

Implementation Of Smart Home By Using Packet Tracer

G.L.P Ashok, P. Saleem Akram, M. Sai Neelima, J. Nagasaikumar, A.Vamshi

Abstract : The technology has been growing from day to day in human life. The necessity for the development of technology is to lead human life comfortably. The basic need of human to lead his/her life comfortably is a home. A home with updated latest technology which means a smart home. This paper gives the basic idea use cisco packet tracer to implement smart home. One is needed to create a smart home when electronic devices are switched on and off. Smart home development is achieved by simulation via testing system, network setup and wireless home gateway computer network equipment required by a smart home network cisco packet tracer using Internet Thing (IoT)/IoE command. The software chosen for the simulations is Cisco Packet Tracer, the tool's main strength is to offer a variety of network components that represent a real network, and then interconnect and configure devices to create a network. Cisco implemented (IoT) functionalities in the latest version of the platform, and now it is possible to add all the smart devices, sensors, actuators and also devices, which simulate microcontrollers like Arduino or Raspberry Pi to the network. All IoT devices can be run on generic programs or modified by Java, Python or Blockly programming them. This makes Cisco Packet Tracer a perfect method to construct functional simulations for IoT.

Index Terms : Internet of Everything, Smart home, packer tracer tool, sensors.

1. INTRODUCTION

In today's technologically growing world technological development without becoming a requirement that is frequently used in today's human life. Living home that includes smart objects with specific functions is called smart home. i.e aimed to improve safety, comfort and efficiency .which can be used to automate home activities without users using various sensors (Temperature, Humidity, Smoke, Wind, Sound) to monitor the home environment[1], [2]. And there are usually monitoring tools, and the devices that are controllable and automatic this can be accessed via an internet-connected computer or smart mobile device. Instead of providing security that is safe, smart home can provide different features to provide automatic security using various alarm systems, as LCD display and siren sound and by sending email to valid users if sensor detects security issues [3]. Home automation states handling and monitoring home items using microcontroller or computer technology. Automation is common because it makes the process simple [4], productive and secure. All smart devices are registered at the home gateway in this paper and operated by a legitimate person [5]. By including different sensors in home automation, Smart Home eliminates user engagement in tracking home settings and operating home appliances. IOT (Internet of Things) is a system in which people, objects with a specific identity and moving capacity information without needing a dual human-to-human origin [6], i.e. destination or contact between people and computers IoT and IoE are a well versed technology which optimizes the life based on smart sensors and smart devices which operate together on the internet. All(IoE) web is a theory that extends machine-to-machine communication (M2M) emphasis of the Internet of Things (IoT) to describe a more complex system that also includes people and processes[7], [8].

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IoE is a smart people, method, information and stuff relation. The Internet of All (IoE) describes a system in which billions of entities have sensors for measuring and determining their status; all linked by common or proprietary protocols over public or private networks. This paper describes the implementation of smart home with the use of latest version of cisco packet tracer (7.2) as this version includes different sensors, actuators and smart devices used for home automation [9]. Chic lights, chic windows, chic fans, chic doors with different detectors and sensors are some of the devices [10]. Latest version the simulation program for cisco packet tracer modelling and configuration of IOE systems with conventional networking system to implement smart home.

2. MOTIVATION

Through the simulation framework based on cisco packet tracer (version 7.2), smart home system can be implemented. Cisco Packet Tracer is a tough Cisco system Academy network modelling application that can simulate/create a network without a physical network. It has a drag and drop interface that, while configuring complex networks, is simple to use yet highly effective [11], [12]. Additionally, Cisco Packet Tracer (version 7.2) can operate as a hybrid network that combines real networks with virtual networks [13]. This latest version of cisco packet tracer (7.2) is also added to MCU-PT board single boarded computers (SBC-PT) [14], offering programming environment to power connected devices. Newly released Packet Tracer advantages are:

- Provides the practical IOT machine simulations and visualizations.
- Allows users to plan, create, customize smart homes, smart cities by supplying them with various smart objects.
- Provide board for the control of intelligent objects.
- Allow students to explore the concepts of IOE principles.
- Provide sensor detector.

3. METHODOLOGY

Including various smart objects which are used for implementing home automation such as chic windows, chic fans, chic lights, chic doors, chic garbage doors, lawn sprinklers, fire sprinklers, 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.

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.

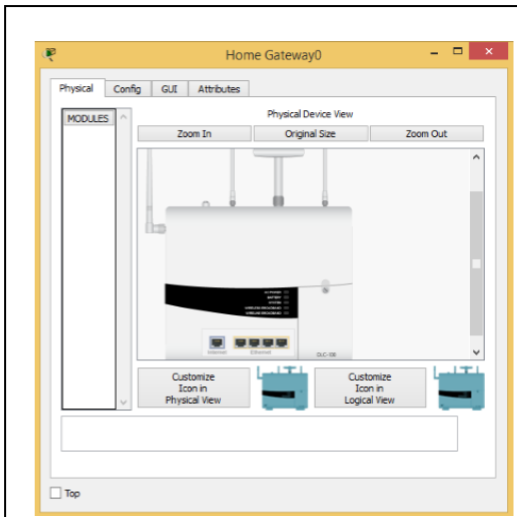


Fig 1(a): Home gateway Internet and Ethernet port

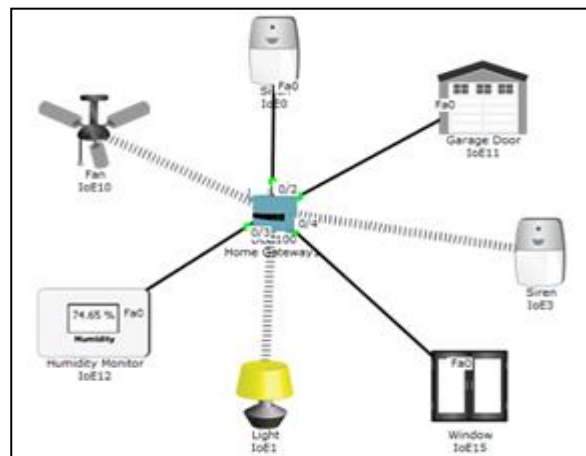


Fig 1(b): Home portal with seven linked smart things



Fig 1(c): shows IOE devices that are connected on home Gateway

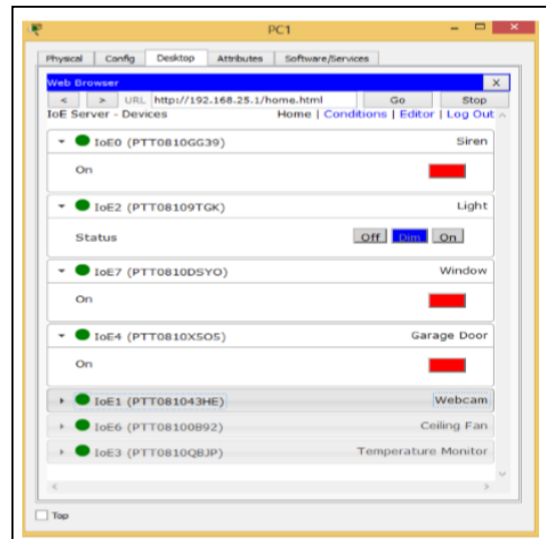


Fig 1d: registered IOE device with their status

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.

B. MICROCONTROLLER (MCU-PT) BOARD

The microcontroller board is used to connect different chic objects internally and to offer programming upbringung with various languages to monitor the linked smart object (see figure below).

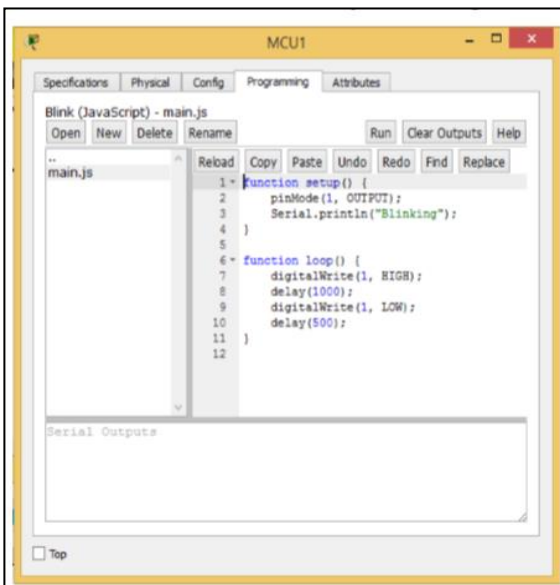


Fig 1(e): MCU programming environment

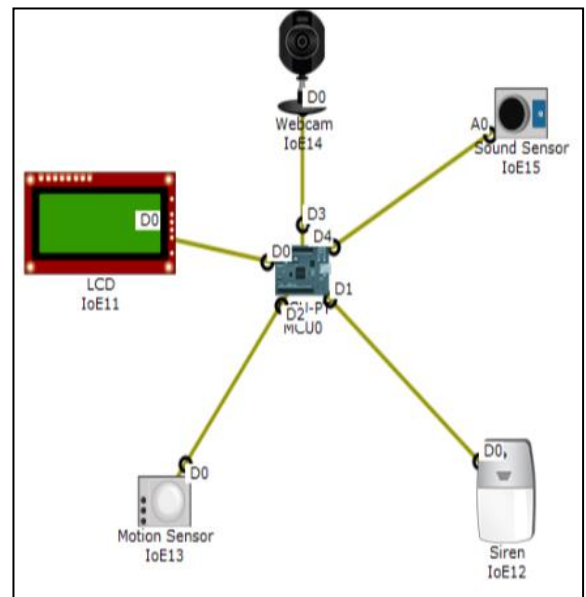


Fig 2(a): IOE device connected to MCU Board

4. IMPLEMENTATION

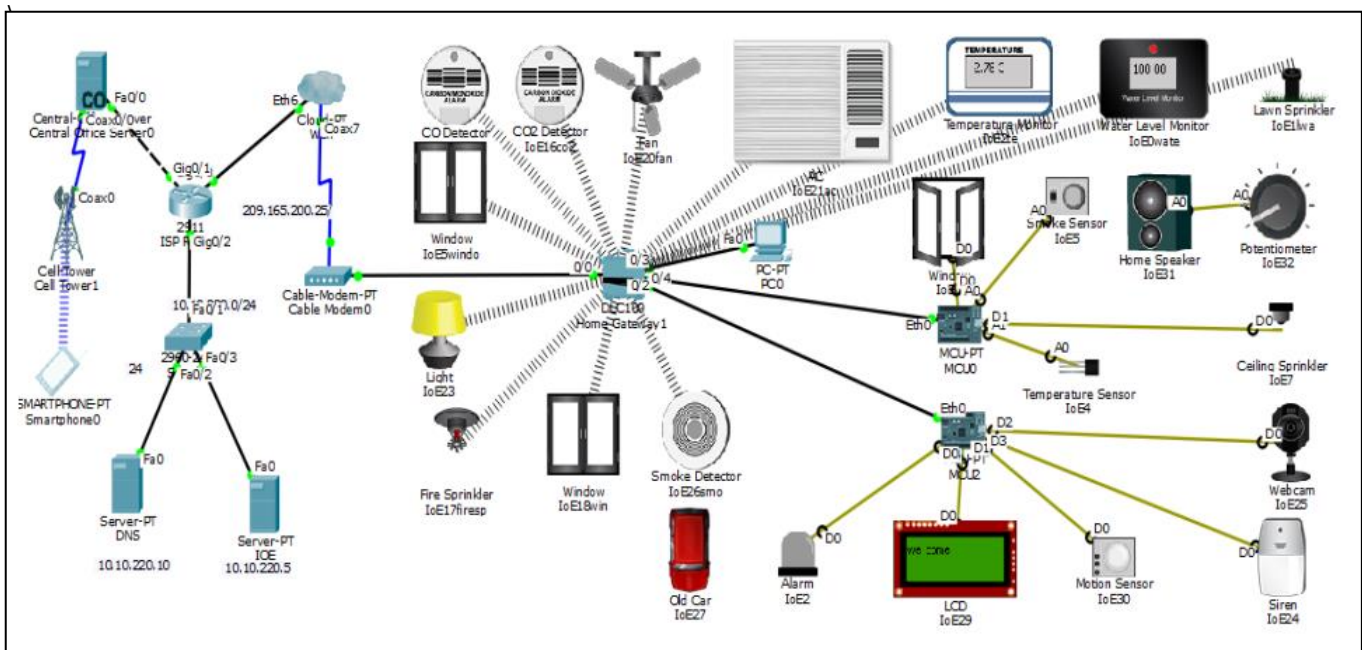


Fig 2 (b): Smart Home Architecture

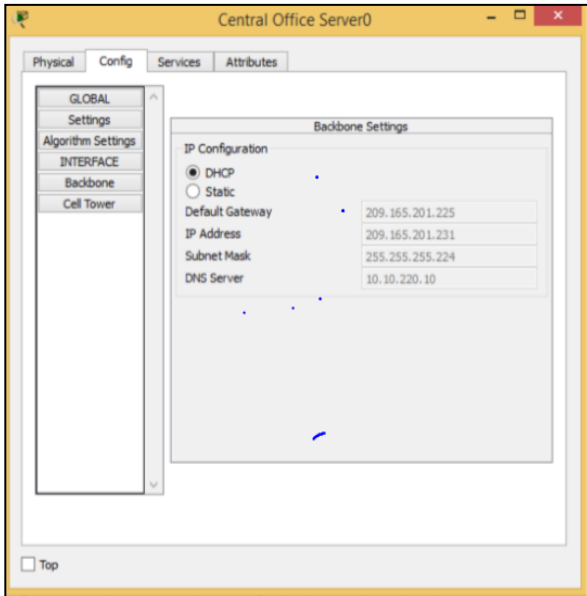


Figure 2 (a) shows the total schematic architecture of the design model, where as the Figures 2 (b), (c), (d) and (e) represents the screenshots of the Cisco packet tracer of implementation of Smart home and the various stages involved in it.

The above figure(2b) indicates the home architecture that uses wireless and wired media to connect to each other.

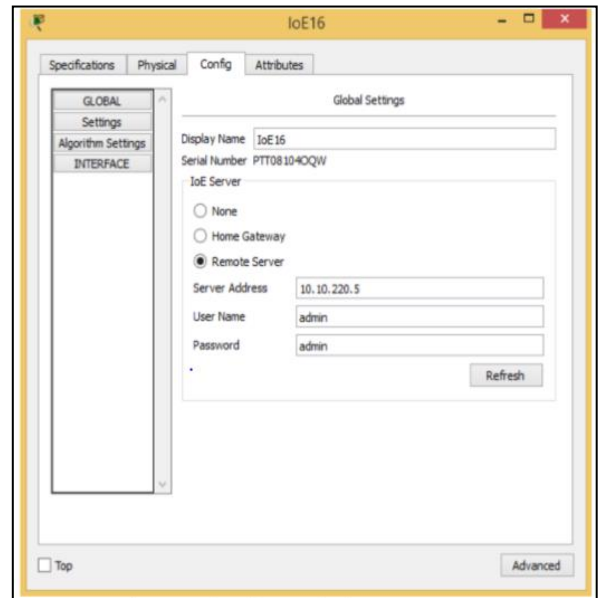


Fig 2 (d): Home Gateway obtains Http ISP Database password

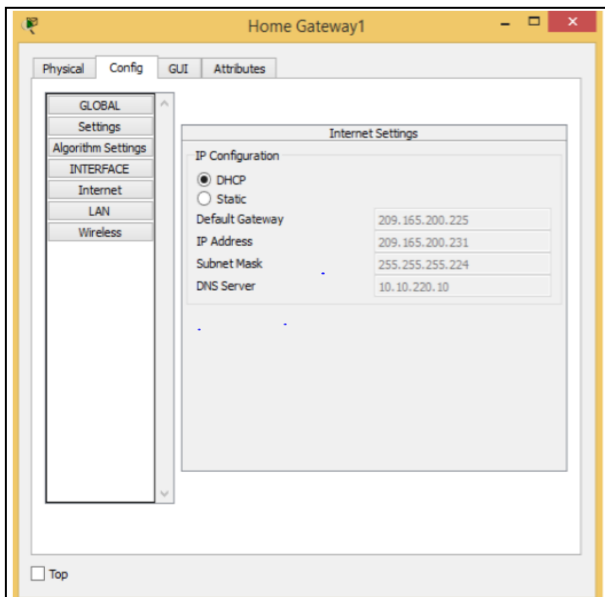


Fig 2(c): The IP address is retrieved from the central office Server

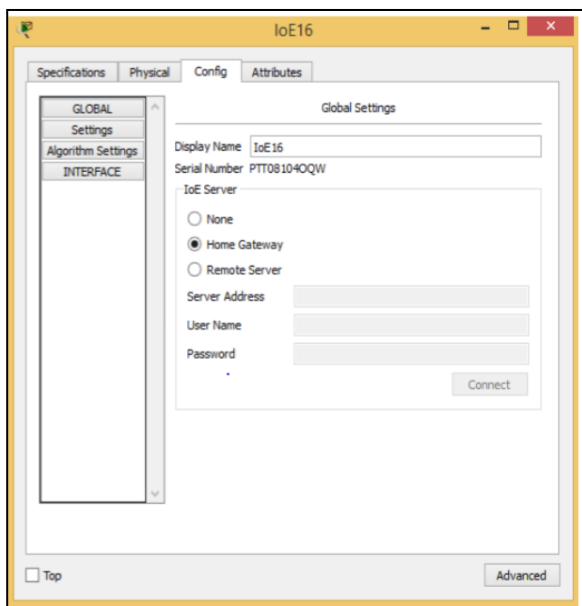


Fig 2 (e): IOE Database registration of IO devices(remote sensor)

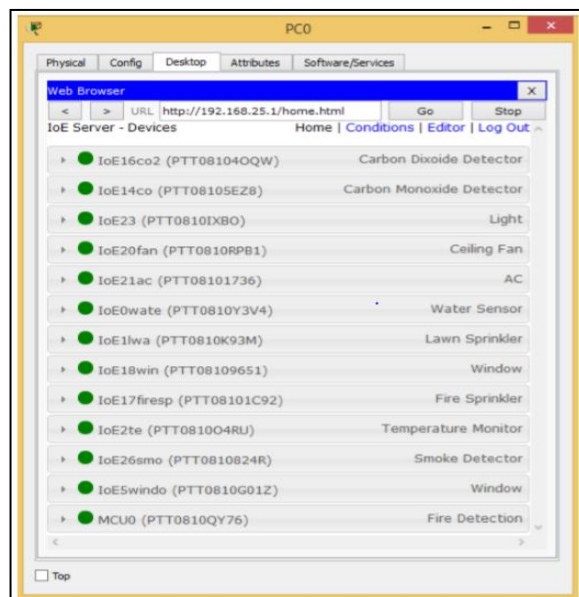


Fig 3(b): Registering Io devices to Home Gateway

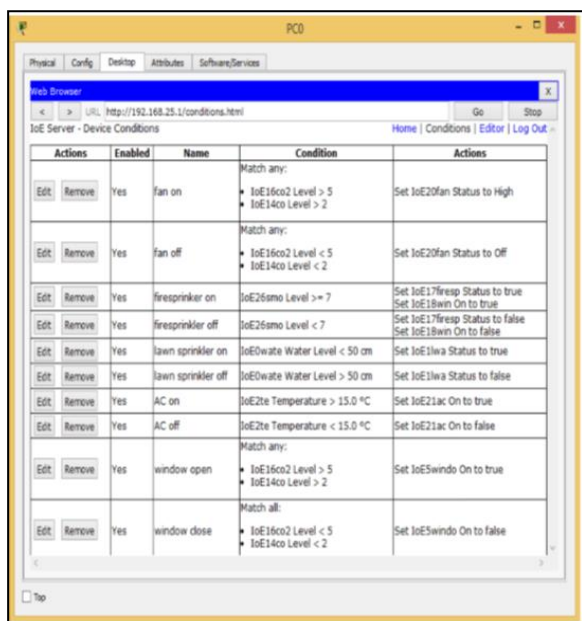


Fig 3(a): IO devices registered in the Home Gateway

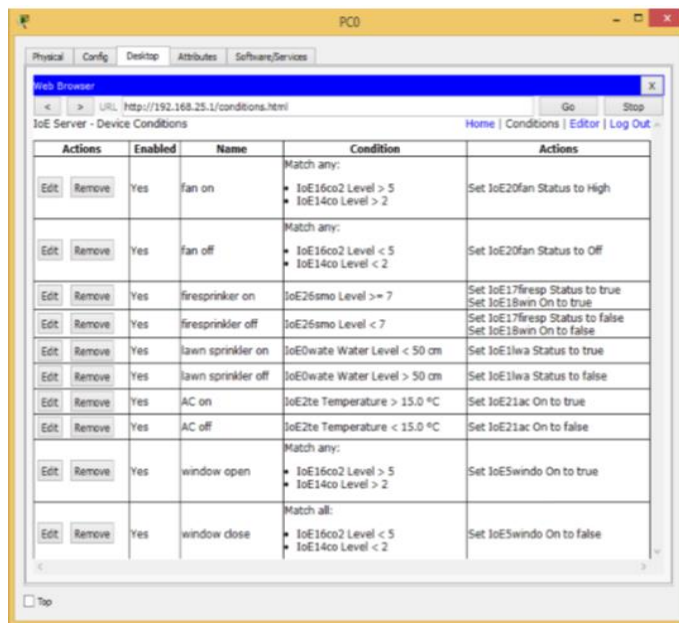


Fig 3(c): Condition made to control the IOE device on the home gateway.

Figure 3(a) indicates how IOE device can be registered to Gateway home. The home gateway has the default username and password for accessing the registered IOE device via the web.

4. USED DEVICE FOR DESIGN

Table 1. Device used for deployment

S. No	Devices	Functions
1	Router(1941)	Used to link home to the network of cellular.
2	Cable modem	Use to connect to the internet at home
3	Home gateway	Used to register smart objects and provide smart objects with IP addresses
4	IOE Server	To monitor intelligent things that are recorded on it and to have specific database features
5	Central office server	Used to link the router with the cellular network
6	MCU	Used to connect different intelligent things

7	PC	Link to your home destination to access intelligent objects
8	Fan	Used for ventilating the home environment on the basis of certain circumstances
9	Webcam	Control the home
10	Siren	Provide sound at home for some case
11	Light	Provide light
12	Motion detector	Link to your home getaway and detect motion
13	Smart door	Link to your home getaway and provide an event based on functions
14	Cell tower	Provide home user cellular network coverage to monitor the remote mode of the home appliance.
15	Tablet	Used to control the home from outside
16	CO detector	Used to detect CO of home
17	CO ₂	Used to detect CO ₂ of the home
18	Water level monitor	Used to monitor household water levels
19	Lawn sprinkler	Used as a sprinkler based on environmental water level
20	Smoke sensor	Used to sense the smoke level
21	Sound sensor	Used to sense the sound
22	Home speaker	The sound sensor is used to simulate the sound volume at 65
23	Temperature sensor	Used to sense the temperature of the home
24	Ceiling sprinkler	Used to ventilate home environment At a speed of 0.1 cm per second, water level affects.
25	Older car	Used to model various home development scenarios as it affects the amount of oil, co2 and smoke. At a level of 1 percent an hour, this absorbs carbon monoxide. At a level of 2 percent an hour, this absorbs carbon dioxide. Affects Smoke at an hourly rate of 3%.
26	AC	Used at a level of -2 percent an hour to cool the home affects humidity.
27	Smart window	Used to remotely control the window impacts Argon, Carbon Monoxide, Carbon Dioxide, Hydrogen, Helium, Methane, Nitrogen, O2, Propane, and Smoke.
28	Smart Light	Used to give light for home

4. RESULTS

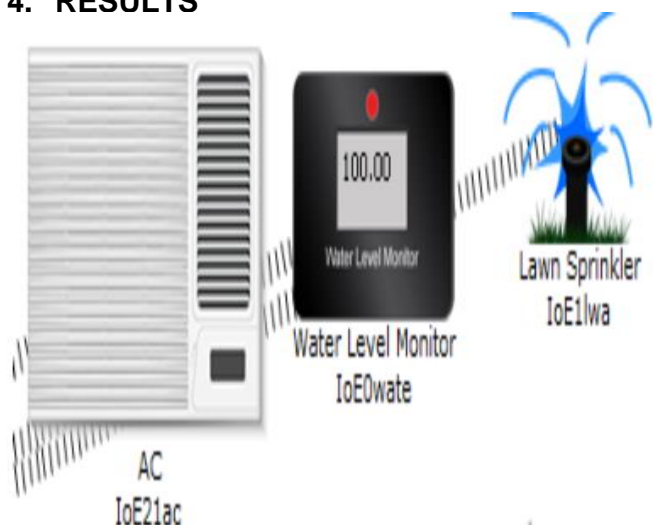


Fig 5(a): Watering the plant by using the lawn sprinkler

Figure 5a indicates that the lawn sprinkler is on, this can be based on a home gateway condition, and if applicable the lawn sprinkler on other off is more than 10 cm water level.

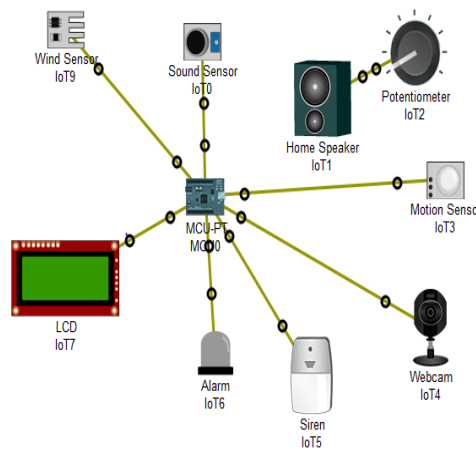


Fig 5(b): Alarming the person to detect motion.

Figure 5(b) shows the alarming the warning device is siren, alarm and LCD by providing tone, red-light and text message, respectively, when the motion is detected. This is accomplished by programming the machine to be operated Microcontroller (MCU).

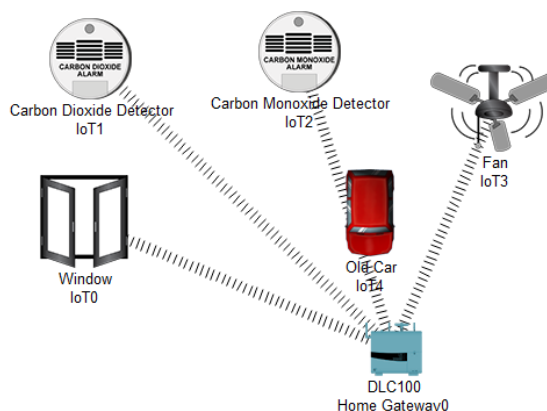


Fig 5(c): when co and CO2 are detected to ventilate the place, the window and fan are open.

The figure 5c indicates by detecting carbon monoxide and carbon dioxide using a carbon monoxide and dioxide detector, the fan and window are opened. The old car is used for scenario testing because by increasing the co and co2 the old car is a lot of trouble.

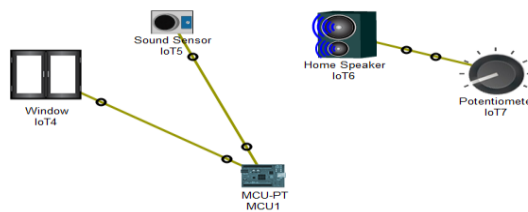


Fig 5d: *When sound is detected, Windows is close*

Figure 5(d) indicates that the window is close because the sound sensor detects it. When a speaker on a sound sensor senses the noise, I use a speaker to mimic the sound sensor and then close the window.

6. CONCLUSION

In this article, We used the latest cisco packet tracer version to introduce smart home, as this version includes numerous IOE devices. We used the home portal for home automation and record smart devices for monitoring them and Microcontroller (MCU-PT) to connect various sensors as well as IOE devices. MCU moreover offers computing environment for different devices and different language of programming.

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