Secure Authentication for Online Banking Using QR Code

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Abstract—In online services security is most important factor. In this paper we design QRP, a secure authentication system that uses a two factor authentication by combining a password and a camera equipped mobile phone, where mobile phone is acting as a authentication token. QRP that is Quick Response Protocol is very secure and also very easy to use for encrypted data. QRP is very secure protocol for use on untrusted computers. Our paper is providing the detail information about developing the security system for online banking transactions using QR code. In our project we use the QR code for providing the security to the online banking authentication system. In the QR code we are storing a complex password. Smart phone we use for scanning the QR code. When user goes for online banking transactions, he/she opens the bank website. After registration QR code is display on the page then user scan that QR code image with the QR code scanner. Scanning result generate one string which is the combination of IMEI number of a phone which is register by the user and the random number, where random number is generated by the random number function. In our project we provide a two factor authentication system. If the network is available on the smart phone then that generated string is automatically entered into the login page and homepage of bank is open, otherwise six digit pin code is generated and then we have to entered that manually on the login page and home page of bank is open for transactions. Our system is a very secure method for online transactions than existing applications.

Keywords-- IMEI, PHP, QRP, QR, RN, TS

I. INTRODUCTION

Now a days we are able to do everything online (like banking, shopping, communicating), and in this the challenge is that while doing this things online our information is not get damaged. Indeed, as the method of cracking the security code get more complex and powerful. There is need to develop more powerful security application. These powerful applications allow user to work on untrusted computers confidently. Our paper is based on the two way authentication system. Where are we provide the security using the QR code. QR code is the Quick Response code. In the existing system the security methods are like password, username, figure prints, and face detection. But in these methods security is not more, so there is need to develop such security system which provides high security.

In our project we develop such a security system which use QR code for security and provide two way authentications. In our security system there are four important modules QR code generation, online authentication system, offline authentication system, and QR code scanning. Another important part of system is camera equipped mobile phone. Here mobile phone is use for scanning the QR code. So our security system provides the security when mobile phone is online or offline. The basic overview of our security system is as show in figure 1.

Figure 1. System overview diagram

Our system block diagrams are as follows.

Figure 2. Online authentication system
II. QR CODE

QR code is the Quick Response code. Before the QR code there were some authentication methods available that are: User name and password, Bar code, Finger prints, Face identity. But user name and password are not providing more security. And the Bar codes have some limitations like bar code only stored up to 20 digits. Bar codes are only readable in one direction. Also when it gets damage it is not readable. So in bar code we are not able to stored very complex password there for bar code is not more secure method.

III. REGISTRATION SYSTEM

The following steps give the information on how to complete the registration process:

The first user would go into the registration section in the web application and would submit her/his username, password and IMEI number of the phone. After validating the data which is user enter is stored in to database. The data which is in the database server produce the public and private key and stored into the server. After this, the user would proceed to download and install the application on her phone.
When user first time run the application the class files of
public key and private are created and stored into the
internal storage of mobile phone. In a registration if the
user not enter all the values like username, password, IMEI
number, mobile number, and email address then
registration process is not get completed. Validation is
most important part in registration process; if validation is
not successful then user is not able to login.

IV. ONLINE AUTHENTICATION SYSTEM

First IMEI number and random number are encrypted
using the public key. This encrypted string generates the
QR code using the QR code generation function which is
present in java. Now this QR code image is display on the
client machine. User scans this QR code using mobile
phone. After scanning, in online mode means net is
available on phone the generated string (IMEI number and
random number) is automatically get entered into the login
page. After successful login the home page of the bank is
get open. So in our system there is no need to remember the
password that is combination of your IMEI number and the
random number. The servers decrypts the string using the
user public key and verifies that a row exists in the
transactions table with our random number, and then
update the row of transaction table. The server checks then
that the IMEI is correct or not and assigned that IMEI to
the correct user. If the login is get successful the trans-
action row is deleted. It means every time the generated QR code
image is different. Now the PHP session is created and
when user gets logoff the session is destroyed.

After entering the pin code server verify the IMEI
number of user which is stored in the database. If the IMEI
number is present then user is valid and then homepage Of
bank is gets open.

Figure 7. Sequence diagram of Offline authentication

The timestamp is also checked. If the random number is
generated before the 5 minutes ago then session is
destroyed. And user is not able to login.

VI. SECURITY

In our system the security is more powerful because of
the QR code and encryption algorithm. A man-in-the-
middle attack is not gets successful in our system because
communication between the server and user is always
encrypted. Username is not gets reuse or copies because
username is get deleted after the user logout. For mobile
application person also need the password so there is no
way for any attack because the file is not easily accessible
and it is encrypted. If the untrusted person knows how to
handle the internal storage then only the security problem is
created. A phishing attack on the mobile phone is possible
by replacing the application by another application. And
the password is also get covered but without the certificate
it still not possible. Another security part is timestamp, if
user not able to login in given timestamp then login is not
successful.

VII. SYSTEM ADVANTAGES

- The QR codes are only readable by the machine so
untrusted person cannot understand what is inside
the QR code.
- QR code can store up to 4000 alphanumeric
characters so we can store more complex
password which is not easily breakable.
- Time stamp provides more security.
- QR code can readable when it is partially damage.
VIII. FUTURE SCOPE

When user uses the mobile application the user need to enter the password that time size of mobile keypad is small so it may get difficult to use for some user so we can establish numeric keyboard or to use pattern authentication. Also system can provide different method for authentication. Also we can use QR code in many applications and give them a more security.

IX. CONCLUSION

Nowadays many people are live in the developed countries. So everyone likes to work mostly on the smart phones and laptops. And because of this the use of online services are increase. For that security is most important factor. So we are developed a secure authentication system which is based on QR code. It gives the function in online and offline mode. The fact that the user does not need to carry any additional device (as she would carry the phone anyway) makes it even easier and more comfortable. Also the smart phone are now not that much costly so this application is very important, easy, and secure for online banking security application.

REFERENCES