ATM SECURITY SYSTEM USING RF, FINGERVEIN RECOGNITION AND GSM TECHNOLOGY

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Abstract -**The main aim of this project is to provide a high level security for ATM machine. The main problem in the current system is the database of the user can easily be hacked using skimmer while using ATM card. This project will provide solution to this hacking. This system consists of microcontroller, RF transmitter, RF receiver, GSM modem and Finger vein recognition system. In this system user will be provided with the RF transmitter when he enters into the ATM, signal is transmitted and is received by receiver in ATM machine. Only then access will be provided to finger vein recognition. If the finger vein is matched then a onetime password (OTP) will be sent to the users registered mobile number .If the user enters the corresponding OTP then the access is granted to transfer the money else denied and alert message is sent to the same mobile number. This type of security systems can be used in ATMs, bank lockers, safe vaults, army base, weaponry etc.**

Keywords-component; RF transmitter, RF receiver, GSM modem, one time password (OTP)

I INTRODUCTION

Security is essential in every places since illegal activities are occurring in every places today. So many private and government sectors are doing researches on improving the security systems.ATM machines are one of the places where high level security has to be provided. Finger Vein Recognition (FVR) system acts as the main level of security in this. Every time when the user using the ATM machines, the Finger Vein will be scanned and comparison is done. Finger Vein Recognition technique is more efficient and effective. When compared with pattern pin number security and other Biometric security like finger print security, palm print security etc.So this system can provide high security. In this system, initially uses will be provided with a particular RF transmitter which will be simply like a Button and it is a battery opened IC.This will transmit the frequency, which will be received by the receiver in the ATM machine. If the frequency matches then access will be provided to the FVR system. If FVR system is successfully accessed, then a onetime password will be sent to the user and user has to enter the password. After that access will be given to withdraw money, otherwise denied provided with an Alert system.

II DESIGN AND PROCESSING

This project is implemented using both hardware and software tools. Hardware tools includes the IC HT12E (Transmitter) and HT12D (Receiver) which are used RF transmitter and RF receiver and GSM module.The above mentioned are the main hardware.Firstly,RF signal is transmitted through the IC HT12E which has 18 pins and it is receiver in the receiver section using IC HT12D which asks as the receiver .If the address bits are matched, then the corresponding data signal will be passed to the controller unit.Through this method first stages of identification is done efficiently.

Now controller (ARM7LPC2148) unit will send a signal to the image acquisition unit to open the data base of vein detail.Image acquisition unit will process the user's vein image with the database image .Here MATLAB software is used to match the vein images and granting access. If anything wrongly happens, controller will send alert to the security number immediately using GSM module. If the image is matched properly,then an OTP is send to the security number of the user. The user should enter the security pin number for further processing. This method will therefore bring more security and satisfaction to the user.

FINGER VEIN RECOGNITION AND OTHER BIOMETRIC SECURITY

The FVRS mobile unit has the following important module sections. Those are RF system, image acquisition module, embedded main board, and human machine communication module. These sections which will play the important role.

In the current system, there are many biometric methods and many such systems have been developed and implemented,

including those for the face, fingerprint, hand shape,voice,signature and gait. There are many biometric security like finger print and palm prints, voice, signatures, hand shapes, iris image and face recognition. Finger print and palm print, signatures can be easily forged. Iris image can be exactly made in a contact lense and are easily frayed. Face recognition does not have much accuracy because.face may apper different in low light conditions and due to injury and face lifts. Similary voice recognition system also does not have much accuracy.

4. SYSTEM HARDWARE

4.1. ARM Processor:

The ARM7 family consists of the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. TheARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. In this Project ARM7LPC2148 processor is used. It has Small set of Instruction set.Compatibility: avail 64 Pin Ics. 44 pins will be input and output function.

4.2Wireless communication:

RF communication:

Radio Frequency:

Any frequency within the electromagnetic spectrum associated with radio wave propagation. When an RF current issupplied to an antenna, an electromagnetic field is created that then is able to propagate through space. Many wireless technologies are based on RF field propagation

Transmitter:

A HT12E extremely small, and are excellent for applications requiring short-range RF remote controls. The HT12E modules do not incorporate internal encoding. The simple control or status signals such as button presses or switch closures want to send, consider using an encoder and decoder IC set that takes care of all encoding, error checking, and decoding function. Transmitter output is up to 8mW at 433.92MHz with a range of approximately400 foot (open area) outdoors. Indoors, the range is approximately 200 foot, and will go through most walls

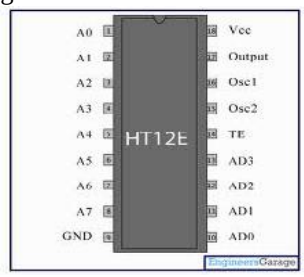

Figure 1: RF Transmitter

RF receiver:

HT12D: The receiver also operates at 433.92MHz, and has a sensitivity of 3uV. The HT12D receiver operates from 4.5 to 5.5 volts-DC, and has both linear and digital outputs. A 0 volt to Vcc data output is available on pins. This output is normally used to drive a digital decoder IC or a microprocessor which is performing the data decoding. The receiver's output will only transition when valid data is present. In instances, when no carrier is present the output will remain low. The HT12D modules do not incorporate internal decoding. If you want to receive Simple control or status signals such as button presses or switch closes, you can use the encoder and decoder IC set described above. Decoders with momentary and latched outputs are available

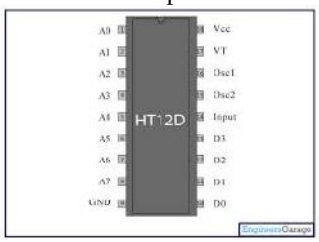

Figure 2: RF receiver

4.3 FINGER VEIN RECOGNITION:

The technology is currently in use or development for a wide variety of applications, including credit card authentication, automobile security, employee time and attendance tracking, computer and network authentication, end point security and automated teller machines. To obtain the pattern for the database record, an individual inserts a finger into an attester terminal containing a near-infrared LED (light- emitting diode) light and a monochrome CCD (charge-coupled device) camera. The hemoglobin in the blood absorbs near-infrared LED light, which makes the vein system appear as a dark pattern of lines. The camera records the image and the raw data is digitized, certified and sent to a database of registered images. For authentication purposes, the finger is scanned as before and the data is sent to the database of registered images for comparison. The authentication process takes less than two seconds.Blood vessel patterns are unique to each individual, as are other biometric data such as fingerprints or the patterns of the iris. Unlike some biometric systems, blood vessel patterns are almost impossible to counterfeit because they are located beneath the skin's surface. Biometric systems based on fingerprints can be fooled with a dummy finger fitted with a copied fingerprint; voice and facial characteristic-based systems can be fooled by recordings and higher solution images.The finger vein ID system is much harder to fool because it can only authenticate the finger of a living person.

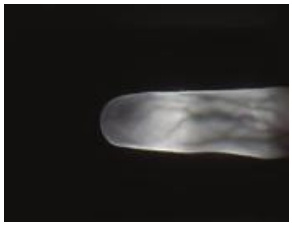

Fig4 Original finger vein image

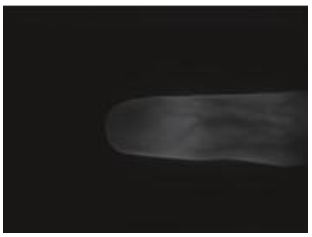

Fig5 Normalized finger vein image

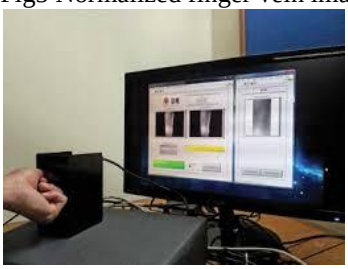

Fig6finger vain image

4.3 GSM

A GSM modem is a wireless modem that works with a GSM wireless network. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz GSM provides recommendations, not requirements.

GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers The GSM network is divided into three major systems.

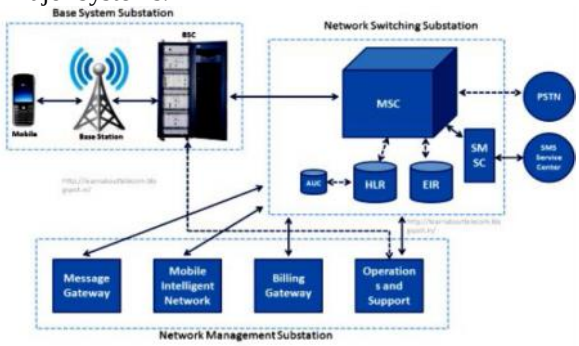

Figure :7 GSM Network Topology

Conclusion

In this system we have inferred a high level security system for ATM machines. This will also provide a user friendly interface since one's own finger vein is used for recognition. This project will also prevent the hacking by using skimmer. Here we have completed the design of visual basic and further move on to the mat lab programming and hardware interface.

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