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Cloud Based QR Code for Confidential Message

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Abstract. The QR code was created to be used for data storage and high-speed reading applications. QR codes are used to connect important world products that have been tagged with a QR code to the internet. A new QR code with two storage cloud layers is proposed: a private cloud and a public cloud. The private cloud is imperceptible to typical QR code perusers. It can also be utilized for archive verification. It comprises data encoded utilizing QR code with a blunder revision limit, which assists with further developing the first record from a duplicate and the QR code storage limit. The public cloud is, in many cases, perused by many. While the public level is created by replacing dark modules with clear finished designs, the private level is created by replacing dark modules with clear finished designs. This confirmation is addressed by being aware of the print-and-scan process's used finish. The acknowledgement method is commonly used in both private message exchange and confirmation situations. The capacity limit is frequently worked on by increasing the number of code letters in order Q or increasing the size of a two-level QR code for secret messages. When the coding alphabet QR is increased or the pattern size is increased, the storage capacity is frequently significantly increased.

Keywords: QR code, Cloud, Confidential, Message

1 Introduction

Cloud computing is a model for delivering simple, on-demand access to a shared pool of computing resources from anywhere. Examples include servers, storage, networking, applications, and services that can be provisioned and deployed fast and easily [1]. The cloud model has five distinct characteristics. Self-Service on Demand: This allows users to swiftly and automatically acquire access to IT resources without the need for extra human interaction. SaaS, PaaS, and IaaS are three different forms of cloud data [2]. SaaS (Software as a service) allows users to access an application without having to manage or control the cloud infrastructure. PaaS (Platform as a Service) is a software development environment that allows customers to create their own cloud apps using programming languages, libraries, services, and tools. These apps are controlled by the user without the need to manage or control the underlying cloud infrastructure. Cloud is the most common perception. Is Infrastructure as a service, or IaaS, allows users to deploy entire computing capabilities, including processing, storage, and networks, rapidly and efficiently without having to maintain or control the underlying cloud infrastructure. In cloud computing, authentication is a crucial step [3]. In public storage, data security is a major issue. Customers with limited computational resources can use cloud computing to outsource their huge computational tasks to the cloud and benefit from massive processing power, bandwidth, storage, and even relevant software that can be shared on a pay-per-use basis. From the perspective of cloud customers, seeing the cloud as an inherently insecure computing platform. The ubiquity of QR codes is because of the accompanying elements: they are not difficult to duplicate and peruse by any gadget; they have a high encoding limit upgraded by mistake adjustment highlights; they have a little size and are vigorous to mathematical mutilations [4]. Those unquestionable benefits, on the other hand, come at a price: 1) A message encoded in a QR code is always accessible to everyone, even if it is encrypted and hence only accessible to authorized users. 2) It's impossible to tell the difference between an original printed QR code and a copy due to the insensitivity of the Print-and-Scan process. We propose in this paper that the conventional QR code encoding capacity be enhanced to address these issues. The black modules are replaced with unique textured patterns to achieve this enrichment. These patterns can be engineered to be sensitive to distortions caused by print and scan processes, in addition to the increased storage capacity. The normal

reading process is unaffected by these patterns. As a result, the public information is always accessible, even if the private information is degraded or lost in the copy. The suggested two-level QR code has a first level that can be read by any conventional QR code reader, thus it retains the usual QR code's characteristics, and a second level that enhances the normal QR code's capabilities and features. The second level's data is encoded using a q-array code with error correction. Because the textured patterns are perceived as black modules, this information is obscured by a standard QR code reader. As a result, the second level can be utilized to send and receive confidential messages. An application for the private level is required. This two layer QR code can be utilized in authentication and private message sharing settings. Replace black modules with specific textured patterns and private messages to create the private level. Version data, format data, data and error correction keys, and patterns are all included in the QR code.

2 Literature Review

QR codes are images that are interpreted by a camera and are used to send text information such as emails or phone numbers. This research shows how picture merging can be used to produce visually huge QR codes. Images as diverse as company logos and family portraits can be incorporated in full color into the code using this method. The goal of this study is to describe a statistically validated approach for mixing color images into QR codes in order to improve their visual impact [5]. Authentication of real-world commodities with 2nd barcodes (2D-BC) and consideration of the opponent's perspective. It is assumed that the opponent has access to Nc noisy copies of a real 2D-BC. A simple estimator of 2D-BC based copy averages is proposed, allowing the opponent to print a phony 2D-BC in the hopes of the system detecting declaring it genuine [6]. It has been demonstrated that the adversary can make fake duplicates that successfully mislead the detector using a small number of genuine products. An opponent's goal in this case is to build phony 2D-BCs that the detector declares real, whereas the goods manufacturer's goal is to make such a reproduction difficult or impossible. This issue is addressed using a security method based on research in digital watermarking [7]. The two key issues are storing the actual content of a QR code and encoding sensitive information into it. The technique for concealing secret information is extremely vulnerable to assault. If an attacker modifies any hidden data, recovering the secret information becomes extremely difficult or impossible. This study suggests a solution to the problem. The main goal is to develop methods for hiding a secret message in a QR code. The private communication is hidden from attackers and protected from change or harm.

3 System Proposed

For data concealing, the suggested method employs a two-level QR scheme.
The tiers of this two-level QR code are as follows:

3.1 Private Cloud Message

The suggested two-level QR code has two levels: a first level that can be read by any conventional QR code reader and so retains the QR code's strong features; and a second level that increases the capabilities and characteristics of the first QR code. To ensure message error correction following the P & S operation, the private row-bit string is encoded using an error correction code (ECC). It encodes messages with block codes. By enhancing the typical QR code encoding capabilities, several flaws can be addressed. This enrichment is achieved by swapping out the black modules for patterns. These designs can be engineered to be sensitive to print and scan process aberrations as storage capacity increases. These do not obstruct normal reading and are always recognized as black modules by any QR code scanner. As a result, public information is usually accessible for reading, even if private information is damaged or lost inside the copy.

3.2 Public Cloud Message

The normal QR code contains the public message. The steps in the conventional QR code creation algorithm are as follows: To start, the most proper mode (numeric, alphanumeric, byte, or) still up in the air by inspecting the message content. The public message is encoded utilizing the most brief series of pieces practical. 8-bit long data codewordsare created from this string of bits.

4 Generation QR Codes in Cloud

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The suggested system includes several processes for storing and retrieving data in a cloud computing environment. First, secure random number generation is utilized to generate a unique key for each user. Following that, homomorphic authentication is used to encrypt the uploaded file, which is then paired with the QR code. This set of encryption codes is spread among servers. The user is provided a key at the time of download. If the key is correct, data is downloaded from servers. Before being shown to the user, the data is combined and decrypted. Flowchart in figure 1.

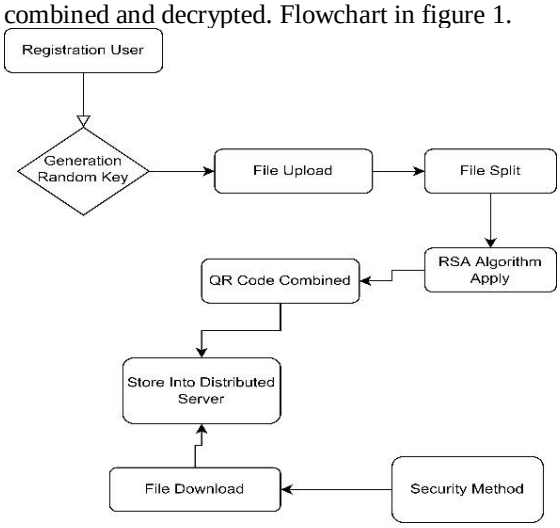

Fig. 1. Flowchart

The 2 step QR code has a similar design by way of the typical QR code and comprises of position labels, arrangement designs, timing examples, adaptation and configuration designs. Nonetheless, the typical QR code has silver and dark modules, and the 2-level QR code has silver modules and finished modules over the dark module. This substitution of dark modules by finished modules doesn't disturb the ordinary QR code understanding interaction. In any case, it assists with having a subsequent stockpiling level that is undetectable toward the ordinary QR code peruser. Subsequent level holds the private message that has been encoded with QR-exhibit (QR ≥ 2) code with blunder amendment limit. This substitution of dark modules by finished modules doesn't influence the ordinary QR code understanding cycle. In any case, it permits to take a subsequent stockpiling level, which is imperceptible to the typical QR code peruser. These finished examples have explicit elements and are utilized for private message tockpiling in the new two step QR code. In the private message distribution technique, the dark modules of the QR code are likewise supplanted by designs. The beneath figure 2 shows the fundamental construction of the two step QR age process.

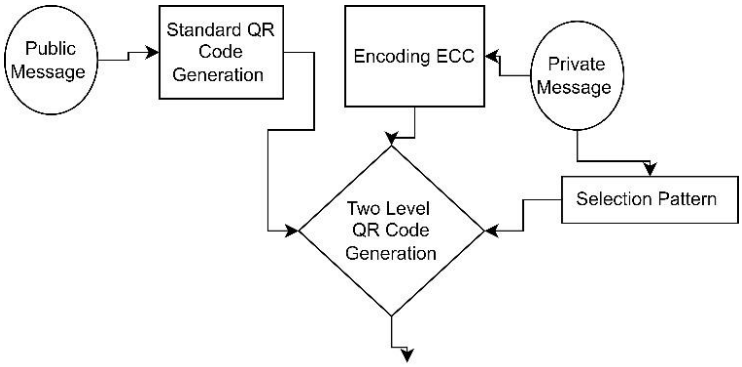

Fig. 2. Flowchart

5 Application of Two Layer QR in the Cloud

The QR code was made for data capacity and speedy understanding applications. Since its inception, QR codes have gone a long way. It serves a variety of functions, including commercial tracking, product labeling, marketing, and movie ticketing. QR codes are increasingly being used to direct audiences to a website for

browsing, bookmarking, sending emails, making phone calls, sending messages, creating links to web URLs, associating with WI-FI organizations, getting to data, getting coupons, seeing recordings, buying things, handling orders, publicizing items, etc. The two primary application situations for two layer QR code are a mystery message sharing situation and a validation circumstance. The crucial objective of a mystery message sharing situation is to store and send private data into QR codes undetectably.

6 Test Study

Because the storage capacity of private messages was low in the first trial, we boosted it by adding a pattern. The storage capacity was low before the pattern was added. The QR code has a capacity of 272 bits after adding the pattern. On the decoding side, the message was successfully decoded without any problems in every attempt, and the pattern size varied depending on the QR code size, but this had no effect on the typical public message scanning procedure. Because it can only be read by the relevant program, the private message was secured and was not exposed during the standard scanning procedure.

7 Conclusion

As a result, we suggest that using QR for conveying secret communications is a good strategy that may be adopted in cloud computing to avoid the cloud problem and improve security. The application of new technologies to increase the speed of data access from the cloud environment is a future enhancement of this study.

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