Room Automation System for Remote Monitoring Using Cisco Packet Tracer

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Aim:

To design and simulate a room automation system for remote control of fan and room lamp using Cisco Packet Tracer.

Problem Statement:

Manual operation of electrical appliances like fans and lamps is inconvenient and leads to energy wastage. There is a need for an automated system that allows remote monitoring and control, optimizing energy use and improving user experience. This system should enable control via wireless networks through smartphones or computers and automatic operation based on sensor inputs.

Abstract:

This project presents a room automation system simulated in Cisco Packet Tracer. The system integrates IoT-enabled fan, lamp, and sensors connected to a home gateway, allowing remote monitoring and automatic switching based on sensor data. The simulation demonstrates how IoT devices communicate over a wireless network for smart device management with programming logic embedded within the home gateway. This solution increases convenience and energy efficiency in managing room appliances.

Introduction:

With rising adoption of Internet of Things (IoT) technology, smart home automation systems have become more accessible. Automating room appliances allows user convenience, remote accessibility, and energy savings. Cisco Packet Tracer provides a powerful platform to simulate such IoT networks and device interactions effectively without physical hardware.

Objectives:

- ➢ Simulate a wireless IoT network for room automation using Cisco Packet Tracer.
- ➢ Enable remote control of fan and lamp via smartphone.
- ➢ Implement automation by programming device behavior according to sensor data.
- ➢ Demonstrate energy-efficient management of room devices.

Scope of the Solution:

- Controls for fan and lamp appliances.
- Remote access and control through IoT-enabled devices.
- Expandable to other smart devices and sensor types.
- Simulation and testing environment through Cisco Packet Tracer software.

Required Components:

- Cisco Packet Tracer software with IoT simulation support.
- Home Gateway (controller device)
- Wireless Router or access point for network connectivity.
- IoT-enabled fan and lamp devices.
- Laptop or end-user device for remote access.

Methodology:

1. Design wireless network topology connecting sensors, fan, lamp, and smartphone to a home gateway.
2. Configure the home gateway as central controller with programming logic.
3. Register smart devices to the gateway for control and monitoring.
4. Implement automation scripts to manage appliances based on sensor data.
5. Simulate the network in Cisco Packet Tracer and test remote and automatic operations.

Circuit Design and Network Topology :

- The home gateway connects to a wireless router.
- Fan and lamp IoT devices connect wirelessly to the home gateway.

- Sensors also connect to the gateway providing input data.
- Smartphone connects to the router to act as remote controller over the network.

Device Configuration and Programming:

- Home gateway assigns IPs to devices and runs control scripts.
- Automation logic example: Turn on fan and lamp through end user device.
- Remote commands sent from smartphone to the gateway control the devices.

Simulation Results:

- Fan and lamp respond automatically to simulated inputs.
- Smartphone successfully controls devices remotely over the wireless network.
- The system showcases practical operation of IoT-based room automation for energy saving and convenience.

Conclusion:

The project demonstrates a functional and scalable room automation system using Cisco Packet Tracer. Remote access and automatic control enhance the efficiency and usability of room appliances. Future enhancements can include advanced sensors, additional devices, and AI-based controls.

References:

1. Cisco Packet Tracer Home Automation Project Report
2. IoT-based Smart Home Automation Using Cisco Packet Tracer
3. Remote Monitoring and Control of Automation System With IoT
4. Design and Simulation of IoT Systems Using Cisco Packet Tracer

Server-PT
IOT server

Laptop-PT
Laptop0

2950T-24
Switch0

HomeRouter-PT-AC
Wireless Router0

Light
Hall lamp

Fan
fan