International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 06 Issue: 03 | March - 2022 ISSN: 2582-3930

Aadhaar Based Multi-Bank Debit Transaction with One Smart Card

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Abstract - Generally Customer will perform ATM transaction by using the respective Bank ATM Debit Card. It is difficult for Customer to carry multiple Debit cards and to remember the Pin Numbers. I am suggesting a solution that already every Bank Account is linked with Aadhaar so, Making an Aadhaar into Smart Aadhaar card by adding chip which will used to perform the ATM transactions. Here instead of carrying multiple cards and remembering of their pin numbers, Customer can carry one Aadhaar Digital card and can remember one pin number to perform any Bank ATM transactions. In proposed method what I want to suggest is Government/RBI have to design one SMART card which should linked with Aadhaar and it should make mandatory that all Bank Accounts should linked with Aadhaar.

***Key Words*:** One Card Multi-Bank Transactions, Multibank ATM, Smart ATM, Aadhaar ID based, Biometric Based, Secured ATM Transactions

1. INTRODUCTION

The automated teller machine (ATM) is an automatic banking machine (ABM) that allows the customer to complete basic transactions without any help from bank representatives. There are two types of automated teller machines (ATMs). The basic one allows the customer to only draw cash and receive a report of the account balance. Another one is a more complex machine that accepts the deposit, provides credit card payment facilities and reports account information. It is an electronic device that is used by only bank customers to process account transactions. The users access their accounts through a special type of plastic card that is encoded with user information on a magnetic strip. The strip contains an identification code that is transmitted to the bank's central computer by modem. The users insert the card into ATMs to access the account and process their account transactions. The automated teller machine was invented by john Shepherd-Barron in the year of 1960. So, with ATM lot of benefits are having for the customer and also having many security problems. As technology place a very important role in this Application, I have to provide better solution to overcome the problem. In the existing papers few are suggested the only Artificial Intelligence or Aadhaar based solutions. To provide high security in this paper I am grouping the two techniques of AI and Aadhaar. As the customer Account linked with Aadhaar ID the same data is going to furnish in the ATM card and as well the Customer Facial image with AI. When a Customer insert an ATM card first Account data will be fetched along with that it also fetches facial image and finger print based on AI and Aadhaar ID. Customer will be authorized by reading the current facial image with Cam and Fingerprint by device and will go for validation. After successful validation only Customer can perform the transaction. So, this will be leads to high level security in ATM transactions. ATM is an abbreviation of Automated Teller Machine. It was introduced in the year 1960s. ATM is an electronic telecommunication device that enables the customer of a financial institution to perform financial transactions without the need for a human cashier, clerk or bank teller. At first, the ATM was made to serve for the particular bank customers but later on the ATMs are connected to interbank network, to enable people to deposit, withdraw and transfer amount from the ATM machines not belonging to that particular bank i.e., a user can access any ATM machines to carry out transactions for any of his/her bank accounts [7]. ATMs relay on authorization of a financial transaction by the card issuer or other authorizing institution via the communication network. This is often performed through an ISO8583 messaging system. Many banks charge ATM usage fee from the customers for the transactions. At present every customer has an individual ATM card for each and every bank in which he/she maintains account. Thus, handling the cards and remembering their passwords is a difficult task for the customer. In this paper to overcome these difficulties we embedded more than one bank account of the user in a single ATM smart card and the authentication of the customer is performed by biometric analysis and a single PIN. The customer inserts the card and can select the bank from which he/she interested to carry out the transaction after the authentication is successful. Inter banking in India is provided by National Financial Switch (NFS). NFS is responsible for routing the transactions.

Aim and Objective of project

This proposed system will reduce the expenditure to design multiple cards, carrying of multiple cards and also ambiguity in remembering of multiple PINs. In terms of Security, it is validating the Customer based on Aadhaar database Fingerprint data. So, it will provide good security and also easy for Customer to perform multiple ATM transaction on multiple bank accounts.

Problem Statement:

1. Ambiguity: Having multiple ATM cards has to remember multiple PINs so, it is ambiguity for customer which PIN for which card.

2. Cost and Carry: To issue separate card from each bank the cost will be more, it is difficult for customer to carry multiple cards.

3. Security: Now the transactions is being performed by the customer only with PIN verification, it is known to others can be hacked the account.

2. LITERATURE REVIEW

2.1 The ATM Machine:

The idea of self service in retail banking developed through independent and simultaneous efforts in Japan, Sweden, the United Kingdom and the United States. In the US patent record, Luther George Simjian has been credited with developing a "prior art device". Specifically his 132 patent (US3079603) was first field on 30 June 1960. City Bank of New York installed a machine called a Bankograph in 1961. This wasn't an ATM as we know it, though: rather than dispensing cash, it acted as an automated way to deposit cash and checks but removed after six months due to the lack of customer acceptance. In simultaneous independent efforts, Engineers in Japan, Sweden and Britain developed their own cash machines during the early 1960s. The first of these was put into use was by Barclays Bank in Enfield Town in North London, United Kingdom, on 27 June 1967. This machine was the first in the world and was used by English comedy actor Reg Varney, at that time so as to ensure maximum publicity for the machines that were to become main stream in the UK.

2.2 One SMART card:

As the Customer Bank Accounts is linked with Aadhaar, instead of having multiple Bank ATM Debit cards if Government provides One SMART Debit card which was linked with Aadhaar. Then Customer will perform any Bank ATM Debit card transactions with One SMART Debit card. So, it reduces cost, ambiguity and difficulty in carrying.

2.3 Aadhaar based Security:

In ATM Debit card transaction customer is getting validated by entering PIN, here other than the authorized customer who knows the PIN also can perform the transaction. So, Security is somewhat getting lack. If SMART Debit card is linked with Aadhaar then the Customer should have to get validate by his Finger print which was stored in the UIDAI. So, it was more secured when we compare with the existing one.

3. EXISTING METHOD

When ATM Debit card is inserted into card slot the information present on the magnetic strip is read by two card readers present in the card slot. One card reader looks for special code which confirms that card is real. Second card reader grabs account number and password to check against what you entered. If authentication is successful then ATM connects with bank server through telephone network. Now user can perform bank transactions and when transaction is completed card comes out through ATM slot and user automatically logs out. Counting machine is present to count number of notes and receipt comes through printer which gives you information about transaction completed. User needs to perform one of the following transactions:

1 Cash transfer
2 Cash Withdraw
3 Balance Enquiry
4 Password change
5 Cash Deposit

To perform any of above ATM Debit card transaction Customer needs separate card and pin number for the respective Bank. It is being difficult for customer who have multiple Accounts in multiple Banks to carry multiple cards and to remember multiple pins. This is just general method of what happens.

4. PROPOSED SYSTEM

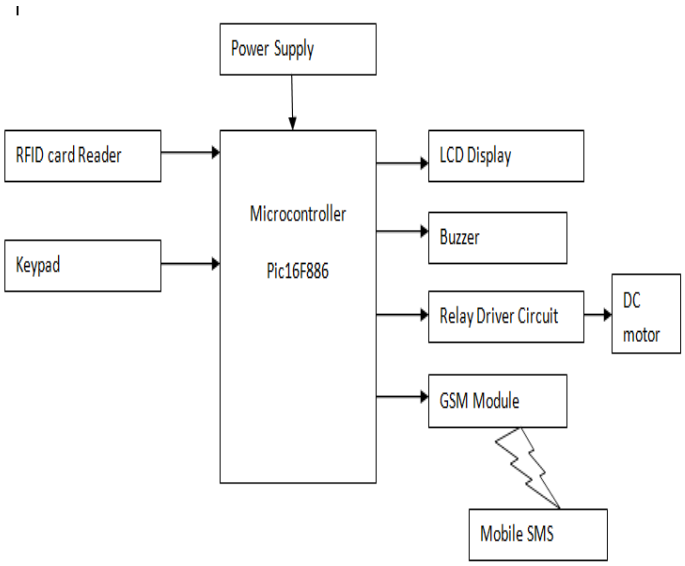

Fig -1: Block Diagram

In proposed method what I want to suggest is Government/RBI have to design one SMART card which should linked with Aadhaar and it should make mandatory that all Bank Accounts should linked with Aadhaar. SMART card also should have chip that should consists of Aadhaar ID. When Customer insert SMART card into the ATM, machine should scan Aadhaar ID and has send a request to UIDAI server to retrieve the Biometric images into cache for validation. If it reads data then it should send a signal to machine to scan the Customer Fingerprints. After reading Customer fingerprints it should send to the UIDAI server cache for validating the customer and to retrieve the linked Bank Accounts of a Customer. It should display the Bank Accounts which was linked to Aadhaar card on display. Customer has to select of any one of the Bank Account to perform the Debit card transaction. Once completion of choosing of Bank Account next will connection will be establish with the respective Bank server. After establishing connection, it will continue to perform the ATM transaction based on the existing scenario.

Our system consists of pic Microcontroller. RFID reader is work as a RFID card reader. By using keypad, we can provide input to system. All process will show on LCD display. It is an electronic device that is used by only bank customers to process account transactions. The users access their accounts through a special type of plastic card that is encoded with user information on a magnetic strip. The strip contains an identification code that is transmitted to the bank's central computer by modem. The users insert the card into ATMs to access the account and process their account transactions

4.1 PIC16f886 Microcontroller:

The PIC16F886-I/SP is a 8-bit flash-based CMOS Microcontroller. It features 256bytes of EEPROM data memory, self-programming, an ICD, 2 comparators, 11 channels of 10-bit Analogue-to-Digital (A/D) converter, 1 capture/compare/PWM and 1 Enhanced capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire serial peripheral interface (SPI™) or the 2-wire inter-integrated circuit (I²C™) bus and an enhanced universal asynchronous receiver transmitter (EUSART). The Analogue-to-Digital converter (ADC) allows conversion of an analogue input signal to a 10-bit binary representation of that signal. This device uses analogue inputs, which are multiplexed into a single sample and hold circuit. The output of the sample and hold is connected to the input of the converter. The converter generates a 10-bit binary result via successive approximation and stores the conversion result into the ADC result registers (ADRESL and ADRESH)

Features:

- Software selectable frequency range of 8MHz to 32kHz
- Fail-safe clock monitoring for critical applications
- Clock mode switching during operation for low-power operation
- Power-saving sleep mode
- Power-on reset (POR)
- Selectable brown-out reset (BOR) voltage
- Extended watchdog timer (WDT) with its own on-chip RC oscillator for reliable operation
- In-circuit serial Programming™ (ICSP™) via two pins
- In-circuit debug (ICD) via two pins
- High-endurance flash/EEPROM cell
- Self-reprogrammable under software control
- Programmable code protection
- Capture/compare/PWM (CCP) module
- Enhanced capture/compare/PWM (ECCP) module with auto-shutdown and PWM steering

Fig -2: PIC16f886

4.2 RFID Card Reader:

RF ID is Radio Frequency Identification which is used to make track of every physical object.

The frequency of operation widely used at present are **LF – Low Frequency 125 KHz** & **UHF (Mifare) 13.5MHz**.

In this post our focus is on 125KHz RF ID.

The main components of the RF ID system are:

1) The **RF ID Reader – EM-18 type** of RFID reader is used for demo in this post.

2) **RF ID tag** – The Tag contains an integrated circuit for memory & an Antenna coil. There are 2 types of Tags – Passive & Active. We make use of Passive tags here. As the name implies these tags do not have a power source. When the passive Tag is near a RF ID reader, the energy is induced by electromagnetic waves. The tag "wakes up" & responds by sending the data stored in its memory. **The RANGE of passive tag access is below 10 cm**.

Active tags have their own battery source & offer a long range of access. Active tags are costlier than the passive ones.

Fig -3: RFID Tag reader

4.3 LDC Display:

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.

The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

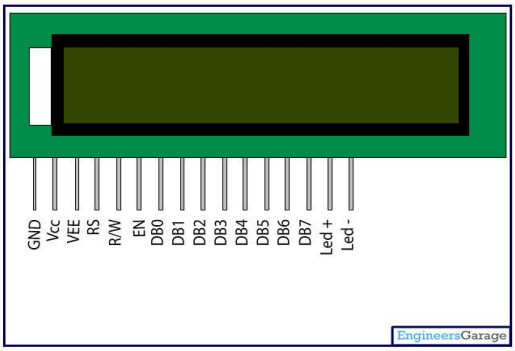

Fig -4: LCD Display

4.4 GSM Module:

This GSM modem has a **SIM800A chip and RS232** interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. Once you connect the SIM800 modem using the USB to RS232 connector, you need to find the correct COM port from the Device Manger of the USB to Serial Adapter. Then you can open Putty or any other terminal software and open an connection to that COM port at 9600 baud rate, which is the default baud rate of this modem.Once a serial connection is open through the computer or your microcontroller you can start sending the AT commands. When you send AT commands for example: "AT\r" you should receive back a reply from the SIM800 modem saying "OK" or other response depending on the command send.

SIM800 is a complete **Quad-band GSM/GPRS** solution in a LGA type which can be embedded in the customer applications. SIM800H support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. With tiny size of 15.8*17.8*2.4 mm, it can fit into slim and compact demands of customer design. Featuring and Embedded AT, it allows total cost savings and fast time-to-market for customer applications.

Fig -5: GSM Module

5. CONCLUSIONS

It is very difficult for Customer to carry multiple ATM Debit cards and also ambiguity to remember multiple PINs. This proposed system will reduce the expenditure to design multiple cards, carrying of multiple cards and also ambiguity in remembering of multiple PINs. In terms of Security, it is validating the Customer based on Aadhaar database Fingerprint data. So, it will provide good security and also easy for Customer to perform multiple ATM transaction on multiple bank accounts.

6. FUTURE SCOPE

- In future we should try on Card-less ATM transactions.
- Here Proposed system is applicable for only ATM based transactions. It is identifying the Customer Physically authorized or not.
- If the Customer want to perform the same Transaction through Online either with mobile app or internet banking there the Customer is identifying only with Password or PIN number to perform transaction. Therefore, Cybercrimes are growing rapidly.
- In future we will try to apply this functionality on Credit card transactions

ACKNOWLEDGEMENT

It gives us great pleasure in presenting the paper on “Adhaar Based Multi-Bank Debit Transaction with One Smart card”. We would like to take this opportunity to thank our guide, Prof. J.N. Dighe, Professor, Department of Electronics and Telecommunication Engineering Department, Amrutvahini polytechnic, Sangamner for giving us all the help and guidance we needed. We are grateful to him for his kind support, and valuable suggestions were very helpful.

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