Department of Computer Science and Engineering

Global Campus, Jakkasandra Post, Kanakapura Taluk, Ramanagara District, Pin Code: 562 112

2022-2023

A Fundamentals of Innovation and Venture Development in Entrepreneurship Report on

"Smart Security System"

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

DATA COMMUNICATION AND COMPUTER NETWORKS (18CIC52L)

Submitted by

AMRIT VERMA
20BTRCS158

Under the guidance of

Dr. RAJAT BHARADWAJ & Prof. GADUG SUDHAMSHU
Professor, Department of
Computer Science & Engineering
Faculty of Engineering & Technology
JAIN (DEEMED TO BE) UNIVERSITY

Department of Computer Science and Engineering

Global Campus, Jakkasandra Post, Kanakapura Taluk, Ramanagara District, Pin Code: 562 112

CERTIFICATE

This is to certify that the project work titled "Smart Security System" is carried out by AMRIT VERMA (20BTRCS158) a bonafide student of Bachelor of Technology at the Faculty of Engineering & Technology, Jain (Deemed-to-be) University, Bangalore in partial fulfillment for the award of degree in Bachelor of Technology in Computer Science & Engineering, during the year 2022-2023.

Dr. RAJAT BHARADWAJ	**Prof. GADUG SUDHAMSU**	**Dr. MAHESH TR**
Professor Dept. of CSE, **Faculty of Engineering & Technology,** **Jain (Deemed-to-be) University** **Date: 12-12-2022**	**Professor Dept. of CSE,** **Faculty of Engineering & Technology,** **Jain (Deemed-to-be) University** **Date: 12-12-2022**	**Program_Head Dept. of CSE,** **Faculty of Engineering & Technology,** **Jain (Deemed-to-be) University** **Date: 12-12-2022**

DECLARATION

AMRIT VERMA (20BTRCS158) is a student of 5TH semester B.Tech in Computer Science & Engineering, at Faculty of Engineering & Technology, Jain (Deemed-to-be) University, hereby declare that the project titled "Smart Security System" has been carried out by us and submitted in partial fulfillment for the award of degree in Bachelor of Technology in Computer Science & Engineering during the academic year 2022-2023.

Further, the matter presented in the project has not been submitted previously by anybody for the award of any degree or any diploma to any other University, to the best of our knowledge and faith.

STUDENT NAME	PRESENTATION(10)	IMPLEMENTATION(10)	VIVA(05)
AMRIT VERMA (20BTRCS158)			
PLACE :BANGALORE DATE :12-12-2022			

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NAME	SIGNATURE
AMRIT VERMA (20BTRCS158)	
PLACE: BANGALORE	DATE : 12-12-2022

ABSTRACT

The Computer Network is much more important for data communication in the automation and security field. This report describes the network design of smart security project installed in smart home using motion detector, webcam and wireless router . In this network topology the nodes (i.e. wireless router, alarm, web camera,motion detector and other devices) are connected to a local area network (LAN) wireless. We have used Cisco Packet Tracer for designing the network topology. It's a general design which can be implemented at any higher level to manage security system.

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1. Introduction

It is no secret that networking has become an essential part of our lives. Our present modern information system makes use of computers for the execution, each of them connected through an optimized network.

WHAT IS SMART HOME AUTOMATION?

Smart home technology generally refers to any suite of devices, appliances, or systems that connect into a common network that can be independently and remotely controlled. When your home technology works together in one system, it can also be referred more loosely as a “connected home”. For example, your home's thermostat, lights, audio speakers, TVs, security cameras, locks, appliances, and more are all connected into a common system, which can be controlled from your smart phone or through a mobile touch screen device.
Smart home automation allows you to tap into high-tech functionality and luxury that wasn’t possible in the past. As technology development continues to expand, so will the possibilities for consumer home automation to make life easier and more enjoyable.

Smart home can provide different function rather than providing safety that is security by providing more automate security using different alarm system such siren sound, LCD display and sending email to legitimate user if security issue is detected by sensor.

This mini project aims to make the network easier and more reliable.Automation is popular because it provides ease, efficiency and secure environment. In this paper all smart appliance is registered to home gateway and controlled by legitimate person. Smart Home reduces user's involvement in monitoring home settings and controlling home appliances by including different sensor in home automation.
The field of Information Technology and Network Infrastructure Management has become crucial components within the healthcare industry. With the advancement in modern technology, advancements in network monitoring devices enables to monitor your home,office and many other 24/7.
This paper presents if any person is detected in front of gate then automatically the person in the house will be alarmed through the siren and then the gate,window and garage door will be closed.
The person in the house can unlock the door if/she wants.

2. About Cisco Packet Tracer

Cisco Packet Tracer is Cisco's simulation software. It can be used to create complicated network typologies, as well as to test and simulate abstract networking concepts. It acts as a playground for you to explore networking and the experience is very close to what you see in computer networks. They also provide their service in languages such as Russian, German, Spanish and French. Packet Tracer enables students to create complicated and huge networks, which is frequently impossible with physical hardware due to cost considerations.
Packet Tracer is available for Linux, Windows, MacOS, Android, and iOS. Packet Tracer allows users to drag and drop routers, switches, and other network devices to create simulated network topologies. If you have a Netacad account, you can download it for free. This programme cannot replace hardware routers or switches because the protocols are implemented solely in software. This tool, however, does not just contain Cisco hardware but also a wide range of other networking devices.

Who Uses Cisco Packet Tracer?

This is primarily intended to train candidates for the CCNA certification, which professionals widely utilise. It is mostly used by Networking Curious & Aficionados, CCNA, CCNA Security and CCNP Students along with Engineers, Educators, & Trainers. Before, implementing any protocol, engineers like to test it on Cisco Packet Tracer. In addition, engineers who want to deploy any modification in the production network prefer to utilise Cisco Packet Tracer to test the changes first and then deploy if everything works as planned.

Features of Cisco Packet Tracer :

- Cisco Packet Tracer supports a multi-user system that allows many users to connect various topologies across a computer network. Instructors can also build exercises for students to perform using Packet Tracer.
- Supports feature expansion via additional programmes that use an API to improve Cisco Packet Tracer's capabilities in areas including curriculum and assessment delivery, gaming, accessibility, and interacting with real-world equipment.
- The Enhanced Physical Mode transports you to a virtual lab where you can simulate cabling devices on a rack. Refresh key skills such as device placement (Rack & Stack), on device power switching, device port-to-port cabling (including cable selection and management), troubleshooting, and more.
- It can be downloaded for free through a Netacad account.
- It enables its users to simulate the configuration relating to the Cisco routers and can be accessed anywhere anytime.
- It can be accessed through unlimited devices.
- Provides an interactive and self-paced environment.

3. METHODOLOGY :

In order to implement smart home I used new released cisco packet tracer, which included different smart object used for home automation such as smart fan, smart window, smart door, smart light , smart garbage door, fire sprinkler, lawn sprinkler and different sensor is included. To control this smart object and sensor, Home Gateway is used, since it provide programming environment for controlling smart object connected to it and provide controlling mechanisms by registering smart device to Home Gateway respectively.

3.1 HOME GATEWAY :

Home Gateway have 4 Ethernet ports in addition to a wireless access point configured with the "Home Gateway" SSID (see fig 1).To secure wireless connection WEP / WPA-PSK / WPA2 enterprise can be configured on home gateway. The figure 1 shows seven internet of Things device connected to a Home Gateway by using Ethernet cable and wireless(In this project I have used wireless option). To connect the Home Gateway to the Internet its Internet WAN Ethernet port available on home getaway.The IoE device can be remotely managed through a web interface hosted by the Home Gateway. The Home Gateway internal (LAN) IP address is 192.168.25.1 but it can also be accessed through its Internet facing IP address.

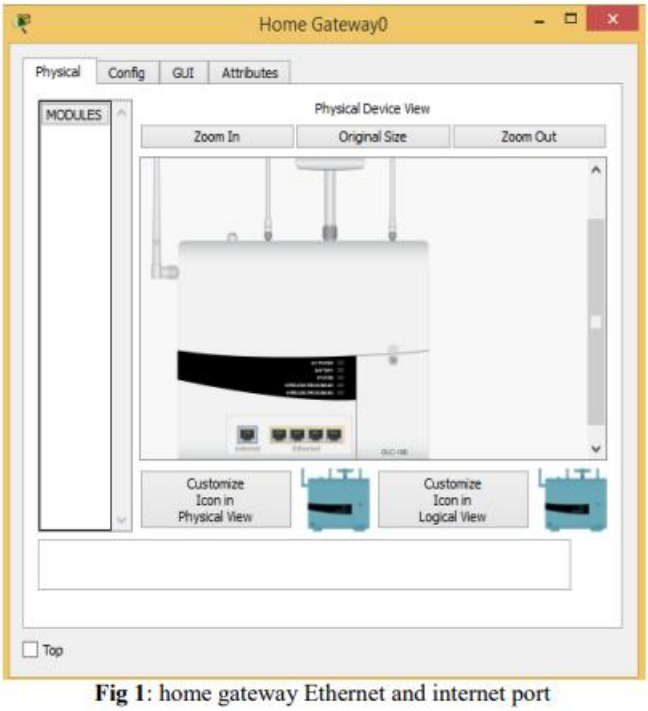


Fig 1: home gateway Ethernet and internet port

3.2 Different components used :

Motion Detector :

A motion sensor, or motion detector, is an electronic device that uses a sensor to detect nearby people or objects. Motion sensors are an important component of any security system. When a sensor detects motion, it will send an alert to your security system, and with newer systems, right to your mobile phone.

Features:

- Registration Server Compatible
- Detects motion from mouse movement.
- Automatically deactivates after 5 seconds without any mouse movement.

Siren :

A device that makes a loud prolonged signal or warning sound.

Features:

- **Registration Server Compatible**
- **On**
- **Off**

Webcam :

A camera device that records and sends data.

Features:

- Registration Server Compatible
- Off
- On
- Video recording

Door, Widow, Garage Door :

Open / Close / Unlock / Lock when the motion sensor detects any movement.

Features:

- Lock and Unlock
- Open and Close

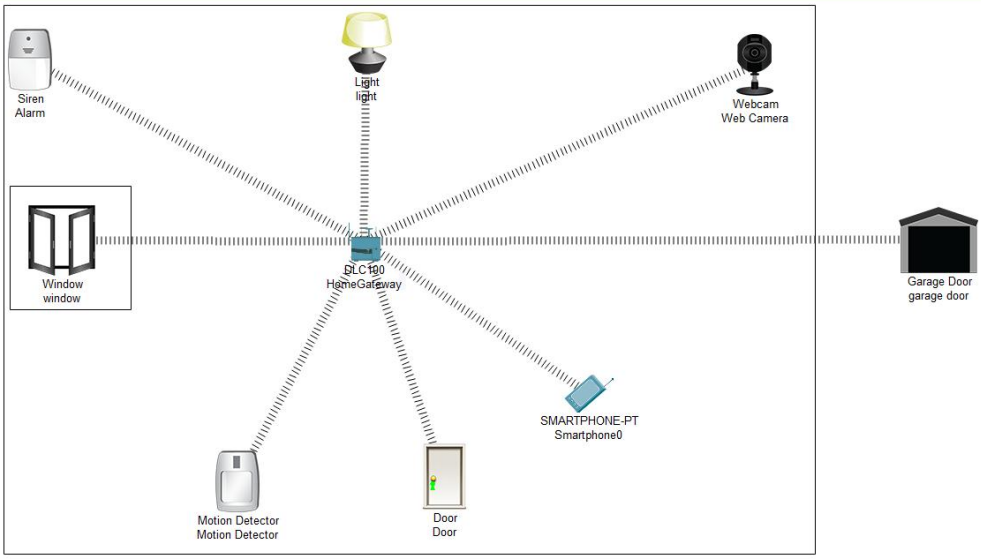


Fig 2: Home Gateway with eight smart things connected to Home gateway.

The above figure shows the smart object is connected to the home Gateway using wireless medium to manage smart device local and remotely. Home gateway also works as DHCP server by assigning IP address to each smart device that connected to it.

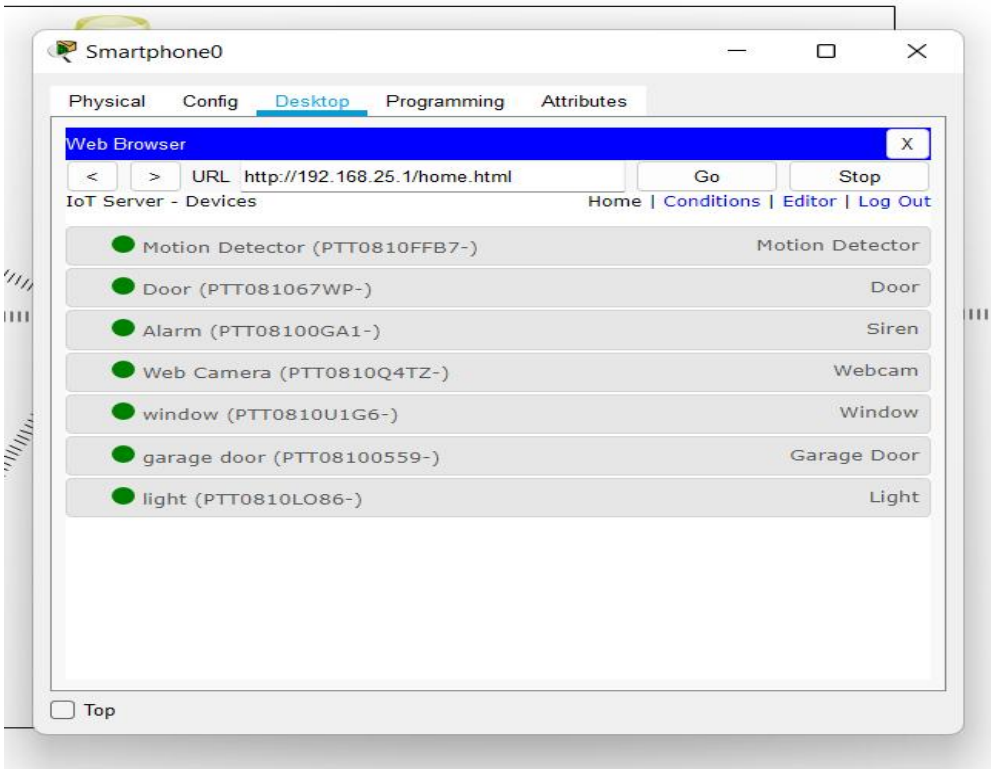


Fig 3: Registered IOE devices on Home Gateway

Fig 4: registered IOE device with their status

The above figure shows after registering smart device to home gateway all device are accessed through web by legitimate user. Figure 4 shows there are seven IOE device registered to Home gateway those all are controlled through web by legitimate person.

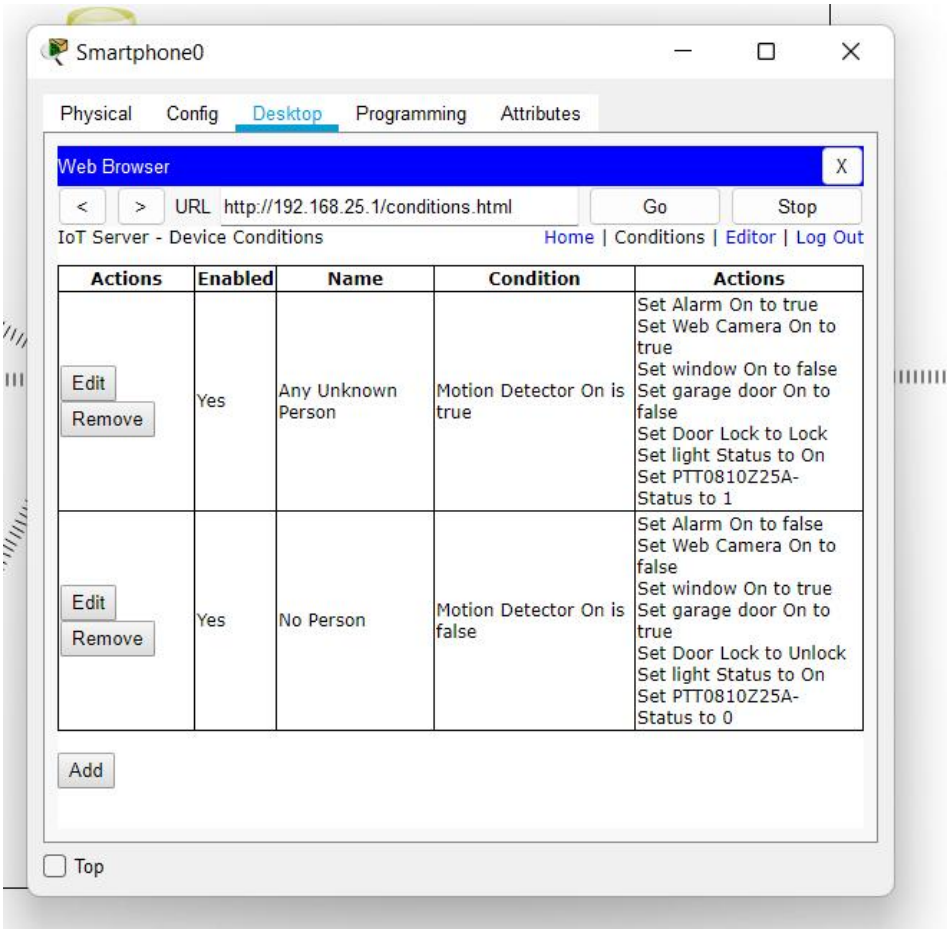
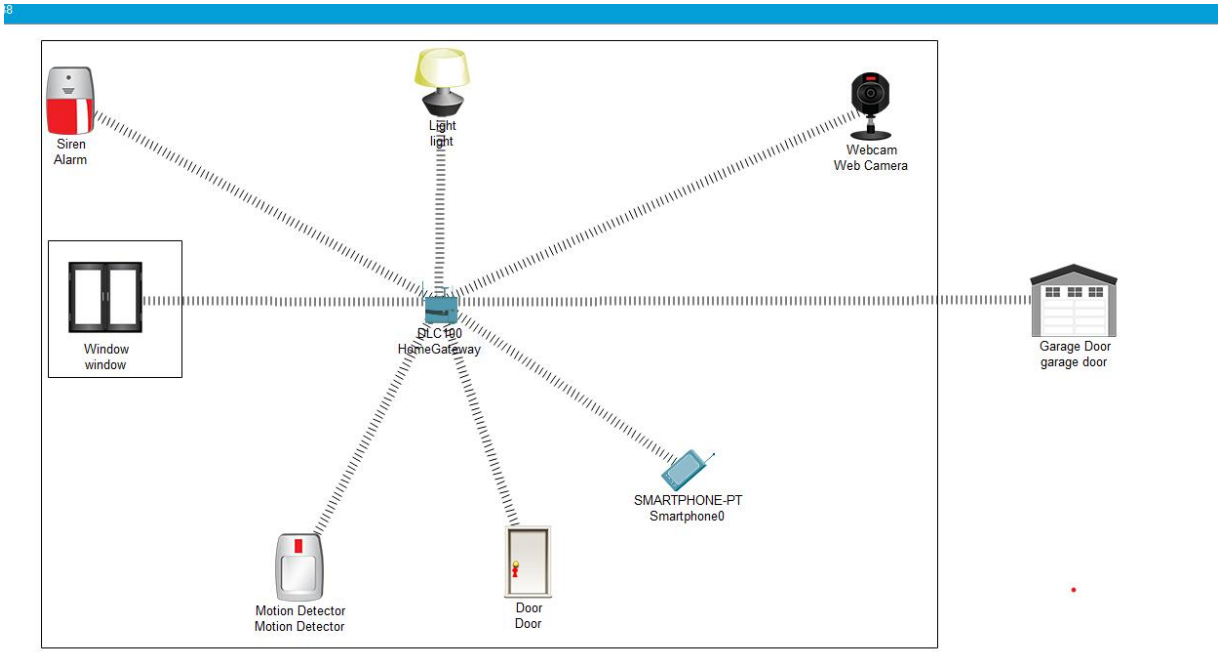


Fig 5: Condition made on home Gateway to control IOE device

4. IMPLEMENTATION

To implement smart home using cisco packet tracer I have used different sensors and smart devices to work smartly.

The following figure :



We can clearly observe in the figure that when the the motion detector detects any person in front of the door it sends the signal to the Siren(alarm)so that the person inside the home can be warned and the web camera is on to record the person. After this the door,window and the garage door is automatically closed in order to prevent any unknown person from entering the house.

Person inside the home can unlock the door if he/she wants by using the unlock door function.

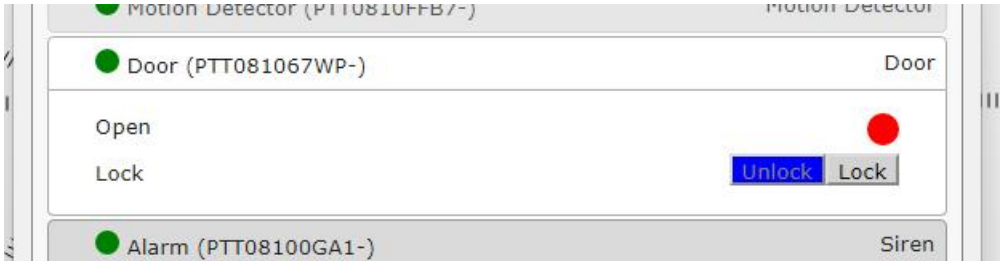


Fig 5 : Locking and Unlocking the Door

4.2 DEVICES USED FOR DESIGN :

No.	**Devices**	**Function**
1.	DLC 100 Home Gateway	Used to register smart object and give IP address to smart object
2.	Web Camera	Monitors the home
3.	Siren	Provide sound for some event in the home
4.	Motion Detector	Connect to home getaway and provide Detection of motion
5.	Smart Phone PT	Connect to home getaway to access smart object
6.	Door	Used to lock when unknown motion is detected.
7.	Window	Used to lock when unknown motion is detected.
8.	Garage Door	Used to lock when unknown motion is detected.

5.Observation And Results

We can clearly observe in the figure that when the the motion detector detects any person in front of the door it sends the signal to the Siren(alarm)so that the person inside the home can be warned and the web camera is on to record the person. After this the door,window and the garage door is automatically closed in order to prevent any unknown person from entering the house.Person inside the home can unlock the door if he/she wants by using the unlock door function.

I have successfully implemented the structure in Cisco Packet Tracer. It can be used in various places like home, offices etc. By having a fully redundant connection and with strategic planning and long-term strategies you can keep your eye on your business,homes,offices etc.

5. Conclusion And Future Scope

Conclusion

In this report, I have installed smart security system in home to prevent any unknown person from getting into house smart home using new released cisco packet, because this version included different IOE devices used for home automation. I have used home Gateway to register smart devices on it to control them and interconnect different sensor and IOE devices. Also MCU provide programming environment to manage different device, different programming language available on MCU but I used JavaScript and python to control the device.

Future Scope

- The project has a very vast scope in future.This field of home automation is fastly emerging in technology making homes safer and better places to live. These features help users to virtually monitor and control home attributes like lights, entertainment systems, security, climate control, etc.
- **Integration of Smart Home Devices**
  Development of smarter home appliances − Daily household devices which we have been using for decades are evolving to become smarter providing better results to their users. Some common devices that have evolved are −**Lights, Fans etc**
- **Increasing control, customization, and efficiency.**
- **Integration of Smart home devices**
- **Smart spaces outside homes**
- Maximizing security
- Remote control of home functions

7. References

- https://www.geeksforgeeks.org/what-is-cisco-packet-tracer/
- https://www.techopedia.com/definition/2306/switch-networking
- https://www.youtube.com/watch?v=42DCkx36Uv8
- https://www.youtube.com/watch?v=zWceWweRgGU