PROJECT ON IOT-SMART HOME USING DHCP PROTOCOL

A COURSE PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this mini project report "**IOT-SMART HOME**" is the bonafide work of **BHOGI SARANYA(RA2011003011100)** and **SAI PRASAD GUDARI(RA2011003011112)** and **KRISHNAPRAKASH(RA2011003011092)** and **AKSHAY DUTH(RA2011003011113)** who carried out the project work under my supervision.

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ABSTRACT

Since a few years, smart devices have become an integral part of our daily lives. As a result, on smart devices, offering facilities and security is becoming more important. The goal of this article is to create a home automation system that works with Android mobile devices. Wi-Fi allows the mobile device and the system to communicate with one another. Current studies discusses the IoT-Based Smart Home Automation. Any suitable device may load the mobile application and interact with the system. Commands to turn on/off electrical equipment such as lights, fans, and air conditioners, as well as setting timers, can be delivered simply and fast from mobile devices through a simple and pleasant GUI application that is straightforward to use for any average user. The system then acts and responds to these orders by performing the tasks specified in the commands and informing the user of the outcome. Within Wi-Fi range, the user may also view the result on an Android mobile application. As a result, developing a home automation system for a luxury living that strives to create an advanced home automation system utilizing Wi-Fi technology is a solid option.

ACKNOWLEDGEMENT

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INTRODUCTION

Home automation is building automation for a home, called a smart home or smart house. Home automation system will control lighting and appliances it also include home security such as access control and alarm systems when connected with the Internet, home devices are an important constituent of the Internet of Things.

IoT home automation is the process of controlling home appliances automatically using various control system techniques. The electrical and electronic appliances in the home such as windows, refrigerators, fans, lights, fire alarms, kitchen timers, etc. can be controlled using various control techniques.

OBJECTIVES:

A smart home will be automated. Our smart home can make life easier and secure. It also can save energy and time. The house is monitoring all the time by some automated webcam that we are added in the house. And the most important thing is the owner of the house can access the house from anywhere of the world by using his smart phone.

LITERATURE SURVEY:

To monitor and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network coordinators.

For this the Wi-Fi network is used, which uses the four switch port standard wireless ADSL modern router.

The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.

REQUIREMENTS:

- Server
- Access Pointer
- Router
- Smart Phone
- IOT Device: Webcam, Street Lamp, Fan, Light, Coffee-Maker, Sensor, etc.
- Motion Detector
- Switch
- Lawn Sprinkler
- Water Drain
- Wind Detector
- Smart Car
- Air Conditioner
- LED Light

SOFTWARE REQUIREMENT:

- Cisco Packet Tracer

ARCHITECTURE AND DESIGN

NETWORK ARCHICTURE:

- Taking server, IOT devices, routers, switches, smart phone, wires etc for making IOT – Smart Home.
- We will connect all the routers. After that we will connect the routers with the switches. Then we will connect all the switches & then all switches will connect with the all IOT devices/home devices, server & smart phone.
- Now we will configure router 0 for giving dynamic ip address by using DHCP protocol in figure 1 & figure 2.

```
Router(config)#ip dhcp pool 10network
Router(dhcp-config)#network 1.1.1.0 255.0.0.0
Router(dhcp-config)#dns-server 1.1.1.2
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 1.1.1.1
Router(dhcp-config)#exit
```

Figure – 1 : Configuration of DHCP protocol in router 0.

```
Router(config)#ip dhcp pool 20network
Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#dns-server 10.0.0.2
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#exit
Router(config)#
```

Figure – 2 : Configuration of DHCP protocol in router 0.

- Now we will configure router 1 for giving dynamic ip address by using DHCP protocol in figure 3 & figure 4.

```
Router(config)#ip dhcp pool 30network
Router(dhcp-config)#network 20.0.0.0 255.0.0.0
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 20.0.0.1
Router(dhcp-config)#exit
Router(config)#
```

Figure – 3 : Configuration of DHCP protocol in router 1.

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#ip dhcp pool 30network
Router(dhcp-config)#network 10.0.0.0 255.0.0.0
Router(dhcp-config)#dns-server 10.0.0.2
Router(dhcp-config)#defa
Router(dhcp-config)#default-router 10.0.0.1
Router(dhcp-config)#exit
Router(config)#
```

Figure – 4 : Configuration of DHCP protocol in router 1.

- Now we will configure routing protocol EIGRP in router 0 so that ownerof the house can access his home from any where in the world over the internet by using his smart phone in figure 5.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router eigrp 1
Router(config-router)#network 1.1.1.0
Router(config-router)#network 10.0.0.0
Router(config-router)#
```

Figure – 5 : Configuration of EIGRP routing protocol in router 0.

- Now we will configure routing protocol EIGRP in router 1 so that owner of the house can access his home from any where in the world over the internet by using his smart phone in figure 6.

```
Router(config)#router eigrp 1
Router(config-router)#network 20.0.0.0
Router(config-router)#network 10.0.0.0
```

Figure – 6: Configuration of EIGRP routing protocol in router

- Smart phone accessing the server by using EIGRP routing protocol in figure 7.

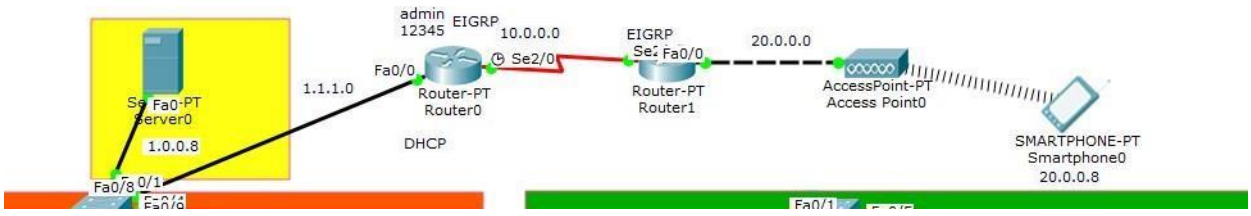


Figure – 7: phone accessing the server by using EIGRP routing protocol.

- Now we will register an account in the server for connecting all the IOT devices/home devices by giving user name & password in figure 8.

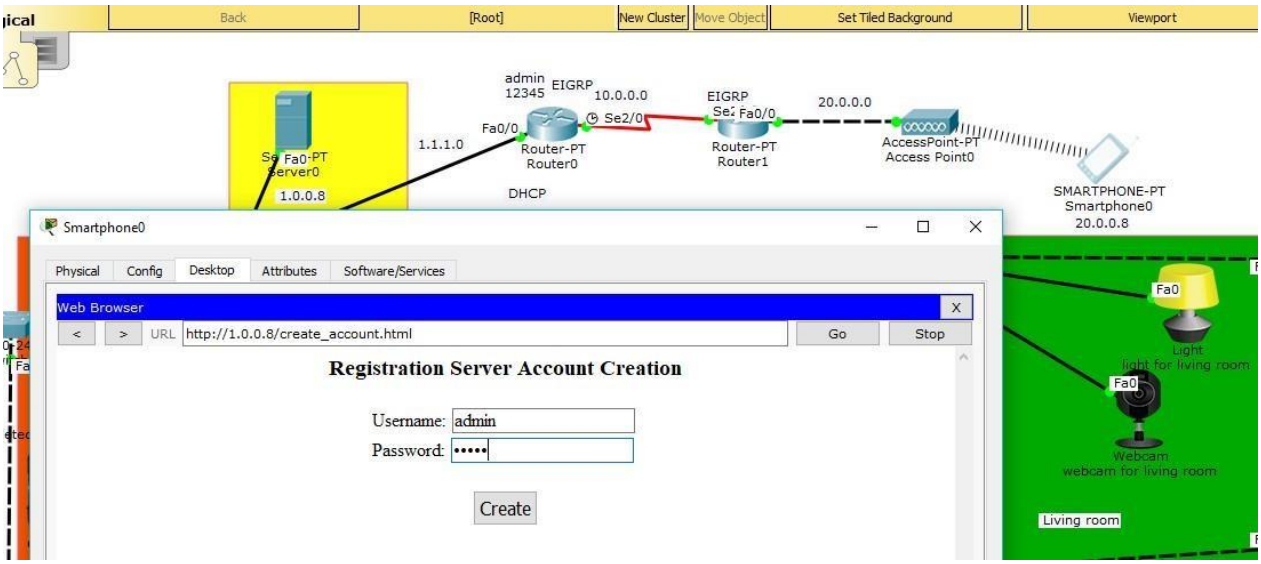


Figure – 8 : Registration of an account in the server.

- Smart phone accessing the home by sign in to the server in figure 9.

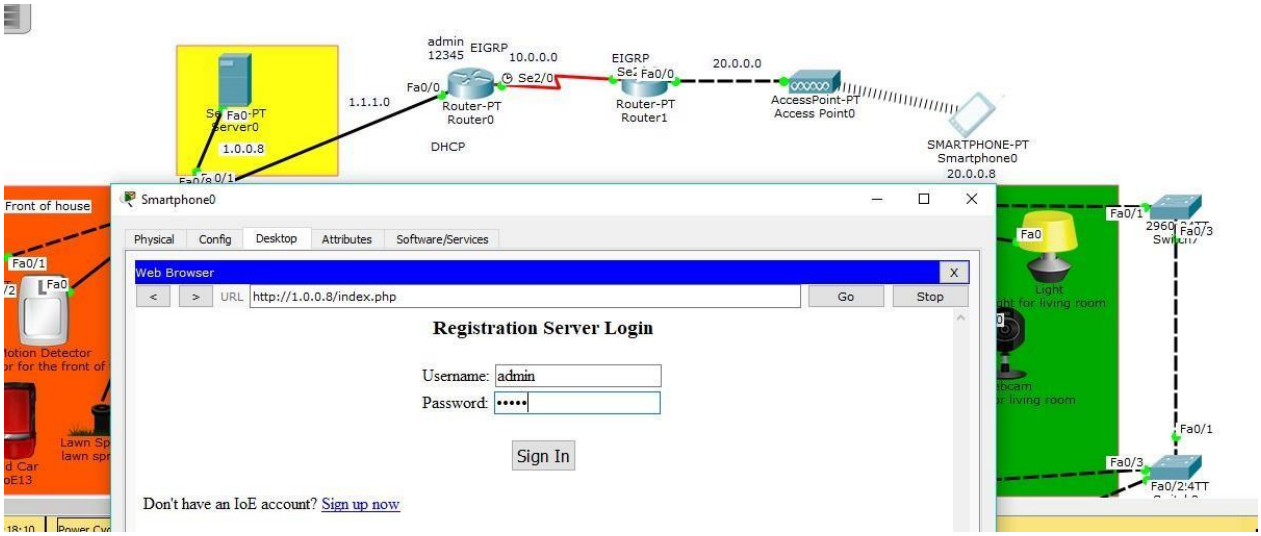


Figure – 9 : Smart phone accessing the home by sign in to the server.

- After sign in to the server by using smart phone in figure 10.

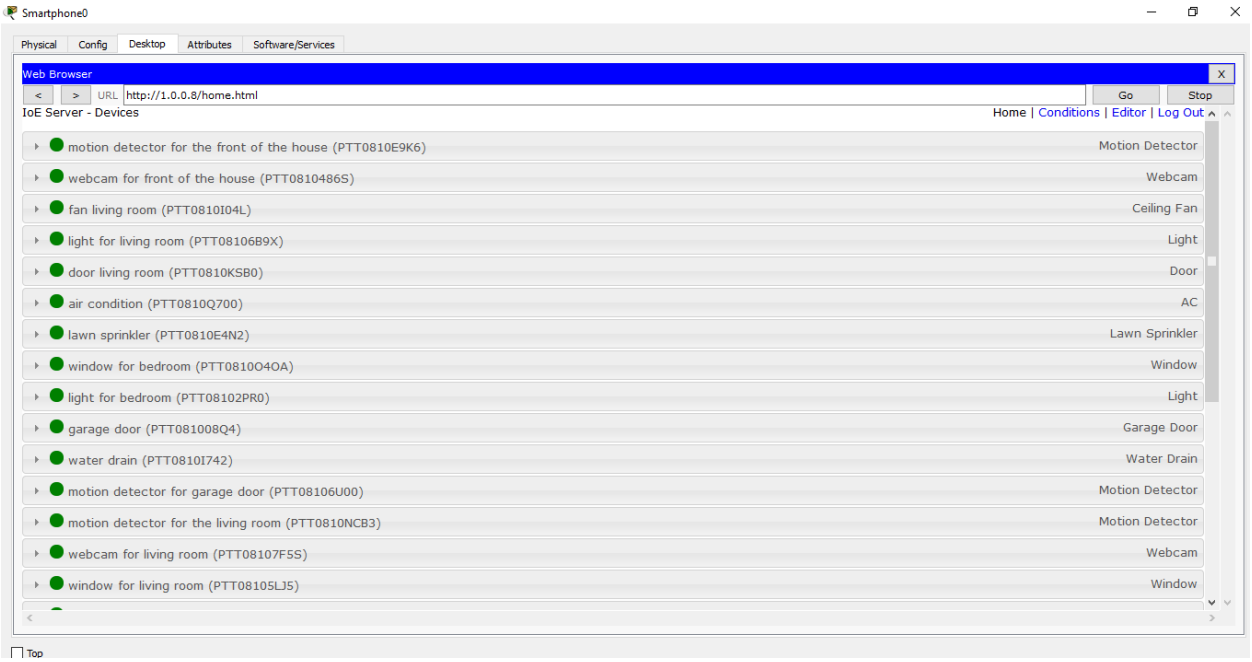


Figure – 10 : After sign in to the server by using smart phone.

Now we will implement all the logics / conditions in the server formaking automated house.

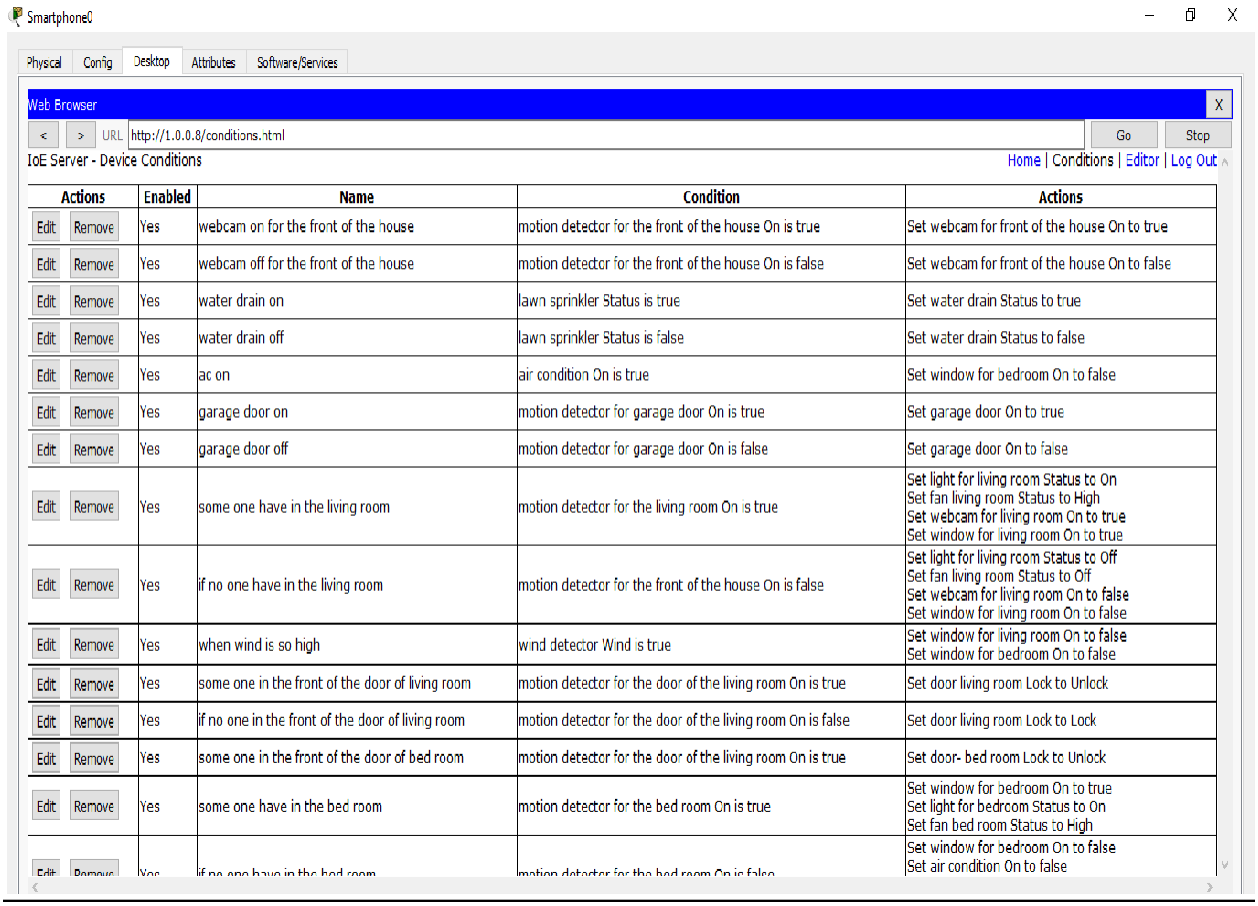
IMPLEMENTATION:

- In front of the house when there will be someone, motion detector will detect that and webcam will be automatically on.
- In front of the house when there will be nobody, motion detector will be off and also webcam will be automatically off.
- In front of the house when lawn sprinkler will be on thenautomatically water drain will be on.
- In front of the house when wind detector detect high wind then all the windows of the house will be off.

- When there will be someone in the front of the door of the living roomthen motion detector will detect that & the door of living room automatically will be on.
- When there will be nobody in the front of the door of the living roomthen motion detector will be off & the door of living room automaticallywill be off.
- When there will be someone in the living room then motion detector of the living room will detect that & all the fan, light, window & webcamof the living room will be automatically on.
- When there will be nobody in the living room then motion detector ofthe living room will be off & all the fan, light, window & webcam of the living room will be automatically off.
- When there will be someone in the front of the door of the bed roomthen motion detector will detect that & the door of bed room automatically will be on.
- When there will be nobody in the front of the door of the bed roomthen motion detector will be off & the door of bed room automatically will be off.
- When there will be someone in the bed room then motion detectorof the bed room will detect that & all the fan, light & window of the bedroom will be automatically on.
- When there will be nobody in the bed room then motion detectorofthe bed room will be off & all the fan, light & window of the bed room will be automatically off.
- When air conditioner of the bed room will be on then the windowof the bed room will be automatically off.
- When there will be any car or anyone in the front of the garage thenmotion detector will detect that & the door of garage automatically willbe on.
- When there will be no car or nobody in the front of the garage thenmotion detector will be off & the door of garage automatically will be off.
- When there will be someone in the front of the door of the kitchen then motion detector will detect that & the door of kitchen automaticallywill be on.

- When there will be nobody in the front of the door of the kitchen then motion detector will be off & the door of the kitchen automaticallywill be off.

All the conditions in figure 11



Actions	Enabled	Name	Condition	Actions
Edit Remove	Yes	webcam on for the front of the house	motion detector for the front of the house On is true	Set webcam for front of the house On to true
Edit Remove	Yes	webcam off for the front of the house	motion detector for the front of the house On is false	Set webcam for front of the house On to false
Edit Remove	Yes	water drain on	lawn sprinkler Status is true	Set water drain Status to true
Edit Remove	Yes	water drain off	lawn sprinkler Status is false	Set water drain Status to false
Edit Remove	Yes	ac on	air condition On is true	Set window for bedroom On to false
Edit Remove	Yes	garage door on	motion detector for garage door On is true	Set garage door On to true
Edit Remove	Yes	garage door off	motion detector for garage door On is false	Set garage door On to false
Edit Remove	Yes	some one have in the living room	motion detector for the living room On is true	Set light for living room Status to On Set fan living room Status to High Set webcam for living room On to true Set window for living room On to true
Edit Remove	Yes	if no one have in the living room	motion detector for the front of the house On is false	Set light for living room Status to Off Set fan living room Status to Off Set webcam for living room On to false Set window for living room On to false
Edit Remove	Yes	when wind is so high	wind detector Wind is true	Set window for living room On to false Set window for bedroom On to false
Edit Remove	Yes	some one in the front of the door of living room	motion detector for the door of the living room On is true	Set door living room Lock to Unlock
Edit Remove	Yes	if no one in the front of the door of living room	motion detector for the door of the living room On is false	Set door living room Lock to Lock
Edit Remove	Yes	some one in the front of the door of bed room	motion detector for the door of the living room On is true	Set door- bed room Lock to Unlock
Edit Remove	Yes	some one have in the bed room	motion detector for the bed room On is true	Set window for bedroom On to true Set light for bedroom Status to On Set fan bed room Status to High
Edit Remove	Yes	if no one have in the bed room	motion detector for the bed room On is false	Set window for bedroom On to false Set air condition On to false

Figure – 11 : All the conditions.

INTERIOR ARCHITECTURE AND DESIGN:

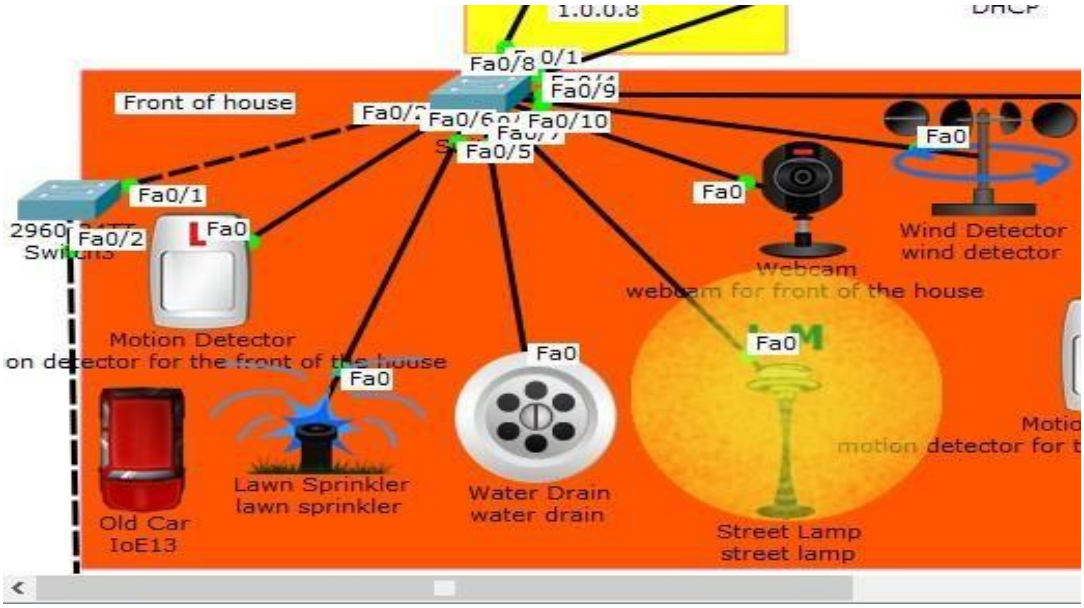
Front of the house:

- Motion sensor
- Webcam
- Wind Detector
- Street Lamp
- Lawn Sprinkler
- Water Drain
- Car

Initially all things are off.

Figure 12: Front of the house before turned on

When a motion is detected by the motion detector, then the webcam, street lightand wind detector will turned on. Automatic water drain will be opened when thewater sprinkler is turned on and drain the excess water.



13:Front of the Figure house after turned on

- **Living room:** In the living room we have,

Motion sensor
Door
Webcam
Fan
Window
Light

Initially all things are off.

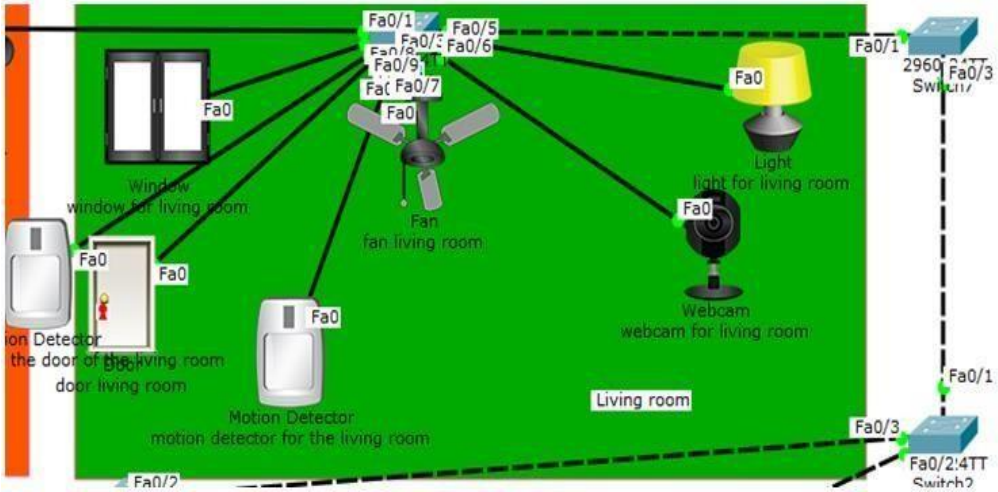


FIGURE 14: LIVING ROOM

- **Bedroom:** In bed room we are taking,
  - Motion detector
  - Door
  - Window
  - Light
  - Fan
  - Air conditioner

At the first point all the IOT device will stay in turn off.

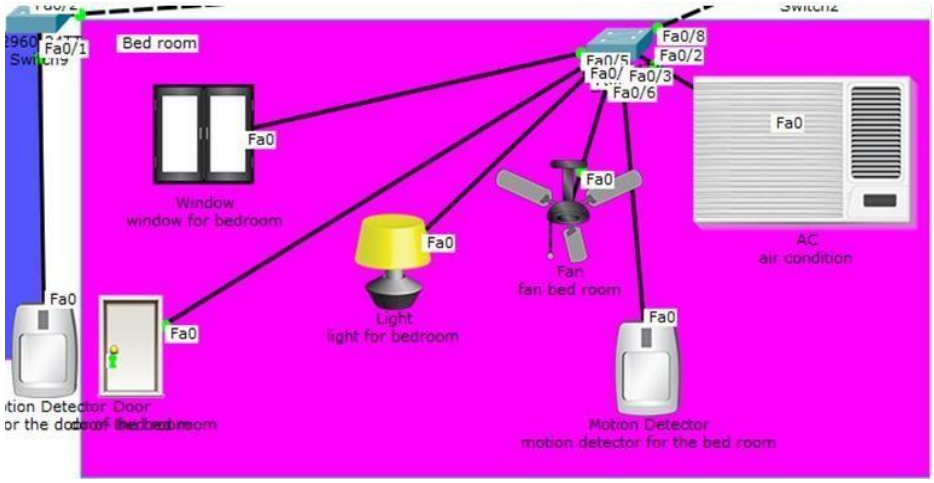


Figure 16: Bedroom, initial state

When the motion happens in front of the door of the living room, the door itself isopen automatically.After entering the room, light, fan, window will run.

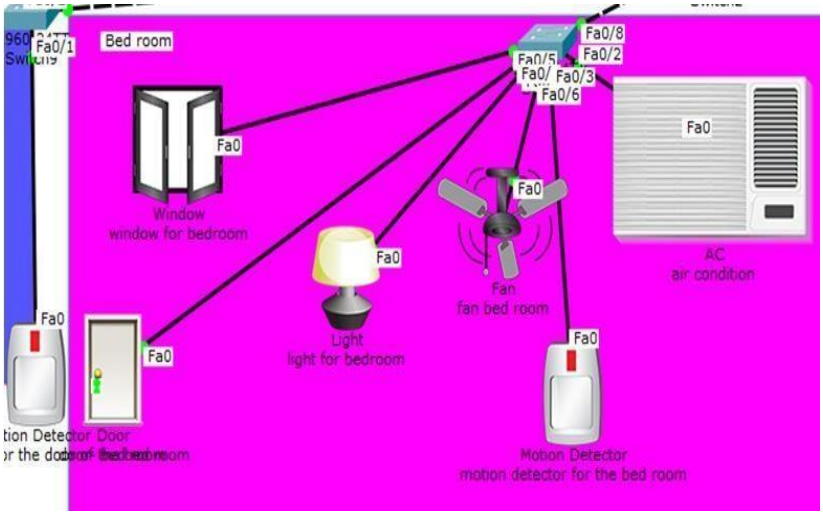


Figure 17: Bedroom light, fan, window on

But when the users turn on the air conditioner, bedroom fan and window will automatically turn off.

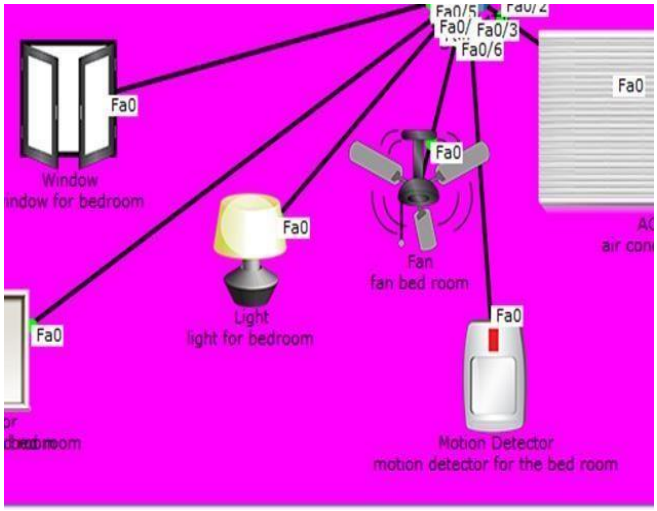


Figure 18: Bedroom AC off, fan, windowon

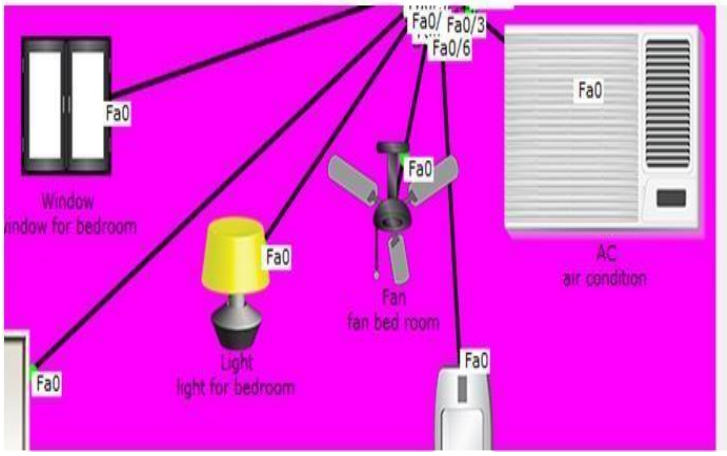


FIGURE 19:BED ROOM ON AND FAN,WINDOW OFF

Garage:

- Car
- Garage Door
- Motion Detector

If the car stays In front of the door of the garage, the garage door will open itself.

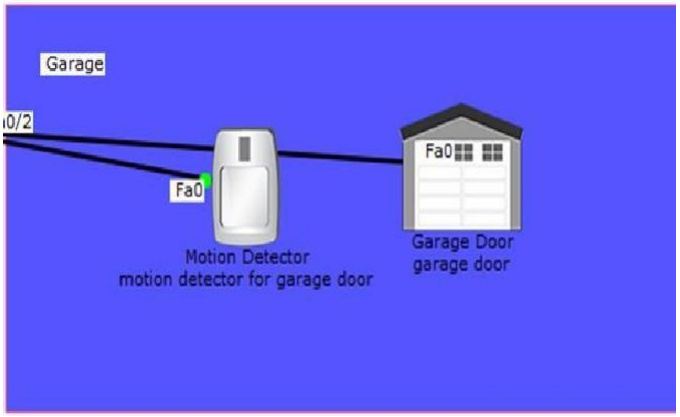


Figure 21: Garage door closed

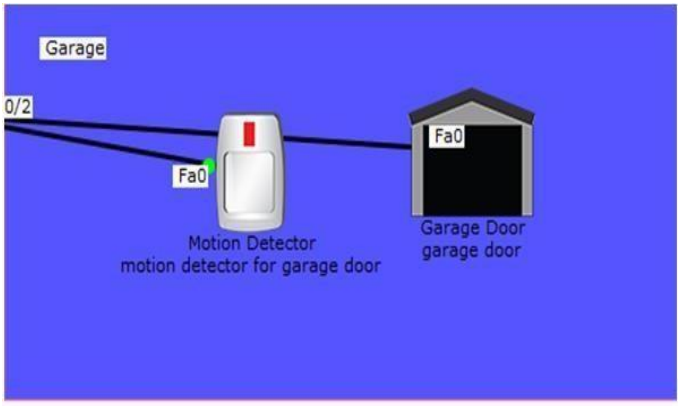


Figure 20: Garage door open

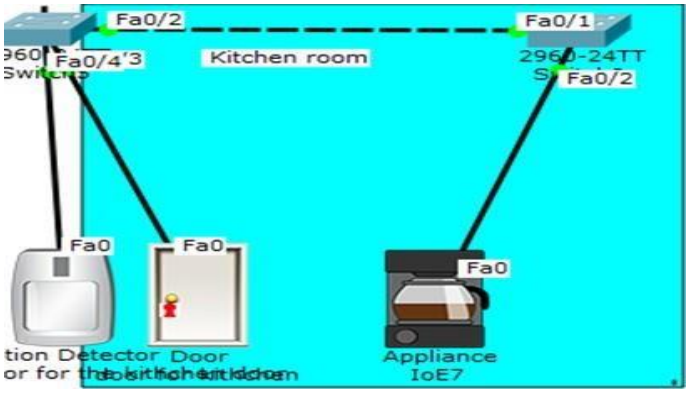
Kitchen:

- Motion detector
- Kitchen Door
- Coffee Maker
- Other IOT devices

As other rooms kitchen door will open itself. And after entering the kitchen

Coffee maker and other IOT device will turn on as well.

FIGURE 23: KITCHEN



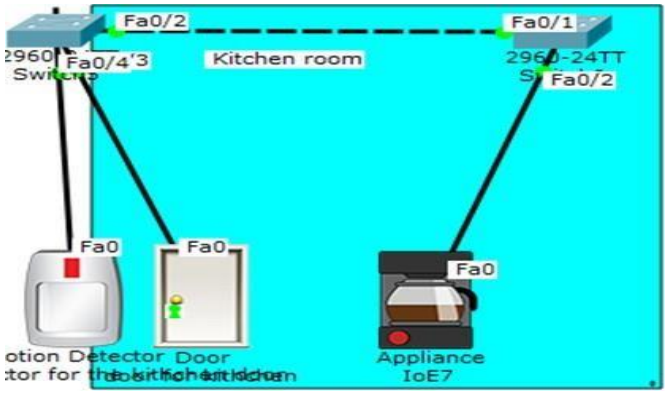


FIGURE 22: EVERY EVICE OF THE KITCHEN IS TURNED ON

RESULT ANALYSIS:

In our smart home we are taking front of the house, living room, bed room, Garage, and Kitchen and also making them automated. We are using the server forth mainconnection and to connect smart phone we are using router. For routing we are using EIGRP.

Cost Analysis-

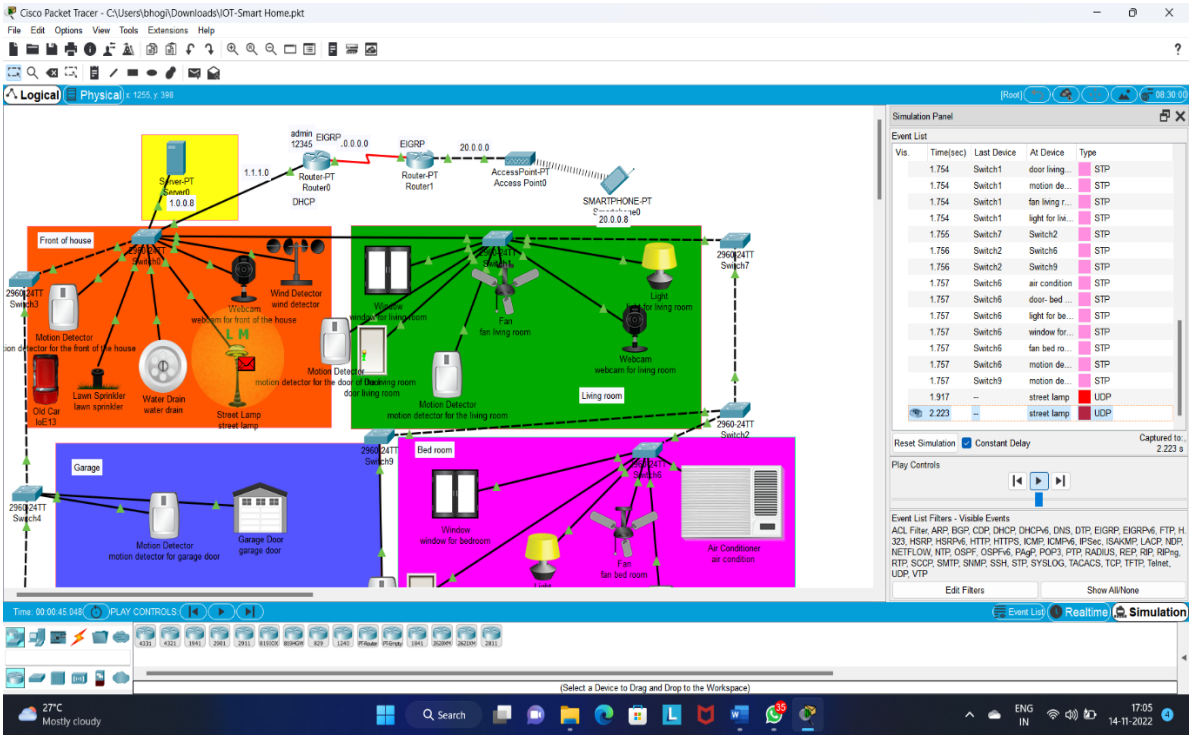
Cost of smart home systems can be categorized into two parts: installation cost and operating cost. Gesture controlled and Internet controlled systems have comparatively higher installation and operation cost compared to the other systems.

Speed, Range and Accuracy Analysis-

Performance of different smart home systems according to speed, range of operation and accuracy are different. The speed and connection strength varies with distance of the devices. This can also affect accuracy.

Reliability Analysis of Smart Home Systems-

Based on different issues such as cost, range, speed,accuracy, flexibility, GUI and many other things, it is important to determine whether a smart home system is reliable or not. Reliability of smart home systems is quite important to determine because consumers need to have a clear idea of the product before buying it. If a system fails from time to time then customers will not gain confidence in such a system, so it's very important to make these devices very accurate.



CONCLUSION:

In the IOT-Smart Home project we have tried to build an automated home that can make life easier, secure, and comfortable. And the house also will save power. The owner of the house can access the house from anywhere of the worldby using his smart phone. Though it is a costly project but after implemented it, our life will be easier and time saving.

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