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GSM BASED ATM SECURITY SYSTEM WITH GPS

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Abstract:

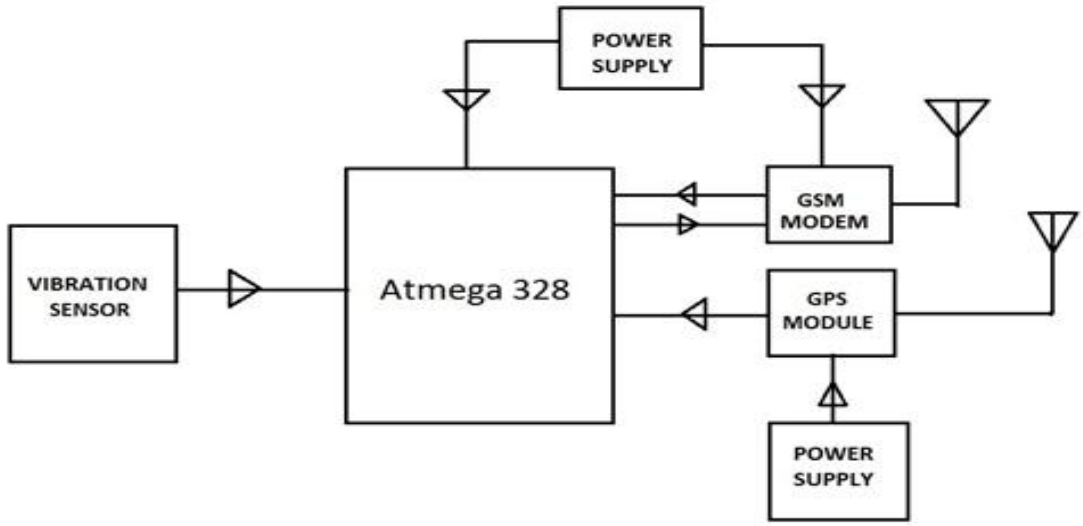
This work also includes preventing ATMs from being stolen by hackers. Here, vibration sens ors are used to detect the vibrations created by the ATM in case of any robbery. When someo ne tries to steal money by tampering with the ATM machine, the vibration sensor will sense t he vibration created by the ATM machine and the microcontroller will be affected by it and t hen the GSM modem will continue to notify the nearest police station. They get a report of th eft in a particular area and then the police can easily track the location of that place using GP S and reach the spot immediately and catch the thief early. possible.

Key Words: Atmega 328, GSM modem, GPS module, Piezoelectric Sensor, LCD.

1. INTRODUCTION

Automated teller machines (ATMs) are now widely used to withdraw cash around the world. Each us er is issued a unique card that is assigned a unique number, so that the person can personally carry out all transactions without knowing anyone. While transactions are generally protected, cash in ATMs is not fully protected. ATMs already have basic security M. Aditya Kasyapatures such as security and closedcircuit TV cameras. However, there are still many ATM rob beries in our country. Therefore, the security of the machine needs to be increased.This study includes the prevention of AM theft and robbery. Therefore, the deficiencies seen in the previous picture need to be eliminated. We have added some additional security features that enable the system to instantly s end notifications to authorized personnel, such as the nearest police station, in case of any theft. There fore, authorities can instantly check the exact location from the GPS installed on the machine and catc h the thieves.

1.1 Block Diagram



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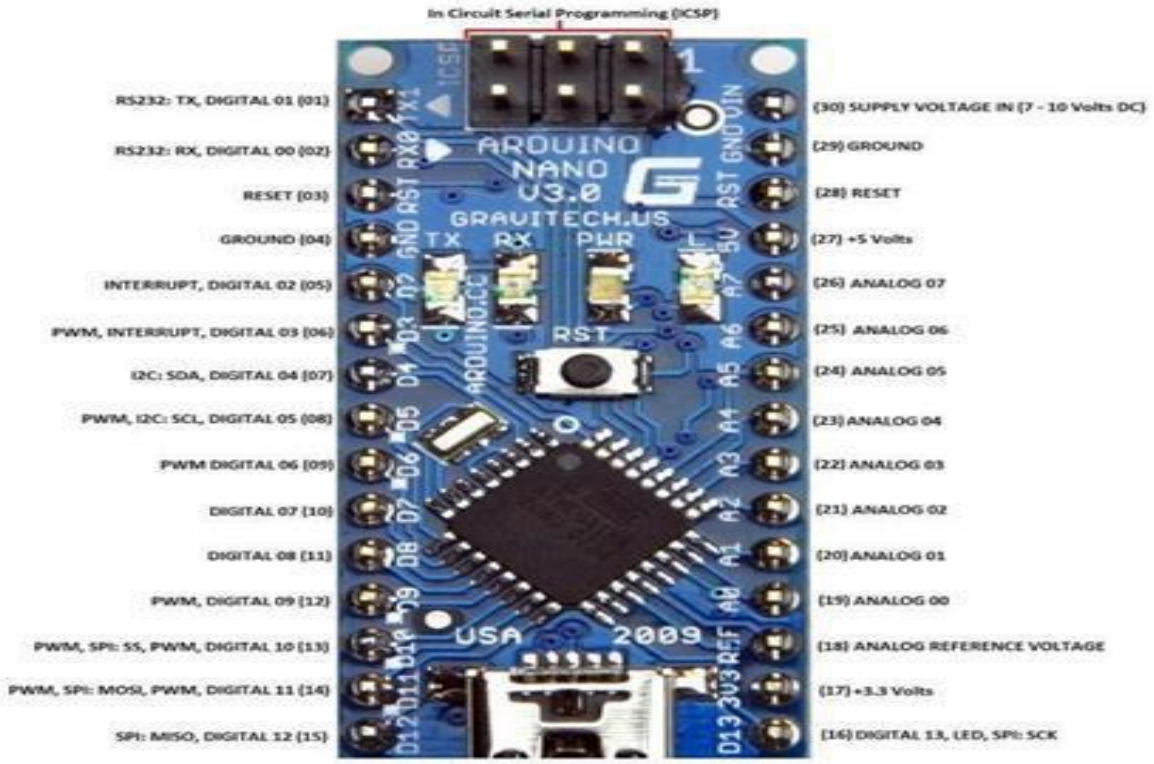
1.2 Working

This project uses GSM modem with correct connection to Arduino. When the GSM modem misses a call, the caller's number is stored in the Arduino to continue communication with tha t number. This gives users unique flexibility to modify the code at their own will, without hav ing to go through the complex process of writing code when importing the program to the Ar duino. So in this case only this number can be used for communication and the user has no op tion to change it. When someone hits the ATM machine, the vibration sensor will sense the vi bration created by the ATM machine, create a voltage level of a certain strength and send the relevant signal to Arduino, and then Arduino will send a signal to GSM. modem Send interru pt signal so that GSM information system sends instant notification to authorized receiver. Th erefore.The authorized person can easily track the location using the GPS location connected to the system.Thanks to the GPS module, the exact location can be easily tracked, thus the sit uation can be monitored.

2. COMPONENNTS

1. ARDUINO NANO (Atmega 328)
2. GSM MODEM
3. GPS MODULE
4. PIEZOELECTRIC SENSOR
5. LCD

2.1 ATMEGA 328



Arduino Nano V3 - Pin Description
www.CircuitsToday.com

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Features

™ There are 22 input/output pins in total.
™ 14 of the pins are digital.
™ Arduino Nano has 8 analog pins.

III There are 6 PWM pins on the digital pins.
III It has a 16MHz crystal oscillator.
III Working voltage is from 5V to 12V.
III ¢ It also supports different communications,

PIN CONFIGURATION

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	**Vin:** Input voltage to Arduino when using an external power source (6-12V). **5V:** Regulated power supply used to power microcontroller and other components on the board. **3.3V:** 3.3V supply generated by on- board voltage regulator. Maximum current draw is 50mA. **GND:** Ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A7	Used to measure analog voltage in the range of 0-5V
Input/Output Pins	Digital Pins D0 - D13	Can be used as input or output pins. 0V (low) and5V (high)
Serial	Rx, Tx	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10(SS),11(MOSI), 12(MISO)and13(SCK)	Used for SPI communication.
Inbuilt LED	**13**	To turn on the inbuilt LED.
IIC AREF	A4(SDA), A5(SCA) AREF	Used for TWI communication. To provide reference voltage for input voltage.

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2.2 GSM MODEM

Fig -2.2: GSM SIM 900

GSM (Global System for Mobile Communications) is the world's most popular telephone sys tem. GSM is used by more than 1.5 billion people in more than 212 countries and regions. Its ubiquity allows mobile network operators to arrange international roaming, allowing users to use their phones in different parts of the world. GSM differs from its previous technology in t hat the signal and voice channels are digital, therefore GSM is considered the second generati on (2G) mobile phone.This is also necessary for the worldwide use of information communic ation. system. GSM also introduced a lowcost version of Short Message Service (SMS) (also known as text messaging), which has since been supported by other mobile phone standards. The system includes international emergency numbers. GSM is a cellular network, meaning mobile phones connect to the network by calling nearby cells. There are five different cell typ es in GSM networks: macro cell, micro cell, pico cell, Fento cell and umbrella cell. Each pho ne's service varies by location.

2.3 GPS MODULE (SIM 28)

Fig -2.3: GPS MODULE

Product features

☆ Supports EASY self-designed orbit estimation
☆ Supports SBAS such as (WAAS, EGNOS, GAGAN MSAS)

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☆ Supports EPO orbit estimation
☆ Power supply 2.9V ~ 3.6 V
Backup Power 3.0V Type

Power Consumption Collection: 23 Ma o Monitoring: 17mA

o Normal Position 3 mW™ Antenna Type Active etc. Passive

2.4 PIEZO ELECTRIC SENSOR

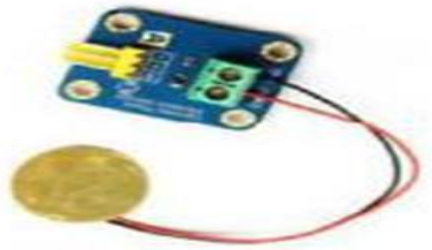

Fig -2.4: Piezoelectric sensor

A piezoelectric sensor is a device that uses the piezoelectric effect to measure changes in pres sure, acceleration, temperature, strain, or force by converting pressure, acceleration, temperat ure, voltage, or force into electricity. It has a very high DC output impedance and can be mod eled as a voltage balance and filter network. The voltage V at the source is proportional to the applied power.

Principle	Strain Sensitivity [V/με]	Threshold [με]	Span to threshold ratio
Piezo electric	5.0	0.00001	100,000,000
Piezo resistive	0.0001	0.0001	2,500,000
Inductive	0.001	0.0005	2,000,000
Capacitive	0.005	0.0001	750,000
Resistive	0.000005	0.01	50,000

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2.5 LIQUID CRYSTAL DISPLAY (LCD)

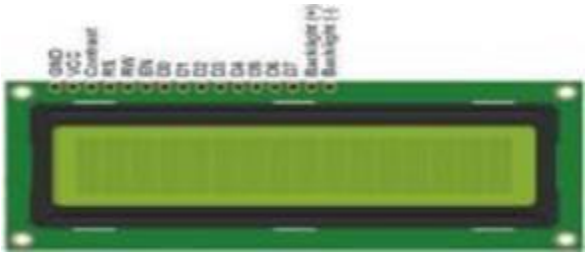

Fig -2.5: LCD

Pin Configuration:-

VSS (Ground): The ground pin is connected to the system ground.

VCC (+5 Volt): Provides +5V (4.7V - 5.3V) power to the LCD.

VEE (Contrast V): Determines the contrast of the screen. Land for the highest rate.

Register Select (RS): Connect to the microcontroller to change the command/data register.

Read/Write (RW): used to read or write data. It is usually connected to ground to write data t o the LCD.

Enable (EN): Connect to microcontroller pin and toggle between 1 and 0 for data verification .

D0D7: Data pins 0 to 7 form the A 8bit data line. They can be connected to a microcontroller to send bit data. These LCDs can also operate in 4bit mode, where data pins 4, 5, 6 and 7 re main active.

LED Positive: Backlight LED pin positive terminal.

LED negative pole: negative pole of the backlight LED pin.

3. CONCLUSION:

This system can be used for ATM security. By using this system, we can largely prevent AT M theft.Using GSM modules to achieve greater security. Sends notification to authorized em ployees.When the thief tries to open the machine, the vibration sensor will activate and send a signal to the microcontroller.

4. ACKNOWLEDGEMENT

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