



Antitheft System with Android Based Smart Home Automation

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Abstract:

The objective of this project is to design an Electronic Security Controlled System for homes and public places like banks, malls, etc.. The proposed system combines the use of home automation and antitheft security systems using same microcontroller board. The electronic security system is placed inside lockers and cash boxes. When an unauthorized person tries to open the locker door and uses a torch light to find the valuable things, the torch light falls on the LDR giving a signal to the buzzer and GSM module. Along with security proposed system provides smart control (ON/OFF) of various appliances like fan, light bulb, TV etc. using Bluetooth. Nowadays, people have smartphones with them all the time. So it makes sense to use these to control home appliances.

Keywords: Arduino Uno, GSM(Global System for Mobile), MIT app Inventor, LDR(Light Dependent Resistor).

I. INTRODUCTION

Home automation system is use of information technologies and control system to reduce the human labour. The rapid growth of technologies influence us to use smartphones to remotely control the home appliances. An automated devices has ability to work with versatility, diligence and with lowest error rate. The idea of home automation system is a significant issue for researchers and home appliances companies. Automation system not only helps to decrease the human labor but it also saves time and energy. Early home automation systems were used in labor saving machines but nowadays its main objective is provide facilities to elderly and handicapped people to perform their daily routine tasks and control the home appliances remotely. An anti-theft system is any device or method used to prevent or deter the unauthorized appropriation of items considered valuable.

Theft is one of the most common and oldest criminal behaviors. From the invention of the first lock and key to the introduction of RFID tags and biometric identification, anti-theft systems have evolved to match the introduction of new inventions to society and the resulting theft by others. Security is of almost importance to us. A security system if implemented it should have the following Important ideas in place. Firstly, the system should be made aware of to the perpetrator. The home owner should then be alerted in order that he takes some action.

II. METHODOLOGY

The proposed system combines the home automation with antitheft security system. The detailed working of system as shown below as two different systems.

Home Automation

The home automation circuit is built around an Arduino Uno board, Bluetooth module HC-05 and a 4-channel relay board. The number of channels depends on the number of appliances you wish to control. Arduino Uno is powered with a 12V DC

adaptor/power source. The relay module and Bluetooth module can be, in turn, powered using a board power supply of Arduino Uno. In this home automation circuit, Pins 10 and 11 of Arduino are connected to pins TXD and RXD of the Bluetooth module, respectively, as shown in Fig. 6. Pins Gnd and Vcc of the Bluetooth module are connected to Gnd and +3.3V of Arduino board respectively.

Pins 2, 3, 4, and 5 are connected to the three relays (RL1, RL2, RL3 and RL4) are connected to pins Vin and Gnd of Arduino board, respectively. Vin is usually used to give input power, but since we are supplying 12V to Arduino using an adaptor, we can use Vin pin on Arduino to power the 12V relay module.

Antitheft System

the LDR detects a change in the light intensity when the locker/safe is open unauthorisely and it powers the Arduino board when high light intensity is present. The board is pre-programmed in such a way that it sends a message to the owner or authorised person and concerned officials through the GSM modem that is interfaced serially.

This indicates that the locker is open or in the case of robbery. The LDR circuit that is attached to the inner side of the locker, immediately detects any slight glimmer of light entering from outside. The remaining circuit (Arduino and GSM) comes outside the locker and is invisible to the burglar as it lies behind the locker case. Pin A5 is connected to the output of LDR circuit in such a way that when pin A5 is at ground the arduino board will send the signal to GSM module to send SMS.

Figure 4.1 shows the schematic overview of the proposed The block diagram comprises of, Arduino UNO board, GSM SIM300 Module, LDR with amplifier circuit and Bluetooth HC-05 module with 4 channel relay module. The circuit is powered using a 9-12 volts AC-to-DC adaptor. A valid SIM card with sufficient recharge amount must be inserted to the modem to send messages.

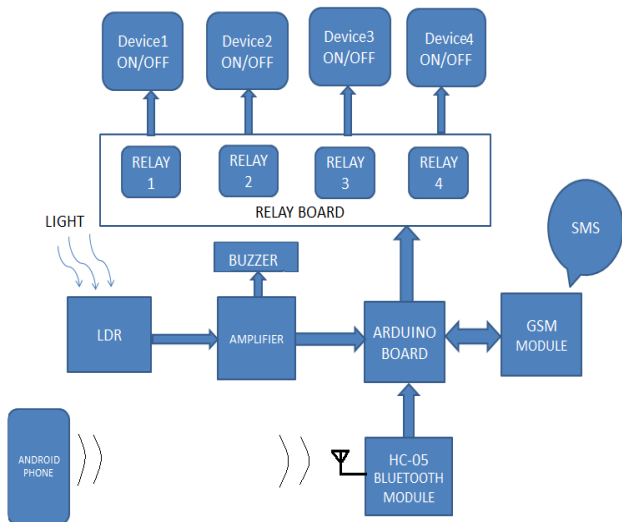


Figure.1. Block Diagram

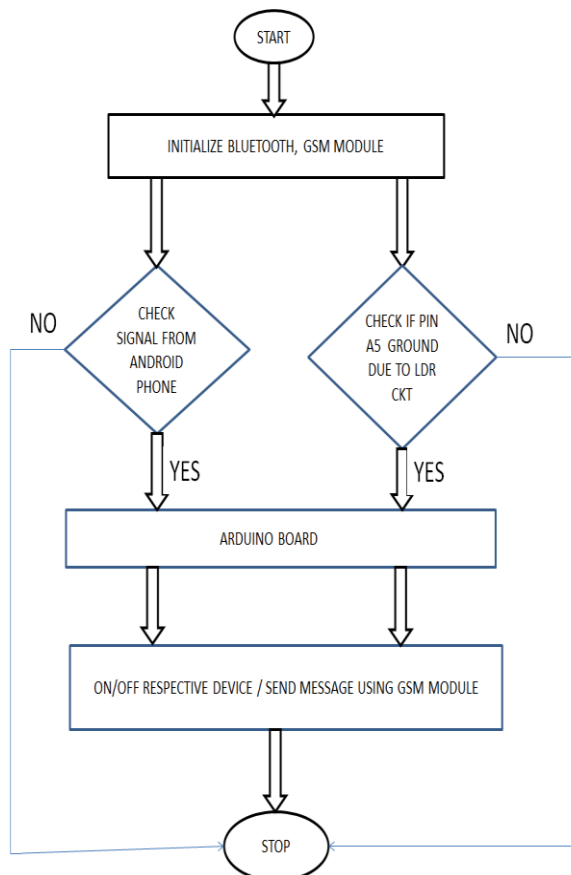


Figure.2. Flow Chart

III. ARDUINO UNO

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board. Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.



Figure.3. Arduino Uno

IV. GSM MODULE

A GSM module (SIM300) or a GPRS module is a chip or circuit that will be used to establish communication between a mobile device or a computing machine and a GSM or GPRS system. The modem (modulator-demodulator) is a critical part here. These modules consist of a GSM module or GPRS modem powered by a power supply circuit and communication interfaces (like RS-232, USB 2.0, and others) for computer. 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.



Figure.4. GSM Module

V. LDR (Light Dependent Resistor)

The LDR is a resistor whose resistance varies inversely with the intensity of light incident on it. Its resistance can vary from 400 Ω (for 1000 lux light) to as high as $10^7 \Omega$ (for 10 lux light). Therefore, even with a slight change in incident light intensity, there is a significant change in resistance, thus making the measurement reliable. It is provided on board to interface the board with the real world luminous intensity as the parameter. It is connected in the lower half of a potential divider configuration with a 10K ohm resistor, so that the resistor-LDR junction voltage is inversely proportional to the amount of light incident on it.

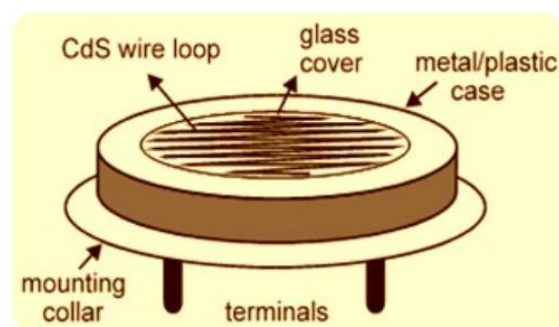


Figure.5. LDR

VI. 4 CHANNEL RELAY MODULE

The 4 channel Relay module allows a wide range of microcontroller such as Arduino, AVR, PIC, ARM with digital outputs to control larger loads and devices like AC or DC Motors, electromagnets, solenoids, and incandescent light bulbs. This module is designed to be integrated with 4 relays that it is capable of control 4 relays. The relay shield use one QIANJI JQC-3F high-quality relay with rated load 7A/240VAC, 10A/125VAC, 10A/28VDC. The relay output state is individually indicated by a light-emitting diode

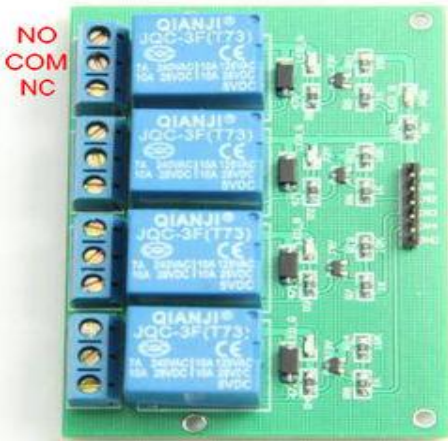


Figure.6. 4 Channel Relay Module

VII. HC-05 BLUETOOTH MODULE

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm. Hope it will simplify your overall design/development cycle.



Figure.7. HC-05 Bluetooth Module

VIII. MIT APP INVENTOR

Android application for smartphone is made by MIT App Inventor. MIT App Inventor is an intuitive, visual programming environment that allows everyone – even children – to build fully functional apps for smartphones and tablets. Those new to MIT App Inventor can have a simple first app up and running in less than 30 minutes. And what's more, our block-based tool facilitates the creation of complex, high-impact apps in significantly less time than traditional programming

environments. The MIT App Inventor project seeks to democratize software development by empowering all people, especially young people, to move from technology consumption to technology creation.

IX. CONCLUSION

In this dissertation, we have developed an approach for determining security with automation for homes and public places. The proposed approach facilitates the antitheft system in order to provide real time information of robbery and end security to our expensive things and money. Also, the proposed system gives wireless access (ON/OFF) to appliances/devices via android smartphone without going to the switch of respective appliances/devices. Such an approach can be used everywhere, where antitheft security is important. This is an only approach that combines antitheft security with automation that is controlling of various devices on a single board.

X. FUTURE SCOPE

This section presents the possible future directions to extend the presented work. In future the system can be enhanced by increasing number of relays to control (ON/OFF) number of devices. As antitheft security depends on light intensity this system fail in the event of robbery in no light. This drawback can be overcome by using pressure sensors to double the security. Further this system can be used with emergency door locking system to automatic shut all the doors at real time in the case of robbery.

XI. REFERENCES

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