Development of Advance Digital Mobile Wallet

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Abstract— Nowadays whole world is moving to era of digitalization. The Drastic digitalization over the past few decades has indubitably affected almost every field of life. Cashless economy is also one of them. Robust technologies made it easy and reliable to transact digitally. However, compulsion of good network deprives many of common mass to be digital. In our scheme, we are proposing an advance mobile payment system in which we are integrating various functionalities of digital transactions, where one can securely make payments online as well as offline in case of unavailability of network. This wallet may also be used in online payments. With the help of proposed system, proximity and distant transactions may be bring down at ground level. NFC (near field communication) technology enables simple and safe bidirectional interaction between two devices, which will be basic key to offline transaction. For online transaction we will use payment gateway such we can also make distant transactions.

Key words: Near Field Communication, Proximity Transaction, Distant Transaction, Payment System, E-Wallet, Digital Wallet

I. INTRODUCTION

From barter system to digital payments world economy have seen many phases of transaction methods. As people faces difficulties with conventional ways in their business and common transactions. To counter, at every phase economists tried to ease the methods of transactions. Paper currency plays the most important role among all the transaction methods. Over a few decades the severe digitalization gives us the simpler and easier ways of transactions.

There was a time when it was beyond thinking to transfer money to thousands of miles in just a minute. Still it is not easy to carry hard cash everywhere and at each instance. Many digital wallets and online transaction gateways already have ease the problems of cash handling and far distant transactions. But still we are unable to take down it at ground level. There are still some barriers which limits the digital payment methods [1]. Complexities, threat of frauds, unavailability of relative resources, poor connectivity are still challenges which are limiting uses of digital method. Proximity transaction can also will done in Offline mode and can efface the compulsion of internet connectivity.

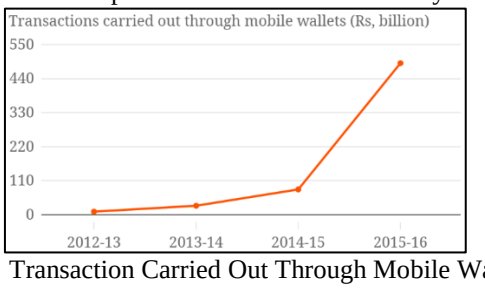

Fig. 1: Transaction Carried Out Through Mobile Wallets (Rs,Billion)[2]

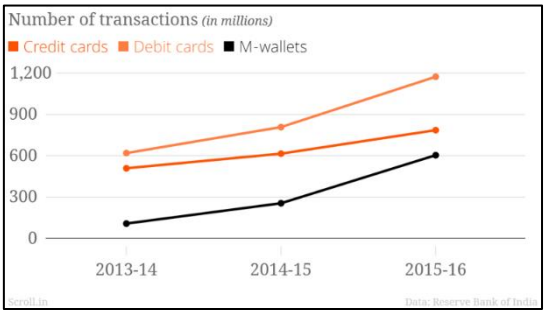

Fig. 2: Number of Transactions [2]

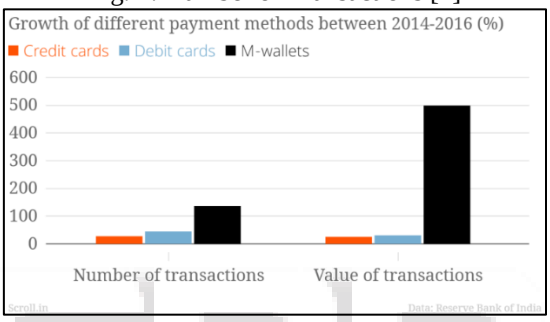

Fig. 3: Growth of Different Payment Methods between 2014-16 [2]

From above data we observe that in the country of 1.25 billion population only 10-15% people uses e-money. In our paper we are proposing an efficient alternative to conventional and current payment systems which is based on providing daily basis transaction facilities which are not govern by nowadays facilities providers. Our device will prove as panacea in the field of digital payment systems.

A. Advantages

There are several advantages of using digital wallet over conventional payment methods:

1) It will supersede the use of hard cash which is not safe and reliable to carry everywhere and at every instant.
2) Risk of theft and lost of money will minimized.
3) There is no limit on number of transactions.
4) Proximity Payments using this device will not be committed of net compulsion; hence transactions are possible in lack of networks.
5) Low value transactions are possible.
6) Even a layman can use this device for their daily transactions.
7) Problem of change will vanish as transaction of any value either odd or even is possible.
8) Control on black money as every transaction will be monitored by server.
9) Minimization in flow of hard cash in economy will reduce black money.
   Device may also use in transactions for online payments.
   Single device is capable to perform multipurpose transaction.

II. RELATED WORK

Offline transaction may be done using NFC (near field communication). Whole transaction process is synchronized by a server. Server is also responsible for refilling of the device which is to be used for payment.

NFC (near field communication) is a short range wireless connectivity technology enables safe bidirectional interaction between electronic devices [3].

Payments using NFC can make proximity transactions easily and offline. Most of the present available systems need some online authentications from bank. This can cause bottle-neck in internet banking system resulting in decreased efficiency. Hence NFC technology may offer a good condition which may be used for better financial transactions [4].

Raja Naeem Akram [5] proposed a recovery method from a missed Digital wallet. His proposed framework helps a smartcard user to recover his/her money from lost card.
Instead of all such methods, we still needs a system which may be user friendly and the customer /merchant may easily believe on its fidelity.

III. PROPOSED SYSTEM DESIGN

We here tried to propose a framework which is for proximity transaction we are using NFC while if we want to transact for distant merchant then we may make use of networks. The whole working and designing of system is further structured in some parts.

A. Registration

Registration is done to give authorization of particular device to an individual. It will done with the help of AADHAR and will give an identity that device belongs to particular user, so that, we can verify the user and can get necessary information about device activity. This ID will enhance security concerns as well as it will help server in monitoring particular's transactions. It will also help in any future dispute related to device.

B. Transaction

In our general life we made two type of transactions as per our requirement, these are

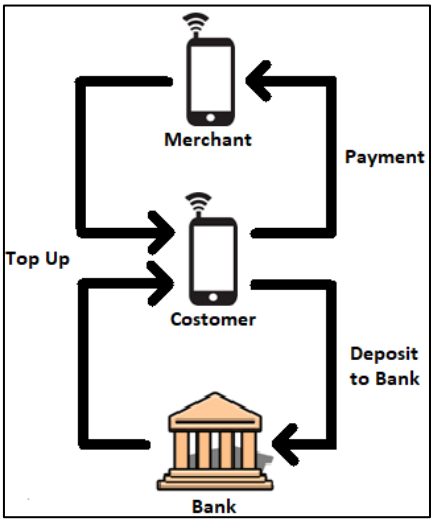

Fig. 4: Transaction Flow Diagram

1) Proximity Transactions

These transactions are near distance transactions. Most of the transactions we made in our daily life from any retailer, merchant are proximity transactions. Mandatory condition for this type of transaction is that the devices should be in the NFC range of each other.

In the country like India we still are in lack of good connectivity of internet. So to take the digital transactions at ground level we proposed a method which will not demand compulsion of internet for their functioning. Any person having the device will be able to send or receive the money offline mode.

a) Working

The proximity transactions will make use of NFC. Every device user will have its password to operate it. When customer wants to pay the money then devices should be in close proximity of customer. Steps for making a proximity transaction are given below.

1) The merchant will enter the amount & command its device to receive at same time customer will command its device to pay. By doing it both devices are ready for transaction.
2) Now both devices should be take close enough to be in the range of NFC By doing such merchant device will send a request to customer's device. In the request customer will receive the request from merchant with its ID and amount.
3) If customer is really wanted to pay then he has to confirm the merchant request. Confirmation by customer the interface will be made between customer and merchant and desired amount of money will be transacted. As the whole process is fully offline which can convince customers that their money is fully safe.

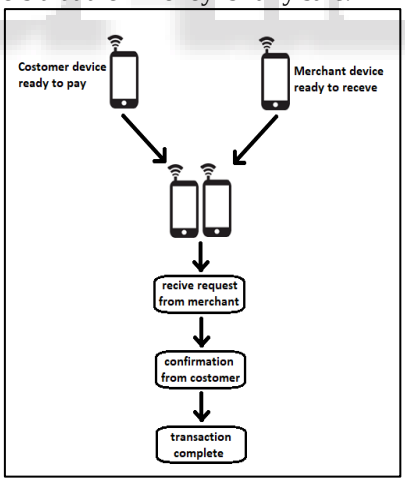

Fig. 5: Procedure for Proximity Transaction

2) Distant Transactions

The transaction made to a distant merchant or retailer comes in this type of transactions. These transactions would make use of network connectivity.
These transactions may be of two types

a) Money transfer to similar device

This type of transaction may be done for paying distant device which is not close enough in the range of customer. For transferring money to distant similar device the process is as follows

1) Input the wallet ID of receiver in your wallet.

2) Input the amount to be paid.
3) The input data will go through a payment gateway.
4) Processing of transaction will be done by the payment gateway; either payment is accepted or declined.
5) If payment is accepted then the merchant will receive the money and an acknowledgement will be send to customer.
   Such payments or transfer of money may be completed for distant similar devices.

C. Online Payments

Online payments may be done for paying money to any online services, e-commerce sites which demands it.
Procedure for online payment is as follows

1) Merchant will create a merchant account for our payment gateway.
2) Merchant will add our payment method at their website.
3) Now the payee will select our wallet payment method in the merchant website.
4) By entering wallet ID in its website it will send all information our payment gateway for further process.
5) A request will be send to payer device for confirmation.
6) If payer confirm the request and has enough money in his wallet then transaction will be completed.
7) After whole process payer will receive an acknowledgement.

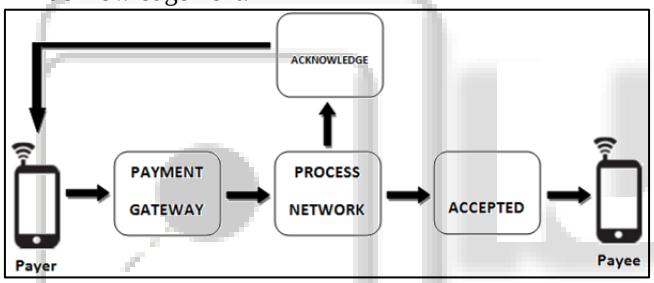

Fig. 6: Functioning of Distant Transaction

D. Synchronization

Details of each and every transaction done with the device will be sending to the server when device is online. All transaction data will be synchronized periodically and the data will be given to main server. Whole data of each transaction mode will be uploaded to administrator for verification of actuality of transaction. This synchronized data will help in making transparency in transaction this transparent transaction can help in controlling black money surveillance on each transaction.

E. Wallet recharge

Wallet should have some amount to make payment. So the wallet should be recharged for payment. This recharge may be done by two methods

1) By adding money by bank account with the help of payment gateway. A device owner can recharge his/her wallet by going on the site of bank and making online transaction with the help of a secure gateway.
2) A wallet can also be recharged by another similar device having some money in its wallet with the help of any mode of transaction as mentioned above.

F. Deposition in User Account

When the money in wallet is more than its threshold and user wants to deposit in his/her bank account then he may deposit his money to his bank account. For this we will provide some payment gateway so that user can instantly send money to bank account just in simple ways.

This function enables customer to deposit his wallet amount in his/her bank account.

G. Security Design

Many security measures should be considered while making the device. As in any case the device is lost the money in the wallet should we recoverable. For recovery money we will take the help of the server. The device owner should inform administrator about lost device. Our server will instantly block the device and no further transaction will be possible from this device. The victim user will be issued a new device and would be register on the device. After registration the user will got the lost amount in his new wallet.

IV. CONCLUSION

In this paper, we tried to work on the barriers of present time digital payment system. We proposed an easier and more reliable digital wallet which may be a good alternate for existing wallets.

By keeping in mind about conditions of net connectivity in our country, we are going to work on a device which will remove compulsion of internet connectivity in digital transactions.

Using NFC, we can made offline transactions in an easier and faster way. To use device in offline mode the devices should be in close proximity. Our device may also work for distant transactions by making it online.

Wallets may be recharged with either bank accounts or another wallet. In any case if wallet is lost then the money of wallet will be safe. These features of our device may easily convince our customers to faith on it as their all transactions are safe. If the device is built as our proposed scheme the surely it will take a revolution in the area of digital transactions.

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