

HOME SECURITY SYSTEM USING ARDUINO

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ABSTRACT

The objective of this project is to develop a home security system using the Motion , which monitors the respective area where it is being deployed. The sensor senses the motion and it triggers the buzzer. In this way the system will provide the security against any misdeed. Some of the existing systems are limited to support basic operations, while some others satisfy a range of additional primitives. In this paper, a security system has been proposed. The introduced system operation is supported by a GSM embedded mobile module, which enables the alert messages transmission to both mobile devices of end users, and central security offices. The proposed system is implemented on a microcontroller module, through an embedded platform. System's operation is also based on cameras and sensors inputs. The proposed system operates on different levels of user's access control, based on passwords policies. Each time, the involved end users and the security offices, can be informed for attacks, operation modes changes etc, through SMS communication, via the available GSM network.

I.INTRODUCTION

Home Security Systems are an important feature of modern residential and office setups. Home security systems must be affordable, reliable and effective. Modern complex home security systems include several security features like fire, intruders, electronic door lock, heat, smoke, temperature, etc. Some security systems may be a combination of all the security measures. Such complex systems may be expensive and may not be affordable by everyone. There are individual security systems based on the requirement.

In this project, we designed a simple but very efficient home security that has a function of calling the homeowner on his/her mobile number in case of an intruder alert.

II. PIR MOTION DETECTION SENSOR

Passive Infra-Red or PIR Sensor is a Pyroelectric device that detects motion. Hence, it is also called as motion detection sensor. It detects motion by sensing the changes in infrared levels emitted by nearby objects. All objects with a temperature above absolute zero emit heat energy in the form of radiation. Usually this radiation isn't visible to the human eye because it radiates at infrared wavelengths, but it can be detected by electronic devices designed for such a purpose.

The term passive in this instance refers to the fact that PIR devices do not generate or radiate energy for detection purposes. They work entirely by detecting infrared radiation emitted by or reflected from objects. They do not detect or measure "heat".

III. GSM Module

With the help of RS232, the modem can be connected to PC or microcontroller via serial cable. Voice calls, SMS and internet access are possible with this module.

There are on board connections for microphone and headphones with which we can make or receive calls. GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.

IV. ARDUINO UNO

It is the main controller used in this project. It detects the signals from PIR sensor and sends commands to GSM Module accordingly. The serial pins of the Arduino are used in this project to communicate with GSM module. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins. It is programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform.

V. WORKING

Home Security Alarm Systems are very important in present day society, where crime is increasing. With the technological advancements we have achieved in the recent years, a homeowner doesn't have to worry about home security while getting off his/her home.

Modern home security systems provide enough security from burglars, fire, smoke, etc. They also provide immediate notification to the homeowner.

The aim of this project is to implement a simple and affordable, but efficient home security alarm system. The project is designed for detecting intruders and informing the owner by making a phone call.

PIR sensor detects motion by sensing the difference in infrared or radiant heat levels emitted by surrounding objects. The output of the PIR sensor goes high when it detects any motion. The range of a typical PIR sensor is around 6 meters or about 30 feet.

For proper operation of PIR sensor, it requires a warm up time of 20 to 60 seconds. This is required because, the PIR sensor has a settling time during which it calibrates its sensor according to the environment and stabilizes the infrared detector.

During this time, there should be very little to no motion in front of the sensor. If the sensor is not given enough calibrating time, the output of the PIR sensor may not be reliable.

When the PIR sensor detects any motion, the output of the sensor is high. This is detected by the Arduino. Arduino then communicates with the GSM module via serial communication to make a call to the pre programmed mobile number.

An important point to be noted about PIR sensors is that the output will be high when it detects motion. The output of the sensor goes low from time to time, even when there is motion which may mislead the microcontroller into considering that there is no motion.

This issue must be dealt with in the programming of Arduino by ignoring the low output signals that have a shorter duration than a predefined time. This is done by assuming that the motion in front of PIR sensor is present continuously.

VI. CODING

```
#define lightsensor
#define alrtsignal
#define warnlight
#define piezobuzzer
Int alrtsignalState;
Int lightsensorvalue;
Void setup()
Pinmode (warnlight, OUTPUT);
Pinmode(alert signal, INPUT);
Pinmode (piezobuzzer,OUTPUT);
DigitalWrite(Warnlight,LOW);
DigitalWrite(piezobuzzer,LOW);
Delay(30*1000);
}
Void loop(){
Lightsensorvalue=analogread(light sensor)
If (lightsensorvalue>=512){
If (alrtsignalState==HIGH){
DigitalWrite(piezobuzzer,HIGH);
DigitalWrite(warnlight,HIGH);
Delay(1000);
}else{
DigitalWrite(piezobuzzer,LOW);
DigitalWrite(warnlight,LOW);
}
Delay(1000);
}
```

CONCLUSION

There are many motion detection algorithms for the security system. But most of the security systems don't detect the moving of the object during night time due to darkness and lack of light. But in this proposed system the moving is monitored and it triggers the buzzer immediately once the intruder is detected. Hence, a home security system is implemented using Arduino with low cost.

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