

# A Novel Approach for Systematic Surveillance with Android using IoT

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**Abstract**—The need for security alarm systems nowadays is a serious demand. As the number of crimes are increasing every day, there has to be something that will keep us safe. We are all aware of high end security systems present in the market but they are not easily available to everyone. Therefore, it is intended to provide the solution by constructing a cost efficient of electronic system. The capability of sensing the motion of the intruders and setting off the alarm. The basic idea behind this project is that all the bodies generate some heat energy in the form of infrared which is invisible to human eyes. But, the electronic motion sensor can be detected. The project involves the use of motion sensor, gas sensor, fire sensor, LCD display and a simple program. The sensor detects any motion or object in its permissible range and triggers the alarm. It will also send the signal to microcontroller which process the signal and with detection message on LCD display. With this system we can easily set up a security system alarm in our home for unwanted intruders.

**Keywords**— *PIR Sensor; Gas Sensor; Fire Sensor; GSM Module;*

## I. INTRODUCTION

We have designed an interesting and cheap security alarm. This Gadget helps you to protect your property from thieves. In this project we are going to use a P.I.R Sensor, gas sensor, fire sensor, GSM module, LCD and some other components. It is a basic motion sensing alarm that detects when someone enters the area. In Our body it generates heat energy in the form of infrared which is invisible to human eyes but it can be detected by electronic sensor. This type of sensor is made up of crystalline material and it is an infrared sensor that generates electric charge when exposed in heat and sends a signal to microcontroller, it displays the status on LCD display and start buzzing and bulb glows. Simple program is running on microcontroller, It checks the sensor if anything is moved or new object has been detected. It is built around an microcontroller. It is easily portable. Once You have the code, you can connects

the all external parts. The easiest way to do this is with a breadboard.

## II.EXISTING SYSTEM

In existing system, There are few alarm based security systems where they would be included certain single using sensors such as fire, gas etc. These existing methods have drawbacks as they work in shortrange. To overcome these drawbacks, we are going to implement the proposed model. The existing system uses password protected door system methodology in home automation system. Door lock password is protected with the LED. It is based on input screen panel. It operates by detecting difference in light intensity captured by the photo diode which is emitted by LEDs and reflected by the finger. The display is a 16X2 LCD panel. IR sensors are used to detect any obstacle while monitoring the windows and doors at night or when away. Fire alarm system is used to check if any increase in temperature and raises alarm. They use the fire sensor components of automation system i.e. LCD Display, IR sensor, Temperature Sensor, Microcontroller, Power Supply, Relay, GSM. In one of the existing system they constructed the security system for car protection. In this concept if thief tries to rob a car it automatically demobilizes the car by disconnecting the key supply from the car battery. It is impossible for anybody to start the car, let alone moving with it. In an attempt of theft through the car doors. The system sends the message to the car owner at the same time it starts the alarm. This design popped out due to the increasing rate at packed cars are stolen especially in our country, but in this design this packed car is being monitored irrespective of where it is packed, provided there GSM network coverage. The basic architecture of an IoT network and the functions of each of its layers discussed in [17-19]

### III. PROPOSED SYSTEM

This project focuses on providing security and controlling lights and fans referred as home automation. The proposed work will be more helpful for handicapped and aged people. This system provides smart security by sending a captured image through an E-mail to the owner using internet when an intruder is detected. If any stranger try to hit the confidential area then an alert message is given automatically. Whenever the alert is received by the owner the voice alert is played. The proposed system is very useful for home automation system, consists of sensors can be easily configured. For sending the details of the unusual event information we will make use of GSM Module protocol once the unusual event is occurred then an message is sent to the owner then the voice alert is played at the end of the user and the android applications are developed to interact the both applications automatically there are two applications which are one will be in owner hand and the other will be in the room where the security is required , after getting the notification the voice alert the owner will request for the photo then the photo is sent to the requested person through email automatically the location will be sent to the source automatically from the destination and that is plotted in the google map.

### IV. PROPOSED ALGORITHM

1. Start
2. Connect the GSM modem to the microcontroller
3. Connect all the sensors to the microcontroller
4. LCD display is connected
5. Connect home appliances with relay
6. Create a variable for input reading
7. Initialize the code with the numbers of the interface pins
8. Declare LCD display as output and sensor as input
9. read input value
10. check if the input is HIGH, then turn bulb ON
11. Put the alarm ON
12. Send SMS
13. Print text to LCD as 'INTRUDER DETECTED'
14. Stop

### V. ADVANTAGES

- The given system is handy and portable, and thus can be easily carried from one place to another.
- The circuitry is not that complicated and thus can be easily troubleshooted.
- The given system sets off a powerful buzzer, and it is effective as any other alarm system available in the market.

### VI. DISADVANTAGES

- The given alarm system determines the presence of the intruder only it does not determine how many persons are in there actually.
- The alarm activates only when the person cuts through the line of the PIR sensor.
- Disadvantages found in other papers are that

### VII. APPLICATIONS

The type of motion, gas, fire sensing alarm system can be easily employable for security purposes at home. It can also be used in very confidential places like banks, various offices and even for sensitive establishments such as for military but this can easily set up this system for household purposes with less expense.

### VIII. HARDWARE DESIGN

#### A. Controller Unit

Controller unit is built with microcontroller. The microcontroller chip has the versatility to sense inputs and control outputs in the devices. Microcontroller is a physical computing platform that are managing and handling electronics. It consists of 8 bit Atmel AV microcontroller. The microcontroller board contains various features like USB. It is an 64 KB flash and 1024 byte of data RAM, supports 12 clock default or 6 mode selection 6 clocks per machine cycle to achieve twice the throughput at the same clock frequency. The flash memory supports both parallel programming and in serial In-system programming (ISP). It facilitates the program to process the electronic signals from the attached components and control them because it's an open source platform independent IDE.

#### B. GSM Modem

GSM is a mobile communication modem. Its stands for "global system for mobile communication". It is a specialized type of modem which accepts over a subscription to a mobile operator just like a mobile phone from the mobile perspective. GSM modem can be a dedicated modem device with serial, USB connection or it can be a mobile phone that provides gsm modem capabilities. It is used to make the development process easier and faster when gsm modem is connected to a computer this allows the system to use the gsm modem to communicate over a mobile network. It Is a wireless module that consists of ultra compact that can support data at both 900 and 1800MHZ, this is low power device which has a tiny size of 24mm then 3mm, which helps in putting it with microcontroller on a bread board with small size box

#### C. Motion Detection

PIR sensor "the passive infrared sensor". It detects infrared light that is emitted from the object, because all objects emit infrared waves (electromagnetic waves that travels with heat). PIR sensor detect general movement it can only detects object that are in front of them. It consists pyroelectric sensor which generates energy when expose to

heat, that means when a human or an animal body get in the range, it will take the movement because human or animal body emits heat energy in a form of infrared radiations that's why the name of the sensor comes from passive infrared sensor. The passive means the sensor don't use energy for detecting purpose, it works by taking the energy given by other objects if sensor value is high it means it is detected. The nominal red edge of visible spectrum at 700 nanometers to 1mm, this range of wavelengths corresponds to a frequency range of 430THz down to 300 GHz.

**D. Smoke Detector**

Fire detector works by detecting smoke or heat, these devices respond to the presence of smoke or extremely high temperatures that are present with a fire. This sensor usually involves having the activation twice within a short period of time. It also contains an IR transmitter and receiver, the IR signal is attenuated to presence of smoke. If smoke is present, conductivity or IR receiver is reduced and if it falls below threshold then it configures a certain pin of microcontroller high. After the device has been activated it will send a signal to the system.

**E. Gas Detection**

The gas detector is a device which detects the presence or concentration of gases in the atmosphere based on concentration of gas. The pyro electric sensing is located in order to detect gas detection, if it detects the heat generated around the device and sends a signal to the PIC notifying a possible gas detection. CM0SLS6511 integrated circuit for detecting gas from the gas sensor and initiating appropriate response and these includes two staging different amplifiers along with a window comparator. It is one which comes handy in applications where we use to detect the variation in the concentration of toxic gases in order to maintain the system safe and avoid any unexpected threats.

**F. Relay**

A relay is an electromagnetic switching device. It consisting of an armature which is moved by an electromagnet to operate one or more switch contacts. Some advantages of relays are that they provide amplification and isolation and are straight forward. 5v 4-channel relay interface board are here used, in this relay each channel needs a 15-20mA driver current.it can be used to control various appliances and equipment with large current relays that work under AC250V 10A or DC30V 10A. The microcontroller can be controlled by standard interface. When sensors are ready to switch things on or off in fraction of a second using clever magnetic switches called relay.

**IX. WORKING DIAGRAM**

Figure shows the block diagram of the system, where fire detector, smoke detector, PIR sensor and gsm modem are connected with the Microcontroller.

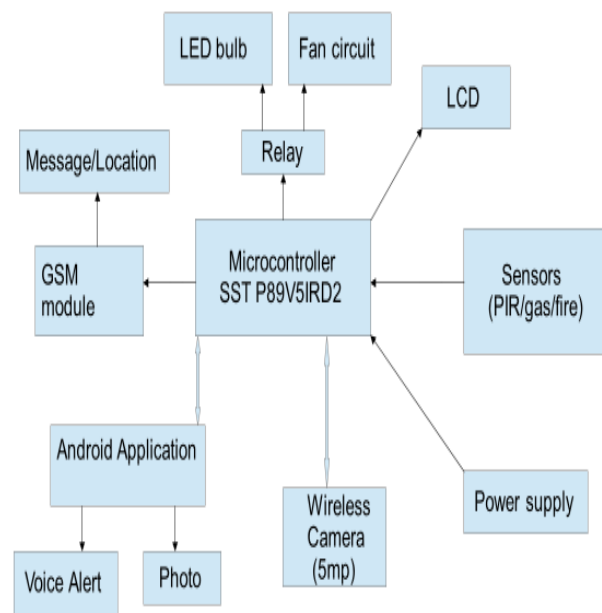


Fig 1: Block Diagram

**X. EXPERIMENTAL RESULTS**

Internet of things based smart security system can only work in the presence of internet. The rapid growth of IoT devices brings more benefits. Even though Wi-Fi is not available everywhere we can go to 3G or 4G services. This is one big advantage of IOT. In this project, the use of a camera connected to the microcontroller might help the user in taking decision whether to welcome the guest after receiving the captured picture of the guest or intruder, If the user identifies he is an unknown person then the user can further forward the same photograph to the police station by explaining his situation. Thus, we have designed a smart security alarm system using Microcontroller and PIR motion sensor, gas sensor and fire sensor which is handy, portable, cost-effective and highly effective as well. These type of alarm systems are hugely in demand for security purposes in home and thus the given security system can be proved useful and effective.



Fig 2: Android Application



Fig 3: Model

## XI. CONCLUSION

This security home feature is expected to draw much attention in the next decades. People are getting more and more concerned about how to protect themselves and their houses from emergencies. These emergencies include not only thief intrusion, but also fire attack. This device provides a means for being able to securely monitor a house by use of sensors integrated with a micro-controller and a GSM unit. SMS provides an economical and convenient way to alert users of a possible intrusion into the property. The use of mobile handsets as a client device to receive warning messages implies that the user will not have to carry an additional piece of equipment as most people already have a mobile phone with them most of the time. By using this system the security services like police and fire brigade of a near by region also be informed about the intrusion instantly and they can take steps rapidly. So this system is safe and cost effective as well.

## XII. FUTURE ENHANCEMENT

Our project can be implemented in a smaller manner so that it can be portable and can install it anywhere. The accuracy of detecting number of persons can be implemented so that we can figure out how many members are present in the surveillance area, though it can be captured by our wireless camera.

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