DESIGN AND IMPLEMENTATION OF GSM BASED SECURITY SYSTEM FOR RETAIL STORE

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Abstract

The paper is to provide security and send fast information to Global System for Mobile (GSM) device using Short Messaging System (SMS) or calling the owner's phone. The system mainly contains a GSM Module and Arduino ATMEGA-328P.Passive Infra Red (PIR) motion sensor is used as the primary sensor for motion detection, GSM module for sending SMS and buzzer for alarm. This Retail Store Security System can monitor home area that is surrounded by PIR sensor and sending SMS, and make people panic by turning on the buzzer when trespassing surrounding area that detected by PIR sensor. Mobile phone is very important which the information sent and received by the user mobile phone in the form of SMS. The proposed system is shown to be a simple, cost effective which makes it suitable for the smart retail store.

Keyword: Global System Mobile, ATMEGA328P, Passive Infra Red (PIR), RFID Reader, Buzzer, LCD

1.INTRODUCTION

Nowadays Home/Office and many others place security is the most important. In our absence these places are not secure. Shop security system using PIR sensor is a system designed to reduce the high rates of crimes in most personal housing. For making these palaces secure many people prefer electronic security systems. The paper shows the details about making a simple microcontroller based shop security system using a GSM module and a PIR sensor. It gives a call and SMS to a pre-specified phone number when any kind of intrusion is found.

2.AIM AND OBJECTIVES

The main purpose of this is to design the security system for retail store using PIR sensor for motion detection and GSM module for SMS messaging to user mobile. The objectives are as follows;

- To provide security when the user is away from home/shop, mobile technology that can perform remote technology communicate wherever they are
- To detect obstacle, GSM Module for communicate with GSM Phone
- To reduce the thieving (crimes) when user is not at home/shop by using this system

3.METHODOLOGY

In our system PIR sensor used for sensing (30 degree &15 feet),When anybody comes in range of PIR sensor, then sensor sends a logic signal to microcontroller after that microcontroller used for controlling and then a GSM module which is used for messaging (SMS) purpose. In this system RFID reader is used for neglect the sensing of PIR sensor by using authorized card. RFID reader reads the data from the card is valid the buzzer (alarm) doesn't work. If the card is invalid the buzzer will make a sound. When the retail store is closed, the ARM switch will be switched ON and after 5 or 10 minutes (the time setting) microcontroller will receive the signal that sending from PIR sensor.

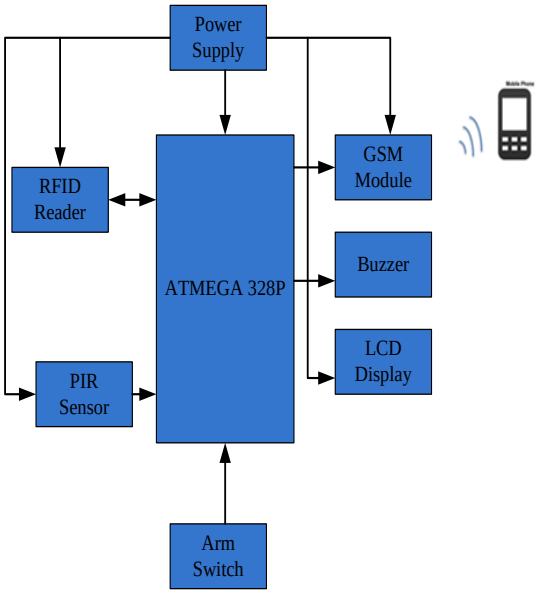

Figure 1. Block diagram of the proposed system

4.PROPOSED SYSTEM IMPLEMENTATION

4.1. Software Description

After hardware components are chosen and interfacing is coded and uploaded for security control system. The software for programming an arduino is easy to use and also freely available for windows, Mac and Linux computer at no cost. The arduino software which is shown in figure 11 is referred to as an Integrated Development Environment (IDE). This is the programming software that is used to upload code to the arduino microcontroller. The IDE is divided into three main areas: the command area, the text area, and the message window area. The IDE contains a text editor where software programs, called sketches, are created and compiler that translates the sketches into a more complicated binary hex file that can be uploaded directly to the microcontroller. The Arduino language is a variant of the C++ programming language, but uses built-in libraries to simplify complicated coding test. Firstly, open the Arduino IDE software version 1.8.5 and add the necessary file. And then write C program and compile. If there is an error, check again libraries and C program. If the error is not found, choose board and upload. If uploading is done, the process is successfully finished.

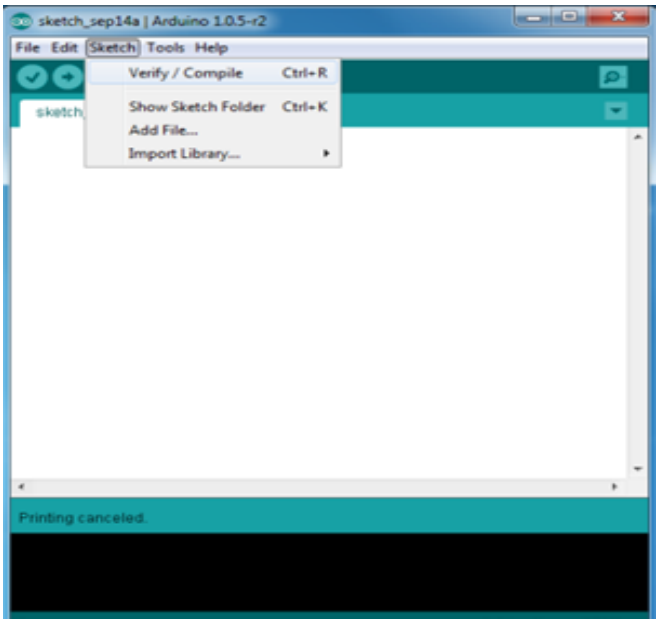

Figure 2. Arduino IDE(1.8.5) software

4.2. Flowchart of the Overall System

This figure show the security system of the shop, first start the program RFID, SIM 900, LCD and timer are initialized, And show the greeting message (GSM/RFID security system). If RFID card present and the card is valid, we can turn off the security and end the process. But the card is not valid card, show Access Denied. The card is not present but the security system is active and PIR sensor is detected then SMS sent to the shop owner's phone.

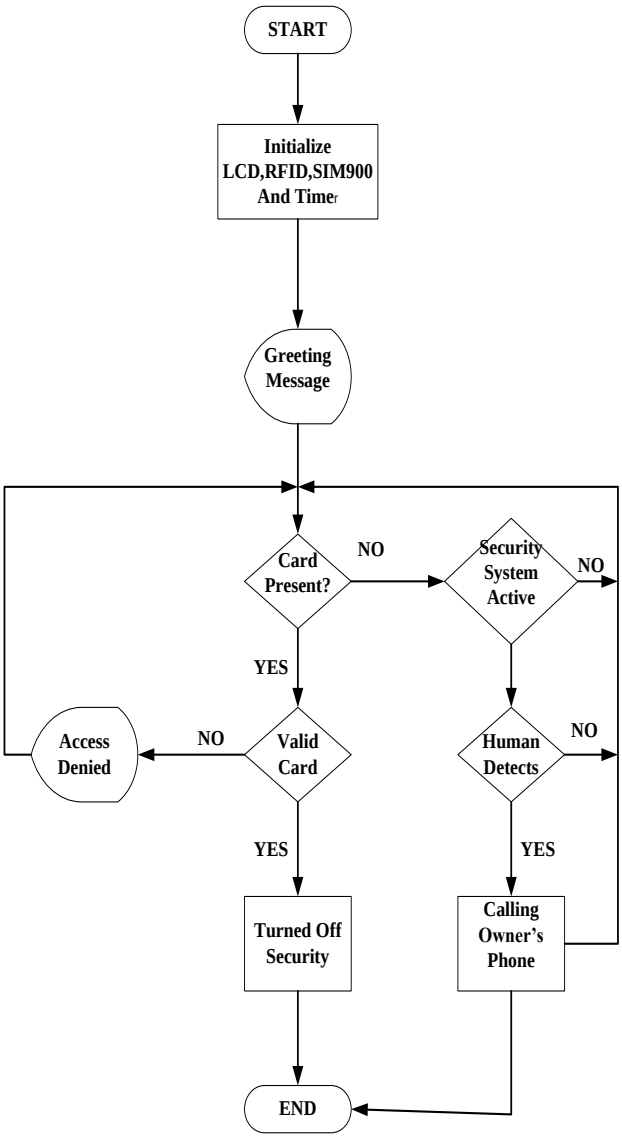

Figure 3. Flowchart of overall system

5.TEST and RESULTS

Figure 4 shows security system is worked the system of the initial situation is displayed on LCD as GSM/RFID Security System. After the ARM switch press to be needed wait 20 seconds.

Figure 4. Security System Active

Initially the tad id's stored to the microcontroller. From the data base of microcontroller is fetched to the corresponding id,if the user used valid card /tag in the rfid reader. If the card is valid, the security system is displayed on LCD " Security System Turned Off".

Figure 5. "Security System Turned Off"

When the card/tag is an unauthorized card is rung a buzzer alarm and also it is displayed as "Access Denied".

Figure 6. "Access Denied"

When anybody comes in range of PIR sensor sends a logic signal to microcontroller and then microcontroller used for controlling and then a GSM module which is used for ***"calling***. If PIR sensor detects human, the owner's phone is calling.

Figure 7. Condition of "Calling"

6.CONCLUSIONS

People are getting more concerned to protect their shop from unauthorized people. This system can monitor a shop by use of sensors that integrated with a microcontroller and a GSM unit. A calling mechanism is used to alert users via mobile phone when a possible intrusion occurs. This system is designed by using modularity to become a flexible system that can be add more sensors without change the whole system, only add some sensors to increase systems functionality. The proposed system can be used at places such as banks, office and home. It is possible to control theft tricks depending on different locations and type of things. Microcontroller has been used for design a security and reliability system for the shop. GSM has been used for calling purpose to the owner (Under any circumstances and in any place) to inform owner if the shop has been hacked.

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