

# Iot Based Home Automation For A Multistorey Apartments

<sup>1</sup>E.Mukil, Asst.Professor, <sup>2</sup>K.Nandhini, <sup>3</sup>M.Keethanjali, <sup>4</sup>A.Abarna

<sup>1234</sup>Department of ECE, KPR Institute of Engineering and Technolgy,Cimbatore

## ABSTRACT

*IoT coverage is very wide and includes variety of objects like computers, smart phones, tablets, digital camera and sensors. Once all these devices are connected to each other, they enable more and more smart processes and services that support our basic needs, environment and health. The main objective of the present work is to design a smart home using sensors and relays which can be monitored and controlled by Arduino Uno using Internet of Things(IOT).The home automation system is also implemented which includes security to the residents. Today we are living in 21<sup>st</sup> century. It is necessary to control the home but in our project we are doing home automation for apartments which include monitoring more number of homes. Home automation is an important milestone in achieving a smart grid and is ever exciting field that has exploded over the past few years. Introducing the Arduino to the world of home automation provides numerous customization to turn a regular home into smart home. Arduino Uno provides a low cost platform for interconnecting electrical/electronic devices and various sensors in a home via the internet network.*

Keywords: Arduino Uno , Internet of Things(IOT)

## I. INTRODUCTION (HEADING I)

The IoT is the network of physical objects or things embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with manufacture, operator and other connected device. Each thing is uniquely identifiable through its embedded computing system but it is able to interoperate within the existing internet infrastructure. IoT communicates information to people and systems such as state and health of equipment and data from sensors that can monitor a person's vital signs.

The scope of this work is to develop a monitoring system by using Arduino which can act as a interface between user and the devices. Live the data can be monitored using cloud server. The Arduino Uno is a low cost microcontroller that is able to run on its own software program and can give endless extension possibilities. The work require a very low energy

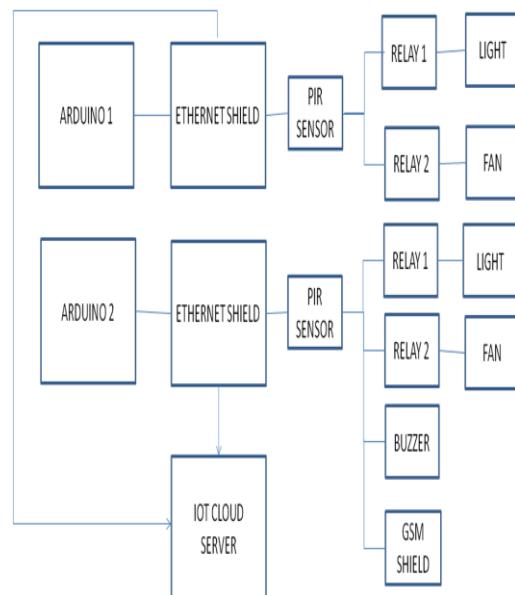
consumption, whereby the Arduino Uno operates with 5 V power.

Most of the home security system available in the control is only for individual homes and it is installed somewhere in the home. The down side of the system is that the home users are not able to access and customized the control panel when they are away from their home.

The motivation to build up this system is due to high number of apartment invasion reported every year.

## 2.PROPOSED SYSTEM

The block consists of Arduino uno, Ethernet shield, PIR sensor, GSM module, Relay control.



During the presence of residents, when they are not side a particular room the devices such as light and fan get off due to the motion detection in the PIR sensor. During the absence of the residents the PIR sensor detects the motion and if any motion is detected it can be detected and a buzzer sound is produced in case of emergency and GSM shield sends the message to the user. This system is very useful in monitoring and controlling the devices and it also provide safety to the users.

### 3. HARDWARE DESCRIPTION

**3.1 PIR SENSOR:** An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor.



Fig.3.1.PIR sensor

PIRs come in many configurations for a wide variety of applications. The most common models When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger have numerous Fresnel lenses or mirror segments, an effective range of about ten meters (thirty feet), and a field of view less than 180 degrees. Models with wider fields of view, including 360 degrees, are available- typically designed to mount on a ceiling. Some layer PIRs are made with single segment mirrors and can sense changes in infrared energy over one hundred feet away from the PIR. There are also PIRs designed with reversible orientation mirrors which allow either broad coverage (110 wide) or very narrow "curtain" coverage, or with individually selectable segments to "shape" the coverage.

### 3.2 GSM Module:

Global System for Mobile Communications, is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991.2G networks developed as a replacement for first generation (1G) analog cellular networks, and the GSM standard originally described a digital, circuit-switched network optimized for full duplex voice telephony.

This expanded over time to include data communications, first by circuit-switched transport, then by packet data transport via GPRS and EDGE .Subsequently, the 3GPP developed third-generation (3G) UMTS standards followed by fourth-generation (4G) LTE Advanced standards, which do not form part of the ETSI GSM standard. GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network—macro, micro, and umbrella cells. The coverage area of each cell varies according to the implementation environment. Macro cells can be regarded as cells where the base station antenna is installed on a mast or a building above average rooftop level. Micro cells are cells whose antenna height is under average rooftop level; they are typically used in urban areas. Pico cells are small cells whose coverage diameter is a few dozen meters; they are mainly used indoors. Femto cells are cells designed for use in residential or small business environments and connect to the service provider's network via a broadband internet connection. Umbrella cells are used to cover shadowed regions of smaller cells and fill in gaps in coverage between those cells. Cell horizontal radius varies depending on antenna height, antenna gain, and propagation conditions from a couple of hundred meters to several tens of kilometers. The longest distance the GSM specification supports in practical use is 35 kilometers (22 mi). There are also several implementations of the concept of an extended cell, where the cell radius could be double or even more, depending on the antenna system, the type of terrain, and the timing advance .Indoor coverage is also supported by GSM and may be achieved by using an indoor base station, or an indoor repeater with distributed indoor antennas fed through power splitters, to deliver the radio signals from an antenna outdoors to the separate indoor distributed antenna system.



Fig.3.3Gsm Module

### 3.3 ARDUINO:

Arduino is a software company, project, and user community that designs and manufacturing computers open-source hardware, open-source software, and microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices. The Arduino Uno is a

microcontroller board based on the objects that can sense and control physical devices.



Fig.3.3Arduino

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures.

#### 3.4 ETHERNET SHIELD

The Arduino Ethernet shield connects Arduino to the internet in mere minutes. Just plug this module onto the Arduino board, connect it to the network with RJ45 cable and there are few steps to start controlling the internet. As always with Arduino, every element of the platform-hardware, software and documentation is freely available and open source. Hundreds of thousands of Arduino boards are already fueling people's creativity all over the world, everyday.



Fig.3.4 Ethernet shield.

#### 3.5 RELAY:

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and most have double throw switch contacts.



Fig.3.5Arduino

Relay allows one circuit to switch a second circuit which can be completely separate from first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuits. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.

Relays are usually SPDT or DPDT but they can have many more sets of switch contacts.

## 4. RESULT AND CONCLUSION

This project covers most important feature, in which it could provide the complete smart home environment. Our project mainly focuses on monitoring, controlling and also provides security which is employed using Arduino and Ethernet. The buzzer system provides advantage to our system. By building system in such an environment, it could play a lead role in real time scenario. This includes the following process:

1. Fabrication of mechanical setup.
2. Electronic circuitry wiring.
3. Programming the microcontroller.
4. Testing and debugging
5. Fusing hardware and software
- 6.

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