WIRELESS ATM SECURITY USING GSM AND MEMS

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Abstract : ATM security system using GSM and MEMS modules is one of the hot topics in the embedded systems industry. For providing security at the ATMs, GSM and MEMS modules are controlled by micro controller Atmel 89C51.
Probably the most useful thing to know about the global system for mobile communication is that it is an international standard. If you travel in parts of world, GSM is only type of cellular service available. Instead of analog services GSM was developed as a digital system using TDMA technology.
The broadest requirement for these very small devices is ability to sense the environment, to collect necessary data and to create a signal or action to make desired changes to the environment.

IndexTerms -sensors,microcontrollers,GSM,MEMS,ATM

I. INTRODUCTION

The block diagram of the present project consists of the 89C51 microcontroller, Gas sensor, MEMS, ADC, GSM. The microcontroller plays major role in receiving the data from the Gas sensor and to take the required action. The buzzer indicates the presence of fire. According to the received data from the sensor microcontroller sounds the buzzer to indicate certain condition has arrived and the same data is transmitted to the concern mobile through GSM module. Here the security system is designed with GSM (Global System for Mobile communications) module is aimed to pass the ATM breakdown information created by the thief. The MEMS module is arranged inside the ATM, so that the module is not visible. The MEMES (Micro Electro Mechanical System) output is amplified & it is converted into the digital using A to D converter, the output of this converter is fed to the microcontroller. Based on the digital data obtained from the ADC, the controller locks the door automatically and the same information is transmitted to the concerned mobile number through GSM module, which is interfaced with microcontroller. After receiving the security code from the same mobile the door will be open.

The Project 'Atm security system using gsm and mems module' is designed using MEMS technology. The MEMS is a sensor device which identifies the tilt produced by the atm machine due to the irregular movement that occur during theft.The project basically consists of a MEMS sensor which identifies the tilt by the machine and activates the microcontroller to start the following sequence in which shutting the door using stepper motor and sending sms to vigilance system using gsm is involved.

II. LITERATUREREVIEW

The idea behind to develop ATM was to reduce workload of a bank. In present ATM system to perform ATM transaction we must enter card and PIN details to verify authentication. In case of losing ATM card/ forget ATM card no chance to perform ATM transaction. In present days this type of technology is not sufficient to secure ATM transaction form intruders. Here are methods to improve lot of security to overcome the difficult in ATM transaction. Methods to improve the security in ATM Banking system are:

2.1.1 Unimodal Biometrics System

Biometrics is derived From the Greek word "bio" means life and "metrics" means measure. Biometrics refers to identity of an individual based upon physical characteristics or behavioral traits. Where identity of a person by password, PIN provides first level of security, fingerprint templates are encoded into smart card memory, to identify his/her fingerprints are compared against the digital templates in card memory.

In Traditional methods to identify persons base on knowledge or token-based mechanism, but easily lost, shared or stolen. So, to overcome all these we introduced biometric system like fingerprint, Iris, Retina, Palm print, Face recognition.
Limitations:
Problems in biometric systems are noise in sensed data, lack of individuality, .Intra-class variations, spoofing.

2.2 Crypto-Biometric System

In this Crypto-Biometric system at the time of transaction retinal image is captured and blood vessel tree is extracted. From that blood vessel tree selective feature points extracted using Harris Corner detection to generate 256 bit key. With help of User's bio-key user's password is encrypted. Encrypted password transform to central server where image is decrypted. Advantages of Crypto-Biometric mechanism increase of reliability and identification quality, reducing error rates. Limitation using Crypto-Biometric mechanism, if biometric fails due to presence of noise in the biometrics, the FRR (False Reject Rate) increases. Increases cost effectively due to installation of additional hardware.

2.3 Authentication in ATM System by One Time Password

Here to perform ATM transaction, place ATM card into system, enter PIN along with the One Time Password it will get to the registered mobile number. But problem with the OTP is if we lost our mobile or OTP may visible to all other's.

2.4 Encryption Techniques Use in ATM Systems for Secure Data Communication

Encryption method that has been a national standard since 1977 is DES (Data Encryption Standard). It uses single secret key to encrypt the PIN at the ATM and decrypt PIN after received by central host processor, to verify customer. DES (Data Encryption Standard) is a symmetry algorithm here Cryptographic algorithm is used- which is called the Data Encryption Algorithm (DEA). The key size used is 56 bits; however a 64 bit key is actually input. But in 1998 Electronic Freedom Foundation group breaks DES.

Triple-DES

Triple-DES offers significantly higher level of security rather than DES, but it is based on the same single DES algorithm.
Encryption and Decryption in Triple-DES:

$$O = EK1 (DK2 (EK1 (I)))$$
$$O = DK1 (EK2 (DK1 (I)))$$

E/D – DES Encryption/Decryption
K1, K2 – secret keys
I/O – data blocks: input/output

Advanced Encryption Standard

The National Institute of Standards and Technology (NIST) have created AES. AES is a privacy transform for IPSec and Internet Key Exchange (IKE) and has been developed to replace the Data Encryption Standard (DES).

One Time Password

One Time Password is a password valid for only one login session for particular time only. OTP avoid problems associated with static passwords. Major advantage is potential intruder who manages record an OTP is not valid for longer time.

III.   PROPOSED WORK

89C51 is heart of project. The project is designed for providing security using MEMS Accelerometer and Temperature sensor.The output of MEMS device is given to ADC circuit to convert the analog values to digital values which is inbuilt for 8051microcontroller.Whenever the accelerometer is disturbed it gives signal to controller and it also senses temperature and givessignal to controller and gives buzzer indication. MEMS are miniaturized structures, sensors, actuators, and microelectronics.Micro sensors and micro actuators are also called as "transducers".
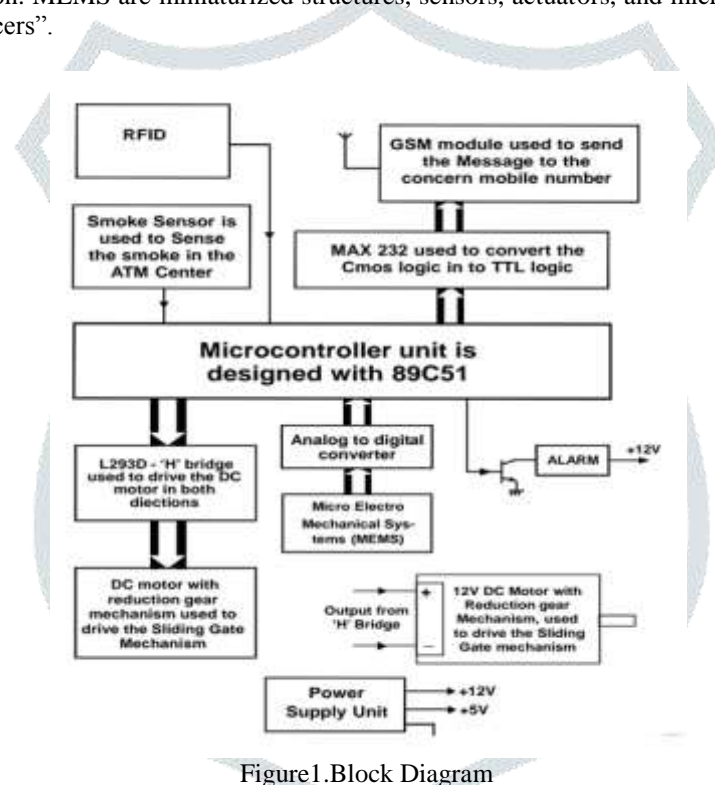

Figure1.Block Diagram

At that time a few would have anticipated excess in ATMs. Then for many years after, the aim was to shift people off the teller lines thus lowering a bank's distribution costs and increase efficiency.In 1939, a rudimentary cash dispenser was invented by Luther George Simijian and established by the City Bank of New York. However, the machine did not work much and had to be removed within six months of putting up the machine. The early versions of the ATM were restricted to cash withdrawal only. In Consequently, the vouchers were matched with a particular personal pin code used by the bank to identify the customer. The ATM was inaugurated by renowned British actor, Reg Varney. The personal identification number was initially a six numbered password, and was later changed to a four numbered password. However, this automated teller machine was very different from the modern day teller machines, which is based on an electronic system between the different branches of the bank. Thus, the history of ATM has seen many changes over the span of 25 years since 1939.
While the conceptualization began in 1968, the patent was issued only in 1973. This cash dispenser was first used by the New York based bank, namely, the Chemical Bank. As was the case with the ATMs of during those years, they were hardly a multi-functional unit. Moreover, they were not based on any electronic system. Hence, the debit cards, distinct from credit cards, were given to only selected clients with good track records. While there were many developments in the history of ATM, the service itself took a stronghold only in the 1970s. Today, the ATM service has become indispensable to our modern day lives.

Figure2.ATM Security

IV. CONCLUSION

This project is used to provide security to ATM. Whenever a person trying to theft the ATM he has to break the ATM container at that time the MEMS sensor had sensed the motion and send to the microcontroller. The microcontroller produces sound using Buzzer and sends a message via GSM .

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