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Smart Home Automation System using Cisco Packet Tracer

T.Y B.Tech. Computer Networks Mini Project Report

GUIDED BY

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Nov - 2022

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submitted in partial fulfillment of the
requirements for the award of the degree

of

Bachelor of Technology

in

COMPUTER ENGINEERING

SUBMITTED BY

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CERTIFICATE

It is hereby certified that the work which is being presented in the SY B.Tech. Minor Project Report entitled **"*Smart Home Automation System using Cisco Packet Tracer*"**, in partial fulfillment of the requirements for the award of the **Bachelor of Technology in Computer Engineering** and submitted to the **School of Computer Engineering and Technology of MIT Academy of**

Engineering, Alandi(D), Pune, Affiliated to Savitribai Phule Pune University (SPPU), Pune is an authentic record of work carried out during an Academic Year 2022-2023, under the supervision of **Mr. Santosh Warpe, School of Computer Engineering and Technology.**

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ACKNOWLEDGEMENT

ABSTRACT

The world is developing way faster than ever, and so are humans too. Everything in this era is "Smart" which includes Smart TV, Smart Phone, Smart Watch. As per the research conducted in 2021, it has been predicted that by 2022, at least over 36% of mobile phone users in the country will own a smartphone. A survey conducted by Rakuten Insight in September 2022 found that around 45% of Indian respondents own a smartwatch. If everything is going its way to "Smart" then why not "Home"?

The project focuses on preparing a simulation on Cisco Packet Tracer for a smart home which also automates on its own given a condition. The door safety system would also be there for not having any intruder at the door trying to enter the home. Hence the overall setup makes our home more smart and safe. There are other automations like AC that can't be switched on until the window is closed and vice versa, webcam on the main door of the house would be on automatically when detected any motion so as to save electricity, the fan would be automatically off when the AC goes on, etc.

LIST OF FIGURES

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1. <u>INTRODUCTION</u>

A smart home is one that features a system that links to your appliances to automate particular chores and is often operated from a distance. Sprinklers, cameras, and home security systems may all be programmed using a smart home system, along with other devices like air conditioners and heaters and refrigerators. You can manage and automate the numerous electrical and technologically based home appliances and equipment with a smart home automation system. Additionally, you may manage everything by using software that is loaded on your smartphone or other mobile device, which will make your life much simpler. You can always check on the status of your remotely controlled home devices, even if you are at work or the grocery store.

Smart Home Automation system using Cisco Packet Tracer is an idea through which our home can make their own decisions based on the conditions given. Cisco Packet Tracer is a famous and one the reliable simulator which helps to set up networks and simulate many applications in the field of networks and helps to find the problem if any. It also has many IOT devices and comes in many varieties from being a component to a smart device. The project consists of the smart device type of IOT devices so as to connect them on wifi of the home. It also helps to set up servers.

The smartphone helps to operate the house appliances and also few of the appliances are automated and can take decisions on their own in a few situations. The following situations are taken so as to reduce the electricity consumption and manual work also they are really very common. The door safety is also maintained hand in hand. Also the garage door is considered in the system. There are other various sensors used in the project which help in working of the home appliances and their automation efficiently. In this project, a person can handle light, AC, fan, window, webcam, garage door and main door with the help of a laptop connected to the home wifi system. The project covers the main and basic appliances of the home.

1.1 Motivation

The world is developing much faster than before. Technology is advancing minute by minute. In the busy schedule of one's life, there can be minor things which they can miss like switching off light. There can be other things too like someone breaking into the house when no one is home. So there arises a question to do something about making our house more secure and power saving. Usually it is noticed if there are kids at home then the AC is switched on even if the fan is on or if the window is not closed. These practices make the budget of electricity increase tremendously. Also keeping an eye on the home while not being home is hard. Even if cameras are placed in every corner of the house the electricity still remains a major issue. So finding a better pocket friendly and user-friendly home automation system is the most important motivation in taking the project forward. Benefitting from the technology in a smart way is the main motive of the project. Creating a secure network so that no one can access the home appliances is another major and important task.

1.2 Problem Statement

Designing and implementing a smart home automation system using Cisco Packet Tracer focusing on making the network a secure one and accessing the appliances through a smartphone.

1.3 Objectives and Scope

1. To make a mini home automation system keeping the network secure and safe.
2. To access the home appliances through a smartphone.
3. To allow the appliances to make their own decisions according to some given situations and conditions.
4. To automate the house such that it becomes user friendly.

2. LITERATURE SURVEY

1. **Smart Home Automation System**
   by PREETI KUMBHAR, POONAM KASARE, SNEHAL TILEKAR, Prof. Mrs. D. M. Yewale
   International Research Journal of Engineering and Technology (IRJET), June - 2017

   In this paper the main discussion consists of the controlling of home appliances using GSM and Bluetooth technologies. Controlling home appliances from outside the house by sending one SMS (short message system) using GSM technology. And using Bluetooth controlling from inside the house. Fingerprint sensor as well as Gas leakage detector is used for security. If there is any leakage of gas found then the system will send a message to the mobile phone.

2. Smart Home Automation System using Arduino and IOT
   by V. Sudharani, D. Siva, M. Raju
   International Journal of Science and Research (IJSR), September 2018

   This paper, "Sensing and managing the world around using Arduino and IOT," discusses embedded technologies and the internet of things (IOT), which uses Arduino and uses embedded block and script programming for sensors. This essay introduces home automation. This automation involves intelligent water system control as well as control of home appliances. Sensors like flux sensors and fire sensors are utilized to accomplish these goals. Arduino is interfaced with the sensors. Through a wireless module, the state of the household appliances is uploaded to a cloud platform. The mobile device and the system are linked via the same wireless network. The sensors have the ability to turn on or off the user-controlled sensors. It depends on the flex sensor. The flex sensor is dependent on the gestures of our fingers to control the appliances. All the data is being seen by the user on the cloud platform like THINGSPEAK.

3. <u>SYSTEM DESIGN</u>

3.1 Block diagram/ Proposed System setup
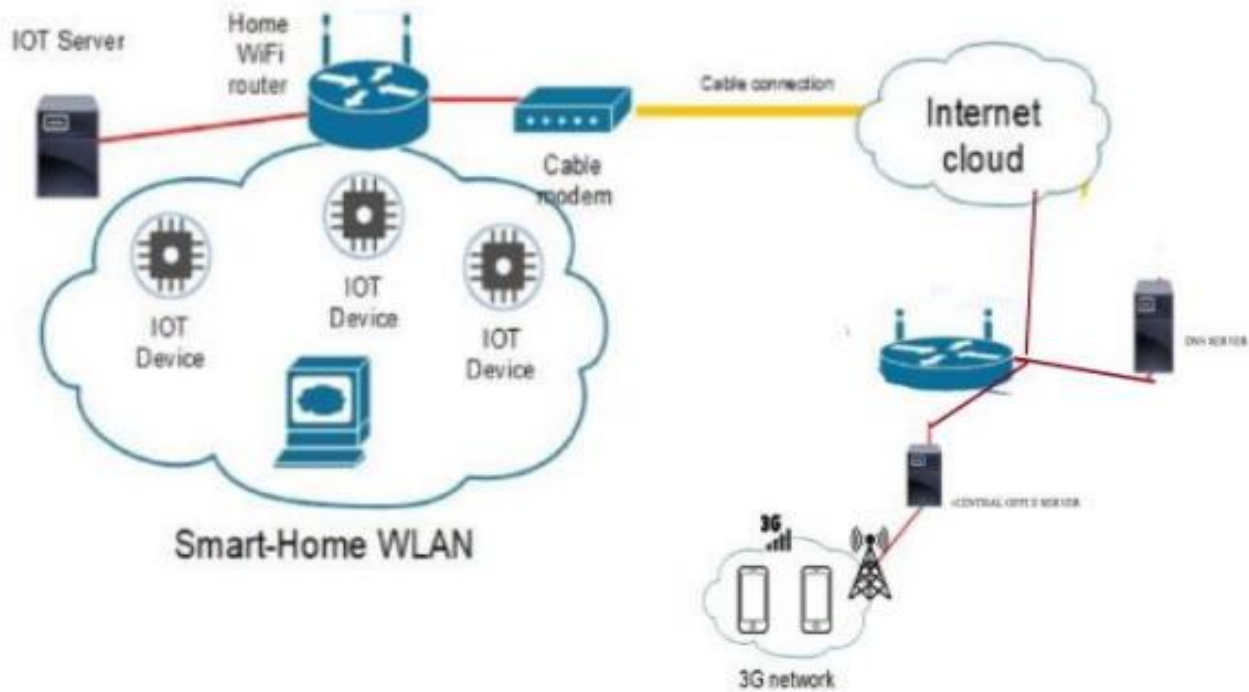
Fig 3.1 Block diagram of Smart Home Automation

3.2 Hardware and Software requirements

For Simulation

Hardware requirements:

1. Laptop

Software requirements:

1. Cisco Packet Tracer version 8.1.1

For Actual Implementation

Hardware requirements:

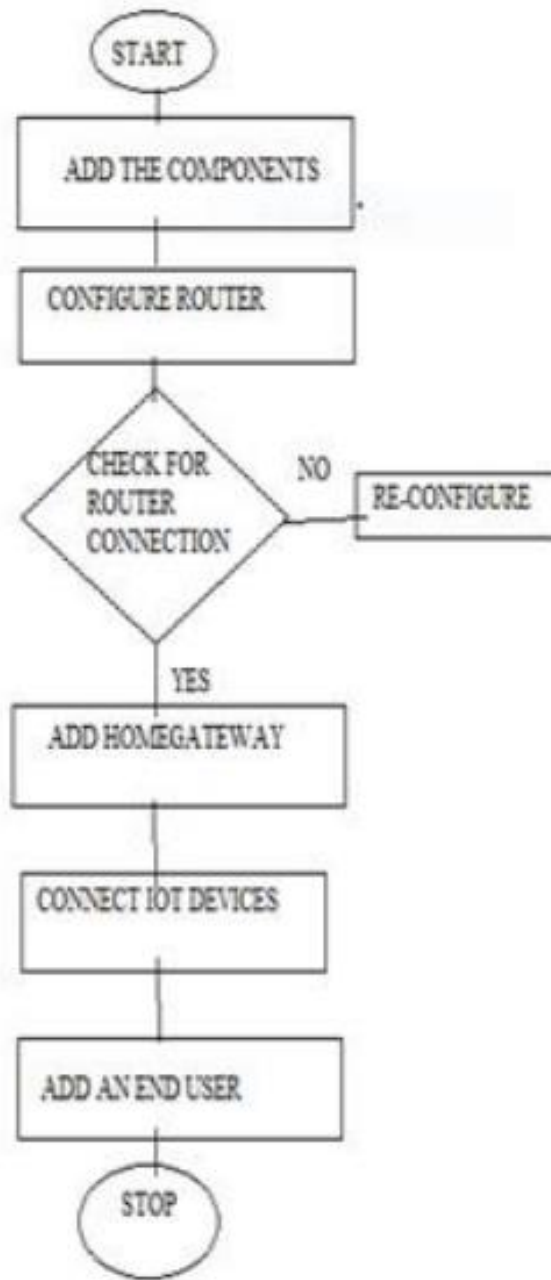1. Laptop
2. Smartphone
3. Home Gateway
4. Smart devices
   a. Fan
   b. AC
   c. Door
   d. Garage Door
   e. Webcam
   f. Light
5. Smart Sensors
   a. Siren
   b. Motion detector

Software requirements:

1. IOT Monitor Application
2. Browser

4. IMPLEMENTATION DETAIL

4.1 Algorithm and flowcharts

Fig 4.1 Flow Chart

4.2 Methodology/Technique

Including various smart objects which are used for implementing home automation such as windows, fans, lights, doors, garbage doors, cell towers, web cams and various sensors. The Microcontroller (MCU-PT) and Home Gateway [15] are used for controlling the objects and sensors, which are providing programming environment for controlling objects that are connected and provide control mechanisms through the registration of Home Gateway smart devices

A. HOME GATEWAY:

The IoE Things can register directly with the IoE service on a Home gateway or network database. The Home Gateway offers 4 Ethernet ports and a wireless contact point on channel 6 equipped with the SSID [16] "Home Gateway." It is possible to configure WEP / WPA-PSK / WPA2 companies to wireless links are safe for connections. Image (1b) displays 7 IOE items connected to a Home Gateway. The home gateway is connected via the WAN Ethernet port [17] on the internet. A home gateway and a web interface it is easy to manage the IOE system. The internal IP address of the Home Gateway (LAN) is 192.168.25.10, but it can be too reached via its IP address in front of the Internet.
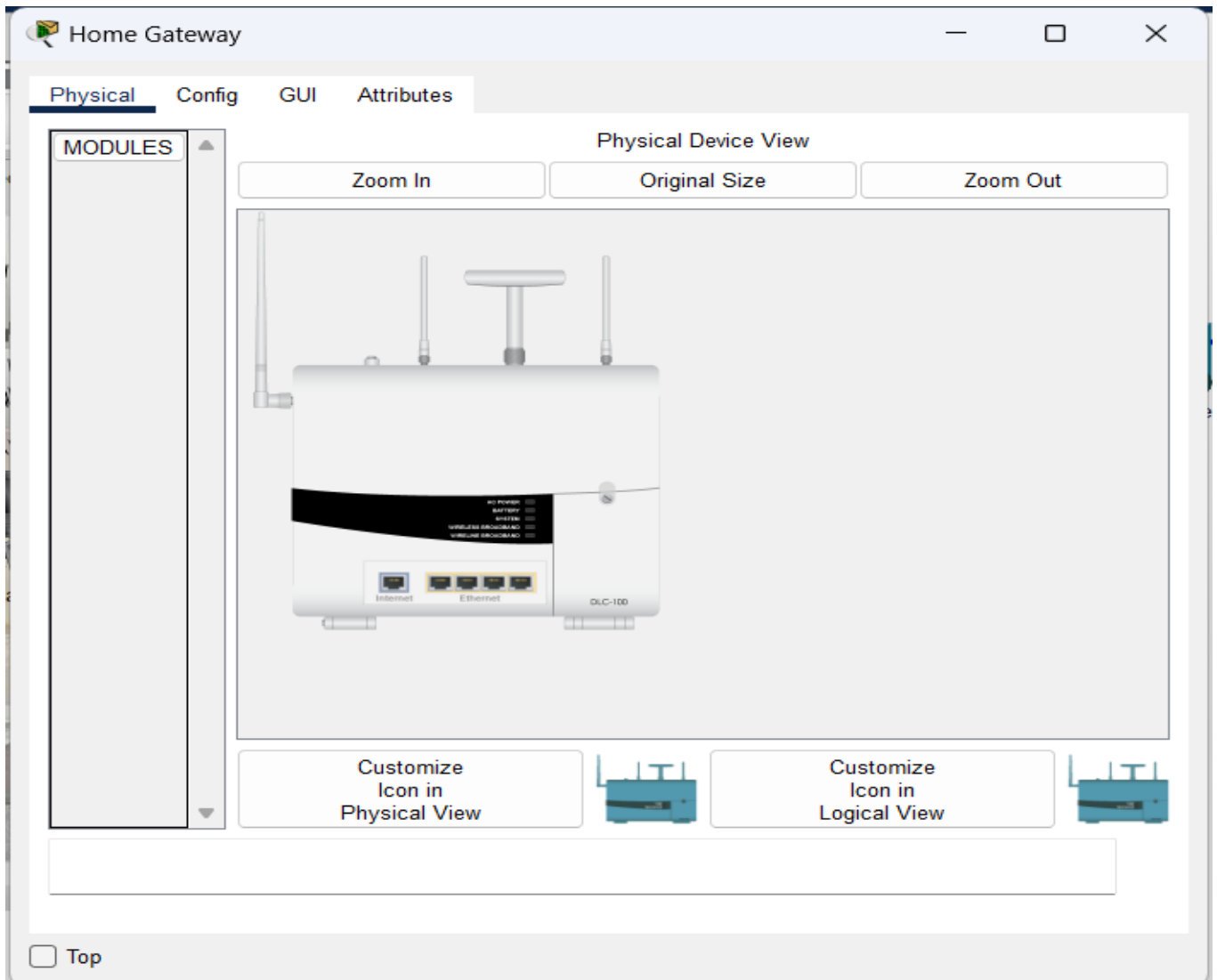

**Fig 4.2.1(a):** Home gateway Internet and Ethernet port

7
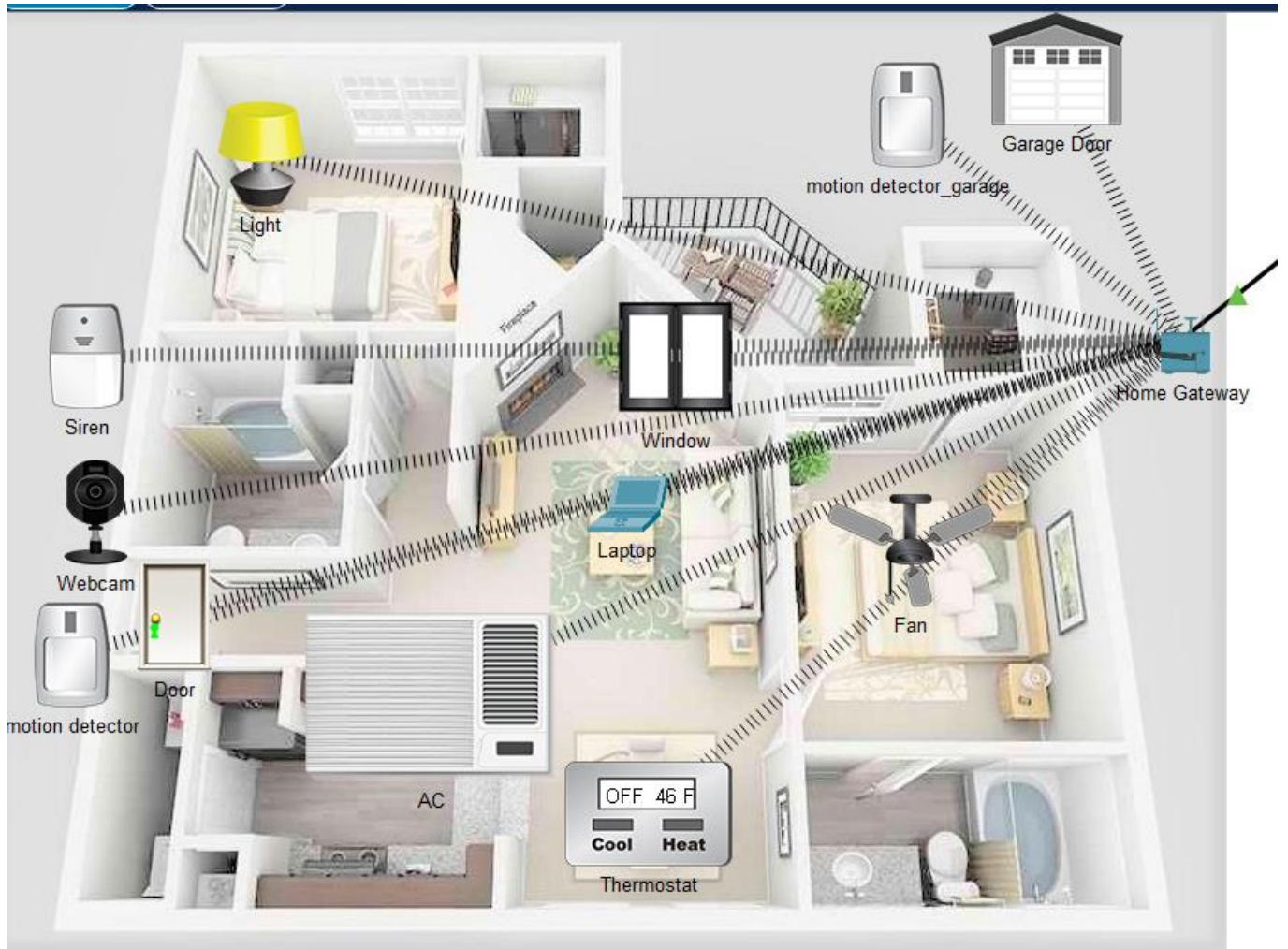
Fig 4.2.1(b): Home portal with seven linked smart things

The figure (1b) above indicates that the smart objects are associated to the home gateway by Wireless medium and Ethernet cable for local and remote control of smart devices. Home portal also acts as a DHCP server [18] assigns IP addresses to any, connected smart device.

After registering the smart device [19], [20] to the home gateway, the figure above shows that all devices are accessed by legitimate users via the web. Figure 4 shows that seven IOE devices that are legally regulated are registered in the Home gateway, which are controlled by legitimate individuals [21], [22] through the web.
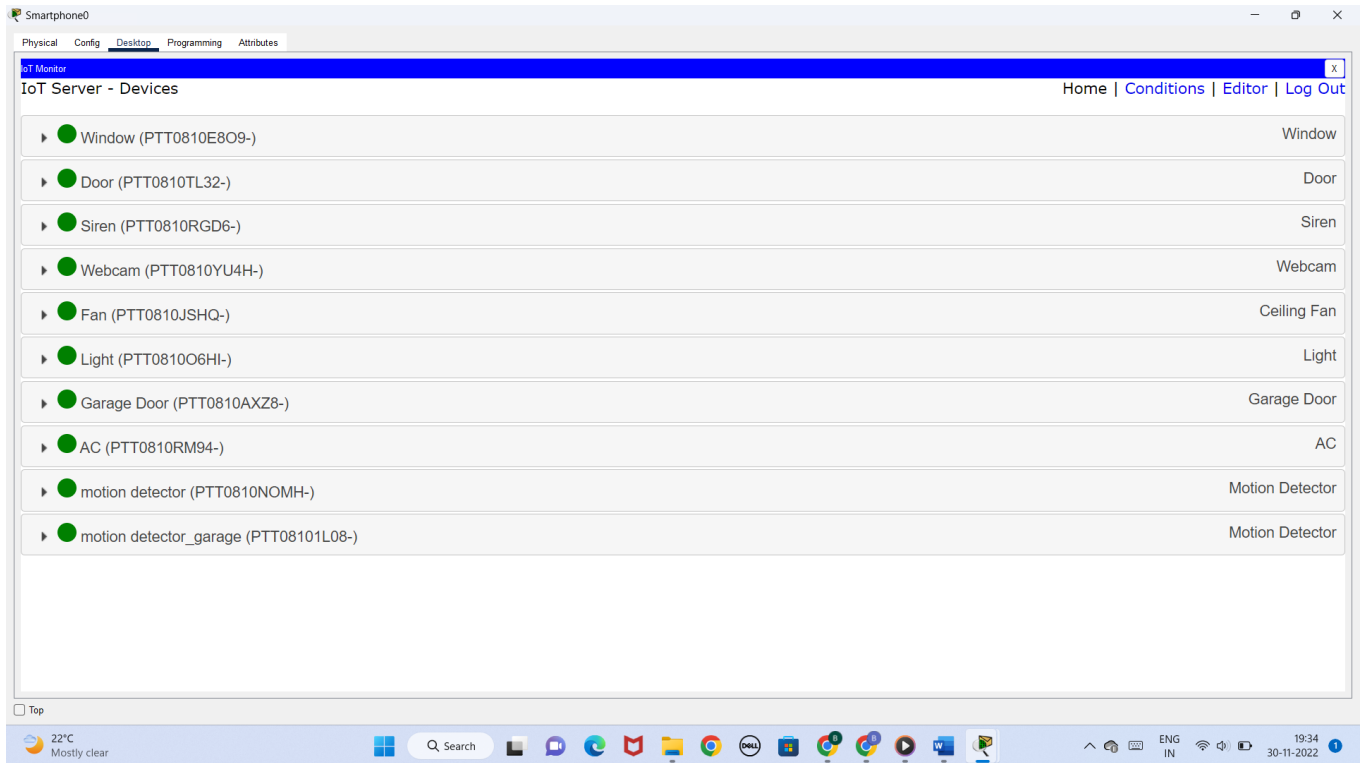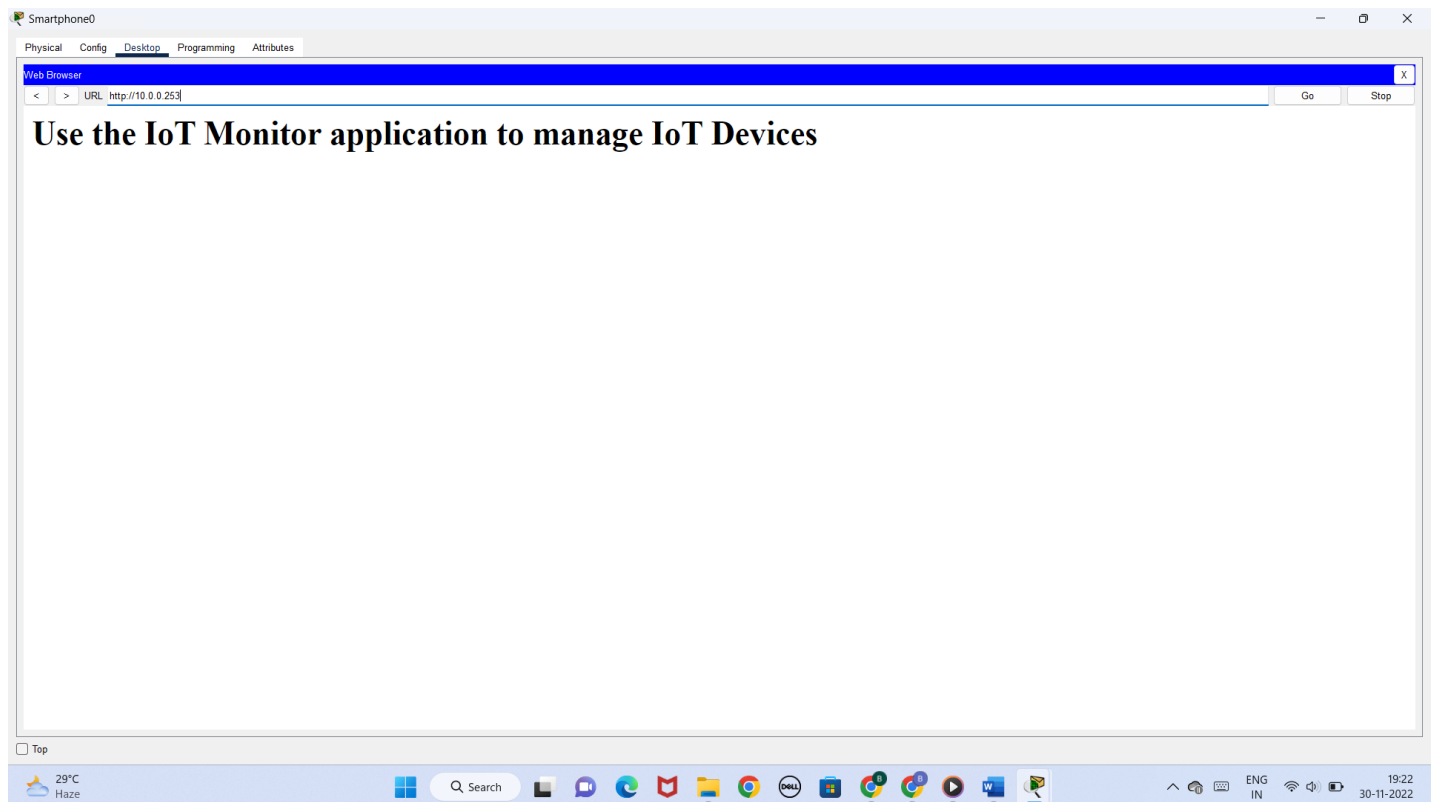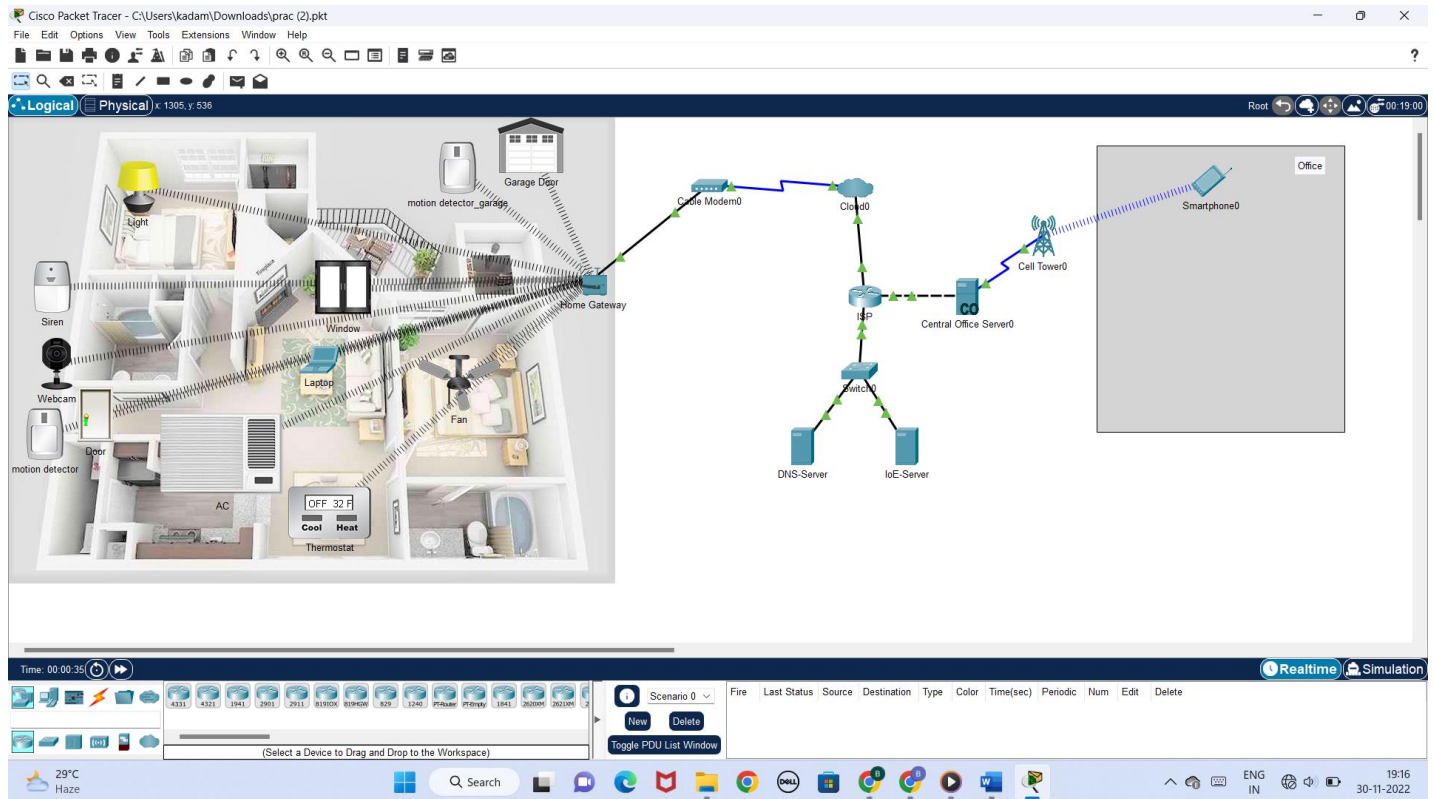
Fig 4.2.1(c): Shows IOE devices that are connected on home Gateway
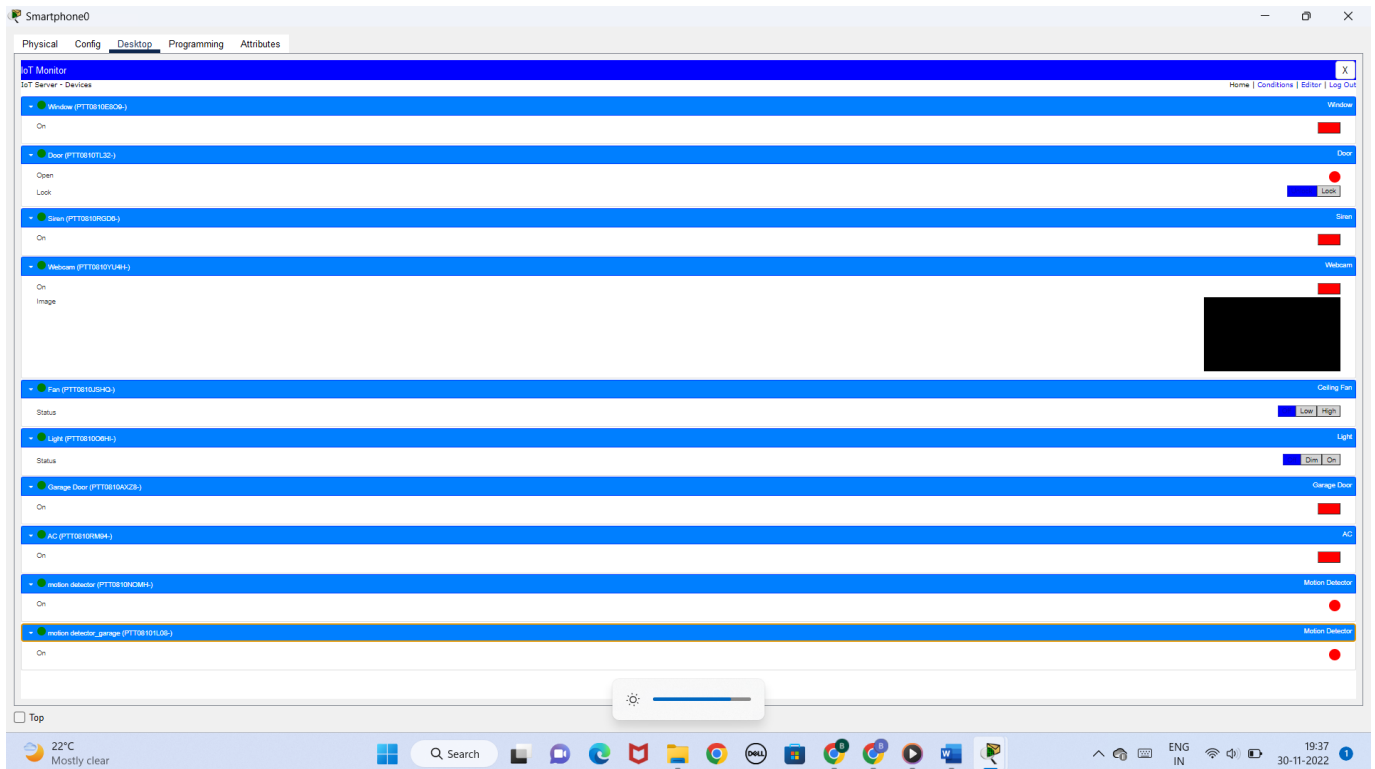
Fig 4.2.1d): Registered IOE device with their status

4.3 Design Screenshots

Physical | Config | Desktop | Programming | Attributes

IoT Monitor X

IoT Server - Devices

▶ ● Window (PTT0810E8O9-)	Window
▶ ● Door (PTT0810TL32-)	Door
▶ ● Siren (PTT0810RGD6-)	Siren
▶ ● Webcam (PTT0810YU4H-)	Webcam
▶ ● Fan (PTT0810JSHQ-)	Ceiling Fan
▶ ● Light (PTT0810O6HI-)	Light
▶ ● Garage Door (PTT0810AXZ8-)	Garage Door
▶ ● AC (PTT0810RM94-)	AC
▶ ● motion detector (PTT0810NOMH-)	Motion Detector
▶ ● motion detector_garage (PTT08101L08-)	Motion Detector

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Physical | Config | Desktop | Programming | Attributes

IoT Monitor X

IoT Server - Device Conditions

Actions		Enabled	Name	Condition	Actions
Edit	Remove	Yes	ac on	AC On is true	Set Window On to false Set Door Lock to Lock
Edit	Remove	Yes	webcam on for the front of the house	motion detector On is true	Set Webcam On to true
Edit	Remove	Yes	webcam off for the front house	motion detector On is false	Set Webcam On to false
Edit	Remove	Yes	garage door on	motion detector_garage On is true	Set Garage Door On to true
Edit	Remove	Yes	garage door off	motion detector_garage On is false	Set Garage Door On to false
Edit	Remove	Yes	fan off	AC On is true	Set Fan Status to Off
Edit	Remove	Yes	siren on	Webcam On is true	Set Siren On to true
Edit	Remove	Yes	siren off	Webcam On is false	Set Siren On to false

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5. CONCLUSION AND FUTURE SCOPE

The Smart Home Automation system using Cisco Packet Tracer resulted in automation of most of the appliances used in home and also it has an eco friendly design and also connects with our phone device ensuring we can easily operate it from anywhere in the world. This system also helps to secure our home. The remote server helps in making it more secure and easy to access for the owner at the same time. The IOT devices are tried to keep minimal but can vary on the layout of the house. The IOT devices used are smart devices and hence while implementing the project in real life should be noted.

Future Scope

Talking about the future of the project, it can be extended to a good optimized solution to the problem. The appliances in control can be increased and automated such that there is very minimum manual work. The sensors can also be chosen according to the different situations which can occur on which actions are to be taken on appliances. There are many other solutions which can be implemented in the project like fire alert system, door alert system, etc. which will help make the project more efficient, reliable and safe for the house. A SMS alert system can also be implemented so that whenever there is an emergency a SMS would be sent and action can be taken quickly.

Drawbacks

The proposed system covers minimal appliances. The situations in the project which are being covered also are minimum. There is no alert system in the designed system. A device failure can cause some conditions to behave anomalously which can result in giving wrong actions. The system is IOT Monitor application dependent and hence would need it to control the system.

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   by PREETI KUMBHAR, POONAM KASARE, SNEHAL TILEKAR, Prof. Mrs. D. M. Yewale
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