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ATM SECURITY USING GSM AND MEMS SENSOR

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Abstract - *The idea of designing this project is born by observing the real life situations happening around us. This project overcomes the older technology used in the ATMs. This Project deals with the security of ATM machine. Whenever robbery occurs, MEMS sensor is used here which senses the movement of ATM machine. A tri band GSM is used to send the message to the vigilance team and for the respective bank authorities. In this project we used AVR microcontroller (ATMEGA328) integrated on arduino board which is based on embedded system process, real time data collected using the MEMS sensor. When the movement of machine is sensed by the MEMS sensor the beep sound will occur from the buzzer which acts an alerting device. A DC Motor is used for shutting the door. Here LCD display board shows the status of our project. A relay is also used in this project to switch on the fan, which is used to spray the anesthesia powder on the thief, so that the thief gets intoxicated. The door can be unlocked by the bank authorities using the secret key.*

Key Words: **MEMS, ATMEGA328, AVR microcontroller, GSM Module, DC Motor, and Relay 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. Banks in India have lost Rs 235.96cr in the last five years to incidents of burglary, robbery, dacoit and theft. The number has been going up since 2013-14 when 587 such cases were reported, amounting to a loss of Rs 34.346cr. In 2017-18, 972 cases of theft and burglary were recorded, an increase of 65 percent, leading to a loss of Rs 44.49crore. So the cases of robber attacks have been increased from last 8 years.

Today ATMs has been increased so crime related to the ATM also increases. In such cases a solution can be provided by using the technology available. In this project we are implementing an idea of using a sensor and GSM module in the ATM to prevent the robberies. Here DC motor is used for shutter assembly.

2. LITERATURE REVIEW

The technological advancement in the field of electronics and telecommunication has brought more and more arrangements in the domestic and industrial environment. Security systems can avoid the unauthorized entry of peoples into the protected area and it stores the details about the authorized peopled entered in the area on the computer through a wireless transmitter. Up gradations in this system can be done easily to improve the efficiency of the system. Security systems are the demands of the day, which helps to avoid theft and avoids unauthorized entry of peoples into the restricted area. It can only be opened when an authorized user is present. Global system for mobile communication is mainly used for sending or receiving data such as voice and message. In this security system GSM plays a important role. Through the use of GSM the user can receive random number. This random number can be used as password, this also another security for system. The main purpose of GSM based ATM money transfer prototype system is for making of secured ATM transactions by not revealing ATM password to users. Account holder will send password through mobile to the GSM modem present in the architecture. GSM modem will send message to account holder that please enter your four digits password numbers. Now he sends his secured password to ATM center number through SMS. If he enters correct password then he will receive return SMS as please enter your amount. If password is wrong we get return SMS as please enter your correct password. If we entered more amount than available balance in our account, then we receive SMS as you are having insufficient money in your account. If the transaction is Successful we receive money and dc motor will rotate in the project architecture.

3. RECENT TECHNOLOGY

Conventional security systems used either knowledge based methods (passwords or PIN), and token-based methods (passport, driver license, ID card) and were prone to fraud because PIN numbers could be forgotten or hacked and the tokens could be lost, duplicated or stolen. To address the need for robust, reliable, and foolproof personal identification, authentication systems will necessarily require a biometric component. Personal safes are revolutionary locking storage cases that open with just the touch of your finger. These products are designed as secure storage for medications, jewelry, weapons, documents, and other valuable or potentially harmful items.

4. SYSTEM BLOCK DIAGRAM

The block diagram of our system consists of ATMEGA328 which is interfaced with MEMS, DC Motor and Relay.

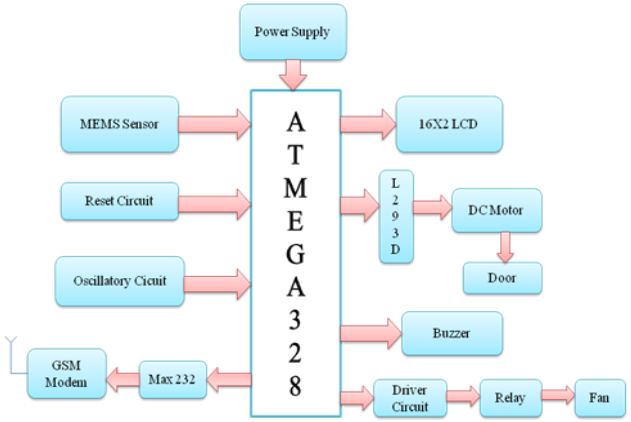


Fig -1: Block diagram representation of Project

5. BLOCK DIAGRAM DESCRIPTION

The above fig.1 shows the Block Diagram of the ATM Machine Security using MEMS and GSM. It consists of Power supply unit, MEMS sensor, 16*2 LCD, Buzzer, L293D Driver, GSM module, Relay and DC Motor.

a. ATM (Automated Teller Machine):

The first ATM was installed by Korea exchange Bank in 1975. In 1982 another ATM was 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 occur, it sends message to authorized bank people 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.

Fig -2: GSM Module

c. MEMS Sensor

MEMS stands 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.

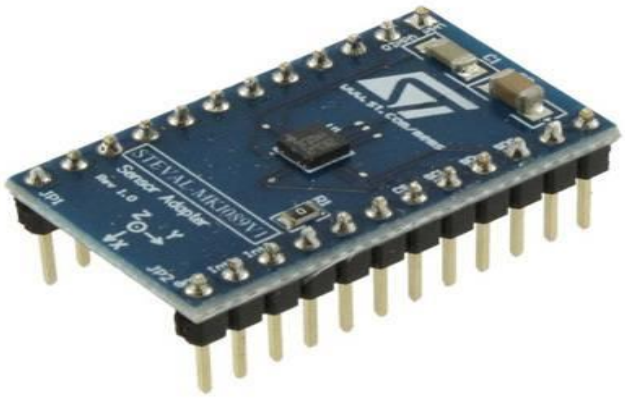


Fig -3: MEMS Sensor

5. ADVANTAGES

- This system is easy to implement.
- In this system GSM is used for longer range communication.
- This system is easy to use.
- Not as sensitive to weather/ environmental conditions.
- System cost is less.

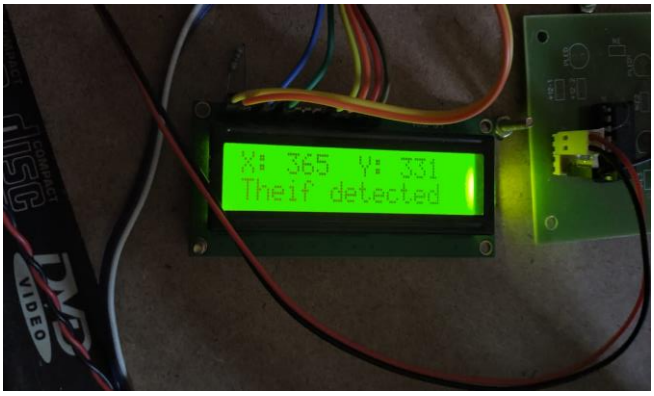
6. APPLICATIONS

- Security purpose
- ATM security systems
- Home security
- Industrial security

7. CONCLUSION

In this paper we have designed an effective implementation of security system that can monitor ATM centers, with Accelerometer sensors, to implement the system which is more secure by using GSM module. It sends the alert message to the authenticated person. The thief tries to open the machine the MEMS is activated this gives signal to the microcontroller which shuts the door and alerts the vigilance system.

8. OUTPUT



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