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Automation Home System

1. Introduction

The purpose of this project is to design a comprehensive home automation system using Cisco Packet Tracer. The system incorporates various components such as fire detection and prevention, motion-activated fan control, temperature control, wireless devices, carbon monoxide detection, and door control. The system is designed to enhance safety, convenience, and energy efficiency within a residential setting.

2. System Design

1. Fire Detection and Prevention System: This subsystem consists of an MCU 1 chip connected to a fire monitor BR and fire sprinklers. The MCU 1 chip is responsible for detecting the presence of fire and activating the fire monitor BR and fire sprinklers to prevent the fire from spreading.

2. Motion-Activated Fan Control System: In the automation room, an MCU 1 chip is connected to a fan and a motion detector. When motion is detected in the room, the MCU 1 chip activates the fan automatically, providing ventilation and comfort.

3. Kitchen Temperature Control System: The kitchen is equipped with a thermostat connected to heating and cooling elements. The thermostat, which is wirelessly connected to the DLC 100 Home Gateway, adjusts the temperature in the kitchen based on the user's preferences. This system ensures optimal comfort in the kitchen.

4. Wireless Devices Connected to DLC 100: Several wireless devices are connected to the DLC 100 Home Gateway. These devices include 2 lawn sprinklers, a water level monitor, a temperature monitor, an appliance coffee machine, 3 windows, 2 smoke detectors, a garage CO detector, a garage door, and a wind detector. The DLC 100 manages the communication between these devices and allows for centralized control and monitoring.

5. Garage Carbon Monoxide Detection and Door Control System: The garage is equipped with a CO detector that detects the presence of carbon monoxide emitted by a car. When the CO level increases, indicating potential danger, the garage door is automatically opened to facilitate ventilation and ensure safety.

6. Control Room Setup: The control room is equipped with a DLC 100 (IP 192.168.25.1), a switch, a TV connected to the DLC 100 using a cable modem, and a PC for monitoring and managing the entire home automation system. The control room provides a centralized interface for the user to control and monitor the various subsystems.

3. Implementation Details

1. Fire Detection and Prevention System: The MCU 1 chip is programmed to monitor for fire signals and activate the fire monitor BR and fire sprinklers when fire is detected. The fire monitor BR alerts the user about the fire, and the fire sprinklers release water to extinguish the fire.

2. Motion-Activated Fan Control System: The MCU 1 chip in the automation room is programmed to detect motion using the motion detector. When motion is sensed, the MCU 1 chip activates the fan, ensuring a comfortable environment for the occupants.

3. Kitchen Temperature Control System: The thermostat in the kitchen communicates wirelessly with the DLC 100 Home Gateway. Based on the user's temperature preferences, the thermostat adjusts the heating and cooling elements to maintain the desired temperature.

4. Wireless Devices Connected to DLC 100: The DLC 100 Home Gateway facilitates communication between the various wireless devices. Each device is assigned a DHCP IP address for identification and control. The DLC 100 manages the devices' status, allowing the user to monitor and control them through the control room PC.

5. Garage Carbon Monoxide Detection and Door Control System: The CO detector in the garage continuously monitors the CO level emitted by the car. When the CO level exceeds a predefined threshold, indicating potential danger, the garage door is automatically opened to allow for ventilation and ensure safety. Once the CO level decreases, the garage door is closed.

6. Control Room Setup: The control room contains a DLC 100, which serves as the central hub for the entire home automation system. The DLC 100 is connected to a switch, a TV, and a PC. The switch facilitates network connectivity, while the TV and PC provide a user-friendly interface for monitoring and managing the system.

4. Conclusion

In conclusion, the home automation system designed in this project utilizes various components and subsystems to enhance safety, convenience, and energy efficiency within a residential setting. The system incorporates fire detection and prevention, motion-activated fan control, kitchen temperature control, wireless device management, carbon monoxide detection, and garage door control. The centralized control room setup allows for easy monitoring and management of the entire system.

5. Topology