

Enhance Security and Performance of Data Using Cryptography Based QR Code Authentication

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Abstract :In era of technology data security and information sharing is prime concern. Cryptography is a technique used to encrypt and decrypt information. Multiple authentication methods have been developed such smart card based system ,one time password and some using biometric features. QR Code authentication technique became great tool and played an important role in the authentication process. In proposed flow(method) we use graphical approach using QR code with cryptography technique which can be applied for information security. We will work on data hiding using QR-code and also design system which enhance the security and performance of the data using QR code.

IndexTerms - QR code, QR code Authentication ,cryptography based algorithm.

1. INTRODUCTION

In today's world, security is a big issue and securing important data is very essential, so that the data cannot be intercepted or misused for any kind of unauthorized use. The hackers and intruders are always ready to get through personal data or important data of a person or an organization, and misuse them in various ways. For this reason, the field of cryptography is very important and the cryptographers are trying to introduce new cryptographic methods to secure the data as much as possible. Keep his valuable data like passport information, bank statements, social security number, etc.

The term authentication describes the process of verifying the identity of a person or entity .Using QR code for authentication is becoming quite common in recent years. QR i.e. "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. The idea behind the development of the QR code is the limitation of the barcode information capacity (can only hold 20 alphanumeric characters).^[1]

2. EASE OF USE

Omni directional and Fast Scanning , Small Size, Huge Data Storage Capacity, Many Types of Data, Error correction, Direct Marking, Available for Everyone. QR Codes are made of multiple rows and columns. The combination of these rows and columns makes a grid of modules (squares). There can be a maximum of 177 rows and 177 columns which means the maximum possible number of modules is 31,329.^[1]

3. RELATED WORK

In Recent years, there have been many papers published on Cryptography Based QR code authentication. QR code has emerged has a research hotspot, which is attracting researchers to contribute their work in this field. Below is the brief discussion about the methods used by different researchers for QR code authentication.

BrinzelRodrigues ,et al.^[2]More presented the QR based authentication system lets the user input the password,if user is authenticated then an encrypted string consisting of IMEI number of user is displayed in the form of QRcode.The user uses his phone to scan the QR code and if the encrypted string is same as the IMEI number of the device the user is authenticated.

Ms. DhanashreePatil, et al.^[3] proposed a system leverages Optical Channel and user's cellphones to avoid password stealing attacks. Optical Channel is a safe medium to transmit information between cellphones and websites. Password is used only to access the user's mobile, and the user is authenticated without inputting any passwords to untrusted computer. In our system, each user only memorizes Open ID URL for access.

Non Thiranant, et al.^[4]proposed framework mainly focuses on the use and popularity of QR Code and mobile devices. QR Code authentication increases a possibility to avoid encountering security threats with the concept "Something you have". This solution not only does provide the strong authentication method, but also in one step, giving multi-factor authentication.

FeiXu, Sheng Han, et al.^[5] proposedQRToken authentication framework QRToken can be used as a twofactor authentication by combine software and hardware authentication together.

Xiangpeng Fu, et al.^[6] proposed to combine the one-time password (OTP) and the personalized challenge/response as the second authentication mechanism to improve the existing fingerprint based access control system.

4.PROPOSED SYSTEM

- The flowchart of the proposed system is as shown in fig-1. In order to enhance the security and performance of data cryptography based QR code authentication technique has been proposed.

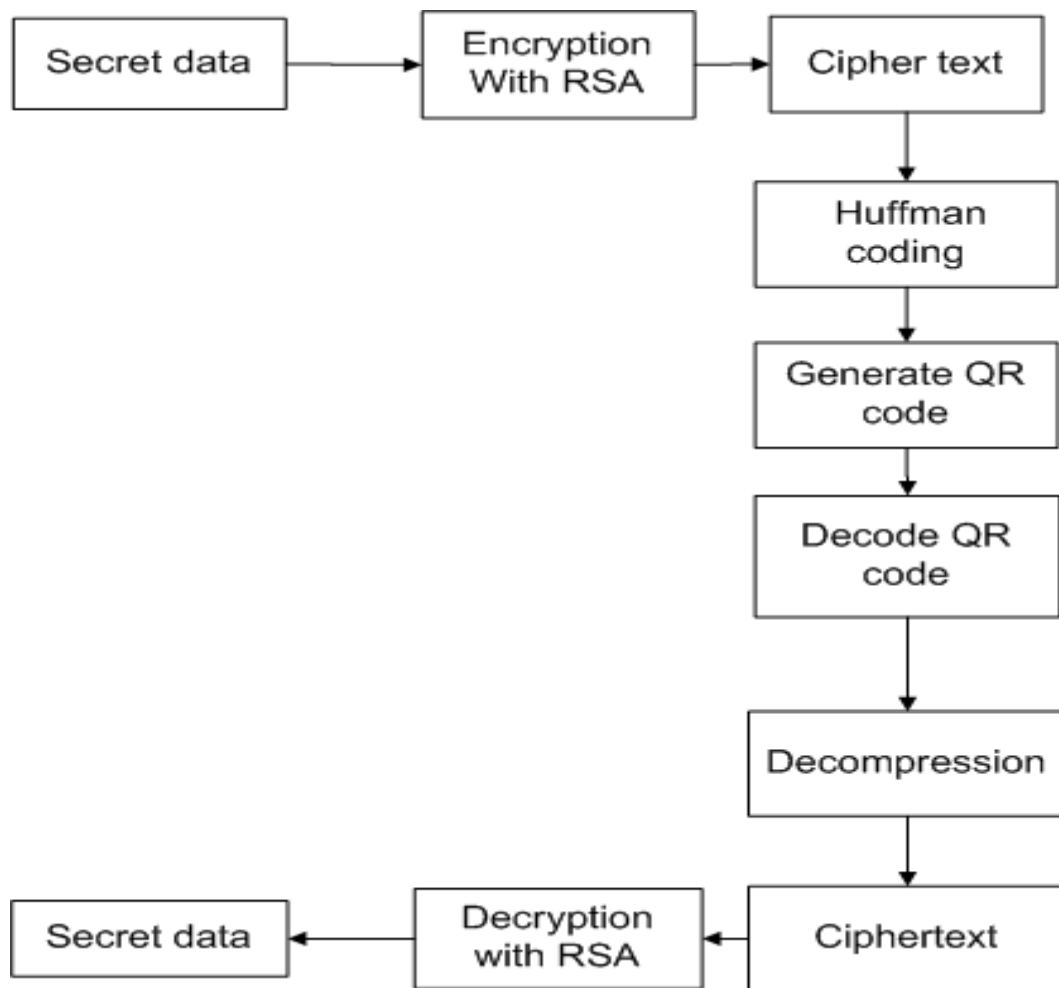


Figure 1: Proposed system

Following are the steps:

- Step 1: Secret Data:**
It is a secret data that we want to make secure.
- Step 2: Encryption:**
Secret data is given as a input to the encryption algorithm which generate cipher text based on key.
- Step 3: Compression:**
Cipher text generated in previous step is compressed by huff man encoding technique which reduce the size of data.
- Step 4: QR code generation:**
the reduced sized data is given as input to the QR code generator which will generate QR code.
- Step 5: Decoding of QR code:**
QR code scanner will decode the QR code at receiver's end.
- Step 6: Decompression:**
As huffman coding is reversible we receive cipher text by decompressing the data.
- Step 7: Decryption:**

Decryption is performed using key, if the data after decryption is same secret data then user is granted access to the system which means that user is authenticated.

5.RESULTS AND DISCUSSION

Implementation results of the proposed system is done using MATLAB R2014b. The operations were carried out on computer having Intel i5processor with 8GB RAM having Windows 8.1(64 bit) Operating system.The parameter selected for result analysis of proposed system is Time. Based on the parameter decided the QR Code Generation time will be calculated. In the system time of QR code generation is Encrypted QR code generation .

The experiment is done with different length of random characters, symbols and digits; Table 1 shows the time taken to generate encrypted QR code with and without Huffman coding in milliseconds and Table 2 shows the overall execution time of the proposed system with and without Huffman coding in seconds.

Length of Character	Elapsed Time to generate QR code with Huffman coding(in ms)	Elapsed Time to generate QR code without Huffman coding(in ms)
2	0.617	0.613
4	0.629	0.621
8	0.637	0.622
10	0.651	0.624
16	0.655	0.634

Table 1. QR code Generation Time

Length of Character	Overall Execution Time of system with Huffman coding(in sec.)	Overall Execution Time of system without Huffman coding(in sec.)
2	0.552	0.516
4	0.557	0.528
8	0.603	0.530
10	0.617	0.560
16	0.647	0.592

Table 2.Overall Execution Time of proposed system

6. CONCLUSION

In era of information technology the security of data is major concern. we proposed a way of authentication which is composed of both text and graphical authentication schemes. The user follows the scheme step by step as he/she further able to login the system. The combination of hybrid scheme will further provide a great protection from threatening attacks. The strength of the schemes is in the complexity of the system itself and cycle of authentication techniques.

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