Implementation of 2LQR for Secret Message and Document Ownership

Kajal. J. Jadhav[1] Prof. Vandana Navale[2]
[1,2]Savitribai Phule Pune University, DPCOE, Wagholi, India

Abstract— The QR code means You get the fast response. It is developed for storage the data and fast speed accessing applications. In this paper developed the new QR code that has a two level storage level. That storage level is used for identifying the Document ownership. The new QR code is named by the 2LQR code. The has two levels i.e private level and public level. The public level in the standard QR code. In the public level accessible by any classical QR code application. The private level developed the new QR code by replacing the black modules with specific textured patterns. The data or message is encoded using q0ary code with an error correction capacity. This does not allow the storage capacity or is identified as the original document ownership. The document ownership is a sensitive process so used the print and scan process. The second level uses the pattern recognition method. In this read the data it can be used for the private message sharing and ownership scenarios. The automatically increased storage capacity the code alphabet q or increasing the textured patterns. The result shows the accurate restoration of secret data or message.

Keywords: Document Authentication, Error Correction capacity, Pattern recognition, Private message, Print and Scan Process, Texture Pattern

I. INTRODUCTION

A QR Code is a Matrix code the QR codes were developed in Japan 1994b Toyota subsidiary, Denso Wave to help track automobile parts throughout production. This technology has been around for over a decade but has since become popular as a medium for marketers to reach smartphone users[1].QR code stands for Quick Response Code, Which is the trademark for the type of matrix barcode which was invented by the Japanese corporation DensoWave .QR code has a number of features such as large capacity data encoding, dirt and damage resistant ,high speed reading, small print outsize,360 degree reading and structural flexibility of application [2].In this paper introduced 2LQ for share secret messages for document ownership. The proposed method in this 2LQR code contains of a first level accessible for many standard QR code reader there for it keeps the strong characteristics of the QR code and second level that improves the capacities and characteristics of the initial QR code. This introduces public level and private level. In public level access to any standard QR code. The private level is replacing the black module by texture pattern. Therefore they gain storage capacity. The private level i,e second level in this encoded using the q-ary with error correction capacities. This information is invisible to the standard QR code reader because it perceives the textured patterns as black modules. Therefore the second level using for sharing a secret message The pattern recognition method that used to read the second-level information can be used both in a private message sharing and in an authentication scenario. The main objective is to provide dual security with data optimization. System also provides document authentication and gives faster results for Customer. This project is aimed to present a new rich 2LQR code that has two storage levels and can be used for document authentication and to avoid remembering username and password and also to ease online transactions. This application provides secure login systems which also perform online transactions.

II. MOTIVATION

The motivation of this project security. In Sep 2011 Kaspersky lab detected first of its kind malicious QR code. The attack method used in QR code was. When the user scans the code he is directed towards the website and then malicious file download in the user phone, without knowledge of the user[2]. In this project a private message is encoded using the ECC algorithm. The private message is hidden in the black module replacement. The main aim is to provide a secured login system. Improve the readability of the initial level, Increase the storage capacity.

III. OBJECTIVE

The main objective is to come up with a banking website and online shopping website that implements and demonstrates how QR code can be used with Encryption to ensure data security as it provides dual security with data optimization. To share a secret message. To provide authentication to the document. To provide Faster results for customers.

IV. LITERATURE SURVEY

A. A Survey on QR Codes

This paper introduced that there are so many possibilities for QR code's use in different areas that are yet to be explored. The technology has a firm ground for research aspects. More and more experiments are done with QR codes in different aspects like enhancing the security, better recognition, reducing redundancy in order to save space, possibility of encoding different kinds of data like audio, etc. As QR code provides the structural flexibility, it opens up the huge platform for researchers to explore the possibilities to enhance the performance of QR code or to merge QR code with different technologies. Experiments can be done to improve data capacity of QR codes. 1)To find out the possibility of the use of coding techniques other than RS coding. 2) Use encryption to encode data first, and then 3) encode it to QR code for better security solutions [5].

B. QR Codes and Security Solutions

In this paper introduced 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. Also, this paper can be served as the first step for the readers to investigate this exciting topic of mobile learning. In this paper the examination outlined the dangers

of possible malicious attacks utilizing manipulated QR Codes. 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. This paper is security conscious for mobile phones users [6].

C. Towards Robust Color Recovery for High-Capacity Color QR Codes.

This paper HiQ, a layered framework for high- capacity color QR codes, which supports robust and rapid decoding using off-the-shelf smartphones. HiQ enables users and developers to create generalized QR codes with a flexible and broader range of choices of data capacity, error correction level and color, etc. Moreover, we have also collected a large-scale color QR code dataset, CUHK-CQRC, which will be made available to the community. Experimental results show substantial advantages of the HiQ over other baseline approaches. The implementation of HiQ using off-the-shelf smartphones has demonstrated its usability and effectiveness in real-world mobile applications. [1].

D. Color Image Coding and Decoding in QR codes

This paper introduces the concept of color image embeddings in QR codes. This is an automatic method to embed QR codes into color images with bounded probability of detection error. These embeddings are compatible with standard decoding applications and can be applied to any color image with full area coverage. To mitigate the visual distortion of the QR image, the algorithm utilizes halftoning masks for the selection of modified pixels and nonlinear programming techniques to locally optimize luminance levels. Take one color image and convert it into gray image. Then this doing the masking process, window extraction, image embedding, decoding like processes. After this process the original gray image is taken from this [2].

V. PROPOSED METHODOLOGY

We Proposed the 2LQR code for sharing the private messages through by replacing by black module with texture patterns. Here the information is public message and Private information. The input information is public message Mpub and Private message Mpriv. The output is 2LQR code.

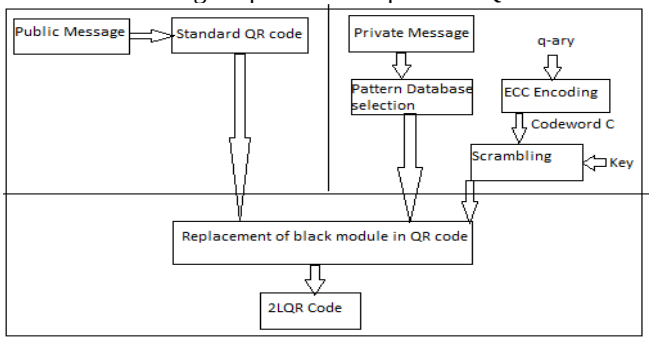

Fig. 1: System architecture

A. Public Message Mpub

The public message is accumulated using the classical generation method [5]. The standard generation method is the following method: First of all, the numeric, alphanumeric, byte or Kanji) is the optimal code. The optimal code is selected by analyzing the message data. The public message is encoded using the shortest possible strings. The public message is divided into 8 bit long data codewords. The error correction coded using the Reed soloman code is generated. After that data and codewords are arranged in an orderly manner. In order to be sure that the generated QR code can be read correctly. Then applied the mask pattern. Manipulation operation is done, after the codewords are placed in a matrix in a zigzag pattern. The codeword is placed starting from the bottom-right corner. The final step is to add the function pattern.

B. Private Message Mpriv

The Private message is encoded using the error correction code (ECC). Reed soloman using the encoded the private message. The cyclic codes can be defined in matrix form and polynomial form[6]. Any cyclic code C is defined by [n,k, d] parameters, where n is the length of the codeword, k is the number of information digits in codeword. d is the minimum distance between distinct code-word. The $n - k$ digits in the codeword are called parity-check digits, and in ECC these digits are used for error detection and correction. The code C is generated by a generator polynomial g(x), which is the code polynomial of the minimum degree in a (n, k) cyclic code C. Let k informative digits of message be represented by a polynomial m(x), of degree, at most $k - 1$. The private message Mpriv is represented in polynomial form. The code-word Cpriv is scrambled using the key K.

C. Black Module Replacement

The codeword is Cpriv is inserted in standard QR code using the replacing the black modules with textured patterns . The texture pattern is P 1, . . . , Pq respecting the codeword Cpriv. The private message is starting from the bottom-right corner. Then, in the case of private message sharing scenario, the textured patterns are placed in the position tags in the QR code with respect to the chosen permutation.

D. Recognition Method

Any QR code production implies a printing process and a scanning process. The P&S process in authentication scenarios is considered as a physical unclonable function [6]. The textured patterns, that are proposed to be used in 2LQR code, are sensitive to the P&S process. The P&S process produces visible and invisible image modifications, which can be caused by resampling inherent to the P&S process, in homogeneous lighting conditions, ink dispersion, varying speeds of the scanning device [7]. The most important elements of the printing process are printer resolution, digital halftoning, toner distribution, physical construction and type of paper. The scanning process is specified by scanner resolution, gamma correction and scanner optics. The optical modulation transfer function of the scanner determines the scanner resolution (which is defined by the number of scanned pixels per inch) and is modeled as a Gaussian blur [8].

E. 2LQR code reading process

In this P&S code has to be corrected during the preprocessing steps. The image preprocessing means lowest

level, input and output are intensity images. In the QR code architecture there are position tags, these position tags are confined to the QR code. The position tags are confined by the standard process to find out the actual position of the co-ordinates. Then applied the re-sample in order for p&s 2LQR code-word. Then get the 2LQR with original size and with correct orientation. Then the next step is module classification is using the threshold technique. The threshold technique in this use global threshold. Then calculated the mean value of P&s 2LQR code. The mean value of block PXP is greater than the global threshold. Find the mean value i,e got the black module class otherwise white module class. The decoding of the public message is functioned by the standard QR code decoding algorithm. And the using position of black n white module. Then another black class module used for pattern recognition of the textured patterns in P&S 2LQR code. In the textured pattern they calculate the total no of code-word digits. Total no. of Code-word digits=No. of codeword X the No. of digit in the code-word. Which belongs to database class. Then perform the descrambling method. The descrambling using the key K. Decoding the code-word using the ECC method then produced the code-word. Then used the parity check digits for error correction and detection. The ECC algorithm decoding for used error correction and detection. The results are restored to the secret or private messages.

VI. ALGORITHM

A. Two Level QR (2LQR) Code Generation Algorithm:

1) Input: public message Mpub, private message Mpriv, Standard QR code, Pattern Database, q-ary ECC, Key K,
2) Output: 2LQR code
    1) Event Public message
    2) Create QR code
    3) Enter Secret message
    4) Secret message encoding
    5) Print and scan the pattern
    6) Texture pattern correlation
    7) Generate 2LQR code

B. Two Level QR (2LQR) code Reading algorithm:

1) Input: 2LQR, global threshold
2) Output: public message, private message
    1) Receive 2LQR code
    2) Extract public message.
    3) Decode private message

VII. RESULT AND ANALYSIS

The result shows that for the correct reading process of public and private levels. The pattern size should be from 6 × 6 pixels to 12 × 12 pixels (the larger pattern size can significantly increase the QR code printing surface). The pattern density can vary from 20% to 80%. The note that the image contrast is too weak, when the pattern density is less than 40% and larger than 70%, the distance among the correlation values is quite weak. The alphabet dimension q can be increased up to q = 8.The larger alphabet dimensions could disrupt the textured pattern detection due to the P&S impact. Summarizing these experiments, the robustness of the proposed 2LQR code depends on the textured pattern size, the alphabet dimension q and the textured pattern density. For Example, if we want to increase the storage capacity of the 2LQR code (either by decreasing the pattern size or increasing the alphabet dimension), the robustness (pattern recognition rate) will decrease (significantly or not). Analogically, the boundary values of textured pattern densities (significantly low or high) decrease the 2LQR code robustness.

VIII. CONCLUSION

We believe that QR codes have great potential in business media. This 2LQR code can be used for private message sharing or for authentication scenarios. The private level is created by replacing black modules with specific textured patterns. The proposed 2LQR code increases the storage capacity of the classical QR code due to its supplementary reading level. One important feature of the textured patterns used is their sensitivity to the P&S process and sensitivity. The two-level color QR code scheme improves the storage capacity of the QR code and provides document authentication ensuring overall security. Thus we present a new rich 2LQR code, that has two storage levels and can be used for document authentication. This application avoids remembering username and password and also to ease online transactions, QR Login is developed. The main aim is to provide secure login systems which also perform online transactions.

REFERENCES

[1] Zhibo Yang, Zhiyi Cheng, Chen Change Loy, Wing Cheong Lau, Chak Man Li, Guanchen Li,"Towards Robust Color Recovery For High Capacity Color QR Codes," IEEE Transactions on Image Processing · April 2017
[2] Mrs.Princy ,Mrs. Jisney Thomas "Color Image Coding and Decoding in QR Codes" International Journal of Science Technology & Engineering Volume 1,Issue 10 ,April 2015
[3] A T. P. Ho, B. A. M. Hoang, W. Sawaya, and P. Bas, "Document authentication using graphical codes: Reliable performance analysis and channel optimization," vol, no. 1, p. 9, 2014.
[4] T. V. Bui, N. K. Vu, T. T. P. Nguyen, I. Echizen, and T. D. Nguyen "Robust message hiding for QR code" IEEE 10th Int. Conf.Intell. Inf. Hiding Multimedia Signal Process. (IIH-MSP), Aug. 2014.
[5] Kinjal H. Pandya 1, Hiren J. Galiyawala "A Survey on QR Codes: in context of Research and Application"IEEE India Conference 1 December 2014
[6] A. Sankara, "QR Codes and Security Solutions" International Journal of Computer Science and TelecommunicationsVolume 3, Issue 7, July 2012
[7] Baras and F. Cayre, "2D bar-codes for authentication: A security approach," 20th European Signal Processing Conference ,2012.
[8] R. Villán, S. Voloshynovskiy, O. Koval, F. Deguillaume, and T. Pun, "Tamper-proofing of electronic and printed text documents via robust

hashing and data-hiding," in Proc. SPIE, vol. 6505, p. 65051T, Feb. 2007

[9] Villán, S. Voloshynovskiy, O. Koval, and T. Pun, "Multilevel 2-D barcodes: Toward high-capacity storage modules for multimedia security and management," IEEE Trans. Inf. Forensics Security, vol. 1, no. 4,pp. 405–420, Dec. 2006.

[10] L. Yu, X. Niu, and S. Sun, "Print-and-scan model and the watermarking countermeasure," Image Vis. Comput., vol. 23, no. 9, pp. 807–814, 2000.

