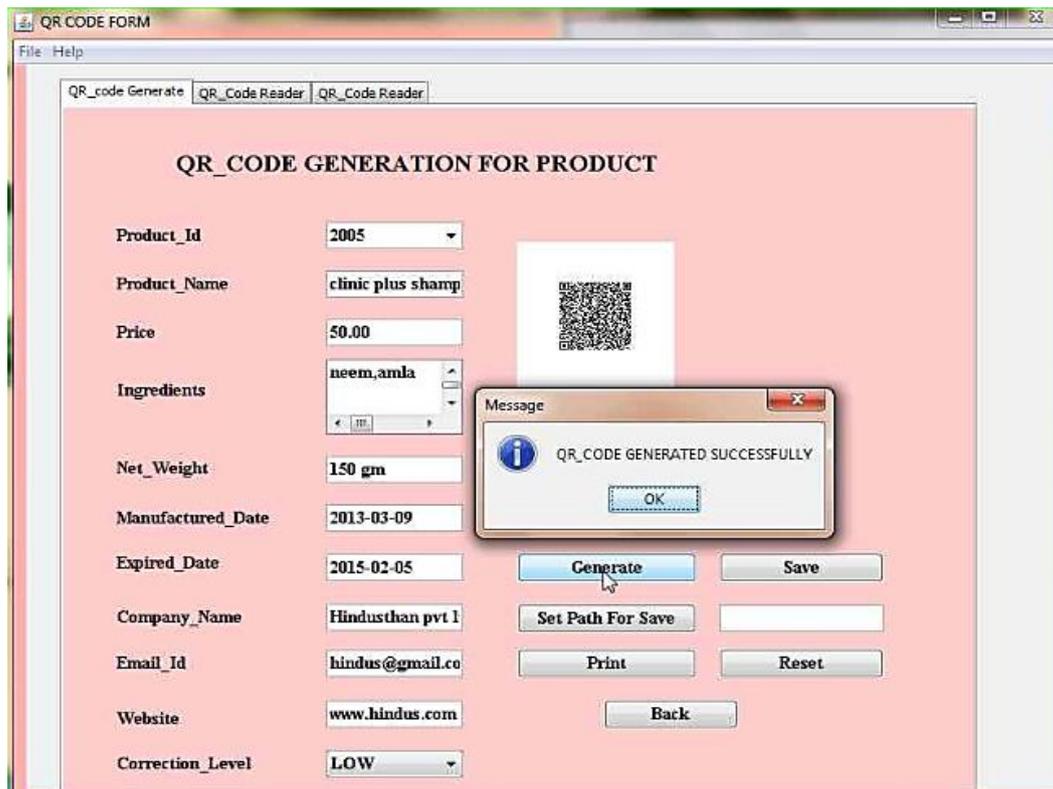


Figure 2. Product QR_Code Form



Figure 3. Path for QR_Code Form

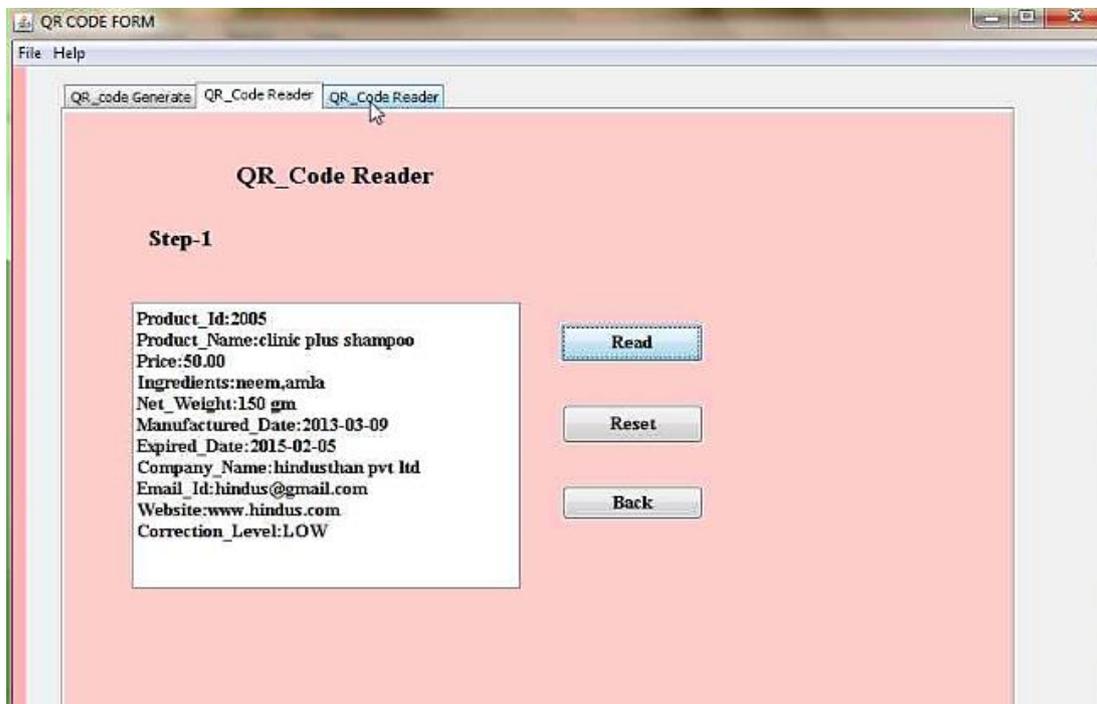


Figure 4. Read Product QR_Code Form

2. 2. IMPLEMENTAION

A QR code (Abbreviated from Quick Response Code) is a type of matrix barcode (or two-dimensional code) designed for the industry. The code consists of black modules arranged in a square pattern on a white background. The QR codes can hold up to 7100 characters of data, Additionally, the QR codes hold characters, numbers, symbols text, and control codes. The information encoded can be made up of any kind of data (numeric, alphanumeric, byte / binary).

QR Codes in that the data is stored in both directions and can be scanned vertically and horizontally. Additionally, when damaged, the QR code can still recover from 30 to 35% of the damaged data, words, or symbols, making the QR code far superior in the capabilities or restoring data, or recovering information which has been lost or damaged for any reason.

QR codes can be read anytime, anywhere with mobile phones. QR Scanner that can read and decode data from a QR code. With a mobile phone camera, and QR scanner software install into our system, it is actually easier to decode such QR codes.

2. 3. QR CODE MODULE

In QR Code module to develop Quick Response Codes (or QR Codes) are types of two-dimensional matrix barcodes used for encoding information. It has become very high storage capacity. The present method is QR is a combination of strong encryption algorithm and data hiding in two stages to make the entire process extremely hard to break. Here, the secret message is encrypted first and hide it in a QR Code and then again that QR Code is embed in a cover file (picture file) in random manner, using the standard method of steganography.

In the way data which is secured is almost impossible to be retrieved without knowing the cryptography key, the exact unhide method. QR Code library provides functions to:

- Encode content into a QR Code image which can be saved in JPEG, GIF, PNG, or Bitmap formats
- Decode a QR Code image.

The design of Reed–Solomon codes and the use of 8-bit code word's an individual code block cannot be more than 255 code word's in length. The QR specification does not use the largest possible block size, instead it defines the block sizes so that no more than 30 error-correction symbols appear in each block.

3. CONCLUSION

There are several reasons to choose the QR code over the barcode option. These codes are two dimensional codes, capable of storing data horizontally and vertically. Therefore, the QR codes can hold up to 7100 characters of data. QR codes are far greater at holding and keeping storage, and can store text messages. Since special scanners are not required and the personal computer's or the latest camera mobile phones can scan and present the information contained in the QR codes. It reduce barcode reader.

The organizations use QR barcodes means that used to hold and hide more information about the particular product. Easy to generate and read QR codes using personal computer or smart phone's. The customer also easy read the QR code's and able to know the details and ingredients of particular product.

FUTURE ENHANCEMENTS

The two dimensional QR code now hold and hide only textual information. In future can hold large text files, documents, and image files, audio and video files into the QR code. It also used to send the secret information from one person to another person using QR Code is the best way. Hide audio and video files into the QR code and apply secret key means that's very secure. After that send that QR code from sender to receiver.

References

- [1] H. Huang, F. Chang and W. Fang, Reversible data hiding with histogram-based difference expansion for QR code applications, *IEEE Transactions on Consumer Electronics*, vol. 57, no. 2, pp. 779-787, May 2011, doi: 10.1109/TCE.2011.5955222
- [2] H. C. Huang and Y. H. Chen, Genetic fingerprinting for copyright protection of multicast media, *Soft Computing*, vol. 13, no. 4, pp. 383-391, Feb. 2009
- [3] F. C. Chang, H. C. Huang and H. M. Hang, Layered access control schemes on watermarked scalable media. *Journal of VLSI Signal Processing Systems for Signal Image and Video Technology*, vol. 49, no. 3, pp. 443-455, Dec. 2007
- [4] Z. Ni, Y. Q. Shi, N. Ansari and W. Su, Reversible data hiding, *IEEE Trans. Circuits Syst. Video Technol.* vol. 16, no. 3, pp. 354-362, March 2006
- [5] D. M. Thodi and J. J. Rodriguez, Expansion embedding techniques for reversible watermarking, *IEEE Trans. Image Process.* vol. 16, no. 3, pp. 721-730, April 2007
- [6] Y. Hu, H. K. Lee and J. Li, DE-based reversible data hiding with improved overflow location map, *IEEE Trans. Circuits Syst. Video Technol.* vol. 19, no. 2, pp. 250-260, Feb. 2009
- [7] Mona M. Umariya, G.B. Jethava, A Novel Approach for Enhancing Data Storage Capacity in Quick Response Code Using Multiplexing and Data Compression Technique, *Computational Intelligence and Communication Networks (CICN) 2015 International Conference on*, pp. 1091-1093, 2015
- [8] Weider D. Yu, Hargun Hansrao, Kirandeep Dhillon, Pradeep Desinguraj, NFC based m-Healthcare application focusing on security privacy and performance, *Communications (ICC) 2013 IEEE International Conference on*, pp. 4104-4109, 2013.
- [9] Andrés Marín López, Daniel Díaz Sánchez, Florina Almenárez Mendoza, Patricia Arias Cabarcos, Rosa Sánchez Guerrero, Fabio Sanvido, Private cloud and media privacy in social networks, *Consumer Electronics - Berlin (ICCE-Berlin) 2012 IEEE International Conference on*, pp. 277-281, 2012
- [10] José O. Cadenas, R. Simon Sherratt, Pablo Huerta, Wen-Chung Kao, Graham Megson, Parallel pipelined histogram architecture via C-slow retiming, *Consumer Electronics (ICCE) 2013 IEEE International Conference on*, pp. 230-231, 2013

- [11] Kartini Mohamed, Fatimah Sidi, Marzanah A. Jabar, Iskandar Ishak, A novel watermarking technique in data transmission between QR codes and database, *Open Systems (ICOS) 2013 IEEE Conference on*, pp. 95-99, 2013.
- [12] Hiren J. Galiyawala, Kinjal H. Pandya, To increase data capacity of QR code using multiplexing with color coding: An example of embedding speech signal in QR code, *India Conference (INDICON) 2014 Annual IEEE*, pp. 1-6, 2014
- [13] Guangyong Gao, Yun-Qing Shi, Reversible Data Hiding Using Controlled Contrast Enhancement and Integer Wavelet Transform, *Signal Processing Letters IEEE*, vol. 22, no. 11, pp. 2078-2082, 2015
- [14] Shuang Yi, Yicong Zhou, Chi-Man Pun, C. L. Philip Chen, A new reversible data hiding algorithm in the encryption domain, *Systems Man and Cybernetics (SMC) 2014 IEEE International Conference on*, pp. 3215-3220, 2014
- [15] Ana Ferreira, Gabriele Lenzini, Catia Santos-Pereira, Alexandre B. Augusto, Manuel E. Correia, Envisioning secure and usable access control for patients, *Serious Games and Applications for Health (SeGAH) 2014 IEEE 3rd International Conference on*, pp. 1-8, 2014
- [16] José O. Cadenas, R. Simon Sherratt, Pablo Huerta, Wen-chung Kao, Parallel pipelined array architectures for real-time histogram computation in consumer devices, *Consumer Electronics IEEE Transactions on*, vol. 57, no. 4, pp. 1460-1464, 2011
- [17] Jose Cadenas, R. Simon Sherratt, Pablo Huerta, Wen-Chung Kao, Graham M. Megson, C-slow retimed parallel histogram architectures for consumer imaging devices, *Consumer Electronics IEEE Transactions on*, vol. 59, no. 2, pp. 291-295, 2013