Q-PAY:ANDROID APPLICATION FOR SMART PAYMENT

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Abstract— Q-pay (Qucik Pay) is a smart and secure solution to any type of money transfer between individual users. It is an android application for cash payments. The basic idea behind the project is to implement money transactions in more smart and secure way without ATM or credit cards. QR code plays a vital role in this application. QR code (Quick Response code) is a machine readable code consisting of an array of black and white squares, typically used for storing URL or other information for reading by the camera on a smartphone. The donor and recipient can log on to the application through donor mode and recipient mode respectively. The recipient will generate the QR code, such that donor will have an option to scan it in his smartphone. After scanning, a secure and non-interfered connection is established between both the phones. Once the connection is established, recipient enters his amount. A confirmation message will then be generated and sent to the donor's registered mobile number. He can choose the bank and cash will be transferred to the registered account of recipient through bank's gateway. If recipient has not set a bank account for transaction, it will go to Q-pay wallet by default. The user can transfer his wallet money to bank account at any time.

Keywords— Q-Pay,Smart Payment, QR code Generation, QR code Scanning.

I. INTRODUCTION

Transaction is a part and parcel of our life. Financial transactions involving money have been subjected to many changes in the long run. It has migrated from direct cash transfer to online payments. Automated Teller Machine (ATM) has been widely used for money withdrawal whereas money deposit is done using Cash Deposit Machine (CDM). Online banking/ shopping is easily done through the use of credit/debit cards. Technology has advanced further and mobile banking is the buzzword today. Nowadays, everyone has smartphone. We never forget to carry our smartphone even though we forget our credit cards or ATM cards. Still, manual procedures prevail in rural areas as well as in urban area.

Q-pay is an android application for an easy and efficient money transfer. Using this application, the user can do any type of payment such as for shopping, taxi service, local store etc. The main advantage of this application is that user does not have to carry his credit or debit card. Also, this system does not require any special dedicated device such as Debit/Credit card reader. In this 4th generation of mobile telecommunications technology, many applications have come up with similar use such as Paytm, Freecharge etc. These applications are mainly used for recharging mobile phones, paying of bills to DTH services etc. These applications also provide wallet service, but do not support local cash transfer and cash transfer between users. However, Q-Pay provides a solution to this by enabling cash transfer between users. The transaction is made secure through the use of QR code.

The rest of the paper is summarized as follows: Section II gives a summary of the literature survey done and it consists of the existing methods for payments and money transactions, limitations of the existing methods, why QR code was chosen fo the new system, and a survey and study on QR code. Section III provides the architecture and implementation of Q-Pay. Section IV describes the method used for the generation and scanning of QR code. Section V gives the conclusion and future work.

II. LITERATURE SURVEY

A. Existing Systems

Many applications such as Paytm, and Freecharge provides bill payment functionality. By using these applications, user can pay his mobile phone bill, DTH bill etc. These applications provide wallet service to their users. By using the wallet, they can do mobile recharge or bill payments without connecting through bank servers. Freecharge does not provide cash returns to bank account. That is, the user can withdraw cash from bank account to application's wallet, but cannot transfer wallet amount back to bank account. Paytm does not provide the cash transfer between users.

Limitations of existing system:

- Lack of security
  The existing systems do not provide much security to the transactions. The chances of hacking, loss of credit/debit cards etc. makes the systems insecure.
- Need of dedicated devices like debit/credit card readers
  The use of hardware devices makes the system more complex, expensive and cannot be used in all transaction contexts. Q-Pay is an

Android application and it does not need any dedicated device for its working.

B. A Survey on QR Code

Q-Pay uses QR code for transferring money. A QR code is a type of matrix barcode, which was first designed for the automotive industry by Denso Wave in Japan. QR code is a two dimensional i.e. matrix type symbol with a cell architecture arranged in a square. QR codes have replaced barcode in many areas because of several advantages like increase in capacity, reduced size, etc. Combined with the diversity and extendibility offered, it makes the use of QR code more appealing than that of the barcodes. QR codes are capable of symbolizing same amount of data in approximately one tenth the space of a traditional barcode. Information such as URL, SMS, contact information and plain text can be symbolized into the two dimensional matrix.[1].

QR codes consist of different areas that are reserved for specific purposes. Finder, separator, timing patterns and alignment patterns comprises function patterns. Function patterns are not generally used for encrypting data. The finder patterns located at three corners of the symbol are intended to assist in easy location of its position, size and inclination.[1].

Google playstore provides Android applications for QR code scanning and generation for different purposes. These applications recognize the QR code to which the phone's camera is pointing at. But, none of those are related to any kind of cash transfer. In short, Q-pay is the combination of these two functionalities.

C. Potential threats of QR codes

Ususally, QR codes are used to direct the user to a particular website of their interest. As the users cannot understand what QR code contains, there is a chance of getting directed to a malware site. Attackers can use QR codes for various types of attacks. However, two critical attacks which are of interest for this study are phishing and malware attacks. Phising is an attempt to acquire personal informations such as username, password, ATM pin etc. for malicious reasons, by acting like a trustworthy entity in an electronic communication. A malicious QR code may redirect the user to a site that contains malware.

III. Q-PAY

Q-Pay is a smart and secure Android application that overcomes the limitations of existing money transferring applications. In Q-Pay, QR code scanning, and OTP protection increases the level of security. The donor (the user who donate/pay his money) and recipient (the person who receive money) must have the application in order to connect with the account for the money transfer. Once the application is installed, to initiate a transfer, the user should provide correct login details to log on. If the user is new to Q-Pay, he/she has to create a new account. The application will work in two different modes:

1: Donor mode, for the donor to donate money

2: Recipient mode, for the recipient to receive the money

The recipient system will generate the QR code according to the amount entered and userid of the recipient, such that donor will have an option to scan it in his system. After scanning, a secured and non-interfered connection is established between both phones. Once the connection is established, the donor can initiate the money transfer. The donor can choose his bank. After choosing the bank, it will go to the corresponding bank's official website so that donor has to confirm his amount once again. If he confirms it, the transaction will take place and the cash will be transferred to the registered account of recipient. If recipient has not set a bank account for transaction, it will go to Q-pay wallet by default. The user may convert his wallet to money at any time. The user can transfer the wallet amount to bank account . Thus, a safe and secure money transaction can be carried out through Q-pay without ATM or credit cards.

A. Architecture and Implementation

The architecture/ block diagram for the Q-Pay system is shown in figure 1 .The 3 blocks in the diagram represents the donor, recipient and server modules. The recipient generates QR code based on the amount and the donor scans the QR code. After that, the transaction confirmation is given to the server. The server then updates the balance amount of both donor and recipient.

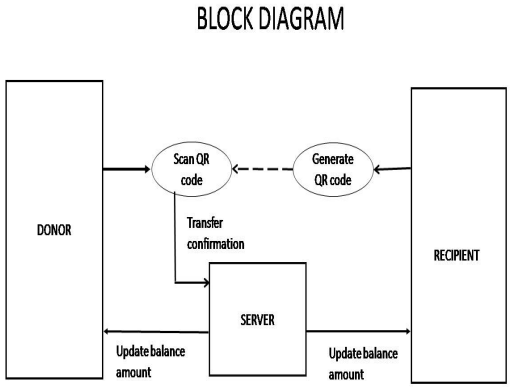

Figure 1. Block diagram of Q-Pay System

After logging in, the user can choose whether to be in donor mode or recipient mode. In donor mode, user has to scan the QR code from the device of the recipient and the donor need to verify the amount to be transferred. After verifying the amount, he/she can initiate the transaction. In recipient mode, the user has to enter the amount to be received and corresponding QR code will be generated. The QR code is generated using the amount to be transferred and the unique userid of the recipient.

IV. QR CODE GENERATION AND SCANNING

QR code scanning and generation is implemented by using ZXing library in Java (https://github.com/zxing/zxing).

QR Code Scanning: The scanning is initiated by invoking the intiateScan() method. IntentIntegrator class helps ease integration of QR code scanner via intents. Here, to integrate the scanner, create an instance of IntentIntegrator class and call initiateScan() method and wait for the result. The result is obtained and processed inside the onActivityResult() function which is called when scanning is successful to process the data scanned.
QR code Generation: The encode() method which is a member of QRCodeWriter class is used to generate QR code. For generating a QR code, the contents whose QR code is to be obtained and the size is passed as arguments to encode(). Now, the encode function returns QR code as a bitMatrix. The generated QR code will be displayed as an image in the application layout.

CONCLUSION AND FUTURE WORK

Q-Pay is an Android application for money transaction which could be used in all money transferring contexts so that money transfer could be made quicker and more effective. It transfers the amount from donor bank account to recipient when the transaction carries out. Thus the work can be extend in future by incorporating a bank payment gateway so that transactions can be linked with any bank account[3][4]. Also the functionalities like QR code generation and scanning are implemented using ZXing library written in Java. These functionalities can be implemented using specific algorithms.

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