Document Authentication using Two Level QR Code

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Abstract—The quick response (QR) code was designed for storage information and high-speed reading applications. In projected QR code authentication a pair of level storage is used, that facilitate to verify original content in QR code. Our projected work uses public and private storage level of document storage. Inside the general public level, same commonplace QR code storage level is explored; which can be legible to any QR code legible device. The private level is created by replacement the black modules by specific rough patches kind cowl image. It consists of knowledge encoded victimization q-r code with misreckoning correction capability. Q-R code will increase the storage capability of the QR code, but in addition to verify the initial document from a reproduction. This authentication is as result of the sensitivity of the used patches to the print-and-scan technique. Steganalytic formula is not ostensibly to defeat our steganographic approach. Third, the reversible capability heritable from our theme provides utility that allows recovery of the availability texture. We have a tendency to tend to weave texture synthesis technique into steganography for concealing secret in image.

Key words: QR Code, Two Storage Levels, Private Message, Document Authentication, Pattern Recognition, Print-And-Scan Process

I. INTRODUCTION

Today graphical codes like EAN-13 barcode, fast Response (QR) code, DataMatrix, PDF417, area unit of utilized in our daily lives. These codes have an enormous range of applications including info storage (advertising, repository art description), redirection to internet sites, track and trace (for transportation tickets or brands), identification (flight rider info, grocery products) etc. The QR code was fancied for the japanese automotive business by Denso Wave1 Corporation in 1994. The foremost vital characteristics of this code area unit tiny output signal size and high-speed reading method. Today, forty QR code versions area unit on the market with very different storage capacities. The littleset QR code version (version V1) features a 21 × 21 module size. It will store 152 bits of data at the bottom correction level. The largest QR code version (version V40) features a 177 × 177 module size. It will store a most of 7089 bits of data at its lowest correction level. A QR code encodes the knowledge into binary kind. Every info bit is diagrammatic by a black or a white module.

As illustrated in Fig. 1, the QR code encompasses a specific structure for geometrical correction and high-speed cryptography. Three position tags square measure used for QR code detection and orientation correction. One or a lot of alignment patterns square measure accustomed code deformation adjustment. The module coordinates square measure set by temporal order patterns. What is more, the format data areas contain error correction level and mask pattern. The code version and error correction bits square measure hold on within the version data areas. The popularity of QR codes is especially thanks to the subsequent features:

- QR code sturdy to the repeating method,
- It is straightforward to browse by any device and any user,
- It has high encryption capability increased by error correction facilities,
- It is in tiny size and sturdy to geometrical distortion.

However, those simple benefits even have their counterparts:

a) Data encoded in an exceedingly QR code is accessible to each user simply, although it is encoded.
b) It is tough to classify original content from duplicate file content thanks to print and scan feature.
c) It’s not possible to differentiate associate originally written QR code from its copy thanks to their unfitness to the Print-and-Scan (P&S) method.

II. LITERATURE SURVEY

J. Rouillard, “Contextual QR codes,” [1] Author studied and proposed under the name of contextual QR code. It relates to the static QR code information with a particular context. The authors developed a specific application, which takes into account the individual users parameters (time, device type, IP address, location) in order to personalize (add the name of a user, change the language) an output message and to transmit user information into a server database.

M. Querini and G. F. Italiano, “Facial biometrics for 2D barcodes,” [2] Author proposed Two D barcode and the most popular enrichment is the stored capacity improvement. The HCC2D code is a rich QR code, which significantly increases the storage capacity of the standard QR code. The authors increased the density and storage capacity of standard QR code by replacing binary colored modules by RGB colored modules. The HCC2D code encodes information using 4, 8 or 16 module colors. This code inherits all the strong properties of standard QR codes, but it is not readable by a standard QR code reading application and needs to be printed using a color printer.

T. V. Bui, N. K. Vu, T. T. P. Nguyen, I. Echizen, and T. D. Nguyen, “Robust message hiding for QR code” [3] the QR code steganography, which aims to hide secret message into a QR code, was introduced. The authors suggest
to insert the secret message by using the error correction capacity of the QR code. That means, they changed the bits encoded in the standard QR code, and inserted errors into it. In this case, the secret message does not disturb the reading process of the QR code message, but the error capacity of QR code is low. The maximum secret message length, mentioned in this paper, is equal to 1215 bytes for QR code V40. There are also some approaches that embed an invisible watermark into the QR code image.

R. Villán, S. Voloshynovskiy, Y. Koval, F. Deguillaume, and T. Pun, “Tamper-proofing of electronic and printed text documents via robust hashing and data-hiding,” [4] proposed interesting rich graphical codes. The multilevel 2D barcode significantly improves the storage capacity of 2D code. The authors proposed to use one halftone cell to represent one multilevel 2D symbol. Only the black-and-white (B&W) halftone printers and low resolution CDD-based scanners (up to 600 dpi) were used for their experiments. It was discovered that the rate of encoded version of multilevel 2D barcode is approximately 261 byte/cm² at a bit error rate of $4 \times 10^{-2}$ in comparison with the rate of DataMatrix, which approximately equals to 58 byte/cm².

T. Langlotz and O. Bimber, “Unsynchronized 4D barcodes,” [5] proposed and studied The rich DataMatrix code, named unsynchronized 4D barcode, increases the storage capacity by using RGB colors of modules and time. It consists of the 9 coloredDataMatrix codes displayed in sequence on the screen. The particular color reference surrounds the DataMatrix and changes for each of 9 dataMatrix codes. This code has good storage capacity improvements, but it cannot be printed. The storage capacity is a transmission capacity and achieves 1400 characters per minute (23 characters per second) the success rate equals to 82%. This code is not readable by standard DataMatrix reading application.

J. Picard, “Digital authentication with copy-detection patterns,” [6] proposed the graphical code used is the copy detection pattern which is a maximum entropy image, generated using a secret key, password or random seed. The authentication process is performed by the comparison of an original graphical code with the P&S graphical code embedded in the document. If the difference among these images is less than threshold $\lambda$, then this graphical code and document are authentic.

III. SYSTEM DESCRIPTION

Proposed system uses two levels QR for data hiding. This 2LQR code has following levels
a) Public level
b) Private level.

The public level QR code will scan text or document simply with reader, however the non-public level desires a selected device with encoded data. This 2LQR code is used for personal message sharing or for authentication mechanism. The non-public level is formed by exchange black modules with rough patches from cowl image. These rough patches area unit thought of as black modules by commonplace QR code reader. So non-public level is hidden to QR code readers, propose system for personal level doesn’t have an effect on in anyway the scanning public information of the general public level. The planned 2LQR code will increase the storage capability of the classical QR code thanks to its supplementary reading level. The storage capability of the 2LQR code is improved by increasing the amount of rough patches used or by decreasing the rough patches size. Cowl image to cover messages, our rule hide the supply texture image and embeds secret messages through the method of texture synthesis. This enables United States of America to extract secret messages and also the supply texture from a stego artificial texture.
V. APPLICATIONS
The fast response (QR) code was designed for storage data and high-speed reading applications. QR codes have come back an extended method since their creation. These days it have a variety of functions, together with transport ticketing, amusement, business pursuit, and product labeling/marketing. QR codes being used to send audiences to a web site for browsing, to bookmark a webpage, to initiate phone calls, send short messages, send emails, manufacture links’ to net URL’s, hook up with WI-FI networks, access data, get coupons, read videos, purchase things, method orders, advertise product, etc. Application situations for 2LQR code square measure principally centered on: a personal message sharing state of affairs and an authentication state of affairs. The most purpose of a personal message sharing state of affairs is that the invisible storage and transmission of personal data into QR code. In an exceedingly written document authentication state of affairs, it aims to verify whether or not the written document is an inspired or a replica.

VI. ANALYSIS
QR code analysis with exactness shows coding and recall shows coding accuracy level. Exactness shows QR image coding uses patches extraction level from cowl image for getting used as texture pattern for overlapping QR image. Texture re-synthesis shows that QR code coding by reversible texture on cowl image by image authentication.

VII. CONCLUSIONS
This 2LQR code may be used for secure non-public knowledge sharing for authentication mechanism. The non-public level is made by substitution black modules with specific rough patches. Image texture patches are thought of as black modules by QR code reader. In order that the non-public level is hidden to QR code readers, we tend to add the non-public level that does not have an effect on in anyway the reading method of the general public level. The projected 2LQR code will increase the storage capability of the classical QR code owing to its supplementary reading level. The storage capability of the 2LQR code may be improved by increasing the amount of rough patches used or by decreasing the rough patches size. Steganography a singular methodology of data activity techniques. It embeds messages into a number medium to hide secret messages thus as to not arouse suspicion by Associate in Nursing listener.

REFERENCES