Real Time Password Authentication System for ATM

Prof. Dr. G.M. Phade[1], Miss. Achuki Saini[2], Mr. Fazal Shaikh[3], Mr. Deepak Sharma[4]

HOD, Department of Electronics and Telecommunication Engineering,

Sandip Institute of Technology &Research Centre, Nashik, Savitribai Phule Pune University, Pune, India[1]

UG Student, Department of Electronics and Telecommunication Engineering,

Sandip Institute of Technology &Research Centre, Nashik, Savitribai Phule Pune University, Pune, India[2,3,4]

Abstract: The existing ATM systems uses one magnetic card & a static PIN. Hence the security of present system is vulnerable as security of such systems can be breached byskimming devices, card trapping etc.The proposed systemintroduces transaction authentication code (TAC) which is dynamic 4 digit secrete code generated during transaction in addition with static PIN and send it to user's cell phone no. Here unless entered code by the user as well as generated code is matched the transaction doesn't get completed. This system is realized using LPC2148 which is a series controller of ARM7 & peripherals like GSM module &RFID systems. Proposed systemis complex and hence provides better security than systems before.

Keywords:ATM, ARM7 LPC2148, TAC, GSM Modem, LCD, RFID Cards and Reader, Keypad.

I. INTRODUCTION

Today as we all seen ATM has been used in our daily lives, as they are used for ease in transaction which was somewhat difficult in early times where there were long queues in bank for withdrawals and checking balance of account. ATM allows a customer to make cash withdrawals and check account balance without the need for human teller. The present ATM system uses Bank ATM card and PIN (Personal Identification Number) which user can change at any time through ATM machines. This password is static type i.e. once set access will be done after using this so the chances to hack it more, and if ATM card is lost and password is stolen then anyone can easily access that account by making financial losses of customer so there are chances of security threats in existing system like shoulder surfing, data skimming, card trapping. Various Shoulder surfing resistant PIN entry methods have Been proposed for secure PIN entry but they are not resistant to recording attack Magnetic Stripe technology is most commonly used in existing ATM cards. In magnetic stripe, when the person inserts his card into the card reader, the skimmer captures the card information with the help of skimming devices which is placed upon the reader, so various chances of skimming attacks has been seen. Several proposed work done with the help of Biometric authentication.The main purpose to use biometrics is for uniquely identify an individual with the help of characteristics of the human body. Biometrics uses characteristics that can be physical such as finger prints, face, voice, and iris scan. As they are known to be very secure and are used in special organization.

II. LITERATURE REVIEW

We have studied various related works to implement this concept and found the following information.Ugochukwu

Onwudebelu [1] proposed an ATM system with mobile phone text message as a SMS based hashing scheme, here customer send mobile phone text message as an alert message to bank for transaction process. Then Bank generates a hash code with the help of PIN andphone number. Here security increases, but the proposedsystem required two way communications because of three mandatory SMS message for complete process which increase the communication charges. R. Rasu [9] Here author's used Finger biometric, Iris and Face recognition method for security of ATM. By using biometric authentication, the system gets costlier and also storage space for biometric data.

Ankush Vishwanath [2] proposed a security system with the help of RFID and GSM. They used a RFID card with unique number to identify a user, after readingcard system will send a password to user's cell phonethrough GSM.

Here access will be done after enteringcombination of password with unique code, but here user has to enter a password and unique code in combinable form which is not easy for every user and they also used that system for security purpose only. Fadi Aloul [3] proposed a mobile phone based software token system.

They used two authentication system, first in which client's mobile and server both will generate one-time password and if bothOTP matches then authentication will have done. In second method client will send SMS to server for OTP, then OTP will be send by the server to the mobile phone of user.

Here a two-way communication is required between both

client and server, and also OTPgeneration software is required on client's mobile phone which is not possible for every user So this paper try to overcome these limitations byusing RFID cards, TAC, one-way communication and with simple and user friendly system.

III. HARDWARE DESIGN

The following Fig. 1 shows the various components of ATM system. The LPC2148 is used which is a series controller of ARM7 family. The ATMsystem consists of power supplyfor LPC2148, 125KHZ RFID card and reader for readingthe data of the RFID card, memory is used for creating thedatabase, keypad for entering PIN and TAC, LCD is usedfor displaying the information, and a GSM modem is used for sending a TAC to the user's cell phone. Here GSM modem and RFID reader both are connected to the controller with the RS232 interface. RFID Based Real Time Password Authentication System for ATM
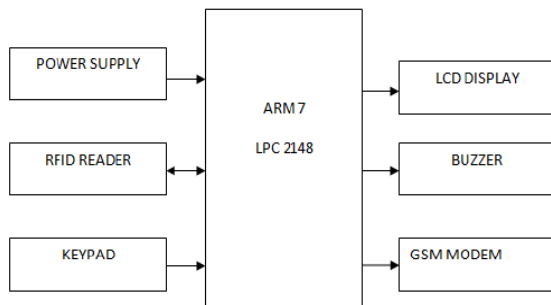

Fig:1 Block diagram of the System

A. RFID System:
Radio frequency identification (RFID): RFID is used for the purpose of identification and tracking with the help of radio waves. It is advance contactless identification technology. In Radiofrequency waves are used totransfer data between readers and tag to identify, track and categorize. There are three primary frequency bands are used for RFID Low Frequency (125/134 KHz), High Frequency (13.56MHz) and Ultra High Frequency (850 MHz to 950 MHz).

RFID system consists of three main components are as follows.
1)RFID tag
2)RFID reader
3)Backend database server.

B.RFID Tag:
RFID tag is a small electronic device in which small antenna and a microchip is present, where chip is used to store a unique identification number and product information. Microchip is an integrated circuit, which is embedded on silicon chip. Mainly there are two types of RFID tag such as active andpassive [6]. Active tag contains their own power source an on board battery is present in active tag andbecause ofthem on board power source, active tag operates at higher frequency and also

they are expensive [7]. Passive RFID tag get power source from reader, operating at lowerfrequency and read range of passive tag is less than active tag [8].

C.RFID EM 18 Reader Module:
It isused for reading he RFID tag. Basically it works as a transponder which sends and receives radio signals. The EM 18 RFID reader module comes with an on chip antenna and can be power up with a 5v power supply. It operates at a frequency of 125 KHz. The transmit pin of the RFID reader module is connected to the receive pin of LPC2148 IC. When a RFID card is brought near to the reader it produces a beep sound and a LED turns ON. The read distance of this RFID card is 5cm and it reads only one card at a time. The Fig 2 shows the principle of RFID system in which the antenna within a reader generates electromagnetic field and transfers the energy signal to the tag with the help of radio waves [6]. Then tag will have received that energy signal and store charge in a capacitor in this way tag get power from the energy signal [8]. When thecapacitor has built up enough energy, tag will transfer the data to words the reader in encoded form using radio waves and then reader decode the data and data will be stored in the backend database server for further processing.

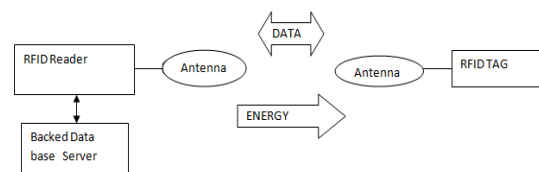Fig. 2: RFID Principle

D.LPC2148:
In this system we are using LPC2148 IC from ARM7 familyfrom NXP semiconductors (founded by Phillips). It is the series controller of the ARM7 family which is an Advanced RISC Machine (ARM).It is a 32bit ARM7TDMIS microcontroller in a tiny LQFP 64 package. It has 8 kB to 40 kB of on chip static RAM and 32 kB to512 kB of on chipflash memory, two 32 bit timers or external event counters, two UARTs [11]. In LPC2148 IC CPU operating voltage ranges from 3.0 V to 3.6 V (3.3 V ± 10 %) with 5 V tolerant I/O pads which is uses low power consumption. In this two power saving modes are available which are power down and idle. Here onchip integrated oscillator operates with an external crystal from 1 MHz to 25 MHz; hence speed of this IC is 60 MHz which offers high performance. Here up to 45 of 5V tolerant fast general purpose input output pins are also available.

E.GSM Modem:
GSM is a Global System for Mobile communication (GSM) and it is globallyaccepted standard fordigital cellular communication. It is a wireless modem which works with a GSM wireless network. It supportswide range of frequencies and also supports integration with RS 232cable, provided with SIM holder [12]. It is programmed with ATcommands, here we have used

DOI 10.17148/IJARCCE.2016.55118   451

SIM300 GSM modem for sending TAC as a SMS messages and to monitorthe signal strength in particular locality.

F.Power Supply:
In this system the power supply consists of a transformer to step down followed by diodes. The diodes are used torectify the ac components to dc, after rectification processthe obtained rippled dc is filtered using a capacitor filter. The positive voltage of 5V is made available through LM7805. After that LM 317 is used to provide power 3.3V to LPC2148.

G.LCD and Keypad:
Here we have used a 16*2 LCDfor display purpose. It is sufficiently wide to serves the purpose of an ATM display screen. It operates at a 5V dc.The keypad that we have opted for is a 4*3 matrix keypad. The rows and columns are connected to GPIO ports of the LPC2148 IC. It is used to enter PIN and TAC in this system.RFID Based Real Time Password Authentication System for ATM

IV. METHODOLOGY & WORKING

To implement this system firstly designed a circuit diagram with the help of Proteussoftware in which LPC2148 IC is connected with all the components after that same design is used to design PCB layout. Then connecting all the hardware components with controller IC, programming is done with the help of keilµ vision 5 [13]. The program is burn into the LPC2148 IC using Flash magic software. In this system user must have to register with his cell phone number at the time of registration. In this ATM system three RFID cards are used.Firstly user have to place a card near a RFID reader, reader will read the card information if the card is authorized then LCD will display message shown in Fig. 3.
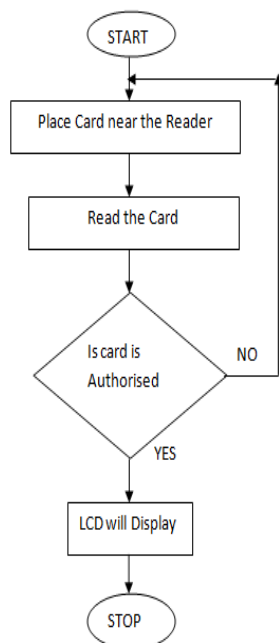
The TAC is a 4 digit code which is randomly generated by microcontroller after card and PIN is authorized and it will be saved in the memory. Then this TAC will be sent to the user's cell phone number as a Transaction Authentication Code shown in Fig. 4. After that user must have to enter that TAC, if the entered TAC is correct then the menu will appear on the LCD. Then user will be allowed for checking Balance, Credit and Debit Money.
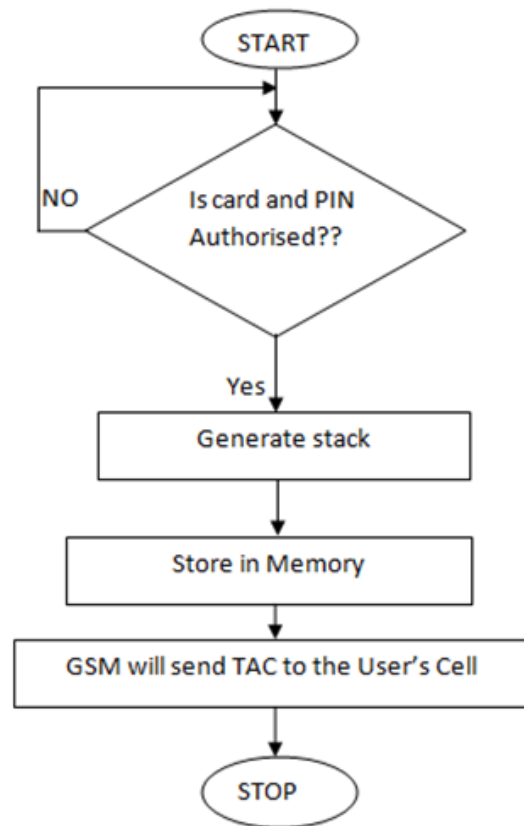

Fig. 4:GSM Flowchart

Steps to be followed by the user
1)Place a card near a RFID reader shown in Fig. 5.

Fig. 5

2)LPC2148 validates that card and LCD will display a message to enter PIN within 30 sec refer Fig. 6

Fig. 3 Flowchart of the RFID

Fig. 6

3)Now controller will randomly generate TACwhich is dynamic 4 digits secrete code.

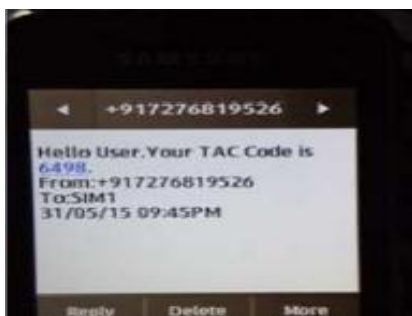4)Then controller sends that TAC to the user's cell phone number as a SMS through GSM modem shown in Fig. 7.

Fig. 7

5)When this TAC is entered by the user within 30 sec shown in Fig 8 then and only then LCD will display a menu on screen.

Fig. 8

6)Finally user can check his account balance, cancredit money into his account, debit money from his account and etc shown in Fig 9.

Fig. 9

7)After performing one operation the system will automatically exit from the menu.
8)Thena confirmation message with balance information is send to the user's cell phone number shown in Fig. 10.
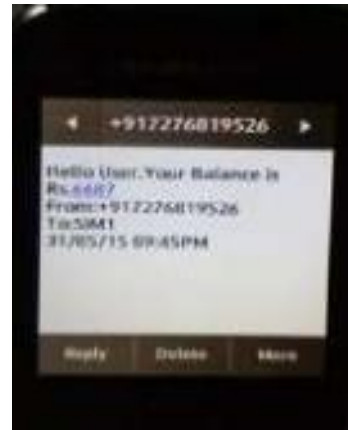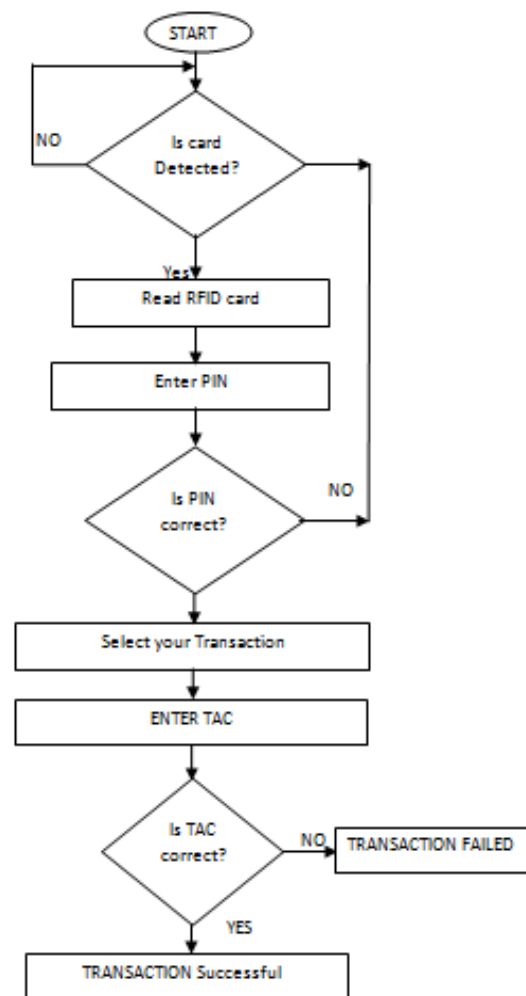

Fig. 10

V. FLOWCHART OF THE SYSTEM

Fig. 11: Flowchart of ATM System

VI. CONCLUSION

Today, single factor for authentication like PIN is no longer considered secure in ATM. Because of easy to guess password, there are increasing financial crime cases for ATM users. The RFID based real time

password authentication has been used to meet the demand of organization for providing stronger authentication options to ATM users. This paper focused on the implementation of RFID and TAC based real time password authentication method using cell phone.

As RFID technology is emerging technology which can be used in wide range of application. Here both RFID and TAC are integrated, as TAC should be entered by the user for successful transaction. This system is suitable for several practical applications like user identity, security purpose and prevention from ATM frauds. Thus this system ensures to solve the aspect of ATM security to a larger extent due to the use of cell phone service. This system works at lower power as LPC2148 is used, and compact in size, less maintenance requires and also it gives easy control, time saving, reliable and user friendly.

ACKNOWLEDGEMENT

REFERENCES

[1]. Ms. Soniya B. Milmile,Prof. Amol k. Boke"Review paper on real time password authentication system of ATM",IJAICT Volume 1, Issue 7, November pp 2348 9928, 2014.

[2]. V. PadmaPriya, S.Prakasam,"Enhancing ATM Security using Fingerprint and GSM Technology,International Journal of Computer Applications (0975 8887) Volume 80 No 16,pp. 43-46,2013.

[3]. Shyamnathi D, Shrinivasan J,"An Embedded real time finger vein recognition System for ATM security, international journal of advanced research trends in engineering and technology (IJARTET)Vol. II, Special Issue xi, pp.94-99, 2015.

[4]. Shobhit Mishra , Sunil Kumar,"An Embedded Real Time Finger Vein Recognition System forATM, International Journal of Engineering and Technical Research (IJETR) ISSN: 2321-0869,Volume-2, Issue-4,pp. 38-43,2014.

[5]. D. Wang , J. Li, and G. Memik,"User identification based on finger vein patterns for consumerelectronics devices, IEEE Transactions on Consumer Electronics, vol. 56, no. 2, pp. 799-804,2010.

[6]. H. Lee, S. Lee, T. Kim, and HyokyungBahn,"Secure user identification for consumer electronics devices, IEEE Transactions on Consumer Electronics, vol.54, no.4, pp.1798-1802, Nov. 2008.

[7]. D. Mulyono and S. J. Horng,"A study of finger vein biometric for personal identification, Proceedingsof the International Symposium Biometrics and Security Technologies, pp. 134141,2008

[8]. G. Udaya Sree, M.Vinusha,"Real Time SMS-Based Hashing Scheme for Securing Financial Transactionson ATM Terminal, International Journal of Scientific Engineering and Technology Research Volume. 02, IssueNo.12, pp.1223-1227,2013