BLUETOOTH BASED MOBILE -WALLET

Neel Shah
(Student)Computer Engineering
RGIT, Mumbai, India
neelshah38@gmail.com

Vinit Shah
(Student)Computer Engineering
RGIT,Mumbai, India.
vinit.b.shah@hotmail.com

Khushboo modi
(Student)Computer Engineering
RGIT, Mumbai, India
kjm703@hotmail.com

Sharmila Gaikwad
(Assistant prof.)Computer Engineering
RGIT, Mumbai, India
sharmila_gaikwad@mctrgit.ac.in

***Abstract*—M-Wallet is radical solution of an age-old problem of carrying large sums of cash or a heap of unwanted credit cards. M-Wallet as the name suggests is an electronic wallet associated with the mobile phone configured with user's bank account. Any data saved in M-Wallet is encrypted using industry standards and access to M-Wallet itself is protected by password thereby making it both safe & reliable. It allows user to transfer funds just through his mobile phone in seconds thereby relieving him from having to securely carry and manage cash, credit cards or to purchase any extra hardware. It also allows user to view account balance, transactions history, and save/use a list of frequent payments. Thus it offers a complete, low cost, powerful and user friendly way of making payments in this mobile world. Feedback from users and experts across a range of countries such as retail, banking, telecommunication and healthcare indicate that we have just scratched the surface and a substantial wave of innovation is necessary to make the digital wallet full-fledged reality.**

Keywords — Mobile wallet, mobile applications, mobile computing systems, digital cash, DES, SSL, Bluetooth

I. INTRODUCTION

As the mobile phone continues to take on an ever more central practices roles in our own lives, it is increasingly replacing old activities and practices. It is a very commonly accepted, for example, that the mobile replaces wrist watch, camera, music video player .In response to these significant changes, we have been experimenting with ideas about how the mobile phone might also entirely replace the function of a physical wallet [11].

M-Wallet gives users a safe, easy to use and secure virtual wallet and gives multiple new revenue opportunities. Using current handsets and other mobile smart devices, M-Wallet offers payment services, secure transactional services and profile-driven value-added services. M-Wallet embraces a world where every transaction from making a bank payment to buying groceries, from paying a cab fare to buying a movie ticket, and various such processes is as simple as pressing a few buttons on the mobile phone or other handheld device. M-Wallet also manages real world purchases including on-site retail transactions such as buying a shirt at a department store or transferring funds from person to person. M-Wallet solution enables people to configure multiple bank accounts or credit cards and debit cards with the application and thereby make secure mobile transactions anywhere and anytime [11].

II. EXISTING SYSTEM

A. Cash

Most common and traditional means of payment is exchange of cash/money [12].

Weakness

- You can't carry around a lot of money with you if you want to make a large purchase.
- Risk of theft or accidental loss of money.
- If it is lost or stolen it may not be replaced.
- It can't be tracked.
- You can't make online purchases.

B. Credit/Debit Cards:

A credit card is a small plastic card issued to its holder to buy goods and services based on the holder's promise to pay for these goods and services. A debit card (also known as a bank card or check card) is a plastic card that provides the cardholder electronic access to his or her bank account/s at a financial institution [12].

Weakness

- Record keeping is mandatory for debit cards.
- Not accepted everywhere.
- Blowing Your Budget.
- High Interest Rates and Increased Debt.
- Credit Card Fraud.

C. E-Commerce Payment System

An e-commerce payment system or Electronic Data Interchange (EDI) facilitates the transfer of funds from one party to another over electronic media [12]. There are numerous different payments systems available for online merchants including the traditional credit, debit and charge card and also new technologies such as digital wallets, e-cash and e-checks and Payment Service Providers (PSP).

Weakness

- Most of the online financial transaction sites require you to open an online account with them which implies the need of password protection.

You also need to maintain an account per organization, which can make it bothersome for some of you.

- There is a potential risk of your personal and account details being stolen. Mostly, electronic cash is based on cryptographic systems. Though electronic payments are resistant to forgery. The keys are vulnerable to attack.

D. E-Wallet:

The e-wallet is used to make online shopping easier. It's a file that is stored on hard drive containing all the personal information relevant to an online purchase, including credit card number, billing address and expiration date. When user is ready to complete an online order form, he can have your e-wallet do much of the work [5].

Weakness

- Not every storefront accepts every wallet.
- If an online order form has blank fields in a different order from those in e-wallet, or if the form has fields that the e-wallet does not recognize, the form may be left incomplete or be completed incorrectly.
- For electronic wallets to become ubiquitous they must retain the functionality and useful ness of physical wallets and also provide new functionality, which takes advantage of internet medium.

III. PROPOSED SYSTEM

Consumers constantly carry their mobile device with them wherever they go, so why should they bother with a bunch of plastic cards when a small device could replace them all. The M-Wallet expedites local payments, micro payments, P2P payments, contactless payments, loyalty, m-ticketing, and authentication.

A. Features

M-Wallet provides bank customers with all the services normally found on the bank's ATM machine, directly on their mobile phones such as

- Bank Account Access
- Balance Inquiries
- Real world bill payments
- Virtual coupons
- One to one transfer

The various options can be shown in fig.1 as it is shown in the proposed mobile application.

Figure – 1. Option Form

IV. BENEFITS

A. Benefits to bank

The various benefits to the bank are as follows:-

Reduced Costs

- Displacement of transactions from more expensive distribution channels; Electronic transactions have the lowest costs (90% Cheaper).
- Dramatic reduction of the enormous costs of deploying extra reachable ATM machines.
- Nothing physical needs to be sold to the customers. It is all secure software that gets downloaded over the air on almost any mobile [12].

Enhanced Security

- Provides a secure, menu-based and user friendly alternative to the non-secure SMS payment solutions.
- Elimination of fraud costs, charge back risks and costs since all transactions have two-factor authentication.

Wider Customer Base

- The ability to offer existing customers additional value-added services by improving their access to, and control over, their financial information.

- Opportunities to enthuse market to recruit new customers from the growing mobile subscribers base, particularly the youth market.

B. Benefits to Client

No Additional Hardware Cost

- Customer constantly carry mobile device with them. Wherever they go so no need to purchase any additional hardware.

Convenience

- Available anywhere, anytime and to anyone
- Allows doing payments without need to share financial information each time.

Ease of Use

- Easy-to-understand, easy-to-use "virtual wallet" concept encourages quick migration and enthusiastic adoption.
- Conduct all transactions with a few clicks and keep track of accounts and expenses.

Enhanced Security

Figure - 2. Registration From

- Free from burden to securely carry and manage cash, credit/debit cards.
- Keep all confidential account information under personal control.
- Enjoy built-in 2-Factor authentication, encryption and easy instant access.

Flexibility

- Use payment method of choice from multiple options available including bank account, credit or debit card, mobile bill, mobile prepaid balance in fig.2.

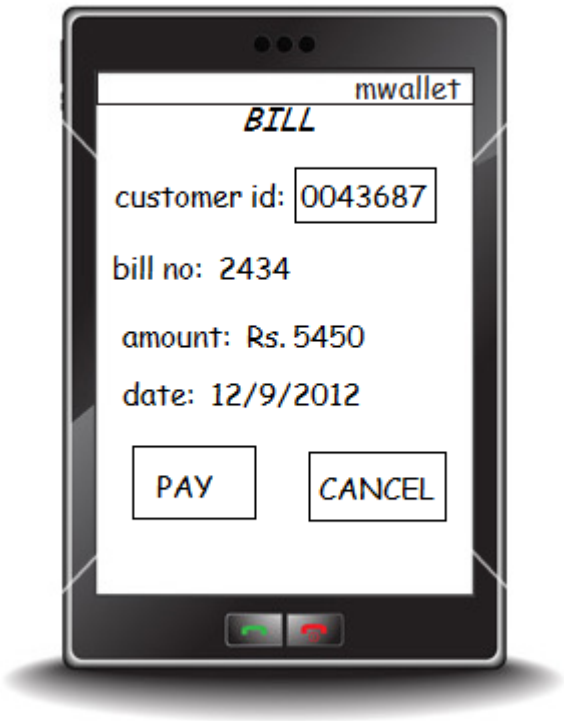

Figure - 3. Bill

V. IMPLEMENTATION

M-wallet transforms the normal GSM phone into a secure password based ATM machine in the hands of every customer. It provides bank customers with all the services normally found on the bank's ATM machine, directly on their mobile phones.

Communication medium can be Bluetooth, NFC but for simplicity purpose we are using Bluetooth because it is low power consumption, easy coding with Bluetooth and sufficient for covering a 10 meter radius circle.

Also NFC is still finding its way in the in Indian Market of mobile phones. This limiting factor which is not in Bluetooth as it is available in all the phones in the market.

With M-wallet, bank clients can carry out any number of cashless card transactions (both debit and credit cards).M-wallet is an application that runs on most phones available today. M-wallet has menu- based, transaction-based user interface that integrates seamlessly with the menus of the mobile phones.

There are various factors which are needed to be considered for the implementation purpose.

A. Configuration

First time the user accesses the application he needs to configure it. He basically needs to store payment details in the M-wallet first time. For consequent payments he need not re-enter the details as they are securely stored in encrypted form. He can select payment method from multiple options available including bank account, credit card, debit card, mobile bill or mobile prepaid balance. In case of bank account he needs to mention the bank name, branch, account number, name of account holder. In case of credit card or debit card he needs to mention the card type, security code, credit card owner's name, date of expiry. Once these details are added user does not need to reveal any credit-card sown in fig.4 or payment related information to any other party.

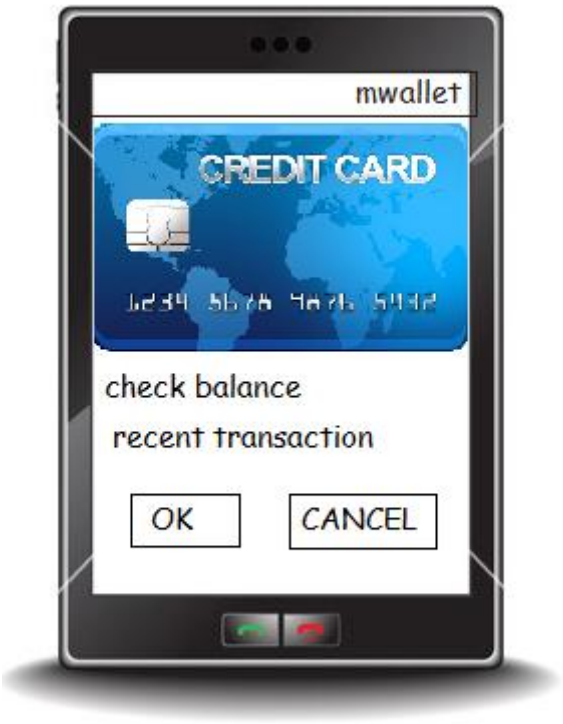

Figure - 4 Credit Card Option Form

For security reasons, user needs to set a password for access to M-Wallet. M-Wallet will also record user's fingerprint that acts as an added layer of protection making M-Wallet safe and reliable.

B. Payment

To make any type of transaction, the user must enter his password, which is then encrypted and verified to authorize access to M-Wallet and only if it match user is granted access to perform monitory transactions.

User can then select the type of transaction and enter relevant details to complete it.

Eg: User wants to pay for shopping at a retail store.

- User simply opens the M-Wallet application on his phone through the password.
- Once verified, user selects from various cardoption and enters the bill amount.
- M-Wallet will generate a random 6 digit code that is valid for just the next 10 minutes.
- User will give the random code to the shopkeeper.
- Meanwhile, the shopkeeper will open his M-Wallet application and select Credit and then enter user specified random code.
- Verifying the credit card number through bank database by transferring user's credit card details via Bluetooth.
- If the credit card details is valid, user's M-Wallet will debit that amount from his configured account whereas shopkeeper's M-Wallet will credit the amount to his configured account

C. Security Factors

Two-Factor Authentication

Provides assurance of someone's identity, using something that you have cell phone lock pattern, something that you know passwordand a pin for every credit or debit card card

Access control

Protects against unauthorized use (by the use of password verification and pin recognition)

Confidentiality

Protects against disclosure to unauthorized parties using standard encryption techniques for data storage and transfer.

Integrity

Protects from unauthorized data alteration by signing the transaction MAC using the password.

Non-repudiation

Protects against the originator of communications later denying it by means of auditable standard evidence that the specific password coupled with the specific fingerprint and Cell-Phone were involved in the transaction.

D. Bluetooth Security

Bluetooth wireless technology is frequency-hopping. It uses a pseudo-random hopping sequence that is unique to the device to hop 1,600 times per second among 79 channels. This provides a measure of security, because two devices must synchronize on the same hop sequence

to communicate. Devices can also be configured so that they cannot be discovered by other Bluetooth devices. In addition, the Bluetooth specification defines security at the link and service level [9].

E. Security

Purpose of DES is to provide a standard method for protecting sensitive commercial and unclassified data. IBM created the first draft of the algorithm. Fundamentally DES performs only two operations on its input, bit shifting, and bit substitution. The key controls exactly how this process works. By doing these operations repeatedly and in a non-linear manner you end up with a result which can not be used to retrieve the original without the key. Those familiar with chaos theory should see a great deal of similarity to what DES does. By applying relatively simple operations repeatedly a system can achieve a state of near total randomness. Users of Enigma will most likely be subject to cipher text only attacks. That is an attack in which the cryptographer has access only to encrypted documents. Under such conditions there is no known method of attack better than randomly guessing keys. This discussion assumes you meet this condition [13].Encryption Protects Data. During TransmissionWeb servers and web browsers rely on the Secure Socket Layer (SSL) protocol to help users protect their uniquely encrypted channel for private communi cation over public Internet. Each SSL Certificate consists of a key pair as well as verified identification information. When a web browser (or client) points to a secured website, the server shares the public key with the client to establish an encryption method and a unique session key. The client confirms that it recognizes and trusts the issuer of the SSL Certificate. This process is known as the "SSL handshake" and it begins a secure session that protects message privacy and message integrity. Strong encryption, at 128 bits, can calculate 288 times as many combinations as 40-bit encryption. That's over a trillion times stronger. At current computing speeds, a hacker with the time, tools, and motivation to attack using brute force would require a trillion years to break into a session protected by an SGC-enabled certificate. To enable strong encryption for the most site visitors, choose an SSLCertificate that enables 128-bit minimum encryption for 99.9 percent of website visitors.

F. Mobile Software

Java Platform, Micro Edition, or Java ME, is a Java platform designed for embedded systems (mobile devices are one kind of such systems)[14]. Target devices range from industrial controls to mobile phones (especially feature phones) and set-top boxes. Java ME was formerly known as Java 2 Platform, Micro Edition (J2ME).Sun provides a reference implementation of these configurations and profiles for MIDP and CDC.The Foundation Profile is a Java ME Connected Device Configuration (CDC) profile. This profile is intended to be used by devices requiring a complete implementation of the Java virtual machine up to and including the entire Java Platform, Standard Edition API.

Table 1 – Database Comparision

Characteristics	**Record management system**	**J2meMicroDB**	**XML parser**
Definition	RMS is a combinational file system and database management system that enables us to store data in columns and rows similar to database tables.	J2MEMicroDB, a database engine for J2ME devices, is based on a three-tier architecture which includes a proxy server application, the remote database and mobile client.	Our XML parser wrapper class DBxmlparser parses a database-format XML document into a tree object and provides methods to access the data.
Features	Data can be inserted, read, searched and sorted by RMS.	A local Mimer SQL Mobile application may also access remote Mimer SQL databases. Very efficient compression techniques are used for the data stored in database to reduce the storage needs of mobile device up to 60%.	Data access requests go from mobile client to proxy server application via HTTP (Hyper Text Transport Protocol) and proxy server application uses the JDBC (Java Database Connection) API to connect to remote databases. It is lightweight, it presents time efficient database access, it uses a remote DBMS through a web service.
Limitation	RMS is not a relational database, so SQL cannot be used.	Mimer SQL Mobile does not support Symbian OS-Series 40 platform which is widely used.	Database using xml document is good for smaller databases having less rows, it's not suitable for storage of larger record.e.g.records generated during transactions.

G. Reserve Bank of India Rules and regulations

M-Wallet falls into the category of Open System Prepaid Payment Instruments in Reserve Bank of India's (RBI) draft for Draft Guidelines for issuance and operation of Prepaid Payment Instruments in India. [10]. these payment instruments can be used for purchase of goods and services and also permit cash withdrawal. According to the guidelines a mobile prepaid system like M-Wallet can be implemented by any bank which has which have been permitted to provide Mobile Banking Transactions by the Reserve Bank of India. The guidelines on Know Your Customer/Anti-Money Laundering/Combating Financing of Terrorism guidelines issued by the Reserve Bank of India to banks, from time to time also apply to prepaid payment instruments. Hence

M-Wallet requires fulfilment of Know Your Customer norms. It also states that all prepaid payment instruments issuers shall disclose all important terms and conditions in clear and simple language. The outstanding balances of M-Wallet shall be part of the net demand and time liabilities of the bank for the purpose of maintenance of reserve requirements. This position will be computed on the basis of the balances appearing in the books of the bank as on the date of reporting.

ACKNOWLEDGEMENT

This work was influenced by countless individuals whom we were fortunate enough to meet during our research duration. While space does not permit us to acknowledge them all, we would remiss if we do not acknowledge the following individuals whose guidance, support and wisdom so greatly influenced this body of work.We are thankful to Prof. Sharmila Gaikwad for helping us and giving us innovative ideas for improving our work.We would also thank our institution and faculty members without whom this work would have been a distant reality

CONCLUSION

Our Secure Mobile Wallet is the productbelonging to the latest technology trends in mobilecommunications and IT security. As the clientapplication of the larger system, Secure. Mobile-Wallet is a software which also introduces convenience, functionality and security for financial mobile transaction. The aim of the design is to provide people a more flexible wayto use cash and credit cards securely-Wallet offers a safe, easy to use, low cost, reliable means of making payments in this mobile world in seconds by just pressing a few buttons on the mobile phone or other handheld device. It thus relieves users from having to securely carry and manage cash, credit cards or to purchase any extra hardware. With M-Wallet monetary transactions can be made anywhere and anytime. In the future we planto expandour repertoire of servicesto include a largercatalogue of content types, refine the user interface, and expand it to a wider variety of user pilots.

In a line, **"**M-Wallet is an ATM machine that literally slips into the pocket**".**

REFERENCES

[1]Mobile Wallet Task Force Mobey Forum, February 2012, URL:http://www.finextra.com/finextradownloads/prdocs/Mobey.pdf

[2][Jack 2011, et. al.] Jack, William; Tavnett, Suri, Mobile Money: The Economic of M-PESA

[3]Irvine, M, Watches lose ground to cell phones, MSNBC, Technology & Sciencehttp://www.msnbc.msn.com/id/17189064/

[4]Mallat, N., Matti R., and Tuunainen, V.K. 2004. Mobile Banking Services, COMMUN ACM, 47, 5 (May 2004), 42-46.

[5]http://www.ehow.com/info_8445090_advantages-disadvantages-ewallet.html#ixzz1XCRyeLMf/

[6]http://en.wikipedia.org/wiki/E-commerce_payment_system.

[7]http://www.ehow.com/info_8445090_advantages disadvantagesewallet .html #i xzz1XCRyeLMf

[8]http://www.motorola.com/pdfs/M-Wallet-Brochure.pdf /

[9]Personal area connectivity with bluetooth wireless technology Pratik Mehta, Senior Communications Architect Clint H. O'Conn or, Dell Technology Strategist Alan Sicher, Wireless Product Manager

[10]Reserve Bank of India. 2009. Draft Guidelines for issuance and operation of Prepaid Payment Instruments in India. [ONLINE] Available at: http://www.rbi.org.in/Scripts/bs_viewcontent.aspx?Id=1902.

[11]Irvine, M, Watches lose ground to cell phones, MSNBC http://www.msnbc.msn.com/id/17189064/

[12]http://www.emeint.net/M-Wallet.aspx/

[13]http://www.thenextwave.com/page19.html

[14]http://en.wikipedia.org/wiki/Java_Platform,_Micro_Edition