

A Survey on Two level QR Code for Message sharing and Document authentication



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ABSTRACT

Quick response codes or QR codes are increasing their popularity as they appear in more places in the today's scenario. Quick Response Codes can be considered as physical hyperlinks that give the ability to users to access information, share messages and authenticate the documents. Apart from marketing, QR Codes have been also adopted in different areas such as the on-line payments. As the usage of QR codes is increasing day by day care must be taken while designing the QR code so that there arent any issues regarding its security and privacy. In this paper we have proposed a technique known as 2 level QR code which consists of two layers of security provided to the QR code. The first level is known as public level and the second level is known as private level. We will be using Reed Solomon algorithm. Our two level architecture is capable enough to provide ample security and privacy as far as private message sharing and document authentication are concerned. In this paper we have studied various state of the art existing techniques of designing QR code along with their comparison with the our proposed 2 level QR code technique.

Keywords- QR Code; Reed solomon.

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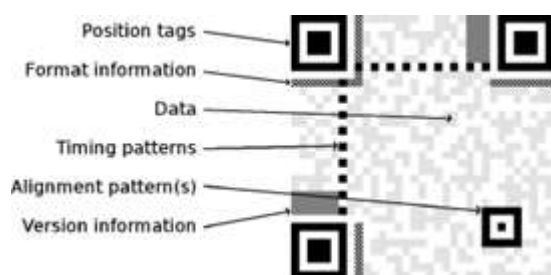
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I. INTRODUCTION

The Quick response codes or QR codes are basically a two dimensional bar codes which are used day by day due to the technological advancements [1]. These codes have plenty of applications. To name a few, these QR codes can be used for storing information (advertising, museum art description), web site redirecting, tracking and tracing (for transportation tickets or brands), Entity identification (passenger information, super- market products), Uniform resource locator, Code payments, Virtual stores, Website login, Message sharing and document authentication. QR code is also known as matrix barcode. QR code was invented by Denso Wave in Japan while working for automotive industry. Due to the technological advancements there are plenty of QR codes which are being used in the market. As a result of which the demand for QR code scanners has also increased proportionally. The popularity of QR code is due to its robustness, easy to read feature, higher encoding capacity and small size. Although it has many advantages but still has many downsides to be improved upon most common disadvantages are: It is easily accessible to anyone even if it is ciphered and it is very difficult to distinguish between the originally generated

QR code with its photocopy. So, in order to intrude the QR code, any third person can retrieve the information with the help of a standard QR code scanner. As far as message sharing and document authentication are concerned the security of the QR code is our highest priority. In order to overcome these shortcomings we have proposed a Two level QR code with enhanced encoding technique. This enhancement is achieved by using textures patterns in place of black modules. These patterns are sensitive to the distortions created while printing and scanning process. Our proposed technique also lays emphasis on storage capacity apart from security and privacy. Our proposed system consists of a public level QR code and a private level QR code. The public level QR code can be accessed with the help of any standard QR code scanner whereas the private level QR code cannot be accessed from any standard QR scanner. Hence it provides a level of security against any possible intrusion to greater extent. The first level keeps the strong characteristics of the QR code whereas the second level improves the storage capacity of the QR code. This paper is as follows: we start with the overview of QR codes and in the subsequent sections we will be mainly exploring the state of the art existing techniques along with the

proposed technique. And at the end we will compare our technique with the existing techniques.



In this review paper, we have tried to identify the different approaches for emotion recognition and also the amount of work that is done on emotion recognition till date. An increase of interest in this subject among the computing community has been noted. The IEEE, ACM and Science Direct are considered to be one of the most important origins of literature related to the latest trend and work done in the field of computation. On searching for the documents containing the word emotion in these libraries, we have found that there is an increasing amount of work done related to emotion. Increasing interest in researchers about emotion can be seen by following graph shown in Fig. 1.

The general layout of this paper is as follows: Section II discusses the various state of the art existing techniques of QR code generation for message sharing and document authentication. It consists of the description of various techniques such as: Contextual QR, QR steganography and copy detection pattern QR code. Section III deals with the proposed technique of two level QR code. Section IV deals with the comparison of the existing technique with the state of the art existing techniques. Finally, in Section V some conclusions are discussed.

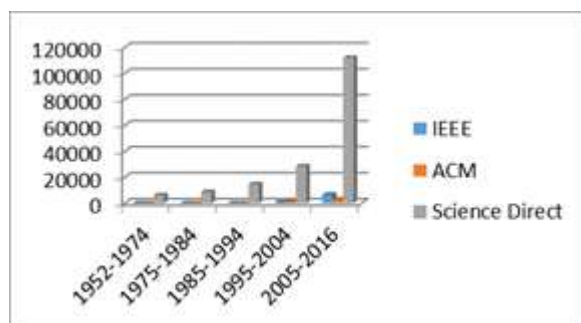


Fig. 1. Graph of work done till date using keyword “Emotion” on IEEE, ACM, and Science Direct

II. LITERATURE SURVEY

M. Querini, et al has invented “2D color barcodes for mobile phones,” In 2011. Barcodes are optical machine readable representation of data, capable of storing digital information about the physical object to which they are attached. Due to their reading speed, accuracy, and functional characteristic, barcodes have become ubiquitous in many applications. R. Kakarala, et al has invented “Visually significant QR codes: Image blending and statistical analysis,” in Jul. 2013 QR codes are widely used as a means of conveying textual information, such as emails, hyperlink, or phone numbers, through images that are interpreted using a smart phone camera. T. V. Bui, et al has invented “Robust message

hiding for QR code,” in Aug. 2014 The concepts of QR code is an automatic method to hide information using QR codes and to embed QR codes into color images with bounded probability of detection error.

Robust picture hashing Author: R. Venkatesan, S.- M. Koon, M. H. Jakubowski, and P. Moulin Portrayal: In [7], creator presents a novel count that uses a wavelet representation of pictures and new randomized get ready frameworks for hashing. They presented a photo hashing computation that progressions over pictures into short, generous piece strings. Using this figuring, can consider two pictures by checking no great strings for clear correspondence, rather than trying the substantially more included issue of taking a gander at “fluffy” picture data. Picture hashes were effective to various ambushes, including both normal picture planning and malignant twistings. The hashing figuring joins diverse musings from the fields of slip-up changing codes, and cryptography Wave Atom-Based QR Image Hashing Against Content- Preserving and Content-Altering Attacks Author: Fang Liu(&) and Lee-Ming Cheng In [8], Author have proposed a hashing arrangement in light of wave molecule change and randomized pixel change, which is fitting for picture content approval, picture database recuperation. The proposed computation can check the photos which have encountered essential substance secured picture get ready operations, for instance, weight, filtering, uproar development besides the geometric control. It is at the same time sensitive to poisonous upsetting the affirmation of system security. Instead of using routine change like DWT, DCT or other change, They have propose to use wave atom change for the sparser improvement and better qualities to think creation highlights when differentiated and others.

Geometric contortion strong picture hashing plan and its applications on duplicate location and verification Author: Chun-Shien Lu Chao-Yong Hsu In [9], The real impediment of the current media hashing innovations is their constrained imperviousness to geometric assaults. Creators have proposed a novel geometric mutilation invariant picture hashing arrangement, which can be used to perform copy area and substance confirmation of cutting edge pictures. a circumstance of copy ID and taking after is given to plan how a photo hashing system can be used to regulate modernized picture substance. Given a photo controlled by its creator, a photo copy revelation sys-tem prerequisites to find out whether illegal copies of the photo exist on the Internet and, if they exist, give back a summary of suspect URLs. This substance looking for approach can be capable by technique for picture hashing, and the yield of the hashing structure can offer proprietors information about unapproved usage of their significant media data. The hash database used for addressing and looking for can be understood a detached from the net way. As needs be, time is basically spent on cross area based hash period of a moving toward request picture. In any case, Their arrangement compensates for this cost by offering power against geometric twisting. A speedy organizing system has moreover been proposed to quicken looking for in a broad picture database.

A Model-based Image Steganography Method Using Watson’s Visual Model Author: Mohammad Fakhredanesh,

Reza Safabakhsh, and Mohammad Rahmati In [10], Author proposes to utilize Watson's visual model to improve perceptual impalpability of model-based steganography. The proposed system checks ostensibly perceivable changes in the midst of embedding. To begin with, the best satisfactory change in each discrete cosine change coefficient is removed in perspective of Watson's visual model. By then a model is fitted to a low exactness histogram of such coefficients and the message bits are encoded to this model. Finally, the encoded message bits are embedded in those coefficients whose most noteworthy possible changes are ostensibly imperceptible. Exploratory outcomes show that movements coming to fruition due to the proposed system are perceptually indistinct, however show based steganography holds perceptually discernable changes. Their Experimental outcomes show that the proposed methodology does not hold any recognizable change in the photo while the model-based strategy holds various noticeable changes in the stego pictures.

Image Authentication by Content Preserving Robust Image Hashing Using Local and Global Features Author: Lima S Sebastiana, Abraham Varghese, Manesh T In [11], Author proposes a picture hash which is made from Haralick and MOD-LBP highlights close by luminance and chrominance, which are prepared from Zernike minutes. Sender makes the hash from picture highlights and attaches it with the photo to be sent. The hash is poor down at the gatherer to take a gander at the validity of the photo. The system recognizes picture imposter and finds the fabricated zones of the photo. The proposed hash is solid to essential substance securing changes and delicate to poisonous controls. The proposed hash is proper to picture approval.

III. EXISTING TECHNIQUES

1) Contextual QR Code [2].

Contextual QR code is one of the most popular QR code used nowadays. Contextual QR code mainly uses the attributes or contexts while designing QR code. It is basically a type of static QR code which is related to a particular context while designing a QR code. Contextual QR code can be generated by giving various contexts or parameters as input such as time, location, IP address and device type for personalizing the output message by adding the name of the user or by changing the language and transfer user information and contexts along with the parameters to the server database. Contextual QR code is generated by taking user attributes into consideration. Contextual QR code mainly takes ubiquitous computing into consideration. Context aware QR code is capable enough to help filter information so that the relevant information under the right time at the right place is extracted. QR codes are used for context aware navigation. QR code also acts as a location source in which the physical location of the QR code is encoded inside a uniform resource locator. Context based QR code can also consider proximity apart from location. Proximity based QR codes can be very useful if the location of the user is very difficult to find. As far as private message sharing and document authentication is concerned contextual QR codes keeps a record of the various user attributes.

Very often, this change is related to privacy. For example, a privacy-aware proximity detection service determines if two mobile users are close to each other without requiring them to disclose their exact locations. Contextual QR can be used to collect database of so called Wi-Fi "fingerprints." Each fingerprint stores the description of the location and it also consists of the MAC addresses and the received signal strengths (RSSI) of nearby access points. This database could be used for Wi-Fi based positioning and historical records for fingerprints let us discover user's behavioral patterns.

2) QR Code Steganography[3]

Steganography is basically the process of hiding data into a secret message. The QR code steganography hides the information or secret message into the QR code. The message to be hidden is termed as the secret message is used after encoding it with the help of error correcting bits. This error correction capacity of the QR code helps to perform the steganography of the QR code. The secret message in the QR code does not disturb the reading process of the QR code as such. The error capacity of the QR code Steganography is very low. In Steganography QR code, the maximum secret message length is equal to 1215 Bytes for QR code version 40 ie; V40. We can also embed an invisible watermark in the QR code which acts as the secret message. For such embedded invisible watermarks, discrete cosine transformation and discrete wavelet transformation are used[4].

Encoding algorithm:

Step 1: Cover image is taken as an input.

Step 2: Generate the QR code with the secret code.

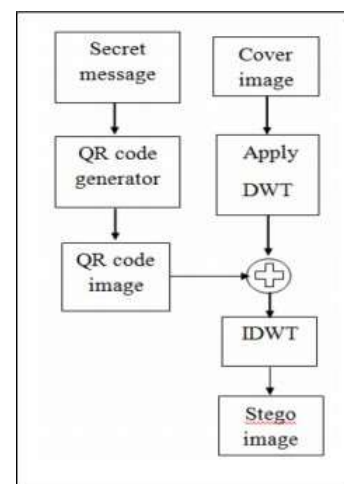
Step 3: Apply Discrete wavelet Transformation.

Step 4: Embed the QR code image on the cover image.

Step 5: Apply inverse discrete wavelet transformation.

Step 6: Steganographed QR code is generated.

3) Copy detection pattern QR code[5].



Encoding Model.

Copy detection pattern QR code is one of the most innovative and popular technique of QR generation. In this technique, with the help of secret key, password and random seed a maximum entropy image is generated which is used as a graphical QR code. This copy detection technique is most widely used for document authentication. The comparison of the original QR code along with the QR code present in the document is performed on the basis of which it is decided whether the document is authentic or not. After performing the comparison the difference is noted, and if the difference between these two QR code is more than a threshold value then we conclude that the document is not authentic and is tampered. In other words, the length of the message is given beforehand. This technique is even useful for removing the drawbacks created by performing the print and scan process, which distorts the original QR code.

IV. PROPOSED TECHNIQUE

The two level QR code which is the proposed technique provides a two level security to the QR code which is mainly focusing on message sharing and document authentication [6]. The first level is known as public level and the second level is known as private level. The public level QR code will store the information which can be shown publicly. The private level QR code will store the information which is secret and private. When this two level QR code is scanned from any standard QR scanner, only the public message will be shown from the scanner whereas the private message will be safe, secured and hidden.

V. CONCLUSION

In this a new rich code called two level QR (2LQR) code is proposed. This 2LQR code has two levels: a public level and a private level. The public level can be read by any QR code reading application, while the private level needs a specific application with specific input information. The proposed 2LQR code increases the storage capacity of the classical QR code due to its supplementary reading level. The storage capacity of the 2LQR code can be improved by increasing the number of textured patterns used or by decreasing the textured pattern size.

VI. REFERENCE

[1] Information Technology-Automatic Identification and Data Capture Techniques-Bar Code Symbolology-QR Code, ISO/IEC Standard 18004:2000, 2000.

[2] J. Rouillard, "Contextual QR codes," in Proc. IEEE 3rd Int. Multi-Conf. Comput. Global Inf. Technol. (ICCGI), Jul./Aug. 2008, pp. 5055.

[3] T. V. Bui, N. K. Vu, T. T. P. Nguyen, I. Echizen, and T. D. Nguyen, "Robust message hiding for QR code," in Proc. IEEE 10th Int. Conf.

[4] P.-Y. Lin, Y.-H. Chen, E. J.-L. Lu, and P.-J. Chen, "Secret hiding mechanism using QR barcode," in Proc. IEEE Int. Conf. Signal-Image Technol. Internet-Based Syst. (SITIS), Dec. 2013, pp. 2225..

[5] J. Picard, "Digital authentication with copy-detection patterns," Proc. SPIE, vol. 5310, pp. 176183, Jun. 2004.

[6] Iuliia Tkachenko, William Puech, Senior Member, IEEE, Christophe Destruel, Olivier Strauss, Jean-Marc Gaudin, and Christian Guichard, "Two-Level QR Code for Private Message Sharing and Document Authentication," IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, VOL. 11, NO. 3, MARCH 2016

[7] ISO/IEC 15420:2009. Information technology - Automatic identification and data capture techniques - EAN/UPC bar code symbology

[8] ISO/IEC 16022:2006. Information technology - Automatic identification and data capture techniques - Data Matrix bar code symbology specification. 2006.

[9] ISO/IEC 18004:2000. Information technology - Automatic identification and data capture techniques - Bar code symbology - QR Code. 2000.

[10] Z. Baharav and R. Kakarala. Visually significant QR codes: Image blending and statistical analysis. In Multimedia and Expo (ICME), 2013 IEEE International Conference on, pages 16. IEEE, 2013.

[11] C. Baras and F. Cayre. 2D bar-codes for authentication: A security approach. In Signal Processing Conference (EUSIPCO), Proceedings of the 20th European, pages 17601766, 2012.