

Smoke detection system with fire prevention using Cisco Packet Tracer tool

CSEE 5110 Network Architecture I

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Final Report Presentation

Team 24

Who are we?

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Brief overview of our project

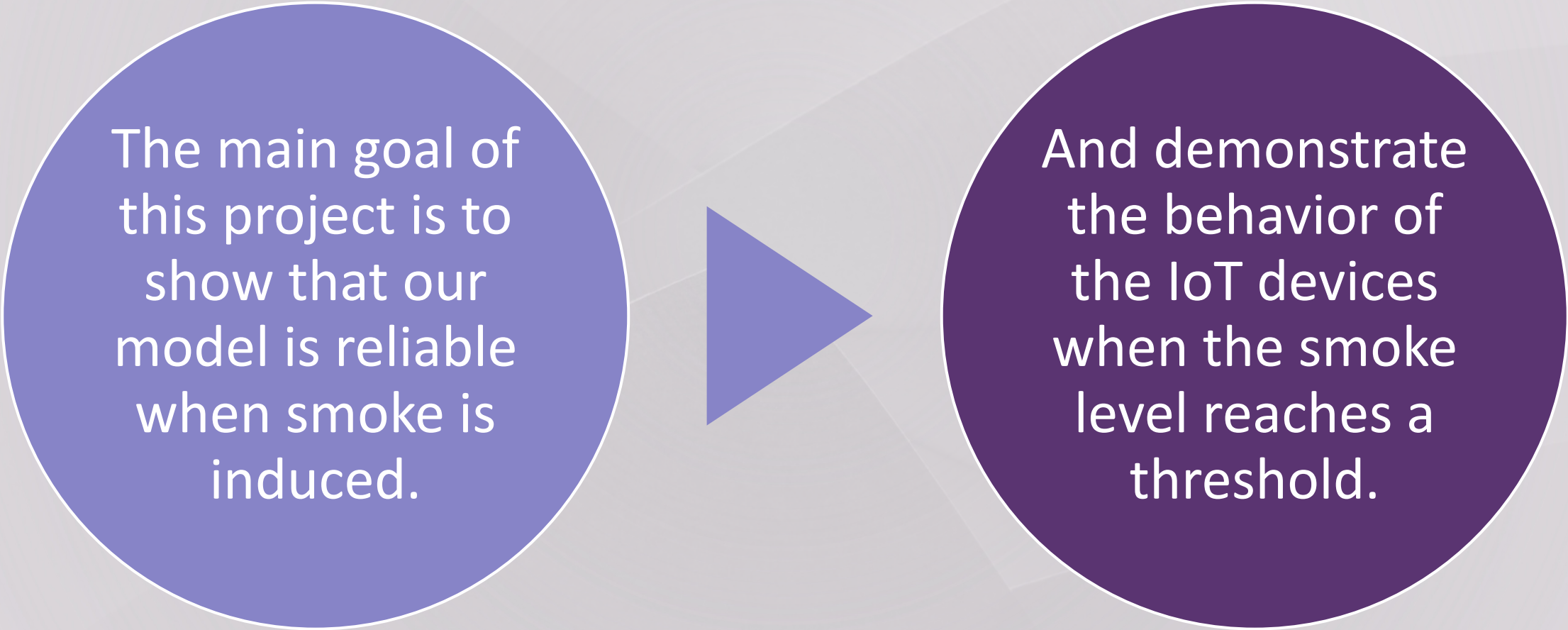


In this project, we will be using Cisco Packet Tracer to detect smoke/fire in a residential one-story smart home. The Cisco Packet Tracer will emit different sets of virtual wireless networks using Internet of Things devices.



When the smoke detector detects a level of smoke that exceeds a certain threshold, various operations will be performed by the IoT devices.

Objective



The main goal of this project is to show that our model is reliable when smoke is induced.

And demonstrate the behavior of the IoT devices when the smoke level reaches a threshold.

The technology we are using

Cisco Packet Tracer

A Home gateway

IoT devices (4 Smoke detectors, 4 Fire sprinklers, 1 Siren, 3 Windows, 4 Doors)

4 Switches

One smart phone

An old car

Procedure

1. Our model consists of a one-story smart home that includes four different rooms including a garage, bedroom, Kitchen, living room. In each room, a smoke detector as well as a fire sprinkler system is placed. The fire sprinkler system is an effective tool for fire prevention as it has a fast reaction time, discharging water when smoke is detected. The alarm in the smoke detector will go off when it detects the environment variable smoke at a certain level.

2. The garage has one door, and the other rooms have both a door and a window. All doors and windows are Registration Server Compatible and can vent Carbon Dioxide and Carbon Monoxide.

3. A siren (Siren1) and a smart phone (Device1) are used in the system.

4. A Home Gateway1 is used to connect all the devices linked by Copper Straight Through and Copper Cross-Over connections through the respective 2960-24TT switches (Switch1, Switch 2, Switch 3, and Switch 4) as shown in Figure 1. All IoT devices and switches are configured using the Home Gateway1, using an IP Address of 192.168.25.1 and a Subnet Mask of 255.255.255.0

Dynamic Host Configuration Protocol (DHCP) is used to manage the IP Address.







List of IoTs devices on the smart phone (Device1)

Physical Config **Desktop** Programming Attributes

Web Browser X

< > URL Go Stop

IoT Server - Devices Home | [Conditions](#) | [Editor](#) | [Log Out](#)

	Siren1 (PTT08109RI3-)	Siren
	FS2 (PTT08102BFQ-)	Fire Sprinkler
	SD2 (PTT0810YRNM-)	Smoke Detector
	D2 (PTT0810LRDG-)	Door
	W2 (PTT0810L531-)	Window
	FS3 (PTT0810OI3H-)	Fire Sprinkler
	W3 (PTT08109M23-)	Window








Device1

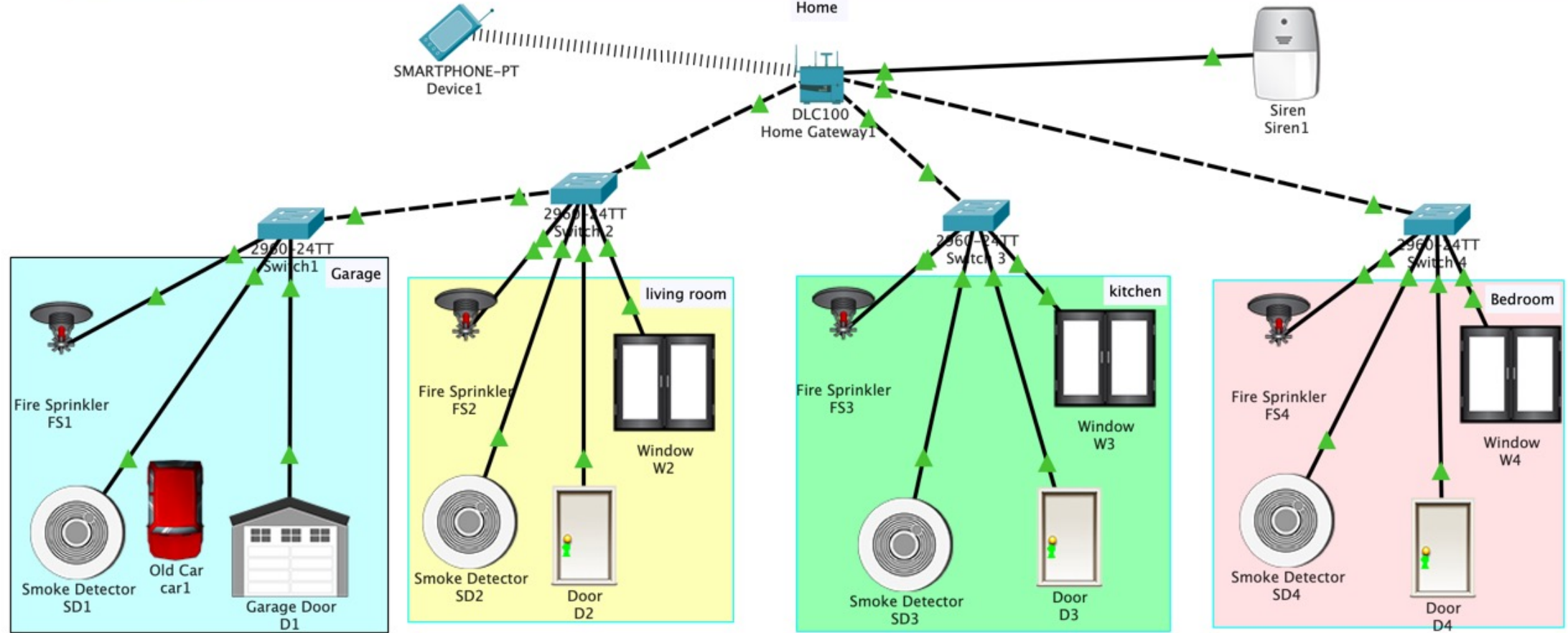
Physical Config **Desktop** Programming Attributes

Web Browser X

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IoT Server - Devices Home | [Conditions](#) | [Editor](#) | [Log Out](#)

	Siren1 (PTT08109RI3-)	Siren
On		
	FS2 (PTT08102BFQ-)	Fire Sprinkler
Status		
	SD2 (PTT0810YRNM-)	Smoke Detector
Alarm Level		 0
	D2 (PTT0810LRDG-)	Door



Our Model

5. For this experiment, we will use an old car (Car1) to generate smoke, by pressing (Alt + click) or (option + click).

6. The above system works when smoke is detected. If the smoke detectors' (SD1, SD2, SD3, SD4) level are more than zero, Siren1 will turn on which will induce the fire sprinklers (SF1, SF2, SF3 and SF4) to spray water while simultaneously opening all windows (W2, W3, and W4) and unlocking all doors (D1,D2,D3, and D4).

Conditions

Web Browser X

< > URL http://192.168.25.1/conditions.html Go Stop

IoT Server - Device Conditions [Home](#) | [Conditions](#) | [Editor](#) | [Log Out](#)

Actions	Enabled	Name	Condition	Actions
<div>Edit Remove</div>	Yes	On	Match any: <ul style="list-style-type: none">SD1 Level > 0SD2 Level > 0SD3 Level > 0SD4 Level > 0	Set D2 Lock to Unlock Set FS2 Status to true Set W2 On to true Set FS3 Status to true Set D3 Lock to Unlock Set W3 On to true Set W4 On to true Set D4 Lock to Unlock Set FS4 Status to true Set Siren1 On to true Set D1 On to true Set FS1 Status to true
<div>Edit Remove</div>	Yes	Off	Match all: <ul style="list-style-type: none">SD2 Level <= 0SD3 Level <= 0SD4 Level <= 0SD1 Level <= 0	Set Siren1 On to false Set FS2 Status to false Set FS3 Status to false Set FS4 Status to false Set W2 On to false Set W3 On to false Set W4 On to false Set FS1 Status to false Set D1 On to false

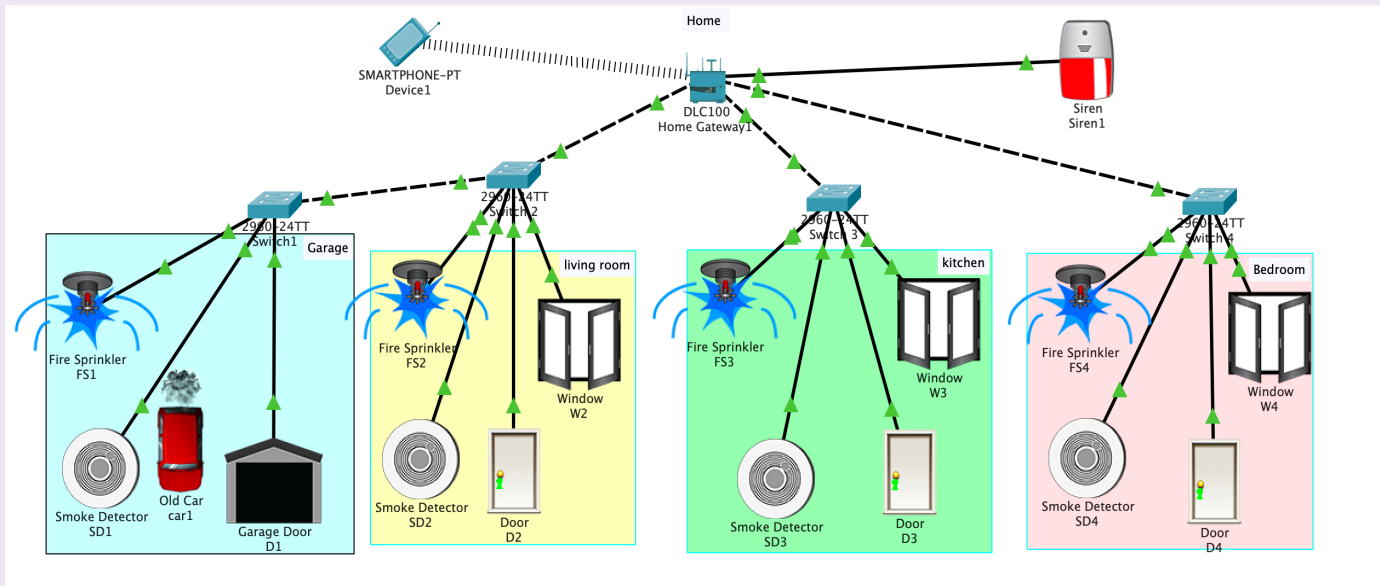
Add

Implementation

- Now, let's implement our project and use our old car to create some smoke.
- When the level of SD1, SD2, SD3 and SD4 are less than or equal to zero, Siren 1 and the four fire sprinkles (FS1, FS2, FS3, and FS4) will turn off, closing all the windows.



Result



Device1

Physical Config **Desktop** Programming Attributes

Web Browser

< > URL <http://192.168.25.1/home.html> Go Stop

● FS2 (PTT08102BFQ-)	Fire Sprinkler
Status	<input checked="" type="checkbox"/>
● SD2 (PTT0810YRNM-)	Smoke Detector
Alarm Level	0.027256
● D2 (PTT0810LRDG-)	Door
Open Lock	<input checked="" type="checkbox"/>
	<input type="button" value="Unlock"/> <input type="button" value="Lock"/>
● W2 (PTT0810L531-)	Window
On	<input checked="" type="checkbox"/>

Conclusion

Finally, we can conclude that our model offers safety and simplicity in case smoke or fire is detected. We observed that our model is also lightweight, powerful thus, making it ideal for building smart homes using wireless and IoT technologies. For future work, we will compare our current model with other models by considering various variables such as simulation time, transmission delay and, we will try to improve the system security to ensure that data transmission is done securely.

Video Link & Github Link for our presentation & Project

<https://pro.panopto.com/Panopto/Pages/Viewer.aspx?tid=c615dca7-67c3-4c07-979d-ae93000ef5f6>

<https://github.com/Ravi-Chandra24/Na1-Project>

Thank you!

