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UID based Mobile Money Implementation in Rural Areas of India

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Abstract

The greatest majority of the population of developing countries in the world is living in rural areas, generally not well educated and disadvantaged of access to financial services. Around 480 million people, mostly living in the country's 630,000 villages, have no banking access. They generally trust on payments from economic migrants for poverty easement.

So, there is a terrible need for the development of an effective way for funds payments especially for the rural denizens (unbanked consumers). Mobile money can be proved a powerful tool for cheap, secure and convenient money transfer.

This paper proposes a framework for mobile money implementation in remote areas for sending money from cities and towns to rural denizens. The objective is to design a convenient, cheap and reliable technique of sending money better than existing transfers. It employs a 3-level security using mobile phone (one time password), fingerprints and the AADHAAR (Individual Identification Number issued by the Unique Authority of India). It proposes a cost model for m-money targeting the extreme rural and distant location of geographically huge India.

Keywords: *Mobile, AADHAAR card, Mobile money.*

1. Introduction

Most of the rural denizens somehow depend on remittance from their family members or friends because these rural areas have lack or limited access to financial services. People have to travel a mile away for collect their money to the nearest pay out point which is often costly and time consuming.

Taking the advantage of facilities provided by banks and money transfer for rural dwellers is somewhat difficult because of low accessibility of these formal financial institutions. So these people used to borrow money from private money lenders at a high interest rate at time of any need. For these rural denizens taking a loan from bank(at low interest rate) is more challenging task than borrow money from private lenders(at high interest rate) as they have to travel several miles with high cost of conveyance to reach the nearest bank branch, in this case they also have to waste their a long time in travelling. This is not all, there is a list of problems that these rural dwellers have to face while accessing bank services. Filling out application forms and completing the necessary documentations required by banks are a headache for them.[6].

2. Mobile Money

Mobile Money (m-Money) can be understood as a range of financial services delivered to the consumer via a mobile phone. The services include savings, payments, credits and lodgings. It could be person to person transfer of funds either domestic or international payments, or person to business payments for goods and services or mobile banking [1].

41% of the population in India does not have access to banks and banking resources[7]. Mobile money services are currently being deployed in many markets across the world and in India too, and there is strong evidence that they can improve access to formal financial services in developing countries. In many developing countries, mobile operators have been more successful reaching unbanked consumers than banks. In those cases where customer have a mobile phone, but no bank account, mobile money services revised a unique opportunity to bring customers from cash economics into the formal financial system and to provide them with access to financial services. Studies in several countries, including Brazil, South Africa, Kenya, Malaysia and the Philippines indicate that the lower cost is one of the most important factors driving the adoption of new mobile money services[7]. Delivery speed and convenience are also important, such as the perceived safety of the money of the loss and security of transactions. There are number of

services in above mentioned countries related to m-money which has also increased the take up of mobiles. These services are characteristically used to perform low-value transactions and are deployed in both urban and rural environments.[7]

3. One Time Password

"One-time" as the name depicts it is only used once and that too for a short span of time. The algorithm that is used to generate OTP is psuedorandomness.

There is a time synchronisation between the client and the authentication server and also it works for short period of time as it is already being mentioned .OTP works on token system. Each time user uses a new password (or token) which is dead after a particular time.

One time password is easy use but practically it implements a strong technique for encryption. One Time Password refers to a secret Password that is shared between prover and verifier and used only for one. if it is used once, then it can't be reused again or we can say it will not remain valid.

5. Fingerprint scan

Fingerprint scan is also renowned as finger scan. It is oldest and widely used biometric technique of authentication. Fingerprints are considered ideal means of identification.

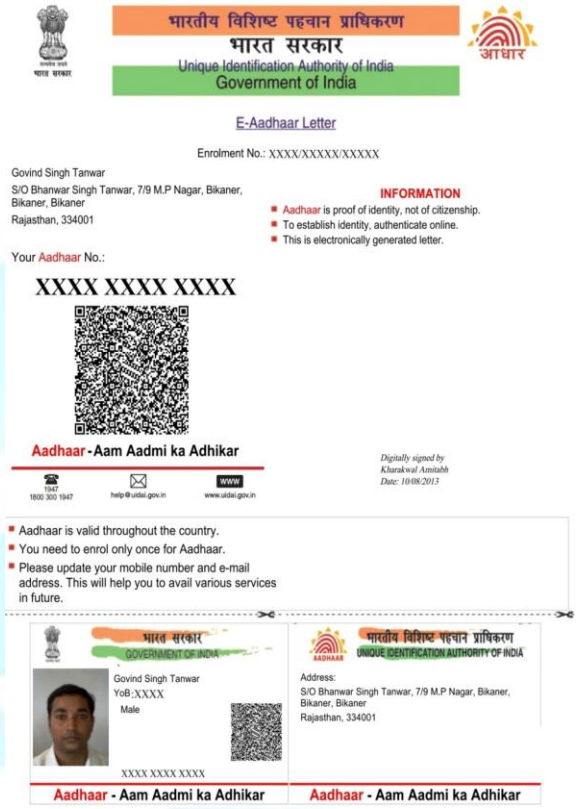
Fig.1: The image of a fingerprint ridge structure created by the friction

Every individual has his own unique fingerprints. No two individuals can have same pattern of fingerprints. Fingerprints remains unchanged for lifetime[11].

Fingerprint scanning is the process of taking human fingerprints and then storing them in database. It saves image in digital form.

5. Unique Identification Card (UID)

Fig.2: Aadhaar Card



UID number is 12 digit numbers that are show the unique id of every Indian citizen.[9]

Aadhaar is meant for people of all ages (including children) in order to establish identity . Because Aadhaar is only for individuals , it is different for all members of a family. Uniqueness of each individual to decide , the demographic details (residential address information) of the person and his / her biometric data (photograph , iris - scan , fingerprints) collected is stored in a centralized database.

6. Related Work

AP Smartcard Impact Evaluation Project, May 2013 by Piali Mukhopadhyay, Karthik Muralidharan, Paul Niehaus and Sandip Sukhtankar relies upon customer service providers (CSP) to process payments last mile on behalf of the contracted banks, using the point of service (POS) for authentication. Since the program wasled deploy smart

card by the Department of Rural Development (DRD) of the GOAP, the program serves two largesocial welfare programs administered by the DRD: Mahatma Gandhi National Rural Employment Plan (MGNREGS) and social state-sponsored pension program security (SSP).

M -PESA was launched in Kenya in 2007. It was launched by mobile network operator, Safaricom. It is most famous mobile money transfer technology. "within 5 years of it's establishment, there are nearly equal 16 million users of mobile money in Kenya, conducting over 2 million transactions every day". M -PESA now processes more transactions all over the country including Kenya than Western Union has globally and provides mobile banking services to more than 70 percent of the adult population[4].

In India, the HDFC bank has provided a service called **Eko**; this services enables the people to open an accounts (savings account) with the bank at a very low cost. [1]To open such an account, the user visit to the nearby "Customer Service Point" (CSP) in the area and registers themselves with these CSPs. According to the Medhi (et al., 2009), "CSP is defined as the small companies that run more than one company at the same time and place". The service can be used by anyone using the mobile phones of any model. Various services that are offered by this are namely, money transferring, cash deposit or withdrawal, receiving salaries, conducting micro-payments, micro-insurance, etc.[1] Eko has provided the facility of real time transactions and cash management through offering prepaid services which ensures transparency in the system. Eko provided the service of operating an account at a very low amount, the service known as "SimpliBank". This system is marked by the three level security system, the three levels of the security are – first is the mobile phone, the other is provided by the company brochure and the last one is the use of PINs [5].

Ay et al. (2007) presented huge opportunities for m-Commerce application in Nigeria based on the rate of diffusion of mobile devices. All banks that survived the "Exercise recapitalization" of the Central Bank of Nigeria actively implementing ICT in the delivery of services through various bank operations, including electronic payment cards and internet banking, but only 52% of banks offer m - banking services.

Similarly, Ayo and Ukpere (2010) designed a (single)-based ATM card with biometric smart card unified machine to reduce the number of cards made by each account holder as well as reduce the wave of identity theft that almost became a drag on the ATM adoption in Nigeria. Ayo (2010) has also designed a unified identity system, where the only electronic identity (eID) can be used across different platforms commercial transactions, banking and general identity. The system is such that the Nigerian national identity card functions as a payment card. This model is recommended for this frame.[8] [1]

7. Problem Formulation

In rural areas, most people do not have bank accounts or access to a financial institution. Carrying out banking services and money transfers for these people is somewhat challenging as a result of low accessibility to formal financial institutions. These people are largely poor old and young adults who depend on their employed relatives in cities for financial support to train their children and pay for other services.[1]
These are following issues, rural denizens have to face to while accessing formal financial institutions:

- Significant distances to the closest service point;
- High cost of transportation in reaching to the service point;
- Problem in filling` out application forms and completing the necessary documentations required by banks as they are not well educated;
- Limited options, such as only account-to-account transfers with access hurdles(e.g., minimum balance requirements);
- Unfamiliarity with other options offered by financial service providers

8. Proposed Work

The objective of our paper is to develop an effective framework for mobile money implementation in rural areas that is secure, cost effective and reliable. Our proposed framework would enable the sender to transfer money without much overhead of bank processing, also it would release the sender from the transportation and processing cost, which will make our proposed model more suitable and flexible.
Here, we are using Aadhaar for individual's identity authentication. It employs a 3-factor authentication using the phone, fingerprints and the Aadhaar card. Our purpose is to design a mobile money model for especially rural dwellers and unbanked consumers which will be reliable, easy to access, affordable, efficient and timeliness.

Description of the framework is given below[1]:

I. The parties involved are:

- Mobile Telecom Operators(MTO):all the mobile telecom operators in India
- All the banks and microfinance banks in India
- Bank outlets, kiosks in India
- The senders
- The recipients

II. The instruments involved are:

- National ID cards(Aadhaar)
- Fingerprint Scanner[1]
- Mobile phone

III. Procedure involved is:

1) Registration of Sender
2) Registration of Receivers by sender specifying the following
   - Name of recipient
   - Mobile number of recipient
   - Address of recipient
   - AADHAAR Id of recipient
   - Amount to remit
3) A unique secure code is sent to Sender and receiver
4) Recipient
   - Receives SMS notification
   - Shows message and Aadhaar card for processing
   - Fingerprints scanning
   - Cash dispensed via kiosk or bank outlets at rural locations
5) Bank
   - Debits sender's account
   - Sends notification to recipient and sender

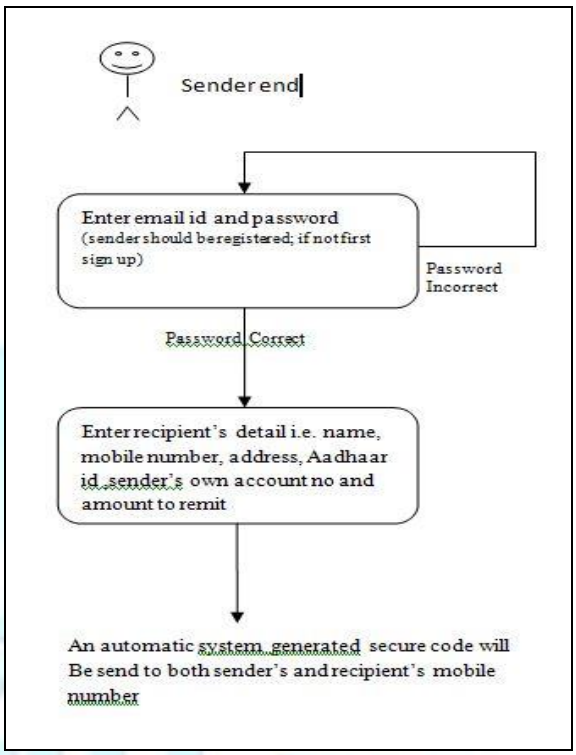


Fig 3: Implementation model of proposed work at sender side

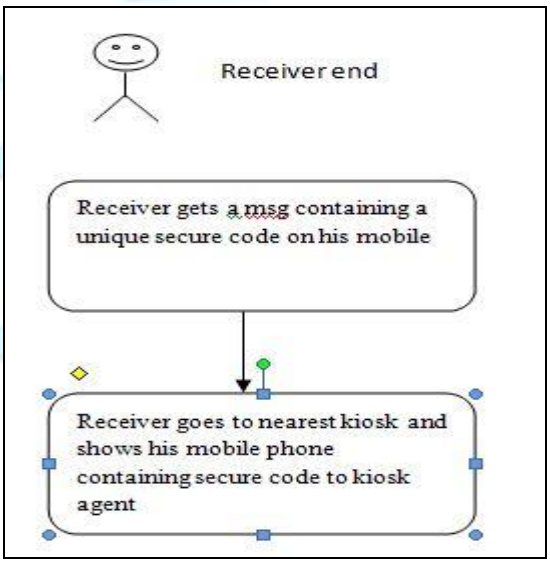


Fig 4: Implementation model of proposed work at recipient side

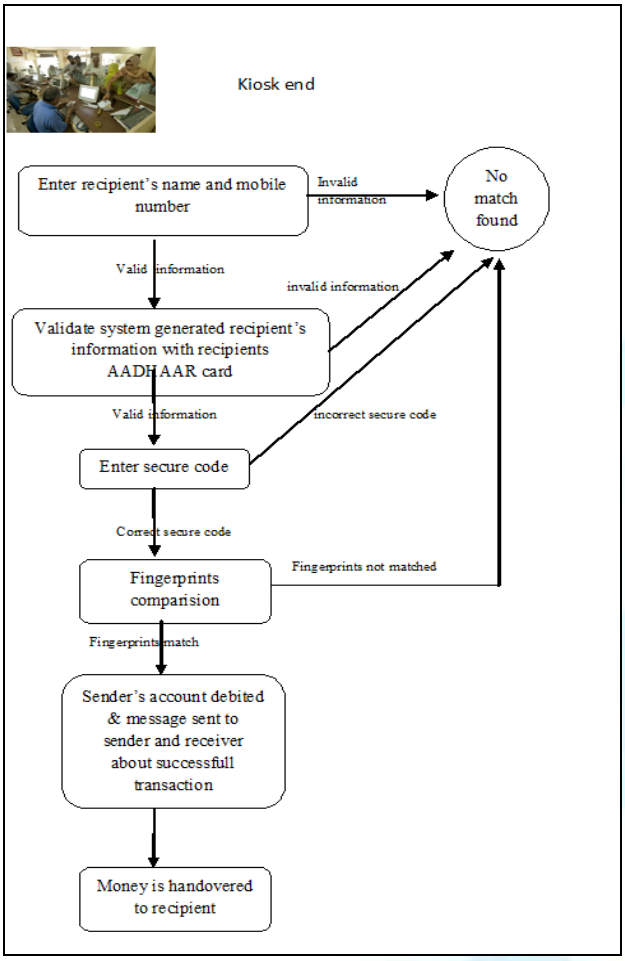


Fig 5: Implementation of proposed work at kiosk side

9. Conclusion & Future Scope

We have developed a framework for mobile money implementation in India based on 3-level security required i.e. authentication using Phone and fingerprints scan , UID. It will prove a simple, cheap and secure way of sending money better than the existing transfers. It proposes a low cost model for m-money targeting the extreme rural and distant location of geographically huge India.

It will facilitate access to finance through the mobile platform, which is widely used all over the world (two-thirds of the world population has access) among other information and communication technology (ICT) facilities.

Our proposed framework would enable the sender to transfer money to the receiver without much overhead of bank processing. Also it would release the sender from the transportation and processing cost, which will make our proposed model more suitable and flexible.

There is no limit of the work that can be done in the field of Mobile Money. Some of the main improvements that can be done to make this framework more efficient are that security parameters can be employed to make this framework more secure. Online authentication using QR code can also be employed rather than biometric authentication.

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