

ATM MACHINE SECURITY SYSTEM USING GSM AND MEMS SENSOR

1 Prof.Shinde S.P, 2 Chingale R.R. , 3 Dhane D.C. ,4 Vader P.B

S.V.P.M.'s College of Engg. Malegaon(Bk.),Baramati,Pune;413115

Abstract - The Idea of Designing and of Security Based ATM machine security system project is born with the observation in our real life examples happening around us. This project overcomes the drawback of older technology used in our society. Project deals with the security of ATM machine. Whenever robbery occurs, Vibration sensor and MEMS sensor is used here which senses vibration produced from ATM machine and the movement of ATM machine. GSM is used to send the message to the police station and authority. In this project we uses PIC controller which is based on embedded system process real time data collected using the MEMS sensor and vibration sensor.

When the movement of machine and the vibration is sensed the beep sound will occur from the buzzer. For closing the door of ATM DC Motor is used. Smoke detector is used here to sense the gaseous or smoke near ATM machine. The use of camera is always in processing and sending video continuous to the Pc and it will be saved. Here LCD display board shows the status of our project. It will prevent the robbery occur. Here, MPLAB tools are used to implement the idea and results are obtained. MPLAB tools are used for run the DC motor for automatic door lock.

Key Words: PIC18F4520 Controller, MEMS Sensor, GSM Module, DC Motor, Vibration sensor, Camera, PC, Smoke detector, etc.

1. INTRODUCTION

Now days different technology make advanced world. The automation and computerization has been installed ATM has been increased and simplify the financial and banking activity. Those crimes for the financial organization have been increased gradually from year 1999 to 2003, little bit decreased in 2004, and then increased again from year 2005. In the year of 2007, 212,530 of theft and 4,439 of robber cases are happened, and 269,410 of theft and 4,409 of robber cases are happened in year 2010 and also in the year 2011, 270,109 of theft and 4,509 of robber cases are happened. So the cases of robber attack has been increased in during 12 years. Among the crime for financial organization such as bank, the cases of theft and robber has been increased .

Today's, ATM has been increased so crime related to the ATM also increases. In market there are solution are available for protecting ATM for this type of attack such as using the GSM technology, Vibration sensor,

MEMS sensor, DC Motor, Smoke detector external ATM machine can be predicted from the robbery attack. . Camera is used to take the continuous video clips. In this project we implement the idea that are using buzzer to give signal for corresponding bank and police station. Here DC Motor is used for shutter assembly.

2. SYSTEM BLOCK DIAGRAM

The block diagram of our system in which PIC18F4520 is interfaced with MEMS, vibration sensor and smoke detector.

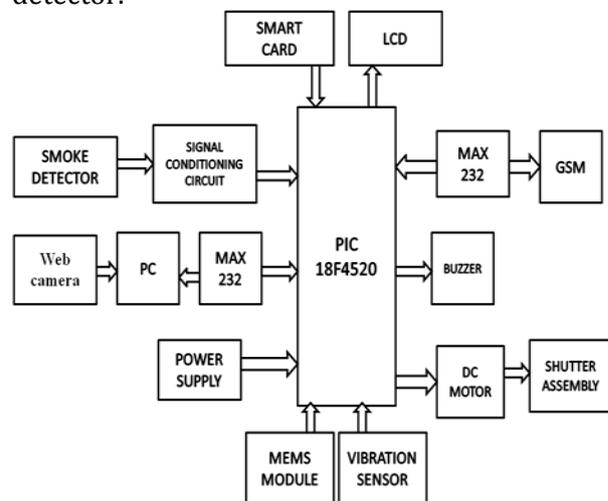


Fig.1 Block diagram of ATM Machine Security System Using GSM and MEMS sensor.

2. BLOCK DIAGRAM DISCRPTION

The above fig.1 shows the Block Diagram of the ATM Machine Security using MEMS and GSM. It consists of Power supply unit, MEM sensor, Vibration sensor, 16x2 LCD, Buzzer, L293D Driver, GSM module and DC Motor.

a. ATM (Automated Teller Machine):

The first ATM was installed by Korea exchange Bank in 1975. In 1982 ATM installed by Shinhan Bank. In the first half year of 2000s the number of installed ATM machine shown the trend of continuously increasing the ratio. External ATM machine has been increased more. ATM machine is secured by installing signal lamp in the machine with impact detecting sensor. To protect the ATM machine impact detecting sensor

immediately send signal to the security centre. Centre send the signal to the agent Therefore, GSM Technology with addition of some more components already mention above which is to suggest in this study is installed in the ATM, the advanced security System can be setup with the rapid reaction implementing in real-time even the theft is happened.

b. GSM (Global System for Mobile Communications)

The GSM is wireless networks it has low-power, low-cost and convenience to use . Global System for Mobile Communications originally from Group of Special Mobile is the most popular standard for mobile telephony systems in the world. A GSM modem it is a most specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks like a mobile phone. A GSM modem is connected to a computer, that time it allows the computer to use the GSM modem and it communicate over the mobile network. While these GSM modems are most frequently used and it provide mobile internet connectivity, like in which many of them can also be used for sending and receiving SMS and MMS messages. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. In this system by using the GSM modem when some accidents is happen, it give the message to Bank authority and police station. Most GSM networks operate in the 900 MHz or 1800 MHz bands. Using GSM Modem in the ATM System: In this system by using the GSM modem when some accidents or robberies is happen, then it will send the message to according to Bank authority and near police station (PS) corresponding to the controller.

c. MEMS Sensor

MEMS is an stand for Micro Electro Mechanical Systems, it defines mechanical structures fabricated with IC processing on (most often) silicon wafers. The MEMS-based on the accelerometers are available in 1-, 2- and 3-axis configurations, with analog or digital output, in the terms of low-g or high-g sensing ranges. In this system we will be using a MEMS motion sensor(piezoelectric transducer) to find disturbance or vibration from ATM machine whenever robbery

occurs. It is 3-Axis Accelerometer with Digital Output (I2C). It is a very low power, low profile capacitive MEMS sensor featuring a low pass filter, compensation for 0g offset and gain errors, and conversion to 6-bit digital values at user configurable samples per second. The device can be used for sensor data changes, product orientation, and gesture detection through an interrupt pin (INT). The device is housed in a small 3mm x 3mm x 0.9mm DFN package.



d. Vibration Sensor

This sensor buffers a piezoelectric transducer. As the transducer is displaced from the mechanical neutral axis, bending creates strain within the piezoelectric element and generates voltages. If the assembly is supported by its mounting points and left to vibrate in free space the device will behave as a form of vibration sensor. The sensing element should not be treated as a flexible switch, and is not intended to be bent. Sensor Value 500 roughly corresponds to 0g acceleration. Acceleration will deflect the sensing element up or down, causing Sensor Value to swing either way. This sensor is not meant to measure precise acceleration and vibration - use it to detect an acceleration impulse, or the presence of vibration. In the system we will be using a vibrating sensor (piezoelectric transducer) to find vibration from ATM machine when ever robbery occurs.

Device Specifications:

- i. Current Consumption –400uA
- ii. Output Impedance –1K ohm

e. Smoke Detector

It is used to sense the smoke which in turn activates the microcontroller to send a message through GSM.

f. C Motor

DC motor is used for closing the door When thieves are entering door will be closed automatically by using DC motor.

g. Web Camera

It is used for capturing the image of person when tilt detection and stored in PC.

3. CONCLUSIONS

Based on the results, the objective of developing ATM Security System using MEMS and GSM has been achieved. This project is used to provide security to ATM. Whenever a person trying to theft the ATM he has to broke the ATM container at that time the MEMS sensor had sensed the motion and send to the microcontroller. Then microcontroller produced the sound using Buzzer and sends a SMS via GSM achieved.

4. FUTURE SCOPE

In Future we can expand this project by adding a GPS module which send the alert message to authority telling that at which the ATM is tried to be theft and it is become more reliable system.

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