ECONOMICAL SMART HOME AUTOMATION USING INTERNET OF THINGS

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Abstract
Momentarily, internet of things is ruling the world in most aspects. Motive of our project is to create an IOT device that will be smartly implemented in the electronic devices which is going to be an advanced in the future. This works in such a way that if humans enter into the room, the device makes the light to switch on and off by detecting the humans using passive infrared rays sensor popularly known as PIR. The advantage of this project is lights on and off can be automated by combining the features of both Light Dependent Resistor (LDR) and PIR sensor with mobile application which can be controlled using our handsets remote anywhere. Also it adjusts the brightness of the light based on the sunlight entering into the room.
Keywords:Wi-Fi, IoT, LDR, PIR, Android, Arduino

1. INTRODUCTION

Internet of Things is a physical device in the real world are connected to the Internet that can be monitored and controlled by the Mobile phones or web applications. The physical device in the real world can be connected to many sensors and other electrical devices. The major things for home automation the home appliance home that can change the environment based on the situation. It can be accessed anywhere from the world when it connected to the Internet.

Home appliances like Fan, Light, motor, Refrigerator, Air Cooler, are also included in the part of home automation the things that can turn On the AC based on Room temperature and based on the human activity in the room to turn ON or OFF the Lights and Fan. Its sense the Soil moisture using the sensor Called Soil moisture sensor it call turn ON or OFF the pumps in the garden. For Security purposes home Automation is mainly used like monitoring the when we out using the camera to connect to the home. Also, recognize the person using IoT. Some of the Devices are Programmed to be automated like turn off the gas when leakage is occurring that are smartly developed for IoT.

2. LITERATURE SURVEY

In the current situation smart home automation is developed using many technology like IoT. As per our survey currently there exists system neither at cheaper rates nor easy to handle. Various systems are hard to install, difficult to use and maintain. Current systems are generally proprietary, closed and not very user friendly.
In this section, discussed ways of previously implement Home Automation System with their technology with features, benefit and limitations they have in their Project that all to be covered. The Figure, shows Basic Architecture of Remote Home Automation. Some of the Previously they handled the Home Automation with Bluetooth and GSM based system they are Cost high to implement so that ideas are not reached. In the Below figure Show the increased rate of home automation from the year 2011 to 2017. Comparisons to other users WiFi based user increased in 2017.
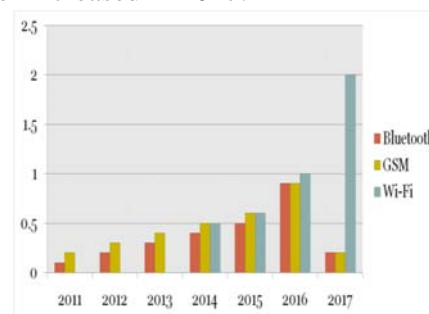
Fig 1. Home automation usage

2.1 SENSOR BASED HOME AUTOMATION

In web based home automation system, user can interact with the system through a web based user interface over the Internet. The system connected to home appliances. The main processor interacts with external components, viz. sensors, appliances and devices.

2.1.1 PIR(Passive Infrared)

PIR sensor is used to detect the human Inferred and Light density present in the Room. This works in such a way that if humans enter into the room, the device makes the light to switch on and off by detecting the humans using passive infrared rays sensor popularly known as PIR.
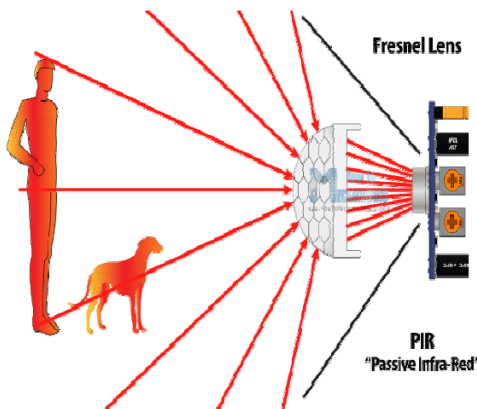

Fig 2. PIR Sensor

PIR stands for Passive Infrared Sensor. PIR sensors allow you to sense motion it used to detect the human has moved in or out of the sensor range. PIR sensor can be easily attached with the Light in home without adding an additional controller. It detects the Motions and Infered in the human Body that's help to turn off the light when the human leaves the room.

2.1.2 LDR (Light Dependent Resistor)

The advantage of this project is lights on and off can be automated by combining the features of both Light Dependent Resistor (LDR) and PIR sensor with mobile application which can be controlled using our handsets remote anywhere. Also it adjusts the brightness of the light based on the sunlight entering into the room.
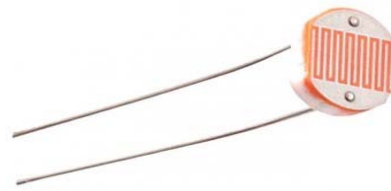

Fig 3. LDR Sensor

The photocells in the LDR are used to detect the light density in from the room. The density of light will be measured by the LDR sensor.
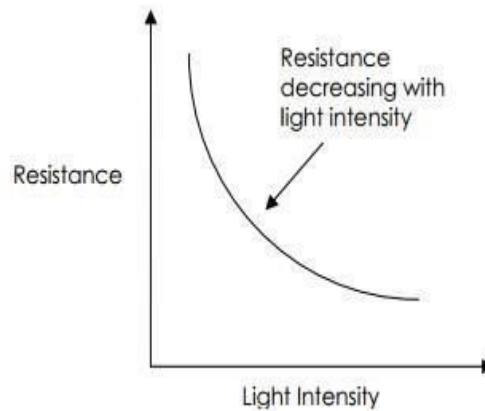

Fig 4. Typical LDR resistance vs light intensity graph

The LDR resistance that falls with an increase in the light intensity falling upon the sensor that read the density of light falls.

When the light level decreases, the resistance of the LDR increases. If the density value falls on the Sensor is high then the Sun light enter into the room is high if the density value is low then the sun light enter into the room is low.

2.2 WiFi Interconnection

WiFi is connected to Arduino it used to send and receive the data to the web Server and the web Server is a centralized control and maintaining the data while sending the data it collect the information from the Arduino and send it to the Web Server. [5]
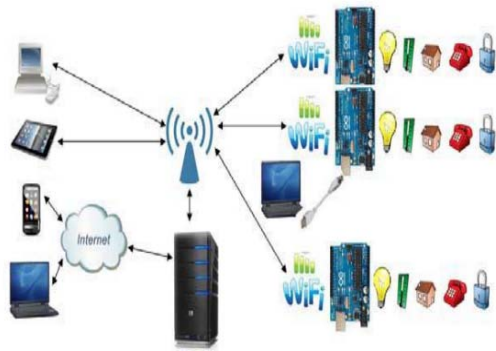
Fig 5. WiFi Based Automation

Data from the Arduino board are sent to the cloud using WiFi module. The WiFi module is connected on the board that were accessing the local Internet using SSID and Password.

2.3 Arduino

Arduino Send the data to the web server using the Wi-Fi Module. Its control the Home Appliance Using the Relay circuit. Wi-Fi module is used for communication between Android mobile app and Arduino board. Arduino processes the received command and control the relay board. For electrical switches we use a relay board that is connected to the Arduino.

Fig 6. Arduino Board

3. PROPOSED SYSTEM

This works in such a way that if humans enter into the room, the device makes the light to switch on and off, by detecting the humans using passive infrared rays sensor popularly known as PIR.

And we are using LDR Sensor that used to detect light how much enter into the room based on the light dependence it turn on the light.

We are using Wi-Fi module to communicate with the controller device , and we can also monitor weather the home appliance is ON or OFF using our mobile phones.

3.1 System Architecture

Arduino board act as a microprocessor that connected with sensors that sense the human motions and infrared in the human body and sense the light density in the room using those the home appliance change the environment like off the light when the human leaves the room
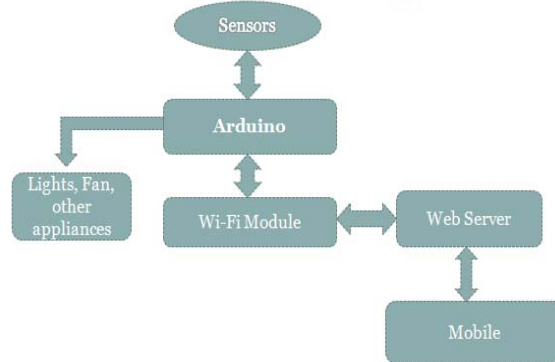

Fig 7. Data flow/ Work Diagram

1. The power supply will be pass the voltage to the arduino board.

2. Wi-Fi modem receive the signal from the mobile app and send the data to the arduino board.

3. Arduino Send the data to the web server using the Wi-Fi Module. Its control the Home Appliance Using the Relay circuit.

4. Relay board is use as switches, for performing on/off operation. Power supply is provided through the relay board to the appliances.

5. Finally user can access the android application in mobile and give command to Wi-Fi module which is connected to arduino which can control the all appliances.

4. IMPLEMENTATION & RESULTS
4.1Android App

Android app is used to monitoring and controlling the home appliance using relay in adruino board.


Fig 8. Screenshot of Android app

To build the android application we used the that is online android application development tool provided by Google. For each appliance we use one button for turning ON/OFF the appliance, after clicking the button it will automatically get toggle. Commands are sent through the webviewer object to the Wi-Fi module. Webviewer passes the commands through the address of Wi-Fi Network.

4.2 Arduino Board Connection

Arduino does not have any wireless connection that's why we are using Wi-Fi module for wireless communication.

Arduino processes the received command and control the relay board. For electrical switches we use relay board that is connected to arduino.
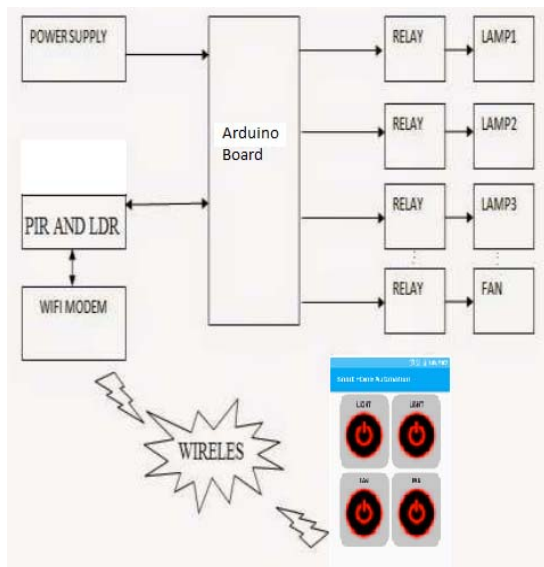
Fig 9. Board Connection

Fig 10. Project result

6. CONCLUSION

A home automation is undeniably a resource which can make a home environment automated. People can control their electrical devices via these home automation devices and set up controlling actions through mobile. In future this product may have high potential for marketing. Usage of this system will reduce about 10-20% of the electricity consumed per year.By using this system around 70% of the electricity charges can be cut-down.

7. REFERENCES

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