

Android Mobile Based Payment System Using QR Code

¹Ashvini Bharambe, ²Vaishali Bhirud, ³Dhanashri Bhuse and ⁴Prof. Y.S.Patil,

^{1,2,3,4}Computer Science & Engineering Department, Shri Sant Gadge Baba College of Engineering & Technology, Bhusawal, India

Abstract-- In the Era of Computer Technology, We need to communicate and accelerate our life with the help of Information and Technology (ICT). We all require certain types of services on online, which require less workout or interference of Human being. Mobile payment is very significant and critical resolution for mobile commerce. A user-friendly mobile payment solution is robustly needed to carry mobile users to conduct secure and reliable payment transactions using mobile devices. This paper presents a modern mobile payment system based on 2-Dimensional (2D) barcodes called QR-codes for mobile users to recover mobile user experience in mobile payment. Unlike other existing mobile payment systems, the projected payment answer provides distinct advantages to support buy-and-sale products along with services based on QR codes. Safe QR-Pay scheme based on QR-code by expressing 2 dimensional can pay things between User and Merchant.

Keywords-- Mobile based Payment Systems, Quick Response Code, Android etc

I. INTRODUCTION

A commercial merchant shows payment information by expressing QR-code to display window. A user shots a condition by means of mobile Device fond of a camera. If a user confirms payment information furthermore ask an approval, the payment system can be complete by itself. Proposed system provides non-repudiation plus confidentiality of payment information. Also, it offers mutual Authentication between users in addition to merchant.

II. LITERATURE SURVEY

A. History

Even though e-commerce is not all about fund relocate, electronic payment (or e-payment), such as credit-card payment over the Internet, is at rest one of the most popular e-commerce applications. In other words, e-payment is one of the essential parts of an e-commerce transaction in that the e-commerce transaction cannot complete with no of it. For instance, an online book store which provides both electronic with physical books to its customers must have a behind payment system available for its customers to transfer money to it. Therefore, each customer can complete the buy which includes goods relief (or commitment of goods delivery) and payment by the store in one transaction. Without the payment system provided, the customers are required to perform two sessions separately: one for the goods purchase and the other for the payment business. In particular, the fee transaction has to be performed by transferring cash to the store's bank account straight.

Due to the actuality that mobile payment represents e-payment, formerly per- formed in fixed environments, in wireless environments, it instructions the same services as that ordered by e-payment. Equally due to the constraints of wireless environments, low-valued expense methods, such as micropayment, which include lightweight operations and low

operational cost, are likely to be more appropriate for wireless environments than other methods.

The mobile users require a payment system that they can execute transactions professionally in that a payment transaction can be finished within a limited amount of time which is suitable by users in terms of operational cost with user satisfaction. A payment operation can be performed on partial capability mobile devices.

B. Scope

A mobile payment is the procedure of two parties exchanging financial value using mobile device in come again for goods and services. It can also be defined as the transfer of money from one party to another from end to end the exchange of information. Mobile devices may consist of mobile phones, PDA's, wireless tablets in addition to any other device that can be linked to mobile telecommunications network for making payments. For any mobile payment to be broadly accepted and adopted it is significant to overcome the subsequent challenges. Interoperability, Usability, Simplicity, Universality, Security, Privacy, Cost, Speed and Cross edge Payments.

Mobile payment is especially important in addition to critical solution for mobile trade. A user-friendly mobile payment solution is robustly needed to support mobile users to conduct safe and reliable payment transactions using mobile devices. A pioneering mobile payment system based on 2-dimensional barcodes for mobile users to get better mobile user experience in mobile payment. Unlike other accessible mobile payment systems, the proposed payment solution provides distinct advantages to hold buy-and-sale products and services based on 2D barcodes. This system uses one standard 2D barcode (Data Matrix) as an example to reveal how to deal with original mobile business workflow, mobile transactions and security issues.

Two main properties are necessary. First, the authenticity of a signature generated from a fixed message and fixed private key can be verified by using the resultant public key. Secondly, it should be computationally infeasible to generate a suitable signature for a party devoid of knowing that party's private key. A digital signature is an authentication mechanism that enables the inventor of the message to add a code that acts as a signature.

III. PROBLEM STATEMENT

The current railway reservation system is human dependent, time consuming when it comes to ticket booking process and non reliable as well as if we lose our octopus or oyster cards. The objective of our project is to develop an android application which will serve as a medium for peoples to book a ticket to travel through railways. The main motive of the app is to ease the process of ticket booking by avoiding the hectic process to stand in a queue and book the ticket for the long distance travelling in the trains. There are several applications available in the market giving information about the travelling

destinations and their fares. But none of these apps include the ticket booking process. Moreover the tickets booked on websites have to be saved and printed so as to be shown at the time of boarding. Whereas our app differs as it would not only book the ticket but also save the ticket in the form of QR code. This QR code can be scanned through other mobiles and saved as well which can be shown to the ticket checker for validation. This makes the entire process very easy. The data about the ticketing and personal information will be securely stored onto the database. Also our app would require the user to create an account so that it can be used by multiple users and would be independent of the devices. The user can log in through any mobile device having the app installed. It also includes alarm system for informing the passenger that railway reached at their destination station.

IV. PROPOSED METHODOLOGY

There are two ways to construct 2D barcodes in mobile payment systems. First approach is to build 2D barcode-based Position- Of-Sale (POS) systems to support mobile payment dealings between mobile users and mobile terminals at anytime .This kind of POS-based payment systems can be used in Parking lots, TAXI, airport and railroad stations. 2D barcodes are useful to support product information retrievals, secured payment transactions, customer and product verification, and mobile security checking. The second approach is to build 2D barcode-based systems to permit mobile users to issue mobile payment transactions using their digital wallets based on mobile payment accounts in a mobile payment server.

The stature displays its underlying payment procedure, which consists of the next steps:

Step 0: A registered mobile user uses his/her customer account and PIN to login the mobile payment system by transfer a login request to the mobile payment server. The mobile server processes mobile client authentication with sends a login response with the server certificate ID, and secured session ID, as well as a public key for the connections.

Step 1: The mobile customer authenticates the mobile server with received public in addition to server's certificate.

Step 2: The mobile client captures or receives a QR code for an interested creation from its advertisement. There are two scenarios in which a mobile user can acquire a QR code. In the first case, a mobile user may make use of a mobile camera on the mobile tool to capture the image of a QR code from a posted product. In the second case, a mobile user may receive a mobile ad on a mobile device as of a merchant. For the time being, the mobile client decodes the customary QR code, which includes product and maker's information, marketing data, merchant's mobile URL information.

Step 3: The mobile user clicks the given QR code to switch the target merchant's mobile site using the provided URL in the usual QR code.

Step 4: The mobile apply prepares and submits a purchasing request in the midst of a digital signature as a QR code to the merchant server.

Step 5: The merchant server authenticates the mobile client based on the provided the secured session ID from the mobile client, as well as the public key. For now, the received signed request is validated by the merchant using the private key.

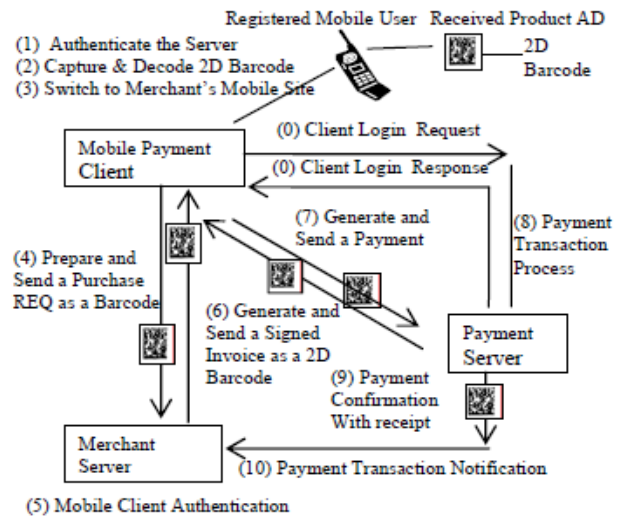


Figure 1: MBPS architecture, Payment process

Step 6: The merchant server generates and sends a signed purchase invoice with a transaction ID to the mobile client.

Step 7: The mobile client prepares in addition to sends a payment request with the same transaction ID and a digital signature to initiate a payment request. The digital signature is ended using the client private key. The entire message is encoded as a QR code.

Step 8: A secure session is established between the payment server and the mobile client. In this step, the payment server validates the given security information, including the certificate from mobile client, session ID, public key, and received digital signature. The mobile payment server processes the payment transaction.

Step 9: The payment server prepares and sends a payment confirmation with a QR code receipt to the mobile client. The mobile client displays the received confirmed message to the mobile user.

Step 10: The mobile server also sends a payment transaction completion notice with a QR code to the merchant server. This code resolve be useful for the merchant to bring elsewhere the post-sale operations, such as pick-up validation or produce delivery.

In the proposed payment system, 2D barcodes are used for the following purposes:

1. In a product ad, a barcode is used to hold product related information. Typical examples are product tracking data, maker, marketing, merchant information. In addition, some security information is also embedded, including a certificate ID for the merchant and public key.
2. In a payment invoice, a barcode is used to carry mobile user's selected purchasing information as well as security data, including secured session ID, client ID, PIN and private key, mobile client for authentication by the merchant.
3. In a payment transaction, a barcode is used to contain the detailed payment information for a mobile user, including the credit card, PIN, private key, and secured session ID for mobile client.
4. In a payment confirmation, a barcode is used to hold the secured transaction ID and conformation code as well as validation ID.

V. HARDWARE AND SOFTWARE REQUIREMENTS

A. Software Requirements

1. JDK1.6 or higher
2. Android SDK for windows
3. Android 2.2 version minimum
4. Eclipse (JUNO)
5. Apache Tomcat Server 6.0
6. MYSQL JDBC drivers

B. Hardware Requirements

1. 32 bit processor
2. 2GB RAM minimum
3. Hard Disk- 40GB minimum
4. Core to dual or higher microprocessor

VI. IMPLEMENTATION

A. User Registration

All users of mobile payment system must registered first before they access the payment services. Since the system provides online website to support all of its user membership and accounts management, so its users (both customers and merchants) can access the provided mobile user interface register, access, and update their profiles and account information. During user registration, each user will be assigned to a unique user ID. In addition, a pair of public and private keys will be generated for the user based on the user's unique International mobile Equipment ID (IMEI) or the Element Serial Number (ESN) and current timestamp. At the end of user registration, a user certificate is issued to the mobile client.

B. Public and Private Key Generation

Each mobile user with a unique user ID will be assigned a generated public and private key pair based on the Elliptic Curve Cryptography (ECC) technique, which provides the public key infrastructure using 256 bit keys to provide confidentiality, integrity, and authenticity.

C. User and Merchant Certification

A certificate request is generated for each user (including merchant user and customer user) during user registration based on a generated key pair. A certificate request for a user is implemented using the Elliptic Curve Digital Signature Algorithm (ECDSA) with the Secure Hash Algorithm (SHA256).



Figure 3: Screen after Login



Figure 4: Screen while processing



Figure 5: Product details



Figure 2: First screen of App



Figure 6: Card details



Figure 7: QR code Generated

ADVANTAGES AND DISADVANTAGES

A. Advantages

1. This technology will replace traditional mobile based payment system.
2. Less time consuming.
3. Customer will get regular update for his/her particular order purchase.
4. Easy mobile based payment system, with easy mode of transfer of confidential information between customer and merchant, which used QR code system.
5. Customer will get all information about any particular product.

B. Disadvantages

1. The system will require Internet connection throughout the process.
2. Customer must need to connect to LAN for application to be processed.
3. Customer either can use mobile data for connectivity purpose.

CONCLUSION

As more and more products and goods are identified using 2D barcodes in commerce, there is a clear need to build new mobile payment systems for mobile users to support mobile transactions based on 2D barcodes. To address this need, this introduces an innovate mobile payment system, which supports and delivers secure and easy operating mobile payment transactions based on 2D barcodes. When digitally signed document is printed out in a human-readable text image, it is useful to include the signature information in the text image for authenticity and integrity checks. With the development of dense 2D bar codes, we can put the digital signature in 2D bar code form into a small area of the printed document.

ACKNOWLEDGEMENT

We would like to thank my Head of Department, Prof. D. D. Patil & sincere thanks to Prof. Y. S. Patil and all the respected teaching faculties of department of computer science & engineering. Also we would like to thank my parents, friend for motivating me in this paper work activity. My special thanks to all the writers of reference paper that has been referred by me.

References

- [1] R.M. Wahul, B.Y. Pawar "Mobile payment based Android baesd Applications for Android Phone". International Journal of Innovative Science and Modern Engineering (IJISME) ISSN: 2319- 6386, Volume-3 Issue-6, May 2015
- [2] Wallace Jackson's (2011) "Android Apps for Absolute Beginners" Apress Publications.
- [3] Wei - Meng Lee" Beginning Android Application Development" - Wiley Publishing Inc..
- [4] Willium Stalings. "Wireless Mobile computing "
- [5] Reto Meier, "Professional Android Application Development" Wiley Publishing Inc., 2009.
- [6] Satya Komatineni, "Pro Android" - Apress Publications, 2009.
- [7] Pressman R., "Software Engineering, A Practitioners Approach", 7th Edition, Tata McGraw Hill.
- [8] Grady Booch, James Rumbaugh, Ivar Jacobson, "The Unified Modelling Language User Guide", Pearson Education.
- [9] Subernarekha Ghoshal,Shalini chaturvedi,Akshay Taywade and N. Jaysankar, "Android Application for secure Mobile base payment systems" Indian Journal of Science and Technology, Vol 8(S2), 171–178, January 2015.

AUTHOR'S BIOGRAPHIES

Ashwini Bharambe is Pursuing Bachelor's Degree in Computer Science & Engineering under Shri Sant Gagne Baba College of Engg. & Tech, Bhusawal. She has published one Research and one Review paper on Mobilebased payment system. Her Area interest is E-Governance & Android Technology.

Vaishali Bhirud is Pursuing Bachelor's Degree in Computer Science & Engineering under Shri Sant Gagne Baba College of Engg. & Tech, Bhusawal. Her Area interest is Future trends in technology.

Dhanashree Bhuse is Pursuing Bachelor's Degree in Computer Science & Engineering under Shri Sant Gagne Baba College of Engg. & Tech, Bhusawal. Her Area interest is MobileComputing.