

PERPUSTAKAAN UMP



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CERTIFICATE AUTHENTICATION SYSTEM
USING QR CODE

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ABSTRACT

Due to the competitive situation in getting a good job, people tend to fraud their academic certificate. However, the origin authentication technique takes a long time to certify a certificate. Thus, in this paper, a certificate authentication system using QR code is developing for makeup easier way for authenticate certificate. This project is used SDLC to manage the development of system while QR technology is used to increase the usability and functionality of system. At the end of project, this system has effective reduction on the time taken for authenticate a certificate. By that, company does have a medium to check the originality of certificate easily.

Keyword: certificate authentication system, QR code

ABSTRACT

Oleh disebabkan keadaan yang berdaya saing dalam mendapatkan pekerjaan yang baik, ramai orang cenderung untuk penipuan sijil akademik mereka. Namun begitu, teknik asal sijil pengesahan mengambil masa yang lama untuk mengesahkan sijil. Oleh itu, dalam kajian ini, system pengesahan sijil menggunakan kod QR telah membangunkan untuk membuat cara yang lebih mudah untuk sijil sahkan ketulenannya. Projek ini digunakan SDLC untuk menguruskan pembangunan system manakala teknologi QR digunakan untuk meningkatkan kebolegunaan dan fungsi system. Pada akhir projek, system ini mempunyai pengurangan yang berkesan pada masa yang diambil untuk mengesahkan sijil. Oleh itu, syarikat mempunyai medium untuk memeriksa keaslian sijil dengan mudah.

Kata kunci: Sistem sijil pengesahan, kod QR

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Nowadays people obtain a certification as a proof that they have the knowledge in the related field. At present time, the companies process to certify a certificate take at least around 3 days [1]. However, some of the companies need a certificate for hiring but they take a shortcut without authenticating certificate with reason which the process needs take a long time. Apart from that, based on the research that has done state that the use of forged degree certificates in higher education has seen a rise in this last few years [2]. Due to that, in this project, a certificate authentication system using QR code will be developing to make people easier in authentication progress and help in solving the current issues.

On the other side, Quick Response Code (QR Code) system has become popular use in authentication method because it has fast readability and great storage capacity compare to other type of barcode. QR code is the trademark of a type of matrix barcode. It has error correction capability which is dirt and damage resistant and it also readable

from any direction in 360 degrees. The Quick Response aspects of the code make it a convenient way to serve up content to people on the go.

Hence, in this paper, it is proposed a QR code with certification method by cryptology. The effectiveness of the certification authentication system is ensured based on the information stored in the QR code generated that printed on the certification. A QR reader application can be appear to be essential because it needed to scan QR code in order to obtain the information that stored in the code which is able to checking the authentication of the certification.

1.2 Problem Statement

At the present time, for the consumer when they want to checking the authentication of certain certification, they need to authenticate the signature in that certification which takes up to at least 3 days for identification of signer due to process of authentication[1]. So, due to that, it has to led to produce research as authentication tools with the ability to help users. Besides that, we as a human may run away from mistake, not to mention in authenticate certificate especially for employer when hiring.

Apart from that, based on the research that had done the last few years have seen a rise in the use forged degree certificates in higher education [2]. In addition, companies need a certificate and cannot bother to go through the process of authentication of certificate, so they take a shortcut. This action has causes the population of unemployed person who is exactly own a certificate increase. At the same time, it is unfair for them who had work hard for many years to get a certificate compare to those who do not invest anything.

1.3 Objective

The general objectives of this project are as follows:

- i. To study the QR code technology for document authentication process
- ii. To develop a certificate authentication system using QR code
- iii. To evaluate the functionality of the document authentication system

1.4 Scope

- i. Target user
The target user of this system is the employers who will be the person to check authentication of certificate.
- ii. Certificate
The information of certificate of the first degree student will be use for data entry that store inside a database in specific website. Then the link of the data stored will be embedding into QR code.
- iii. Retrieves data
QR reader is use to scan and decode to retrieve the input data from that particular website.
- iv. Language
This system will be developing by using C# programming language.

1.5 Summary

Quick Response Codes have become a part of our daily lives. It has been used in local public area. The main aspect is that the potential of QR code use as additional features for verifying the validity and up to datedness of certification documents. Especially for the current issue such as forged certificate, QR code with degree certificate is the most effective way to reduce the forged certificate issue.

In this project, a system will be developing for storing data information in database in order to generate the link into QR code and embed in to the certificate. QR reader which can decode the code, can be used to get the original data from the link for verify information about the validity of certificate in real time.

By this help, the forged certificates, which have repeatedly been identified as cause of fraud, can now be easily detected. The involved distributors and employers can minimize their risk of becoming the victims of criminal activity. It is also to the benefit of inspection and certification bodies that can use the QR code technology to ensure that certificates issued by them are protected against forgery.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Encryption changes data or information that is normally plaintext through the usage of an algorithm so that someone must possess certain knowledge to access it. This special knowledge is normally called a key. For example, something is encrypted if someone must enter a password to access it. Quick Response codes (QR codes) can be considered as encrypted messages; after all no human eye is able to decode it. Thus, the functionality of QR codes is so versatile that they have been used by so many people for a myriad of reasons, and list only continues to grow and expand across a number of industries. They are not very common, since most QR codes are used in marketing, and the developers of those codes want them to be accessible by everyone.

In Japan, the immigration department has used encrypted QR codes on visas [3]. The secure QR codes can be made that make the scanner enter a password to be able to access the content. This is a good idea to make secure QR codes for people use in immigrations. This means other than the immigration department that for check in and out, people cannot see decode the QR code without the password. Obviously, the

security level of QR codes is very high although simple encryption systems may be involved.

Apart from that, applications that already exist are to use encrypted QR codes on products packaging, advertising, in show window display and more for business marketing. This application is built for customer guarantees that any copyrights to any components of products, designs, trademarks that are employed for inclusion in the custom QR codes are either owned by customer.

.In recent years, certificate authentication system using QR code was developed to increase the security of certificate. In this certificate authentication system, the information that encrypted in the QR codes needs to be decoded by using QR reader applications. Then the scanned QR code in the application are processed by using various techniques of image processing such as cryptography, morphological, stenography, image subtraction, watermark and etc to get the information of certificate from the QR code in order to check the authentication of cert. Then based on the information the authentication of certificate is checked.

2.2 Previous System

The project is mainly focus on the basic certificate authentication in QR code technology. The first previous system is according to the research Sir Revathi provides a new enhancing security in identity documents using QR code [4]. The main focus of this system is they want to use QR code to perform checking authentication of documents such as certificates. In this research it focuses on using personal detail information of an individual to embed into QR code. The personal detail information

such as the name of the person, date of birth, register number, and nationality which are used for generate the QR code.

In this system, there have few steps in encode procedure of QR code. Firstly, input data is encoded in according to most efficient mode and formed bit stream. The bit streams are divided into code words. Then code words are divided into blocks, and add error correction code words to each block. All these code words are put into a matrix and are masked with mask pattern. Finally function patterns are added into the QR symbol. A QR Code symbol is formed.

The second previous system is according to the latest product of Intact.Inc Company which is named as Easy-Cert (Ecert) with built-in authentication [5]. This system applies a certificate authentication system with QR code technology. In this system, it focuses on using image of the certificate to generate into QR code. Ecert system consists of two process which are sender process and receiver process.

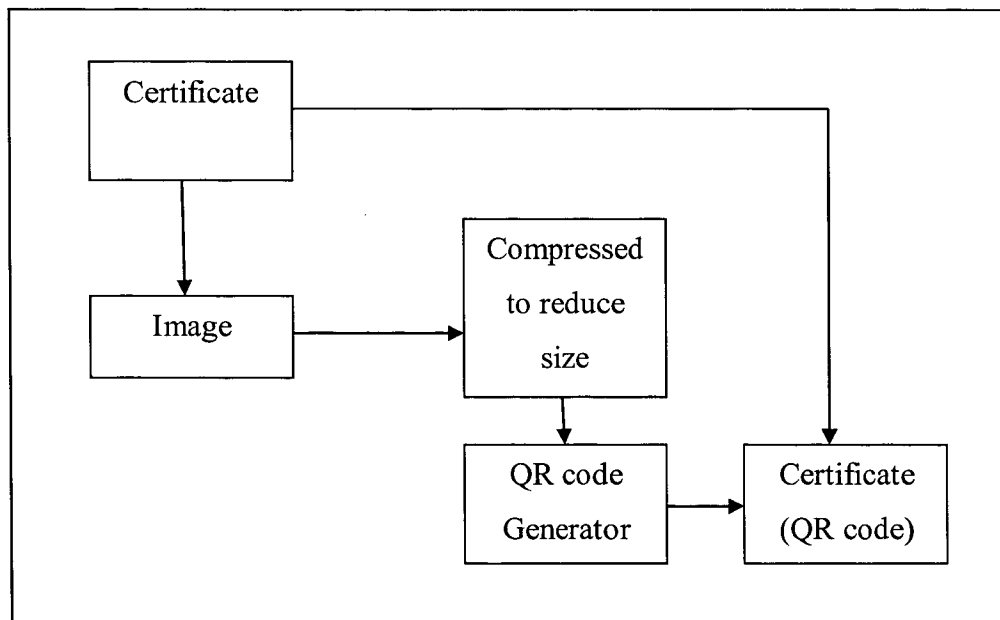


Figure 2.1: The simplified process of the sender

In the figure 2.1 above shows the simplified process of the sender in Ecert system. Firstly, the certificate is generated into image form such as JPEG and GIF. After that, the image of certificate is compressed to reduce size so that it can be stored in a QR code. Then the compressed image of certificate is encrypted to form QR code by using QR code generator. In the final step, the QR code is printed on to paper-based certificate after the QR code has been created.

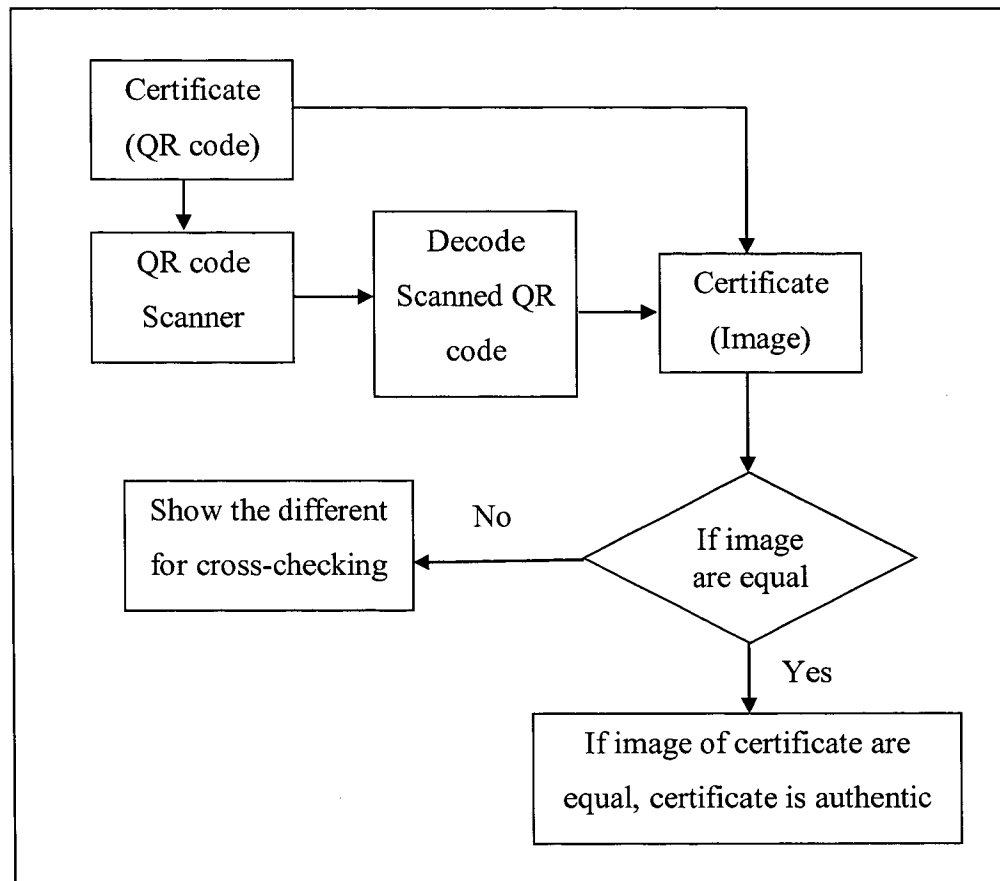


Figure 2.2: The simplified process of the receiver

In figure 2.2 shows the simplified process of receiver, when a receiver obtains the document from a sender, user may verify the authenticity of document by scanning the document and processing the image. In the first step, the verification process starts

with checking the integrity of the information stored in the QR code. Next, the information in the QR code that consists of the image of the certificate is compressed. After scanning the QR code and uncompressing the encrypted data, the certificate can be verified by comparing the image from the QR code and the hand-in certificate. Thus, if both values are identical, the certificate is valid.

The third previous system is according to the research of Kim and Jun, it applies method of QR code recognition, password method, existing user authentication technique and etc to develop a new user authentication technique. This research is proposed user authentication technique by using QR code which is able read by QR reader application on smart phones and transmitted into a server. The main focus on the research is to simplified and implement a more secure process of authentication and also contract to the disadvantages such as keyboard hacking which may occur in other authentication techniques.

2.3 Table Of Comparison

The table 2.1 below shows the comparison between the three previous systems.

Table 2.1: The comparison of previous systems

Name of author	Name of system	Method used in system
Revathi M K (201	Identification Document w QR code	The personal detail information of individual embeds into QR code identify the documents.
Intact.Inc	Easy-Cert (Ecert)	The image of the certificate

		compressed small size to encode the QR code for authentication certification.
Kim and Jun (201	User Authentication System Using QR code Identifying Method	Password method is used to generate QR code for can user authentication purpose.

2.4 Certificate Authentication System Using QR code Technique

According to the previous system and research, the project is mainly focus on the basic QR code technology. Under the same techniques of QR code, the certificate authentication system with QR code also can be implemented based on these techniques specified shows in figure 2.3.

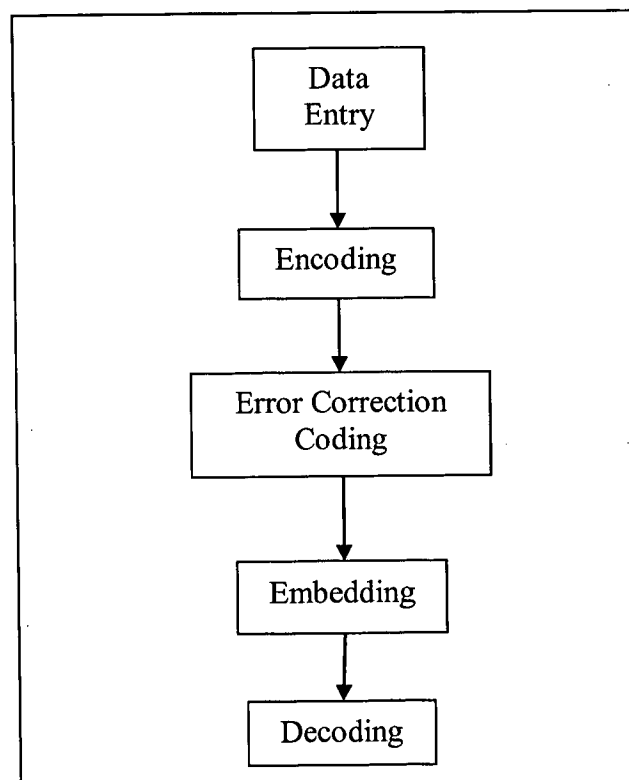


Figure 2.3: Flow chart of QR code technique

2.4.1 Data Entry

Data entry is the process of entering data into a computerized database or spreadsheet. It can be performed by an individual typing at a keyboard or by a machine entering data electronically. Data entry technique is used in certificate authentication system to insert data of certificate and save into database as record.

2.4.2 Encoding

The data encoding mode is designed to create the shortest possible string of bits for the characters that used in that mode. Different method used by different mode in order to convert input data into a string of bits. There were several steps in data encoding process for data information of certificate shown as figure 2.4.

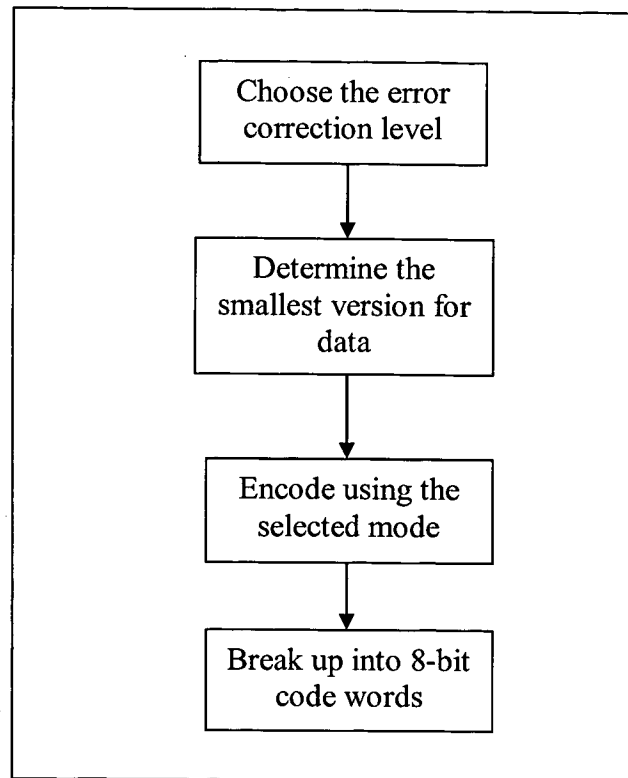


Figure 2.4: Flow chart of data encoding process

2.4.2.1. Choose the error correction level

Before the data encoding process begin, an error correction level is selected to create error correction code words based on the encoded data. By this, error correction code words able to correct the error if QR code reader did not read the data correctly.