IOT Based Smart Security and Home Automation System

Vivek Dharmendra Pandey,[1] Anup Kedarnath Chaurasiya[2], Prof.Sachin M. Vaidya[3]

[12] Final year Student MCA,, Department of MCA ,A.C. Patil College of Engineering, Navi-Mumbai , Pincode: 410210, India
[3]Professor & HOD, Dept. MCA, A.C. Patil College of Engineering, Navi-Mumbai, Pincode: 410210, India

ABSTRACT

The new generation is based on smart humans using smart technology. A smart technology makes human life easy and updated. The proposed system is designed for home automation with some increased functionalities and using Wi-Fi as an Internet connection protocol. The home automation system technology is unique from other systems which give ability to the user to control the system from any location around the world through an internet connection. The existing system describes implementation of a security system that uses Android mobile devices with the use of Blue tooth as a wireless connection protocol.

Keywords: PIR Sensor, Arduino Uno Board, Buzzer, LED Light, GSM Board.

1. Introduction

Home security has changed a lot from the last century and will be changing in coming years. Security is an important aspect or feature in the smart home applications. The new and emerging concept of smart homes offers a comfortable, convenient, and safe environment for occupants. Conventional security systems keep homeowners, and their property, safe from intruders by giving the indication in terms of short message. However, a smart home security system offers many more benefits.

Nomenclature

Arduino Board
PIR Sensor
GSM 900A

2. Literature Survey

Objectives of the project are the main part of any project. Following are listed:

The aim of the project is to develop and launch on up to date, reliable and user-friendly security system to automate home security using microcontroller circuitry synchronized with GSM module with an objective to provide maximum possible security based on an automatic emergency care response using detection system. General objectives of the project are defined as;

Bulleted lists may be included and should look like this:

- To know the situation of their home throughSMS
- To effectively receive and transmit data via SMS
- Minimize power and time wastage

The system specification shows the description of the function and the performance of system and the user. The scope of the project GSM Based home security system is immense. The future implications of the project are very great considering the amount of time and resources it saves. The project itself

vivek D. Pandey: Tel.:+91 7021893905;
E-mail address: pandeyv205@gmail.com

can be modified to achieve a complete Home Security system which will then create a platform for the user to interface between himself and the household. This system is aimed toward all the average users who wish to control their household remotely by their cell phones provided that the home is controllable from different situation. Example of feasible security and applications under consideration include; theft are problems to be addressed by the project.

3. Material & Method

3.1 Arduino UNO

Arduino Uno is a microcontroller board based on the ATmega328P. 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.

3.2 PIR Sensor

PIR sensors are more complicated than many of the other sensors explained in these tutorials (like photocells, FSRs and tilt switches) because there are multiple variables that affect the sensors input and output. To begin explaining how a basic sensor works, we'll use this rather nice diagram
The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors.
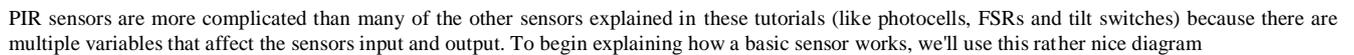
3.3 SIM 900 AGSM Module

SIM900A GSM Module is the smallest and cheapest module for GPRS/GSM communication. It is common with Arduino and microcontroller in most of embedded application. The module offers GPRS/GSM technology for communication with the uses of a mobile sim. It uses a 900 and 1800MHz frequency band and allows users to receive/send mobile calls and SMS. The keypad and display interface allows the developers to make the customize application with it. Furthermore, it also has modes, command mode and data mode. In every country the GPRS/GSM and different protocols/frequencies to operate. Command mode helps the developers to change the default setting according to their requirements.

3.4 Jumper Wires

Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins. Use them to wire up all your circuits.

3.5 Hardware Connection

- Arduinounosensor connect pin 5V to + 5V PIR Sensor and then connected gnd pin to the output pin of the PIR sensor. The pin #2 on the right part of the board should be connected to the VCC.

- Take pir sensor connect the gumper wire with Vcc pin,groujnd.

- LED Light you can connect an led light for notification purpose it will blink as soon someone crosses the pir sensor.

- GSM 900A can be connected for the notification with Txd and Rxd port with the jumper wire. This will add a plus point because you don't have to monitor the sensor it will call on your cell or you can add messaging code so it will send a text.

4. Implementation

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. Some examples of how your references should be listed are given at the end of this template in the 'References' section, which will allow you to assemble your reference list according to the correct format and font size.

5. Problem Faced

Along the course of project completion, we encountered various problems and obstacles. Not everything that we had planned went smoothly during the project development span. Also, we had a limited amount of time for its completion so we were under a certain amount of pressure as well. We had to start from the research phase at the beginning and needed to gain knowledge on all the devices and components that we had intended to use for our project.

Other phases of the project included coding, debugging, testing, documentation and implementation and it needed certain time for completion so we really had to manage the limited time available to us and work accordingly to finish the project within the schedule.

5.2 Limitation

1. The receiver must reside in a location where a signal with sufficient strength can be received from a cellular phone network.
2. Operation of the controlling unit is only possible through a cell phone with SMS messaging capabilities.
3. The Controlling unit must be able to receive and decode SMS messages.
4. All over the world, there could be an area where the mobile network is not established, so no connectivity of mobile phones in that area.
5. Acknowledgements and Reference heading should be left justified, bold, with the first letter capitalized but have no numbers. Text below continues as normal.

6. Conclusion

Home security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition, there is need to automate home so that the user can take the advantage of technological advancement. This project presents a model that will provide security to their home, via SMS using GSM technology. Basic Idea of our project is to provide GSM Based security even if the owner is away from the restricted areas. For this we adopted wireless mode of transmission using GSM. Beside this there are many methods of wireless communication but we selected GSM in our project because as compared to other techniques, this is an efficient and cheap solution also, we are much familiar with GSM technology and it is easily available. This project is designed to provide ubiquitous access to the system for the security using extensive GSM technology for communication purposes and microcontroller for device control. The detailed sensors above are used to sense the disturbance and inform to the programmed microcontroller and then information is sent between controlling unit and home owner for security purpose. The end product will have a simplistic design making it easy for users to interact with.

REFERENCES

[1] Industry eMagazine. Archived from the original on September 30, 2014. Retrieved October 8, 2014.

[2] "1.5 Million Home Automation Systems Installed in the US This Year". www.abiresearch.com. Retrieved 2016-11-22.

[3] "Smart Home - United States | Statista Market Forecast". Statista. Retrieved 2019-11-07.

[4] Caccavale, Michael. "The Impact Of The Digital Revolution On The Smart Home Industry". Forbes. Retrieved 2019-11-07.

[5] Mandula, K.; Parupalli, R.; Murty, C. A. S.; Magesh, E.; Lunagariya, R. (December 2015). "Mobile based home automation using Internet of Things(IoT)". 2015 International Conference on Control, Instrumentation, Communication and Computational Technologies (ICCICCT): 340–343. doi:10.1109/ICCICCT.2015.7475301.

[6] Preville, Cherie (26 Aug 2013). "Control Your Castle: The Latest in HVAC Home Automation". ACHRNews. ACHRNews. Retrieved 15 Jun 2015.

[7] Asadullah, Muhammad (22 Dec 2016). "An Overview of Home Automation Systems". Conference Paper. IEEE. doi:10.1109/ICRAI.2016.7791223.

[8] Jin, M.; Jia, R.; Spanos, C. (2017-01-01). "Virtual Occupancy Sensing: Using Smart Meters to Indicate Your Presence". IEEE Transactions on Mobile Computing. PP (99): 3264–3277. arXiv:1407.4395. doi:10.1109/TMC.2017.2684806. ISSN 1536-1233.

[9] Jin, M.; Bekiaris-Liberis, N.; Weekly, K.; Spanos, C. J.; Bayen, A. M. (2016-01-01). "Occupancy Detection via Environmental Sensing". IEEE Transactions on Automation Science and Engineering. PP (99): 443–455. doi:10.1109/TASE.2016.2619720. ISSN 1545-5955. S2CID 4600376.

[10] Berger, Lars T.; Schwager, Andreas; Pagani, Pascal; Schneider, Daniel M. (February 2014). Smart Grid Applications, Communications, and Security. Devices, Circuits, and Systems. CRC Press. ISBN 978-1-4665-5752-9.

[11] "Tips: Smart Appliances | Department of Energy". energy.gov. Archived from the original on 2015-09-29. Retrieved 2016-04-20.