

Design and Implementation of Secure QR Payment System based on Visual Cryptography

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ABSTRACT

In this paper, we will describe the design and implementation of a secure payment system based on QR codes. These QR codes have been extensively used in recent years since they speed up the payment process and provide users with ultimate convenience. However, as convenient as they may sound, QR-based online payment systems are vulnerable to different types of attacks. Therefore, transaction processing needs to be secure enough to protect the integrity and confidentiality of every payment process. Moreover, the online payment system must provide authenticity for both the sender and receiver of each transaction. In this paper, the security of the proposed QR-based system is provided using visual cryptography. The proposed system consists of a web application that implements visual cryptography. The application provides a simple and user-friendly interface for users to share links through QR Code.

Keywords: - QR Codes, Image Cryptography

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I. INTRODUCTION

A QR code is a two-dimensional matrix barcode that encodes and stores large amounts of data. Due to their speed and convenience, QR codes have been used extensively in many vital applications such as health, education, and finance. A number of secure QR-based online payment systems have been proposed in literature. In different payment models each providing different levels of speed and security have been presented. These models include the Operator Centric Model and the Peer-To-Peer Model. As digital image play an important role in multimedia

technology, it becomes more important. for the user's to maintain privacy. And to provide such security and privacy to the user, image encryption is very important to protect from any unauthorised user access. Image encryption has applications in various fields including internet communication, multimedia systems, medical imaging, Tele-medicine and military communication. Colour images are being transmitted and stored in large amount over the Internet and wireless networks, which take advantage of rapid development in multimedia and network technologies. The image encryption techniques are different from the data encryption techniques. And there several

security problems associated with digital image processing and transmissions, so it is necessary to maintain the integrity and the confidentiality of the image. Moreover digital images are comparatively less sensitive than data because any single change in the pixels of the does not change the entire image. In other words a small modification of digital image is acceptable compared to data but it is more prone to attackers.

II. Related Works

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy n company strength. Once these things r satisfied, ten next steps are to determine which operating system and language can be used for developing the tool. Once the programmers start building the tool the programmers need lot of external support. This support can be obtained from senior programmers, from book or from websites. Before building the system the above consideration are taken into account for developing the proposed system.

An Introduction to QR Code Technology: "Quick Response" code is a 2D matrix code that is designed by keeping two points under consideration, i.e. it must store large amount of data as compared to 1D barcodes and it must be decoded at high speed using any handheld device like phones. QR code provides high data storage capacity, fast scanning, omnidirectional readability, and many other advantages including, error-correction (so that damaged code can also be read successfully) and scode symbols like logo QR code, encrypted QR code, iQR Code are also available so that user can choose among them according to their need. Now these days, a QR code is applied in different application streams related to marketing, security, academics etc. and gain popularity at a really high pace. Day by day more

people are getting aware of this technology and use it accordingly. The popularity of QR code grows rapidly with the growth of smartphone users and thus the QR code is rapidly arriving at high levels of acceptance worldwide.

Summary: A "Quick Response" code is a 2D matrix code that is built with two goals in mind: it must hold a lot of data compared to 1D barcodes, and it must be decoded quickly using any handheld device like a phone. QR codes offer large data storage capacity, quick scanning, omnidirectional readability, and a variety of other benefits like as error correction (so that even damaged codes can be read successfully) and many versions. Different types of QR code symbols, such as logo QR code, encrypted QR code, and iQR Code, are also available, allowing users to select the best one for their needs. A QR code is now used in a variety of applications such as marketing, security, and academia, among others, and is rapidly gaining popularity. Every day, more people become aware of this technology and begin to use it appropriately.

A New Method for Cipherring a Message Using QR Code: In this paper, we have introduced a new data-hiding algorithm, where message is converted to QR code (Quick Response Code) and generate QR for mask (Key). QR Codes are mainly used to carry or store messages because they have higher or large storage capacity than any other normal conventional 'barcodes'. In the present work the authors have introduced the encryption technique by XORing part (series of bits) of QR message with the same part of QR mask (key) to encrypt any message and then embedding the key into the resulted QR. The resulted QR code may be sent to destination or may be saved for future use. In this encryption method authors have used bit-manipulation, byte-reshuffling and generalized this method. The cipherring method used here has been tested on different plain texts and it was found that the method is unbreakable using traditional cryptanalysis techniques like frequency

analysis, plain-text attack, Differential attack, Brute-force attack, etc. The data is encrypted using a symmetric key method, then inserted in QR code, so that data cannot be easily retrieved without adequate authorization / permission.

Summary: In this paper, we present a new data-hiding approach in which the message is converted to a QR code (Quick Response Code) and a QR for mask generation is generated (Key). Because QR Codes have a higher or larger storage capacity than other traditional 'barcodes,' they are primarily employed to carry or store messages. In this paper, the authors offer an encryption approach that encrypts any message by XORing a section (series of bits) of the QR message with the corresponding part of the QR mask (key) and then embedding the key into the resulting QR. The QR code generated can be transmitted to a destination or stored for later use. The creators of this encryption technology used bit manipulation, byte reshuffling, and generalized it.

The implementation of QR codes in the educational process: Spoofing attacks are one of the security traits that biometric recognition systems are proven to be vulnerable to. When spoofed, a biometric recognition system is bypassed by presenting a copy of the biometric evidence of a valid user. Among all biometric modalities, spoofing a face recognition system is particularly easy to perform: all that is needed is a simple photograph of the user. In this paper, we address the problem of detecting face spoofing attacks. In particular, we inspect the potential of texture features based on Local Binary Patterns (LBP) and their variations on three types of attacks: printed photographs, and photos and videos displayed on electronic screens of different sizes. For this purpose, we introduce REPLAY-ATTACK, a novel publicly available face spoofing database which contains all the mentioned types of attacks. We conclude that LBP, with ~15% Half Total Error Rate, show moderate discriminability when confronted

with a wide set of attack types. Spoofing attacks are one of the security traits that biometric recognition systems are proven to be vulnerable to. When spoofed, a biometric recognition system is bypassed by presenting a copy of the biometric evidence of a valid user. Among all biometric modalities, spoofing a face recognition system is particularly easy to perform: all that is needed is a simple photograph of the user. In this paper, we address the problem of detecting face spoofing attacks. In particular, we inspect the potential of texture features based on Local Binary Patterns (LBP) and their variations on three types of attacks: printed photographs, and photos and videos displayed on electronic screens of different sizes. For this purpose, we introduce REPLAY-ATTACK, a novel publicly available face spoofing database which contains all the mentioned types of attacks. We conclude that LBP, with ~15% Half Total Error Rate, show moderate discriminability when confronted with a wide set of attack types. Spoofing attacks are one of the security traits that biometric recognition systems are proven to be vulnerable to. When spoofed, a biometric recognition system is bypassed by presenting a copy of the biometric evidence of a valid user. Among all biometric modalities, spoofing a face recognition system is particularly easy to perform: all that is needed is a simple photograph of the user.

Quick Response (QR) codes are two-dimensional (2-D) barcodes that can contain information such as URL links (e.g. a link to YouTube video, website link) and text (e.g. contact details, product details). These square pattern codes consist of black modules on a white background. QR code generator is software that stores data (e.g. URL link, text, Google maps location) into a QR code. This encoded data can be decoded by scanning the QR code symbol with a mobile device that is equipped with a camera and a QR code reader software. QR codes have a number of purposes; they are mostly used in manufacturing (e.g. product traceability, process control, inventory and equipment

management), warehousing and logistics (e.g. item tracking), retailing (e.g. sales management), healthcare (e.g. medical records management, patient identification, equipment and device tracking), transportation (e.g. ticketing and boarding passes), office automation (e.g. document management), marketing and advertising (e.g. mobile marketing, electronic tickets, coupons, payments). This paper will describe various methods for the implementation of QR codes in the educational process. Experience from the School of Electrical Engineering in Zagreb shows that QR codes supports both independent and collaborative learning and can create an interactive learning environment.

Summary: QR codes are two-dimensional (2-D) barcodes that can hold data such as URL links (e.g., a link to a YouTube video or a website link) and text (e.g. contact details, product details). Black modules on a white background make up these square pattern codes. A QR code generator is software that converts data (such as a URL link, text, or the location of a location on Google Maps) into a QR code. Scanning the QR code symbol with a mobile device equipped with a camera and QR code reader software can decipher the encoded data.

Applying QR Code to Secure Medical Management: In this paper, we will describe the design and implementation of a secure payment system based on QR codes. These QR codes have been extensively used in recent years since they speed up the payment process and provide users with ultimate convenience. However, as convenient as they may sound, QR-based online payment systems are vulnerable to different types of attacks. Therefore, transaction processing needs to be secure enough to protect the integrity and confidentiality of every payment process. Moreover, the online payment system must provide authenticity for both the sender and receiver of each transaction. In this paper, the security of the proposed QR-based system is provided using visual cryptography. The

proposed system consists of a mobile application and a payment gateway server that implements visual cryptography. The application provides a simple and user-friendly interface for users to carry out payment transactions in user-friendly secure environment.

Summary: The design and implementation of a secure payment system based on QR codes will be described in this paper. Since they speed up the payment process and give consumers with optimum convenience, QR codes have been increasingly popular in recent years. QR-based online payment systems, as easy as they may appear, are subject to a variety of assaults. As a result, transaction processing must be sufficiently secure to ensure the integrity and secrecy of every payment transaction. Furthermore, the online payment system must ensure that both the sender and receiver of each transaction are valid. Visual cryptography is used in this paper to ensure the security of the suggested QR-based system. The suggested system consists of a mobile application and a visual cryptography-enabled payment gateway server. Users can conduct money transactions in a user-friendly and safe environment thanks to the application's simple and user-friendly interface.

A QR Code-Based on-Street Parking Fee Payment Mechanism: Quick response (QR) code is a convenient product for mobile phone users. People can use a smartphone camera to capture the code, and then decode it through a dedicated reader application. Specifically, that code stands for concise text, contact information, or a web hyperlink. Its existence assists phone users in keypad typing more easily. This paper proposes an on-street parking fee payment mechanism based on the QR code of an E-bill. People can regard the code as a bill to pay their parking fee, where the parking information is recorded into a remote server by the fee collectors. The main idea of this mechanism is to save on resources such as reducing paper consumption. Simulation results showed that the proposed mobile application provides

a new mode for E-bill payment for on-street parking in Taiwan. Furthermore, the said application also serves as an exemplary model for other parking payment methods

Summary:

For mobile phone users, a quick response (QR) code is a useful tool. A smartphone camera may be used to capture the code, which can then be decoded using a specialised reader programme. That code, in particular, denotes succinct text, contact information, or a web connection. Its presence makes it easier for phone users to type on the keypad. The QR code of an E-bill is used in this study to suggest an on-street parking fee payment mechanism. People can think of the code as a bill for paying their parking fee, with the fee collectors recording the parking details on a remote server. The major goal of this method is to conserve resources by lowering paper usage. The suggested smartphone application provides a new mechanism for E-bill payment for on-street parking in Taiwan, according to simulation results. In addition, the aforementioned application acts as a paradigm for various parking payment systems.

III. Methodology

Proposed system:

We propose a novel framework based on the image encryption and QR Code for sharing the links. First the url will be converted to QR Code and then the QR code will be encrypted and the url of the encrypted QR Code will be again converted to QR Code. This way the QR Code will be more secure even if we share the QR Code no one will be able to gain access to the actual url only those with image decryption program will be able to decrypt the QR Code and get to the link.

Advantages

- 1. More Secure

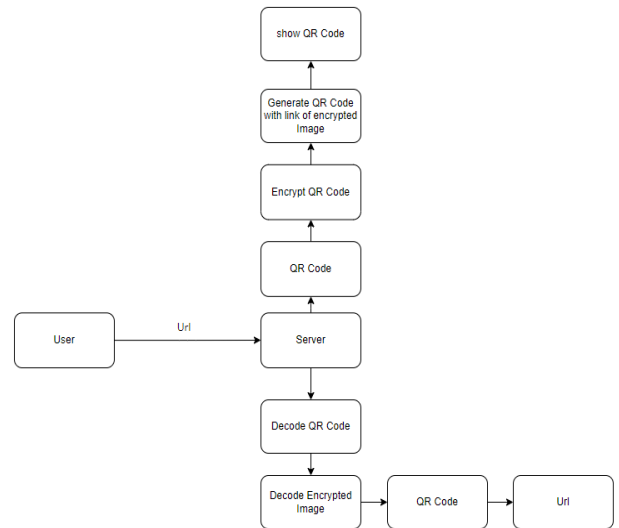


Fig 1 : Block Diagram

IV. Implementation

The project has implemented by using below listed algorithm.

1. Substitution Cipher

Hiding some data is known as encryption. When plain text is encrypted it becomes unreadable and is known as cipher text. In a Substitution cipher, any character of plain text from the given fixed set of characters is substituted by some other character from the same set depending on a key. For example with a shift of 1, A would be replaced by B, B would become C, and so on.

Customer environment or released into the market.

V. Results and Discussion

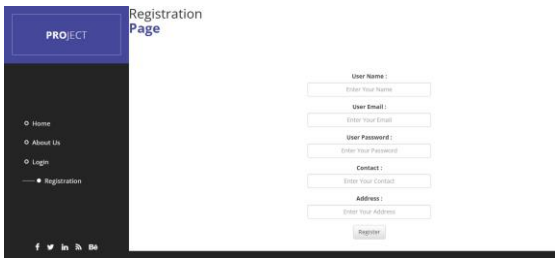
This page is the home page of Design and implementation of a secure QR payment system based on visual cryptography.



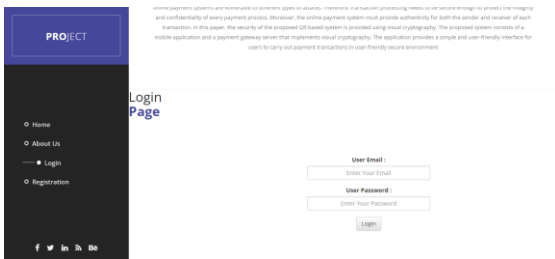
About page: This page describes the project briefly.



Registration page: User must register with required personal details.



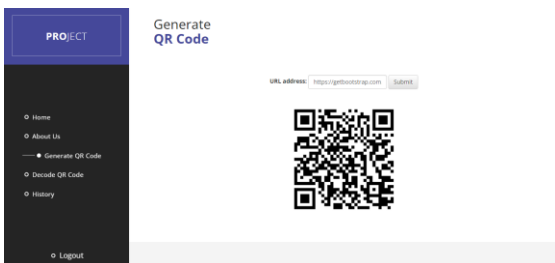
Login page: User must login with valid credentials.



User Home Page: After successful login user can view this home page.



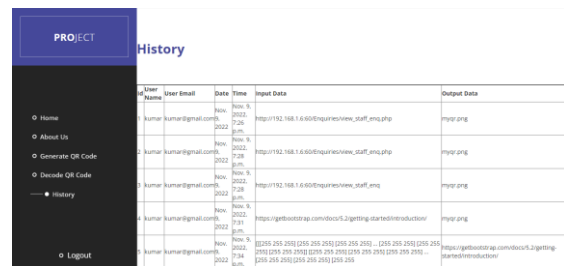
Generate QR Code: Here we can see the QR code generation process. We have to click on generate QR code.



Decode QR code: We have to select the decode QR code to get it works.



History: Here we can see the prediction where u can run the algorithm.



VI. CONCLUSION

In this paper, we proposed a secure QR Code sharing application and increased the security of links with image cryptography.

VII. REFERENCES

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