

QR Based Advanced Authentication for all Hardware Platforms

Dipika Sonawane*, Madhuri Upadhye**, Priyanka Bhogade**, Prof. Sanchika Bajpai

Abstract- This paper seems quite obvious that nowadays we are able to do transactions, shopping, banking, sharing and storing confidential data like other online services which aims to highly secured. The design and implementation of QR is easy to use and read, combined with multifactor (ID/Password which only user knows, Detail information that only the user has, Unique QR code that shows only the user is), camera based all hardware. The information is in the QR code is transmitted in the encryption form. It is portable and cost efficient. The system uses QR codes which are small two-dimensional pictures that en-code digital data. This can be used for all hardware camera equipped platforms that are for tablets, personal computers, laptops, cell phones. QR is readable even if it is partially damage. It provides high level of security and authentication with untrusted devices. Its versatility has made them quite popular, where these are today widely used as a way to quickly store by scanning it with a camera-based mobile device.

Index Terms- Secured Authentication, QR code, One Time Password, for all hardware platforms, camera based, Cash Card.

I. INTRODUCTION

Over an unauthorized public networks client authentication is fundamental process to ensure security for communication as well as sharing user's confidential data and resources. For securing the network system, we required simple and efficient authentication mechanism in distributed systems. To avoid unauthorized access generally ID/password based authentication is provided. The main purpose of using one time password is to create it much difficult to get unauthorized access to restricted resources. Mostly we are using the ID/password as a conventional authentication system, many systems implement one time password schemes using smart card, debit card, ATM card and short messages services to reduce the risk of maintenance cost and tempering. These schemes are impractical due to infrastructure requirements. To overcome these weaknesses, QR code techniques introduced into one time password protocol. As most internet users already have smart phones above proposed schemes based on QR code eliminates usage of password verification as well as cost effective solution. Instead of using demand draft and cheque, it is convenient to use Cash Card. The Cash Card is similar to demand draft and cheque, having unique QR code for only the transactions details. The Cash card is look as given below

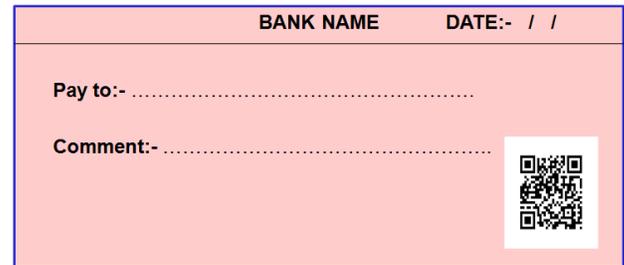


Fig. 1 Cash Card

II. RELATED WORK

In 2002, Clarke et al. were probably one of the first to suggest the usage of camera-based devices as an alternative, more secured authentication method for critical transactions, such as banking operations, and most particularly when connecting from untrusted computers [1]. The amount of camera equipped smart phones around us is increasing so rapidly that mobile based authentication might become a popular method to authenticate in a short time. In traditional Barcode data capacity is around the only 16 digit.

QR Code Data Capacity:

Numeric Code = 7,089 characters max.

Alphanumeric code = 4,296 characters max.



Fig.2 Comparisons of QR and Barcode

QR codes (Quick Response codes) were introduced in 1994 by Denso-Wave [2], a Japanese company subsidiary of Toyota. Initially, these codes were conceived as a quick way to keep track of vehicle parts, being nowadays extremely popular in Asian countries like Japan, South Korea, China or Taiwan and becoming more and more popular in western countries by the day.

The enhanced version of one dimensional barcode is the QR code. Roughly QR code (Two dimensional) contains 350 times more amount of information than the one dimensional barcode. QR code is matrix form or 2D because it contains the rows and columns for storing the information in two directions. Countries like Japan use the QR code for storing

the sensitive information. Nowadays United States also use the QR code. It is popular over the worldwide that will use for future uses.

As we can see the use of QR code is really just the beginning. At this point, we can implement the authentication using the QR code for all platforms such as PC, tablet and mobile phones. We get the idea from the paper, related to our project and we use multi factor authentication. Also by using this project we can replace the demand draft and cheque by Cash Card.

III. GENERATION OF QR CODE

Traditional One dimensional barcode mechanically scanned by narrow beam of light, 2D QR code is detected by the inbuilt auto focus camera and digitally analyzed by programmed processor. The inbuilt camera focuses three (multiple) distinctive square at the corner of QR code image. The small dots in QR code image later on converted to binary representation and validation is done with error correcting code. The data can be stored in QR code depends on version (1...40 indicating number of rows and columns), data type and error correction level. The maximum storage capacity of QR code for version 40 having 177x177 rows and columns respectively.[3][4] The QR code version 1 contains 21x21, version 2 contains 25x25, versions 3 contains 29x29, version 4 contains 33x33, version10 contains 57x57 and version 25 contains 117x117 rows and columns respectively.



Fig.3 After the scanning of QR code by smart phone (QR code version 10).

There are four error correction levels and 8 bit code is used to detect error correction level. The less storage capacity, higher the error correction level. Part of robustness of QR code in the real or broad environment is their ability to resist damage and continues to function even when part of QR code image is defected is happened due to error correction.

The below structure of QR code red color indicates format information. Density of QR code is detected by using the

format information. Light and dark grey shows the fixed pattern. This pattern always present in all QR code and this cannot change. The D indicates the data and E error in QR code, X indicates unused. The collection of data indicates different pattern.

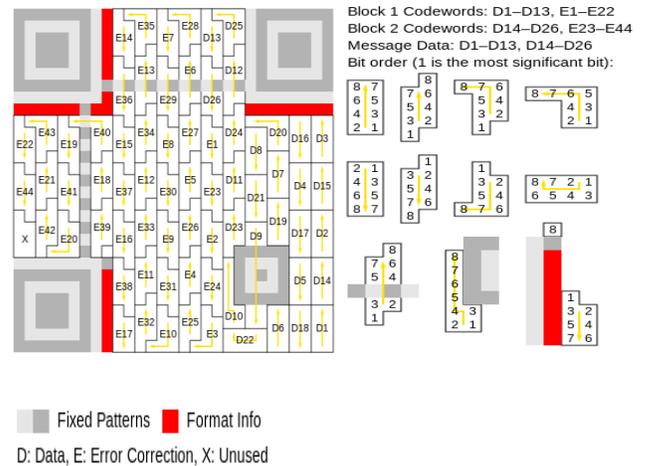


Fig.4 Structure of QR code

IV. SYSTEM FEATURES

Following system features will be facilitated:

A. Sign up

1) User information:

User must enter his naming details, address and valid mobile and valid email. The valid mobile and valid email is mandatory for user.

2) System Generated information:

After entering the naming details by the user according to the system will generate automatically unique QR code and OTP to the mobile and email. After the reentering the OTP the registration is successful.

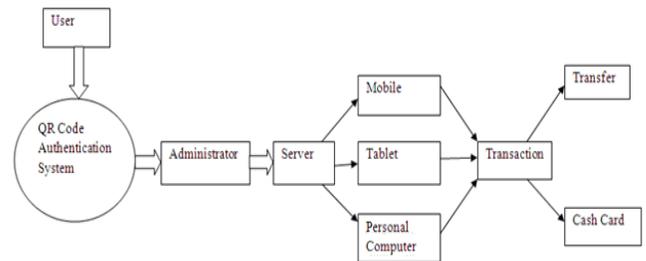


Fig. 5 System Architecture

B. Authentication

In order to provide same level of security as a web application, the system shall provide login screen on the user's hardware device. The login entered by the user shall be user ID, password and scan his unique QR code. After matching the user ID, password and QR code OTP will be sent on user's correspondence number and then OTP was reentered by user. The values shall be verified by the system prior the user having access to the system.

C. Transaction

Transaction can be done in two modes,

1) Transfer:

In this mode we select To Transfer, Amount to be transfer and the comment that will be the reason for what to transfer. Then QR code will be scanned if it matches then only transfer will do successfully.

2) By Using Cash Card:

Instead of Demand Draft and Cheque we can use the Cash Card. In this mode we select pay to, amount pay to and comment that will be the reason for what to pay. System will generate OTP, Unique QR code for Cash Card ,that QR Code will be scanned ,if it matches then only transfer will done successfully by using Cash Card.

V. TECHNICAL SPECIFICATIONS

A. Advantages

1) Portable:

Portability is one of the most noticeable benefits of QR code. As our system is support to all hardware platform devices. Mobiles are Handy and Tablets, Laptops, PCs can be carried anywhere easily.

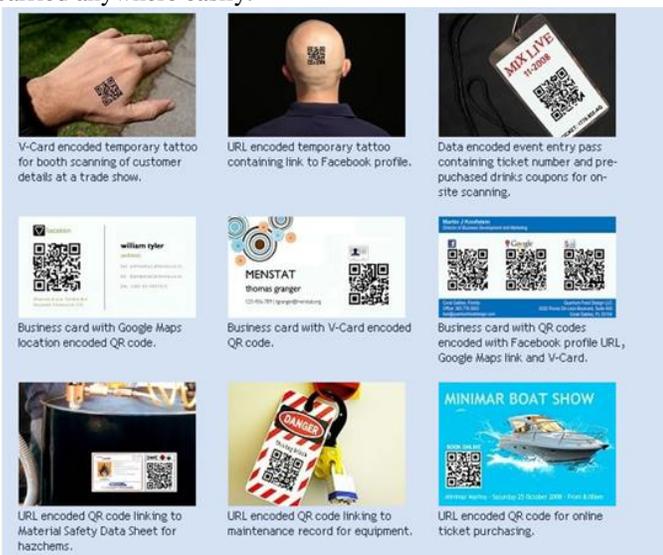


Fig.6 Portable QR code

2) Real Time:

This application System provides real time data about the users interested in QR code.

3) Low Cost:

As QR code can be scanned on any hardware device, it requires low cost and maintenance. All that is maintenance is cell phones with internet access.

4) Easy to carry:

QR code is easy to carry as it can be scan from anywhere to get our authentication and transaction successful.

5) Great deal Resistance to damage:

If the QR code is partially damage then it can also readable.



Fig.7 partially damage QR code

B. Limitations

The only disadvantage of QR code based authentication is that it can easily copy, but we provide other supportive activity.

C. Applications

1) Can replace Smart Card:

It requires the separate scanner to scan the smart card. Smart card has less storage as compare to QR code.

2) Can replace Swipe Card:

Swipe card can be cloned, but QR code can't be cloned. Swipe Card has no memory compared to QR code.

3) Secure way of transaction:

QR code is scanned through camera equipped with hardware device therefore our system provides the more secure transaction.

4) Cash Card:

Transfer can be also done using Cash Card which is replicable to Demand Draft and Cheque. System will generate Cash Card with QR code providing secure authentication.

VI. CONCLUSION

This paper actually is a survey paper which discusses the system features to be implemented for the working of the project. The mentioned system features are for obtaining the Secured multi factor authentication. Various mathematical notations are used to compute the generation of QR code. This paper mainly focuses on the system features to be implemented.

REFERENCES

- [1] Clarke, Dwaine; Gassed, Blaise; Kotwal, Thomas; Burnside, Matt; van Dijk, Marten: "The Untrusted Computer Problem and Camera-Based Authentication". Lecture Notes in Computer Science, 2002, Volume 2414, Pervasive Computing, Pages 114-124, Jan.2002.
- [2] "QR Code features". Denso-Wave. Archived from the original on 2012-09-15. Retrieved 3 October 2011.
- [3] "QR Code — About 2D Code". Denso-Wave. Archived from the original on 2012-09-15. Retrieved 3 October 2011.
- [4] "Version and Maximum capacity table". Denso-Wave. Archived from the original on 2012-09-15.
- [5] "2D Barcode: QR-Code". Archived from the original on 2012-09-15. — TEC-IT

- [6] Orli Sharaby (18 October 2010). "*Form Meets Function: Extreme Makeover QR Code Edition*". Archived from the original on 2012-07-08. Retrieved 29 July 2011.
- [7] "*QRP: An improved secure authentication method using QR codes*". David Pintor Maestre Universitat Oberta de Catalunya 08018, Barcelona, Spain dpintor@uoc.edu June 8, 2012
- [8] Hamilton Chan (18 April 2011). "*HOW TO: Make Your QR Codes More Beautiful*". Archived from the original on 2012-07-10. Retrieved 29 July 2011.

AUTHORS

First Author – Dipika Sonawane^{*}, Computer Dept,
JSPM's BSIOTR (W), dipikasonawane@gmail.com

Second Author – Madhuri Upadhye^{**}, Computer Dept,
JSPM's BSIOTR (W), upadhyemadhuri@gmail.com

Third Author – Priyanka Bhogade^{**}, Computer Dept,
JSPM's BSIOTR (W), priyankabhogade18@gmail.com

Correspondence Author – Prof. Sanchika Bajpai
Computer Dept, JSPM's BSIOTR (W),
+917709835513