# NATIONAL INSTITUTE OF TECHNOLOGY, DELHI

## Project Report


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**Subject Code :** CSBB 310

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**Submitted To :** Dr. Jyoteesh Malhotra


**Department of** Computer Science and Engineering

## Submission Title

Implementation of a Smart Garage System using IOT in Cisco Packet Tracer Simulator

## Abstract

This project explores the implementation of a smart garage system leveraging IoT technology. It aims to simplify garage access through network-connected devices while ensuring security and control over various garage components like doors, windows, lights, and detectors. The implementation utilizes Cisco Packet Tracer for simulation and testing.

## Description

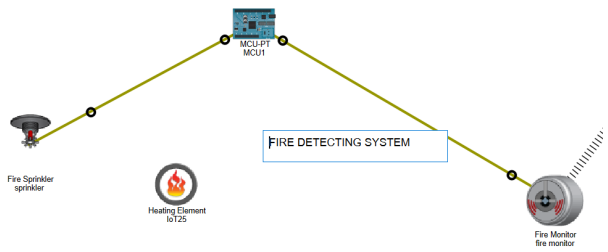
- **Climate Control:** Automatically adjusts garage temperature by opening doors and windows when CO2 levels exceed a set threshold, fostering a more comfortable environment.
- **IoT Interaction:** Enables seamless interaction among IoT devices based on user-defined conditions, enhancing system adaptability and responsiveness.
- **Remote Monitoring:** Utilizes an installed IP camera for remote garage surveillance, reducing the need for constant physical monitoring and ensuring security.
- **Efficient Lighting:** Implements scheduled lighting control, reducing both human effort and power consumption by automating on/off cycles based on predetermine**d schedules.**
- **Smart Security:** Combines smart features with heightened security measures, offering a balance between convenience and safety in line with modern lifestyle preferences.
- **Packet Tracer Implementation:** Motivated by the trend toward smarter solutions, the project employs Packet Tracer for simulation, aligning with the ethos of working smartly rather than laboriously.

## Layout

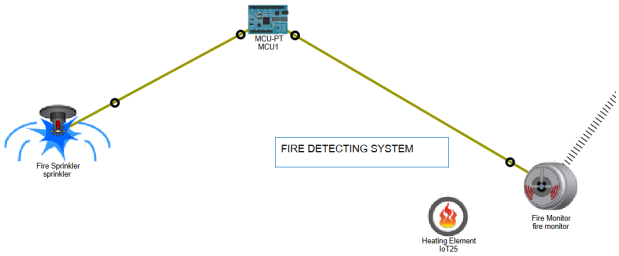
- **Smart Objects Integration:** Utilizing Cisco Packet Tracer, a variety of smart objects like doors, windows, lights, sensors, fire sprinklers, etc., are employed for comprehensive garage automation.
- **Control Infrastructure:** Microcontrollers (MCUs) and an IoT server are utilized to manage and regulate these smart objects and sensors efficiently.

- **Network Connectivity:** Fast-ethernet cables are used to interconnect all smart objects within the garage. These objects are linked via a switch, establishing connections to the server and a controlling PC.
- **Customizable Conditions:** Conditions tailored to user preferences are programmed into the smart objects, allowing personalized control over garage functionalities.
- **Enhanced Security Measures:** Ensuring user security, a PIN lock system is implemented via mobile devices, enabling automated access control and bolstering overall garage security.

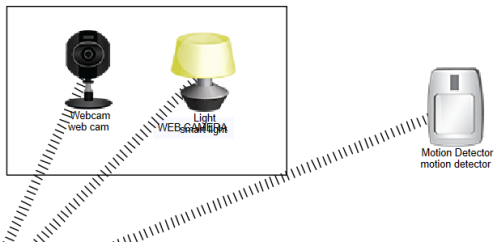
### Fire detector (Before)



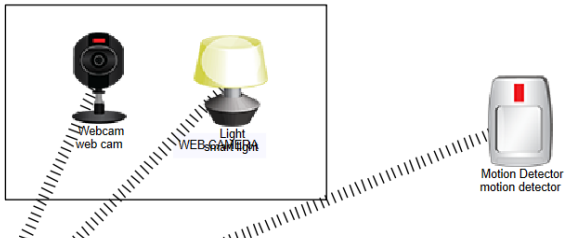

### Fire detector (After)



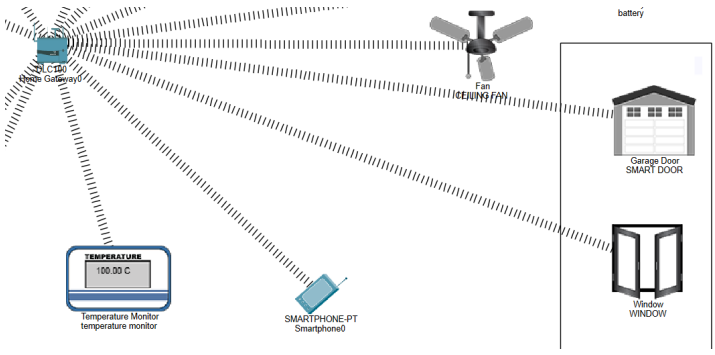

### Motion Detector (Before)



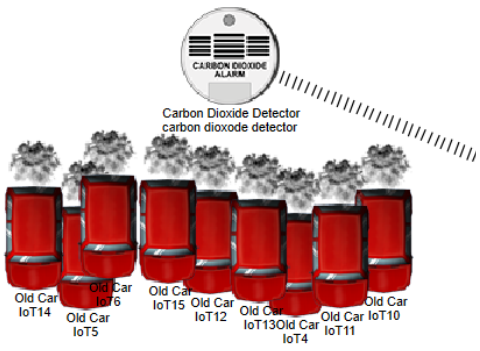

### Motion Detector (After)

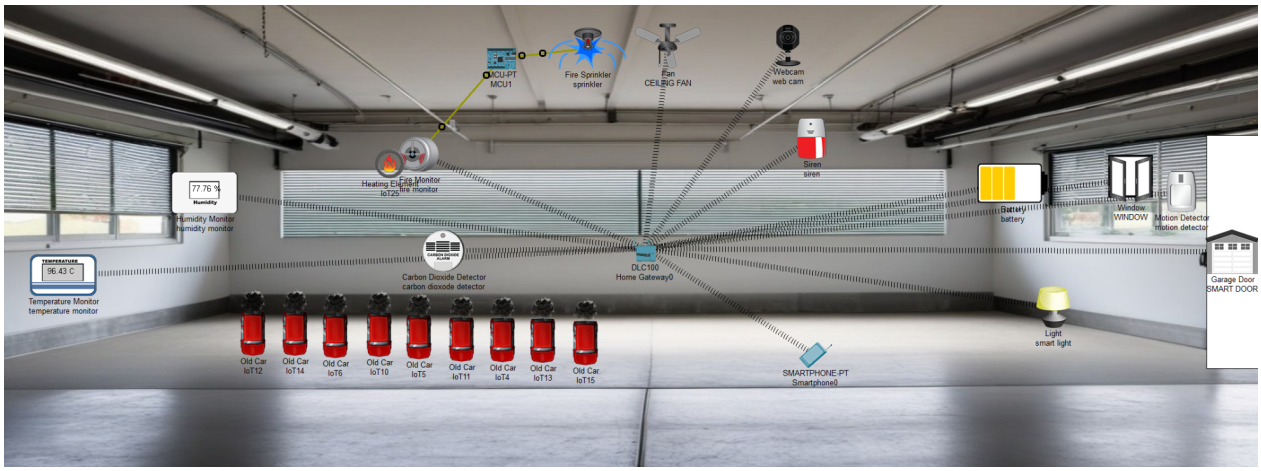



### Smart Door



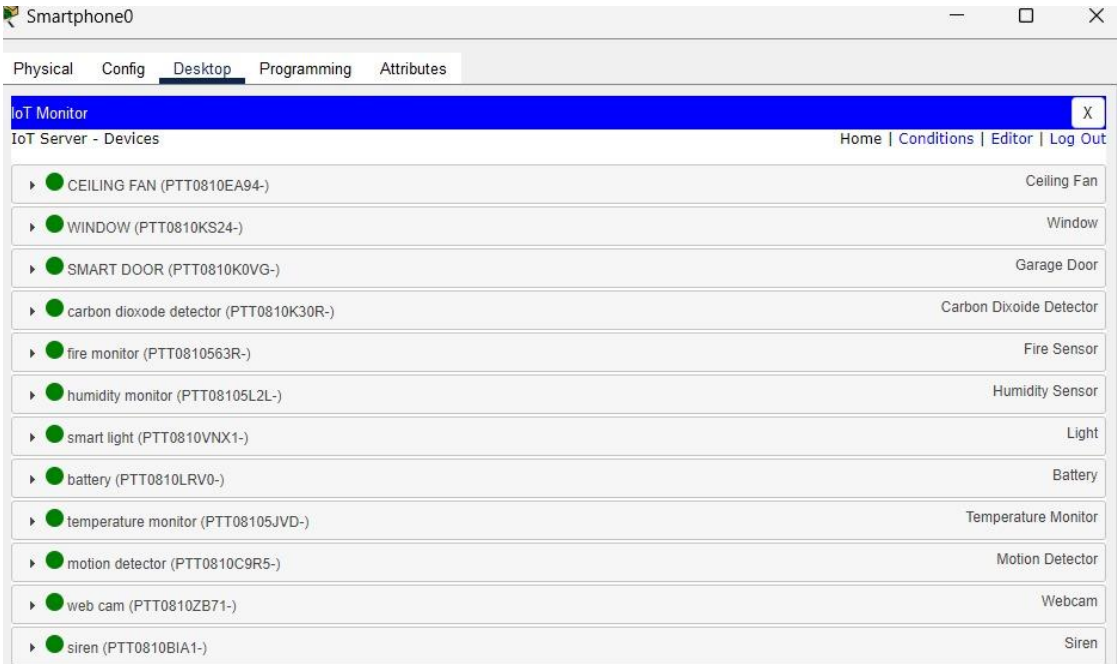

### $CO_2$ Detector






## Results

- Opening of window and door when CO2 emissions are greater than threshold value set by the user
- Activating the ceiling sprinkler when the temperature and smoke level increase.
- Automated the alarm when there is any problem related to fire.
- Secured Authentications for IoT users by giving them username and password to control the smart objects
- Validated access control and functionalities, such as door and window control, utilizing network-connected devices.



Smartphone0

Physical Config Desktop Programming Attributes

IoT Monitor X

IoT Server - Device Conditions

Home | Conditions | Editor | Log Out

| Actions | Enabled | Name | Condition | Actions |
|---|---|---|---|---|
| Edit Remove | Yes | window open | carbon dioxode detector Level > 1 | Set WINDOW On to true |
| Edit Remove | Yes | door open | carbon dioxode detector Level >= 1.2 | Set SMART DOOR On to true |
| Edit Remove | Yes | ceiling fan on | humidity monitor Humidity >= 71.5 % | Set WINDOW On to true<br>Set CEILING FAN Status to Low<br>Set WINDOW On to true |
| Edit Remove | Yes | fire sprinkler on | Match any:<br>• carbon dioxode detector Level >= 2<br>• fire monitor Fire Detected is true<br>• humidity monitor Humidity >= 80 % | Set PTT0810N8K0- Status to 1 |
| Edit Remove | Yes | webcam | motion detector On is true | Set smart light Status to On<br>Set web cam On to true |
| Edit Remove | Yes | web cam off | motion detector On is false | Set smart light Status to Dim<br>Set web cam On to false |
| Edit Remove | Yes | siren on | fire monitor Fire Detected is true | Set CEILING FAN Status to Off<br>Set web cam On to false<br>Set siren On to true |
| Edit Remove | Yes | siren off | fire monitor Fire Detected is false | Set siren On to false |

Add

## Conclusion

This project showcases the successful execution of a smart garage system, demonstrating its practicality and functionality through simulation. The system's ability to provide secure access and control over garage components validates its potential for real-world applications within IoT-driven environments.

# THANK YOU!