

SMART GARDEN

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Abstract

The Smart Garden System is an automation system that utilizes various sensors and devices to monitor and control the environment and plant growth.

The system is designed to optimize plant growth, conserve water, and automate the garden's irrigation process.

The system comprises several components, including a water sensor that monitors the soil moisture level and sends a signal to the microcontroller to activate the sprinkler system when the moisture level falls below a specified threshold.

The motion sensor detects any movement within the garden area and sends a signal to the sprinkler to switch to turn it off.

Additionally, the system has a gate that can be remotely controlled to restrict access to the garden, ensuring security and privacy.

The user can remotely open and close the gate using their devices, providing convenient access to the garden with or without the need for physical intervention.



Introduction

A smart garden system with components such as a water level monitor, sprinkler, gate, and sensor is an example of an IoT-based project that can automate and optimize various functions related to garden maintenance, security, and environmental sustainability.

The system uses sensors and smart algorithms to monitor and control the environmental conditions of the garden. The water level monitor can detect when the soil is dry and trigger the sprinkler system to water the plants only when necessary, preventing overwatering and waste of water.

The gate can be controlled remotely, allowing the user to restrict access to the garden and enhance security.

The system is designed to be accessed and controlled remotely through an application making it easier and more convenient for the user to manage the garden.

Literature Survey

Smart garden systems are becoming increasingly popular as people are looking for ways to make gardening easier and more efficient. A smart garden system typically consists of sensors, irrigation systems, and sometimes even AI-powered controllers that can monitor and adjust the environment in real-time. In this literature survey, we will explore the various components of a smart garden system, including motion sensors, water level sensors, sprinklers, and gates.

Motion Sensors:

Motion sensors are used in smart garden systems to detect the presence of people or animals in the garden. These sensors can be used to trigger alerts or actions, such as activating a sprinkler system. A study conducted by K. Y. Lee et al. (2020) found that a motion sensor-based irrigation system was more effective in conserving water than a traditional timer-based system.

Water Level Sensors:

Water level sensors are essential components of a smart garden system, as they can be used to monitor the water levels in the soil and alert the user when it is time to water the plants. A study conducted by N. N. Sarkar et al. (2020) explored the use of a smart irrigation system that combined water level sensors with a machine learning algorithm to optimize water usage.

Literature Survey

Sprinklers:

Sprinklers are an integral part of a smart garden system, as they provide a controlled and consistent way to water plants. A study conducted by J. H. Song et al. (2019) explored the use of a smart irrigation system that incorporated weather data and soil moisture sensors to optimize watering schedules and reduce water usage.

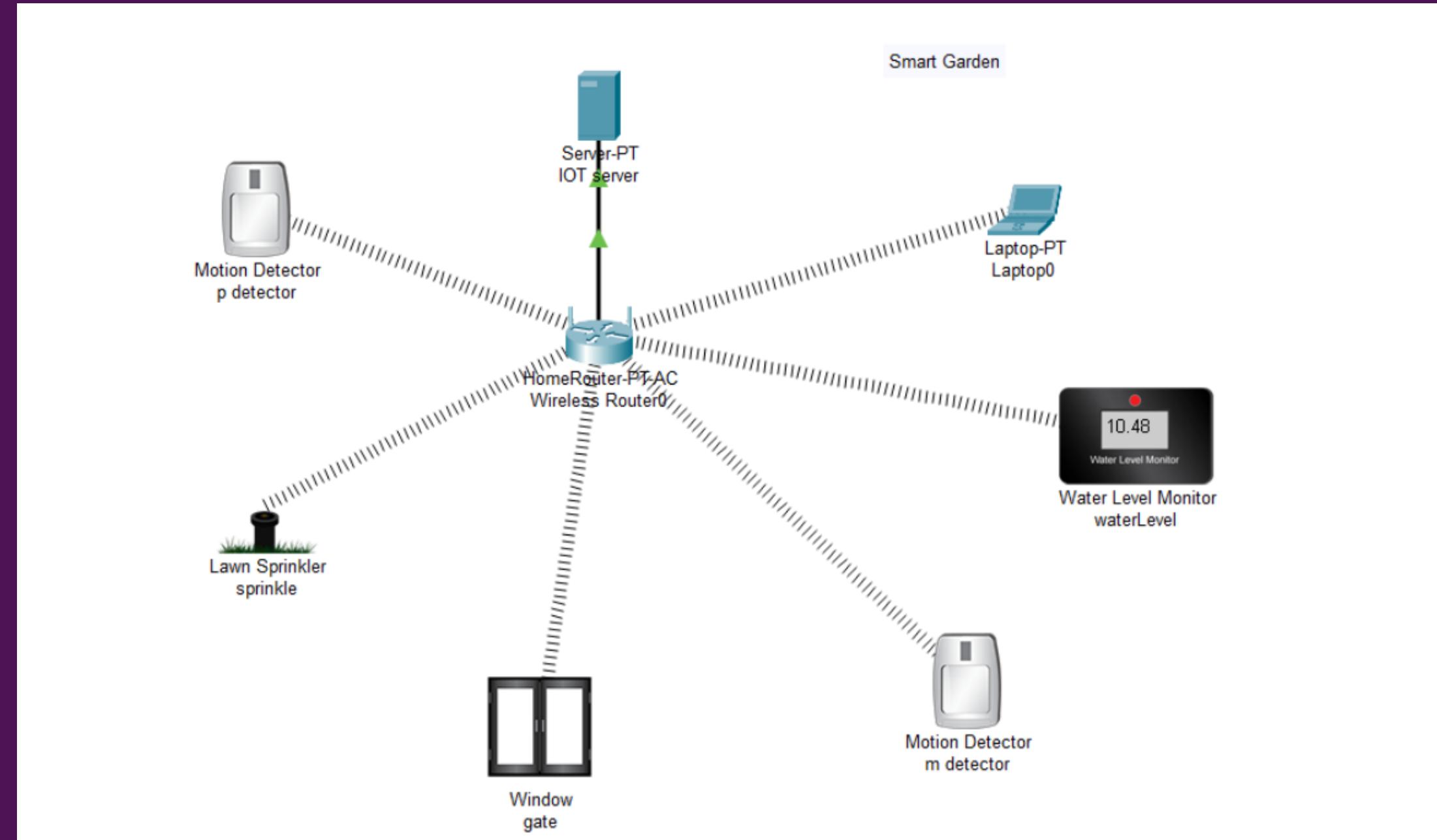
Gate:

Gates are a crucial component of a smart garden system, as they can be used to control access to the garden and prevent unauthorized entry. A study conducted by L. W. Lin et al. (2020) explored the use of a smart gate system that combined facial recognition technology with a mobile app to allow authorized users to enter the garden.

In conclusion, smart garden systems are an emerging technology that can greatly improve the efficiency and effectiveness of gardening. Motion sensors, water level sensors, sprinklers, and gates are all essential components of a smart garden system, and their integration can lead to significant benefits in terms of water conservation, plant health, and security.

DESIGN WITH MODULES DESCRIPTION

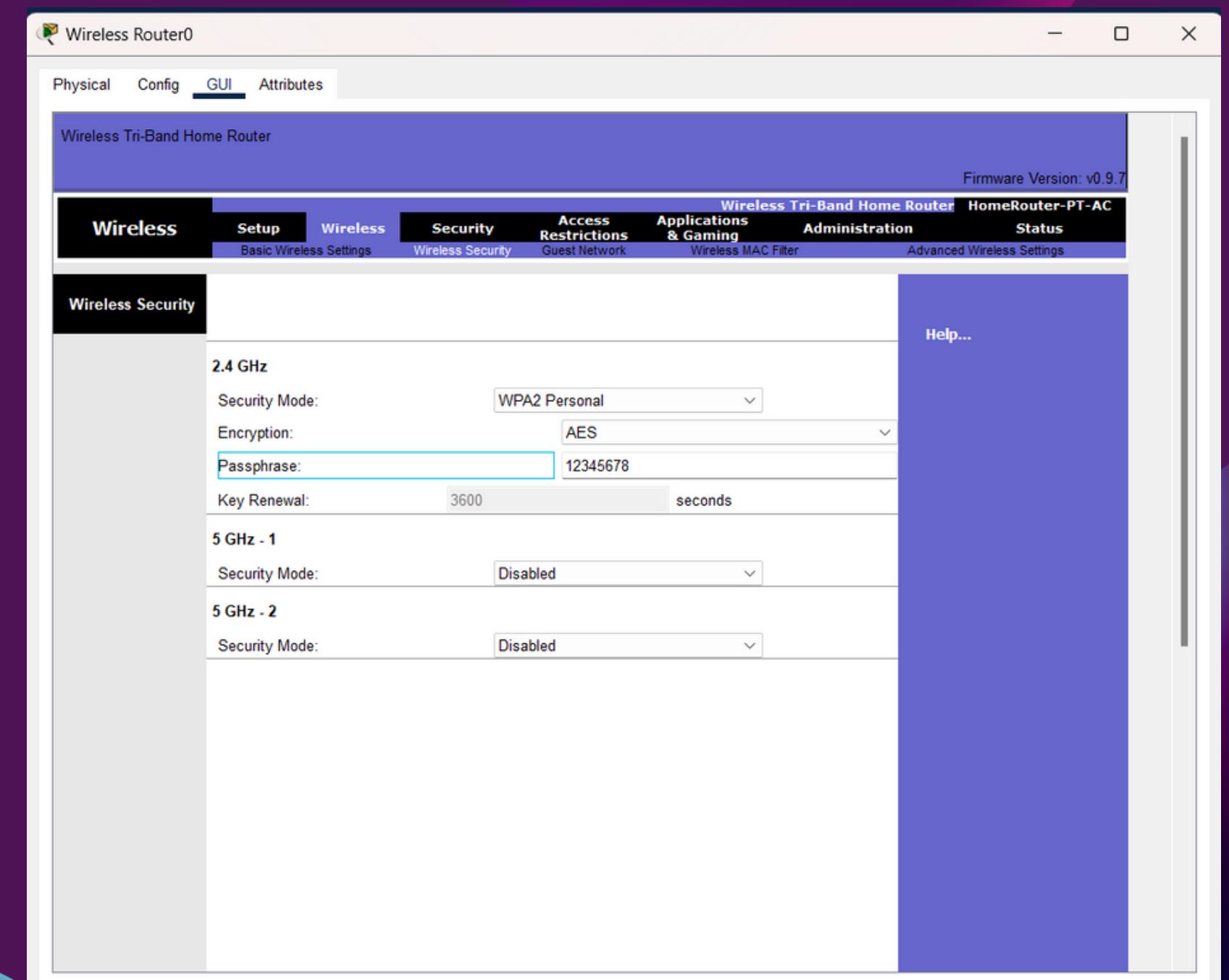
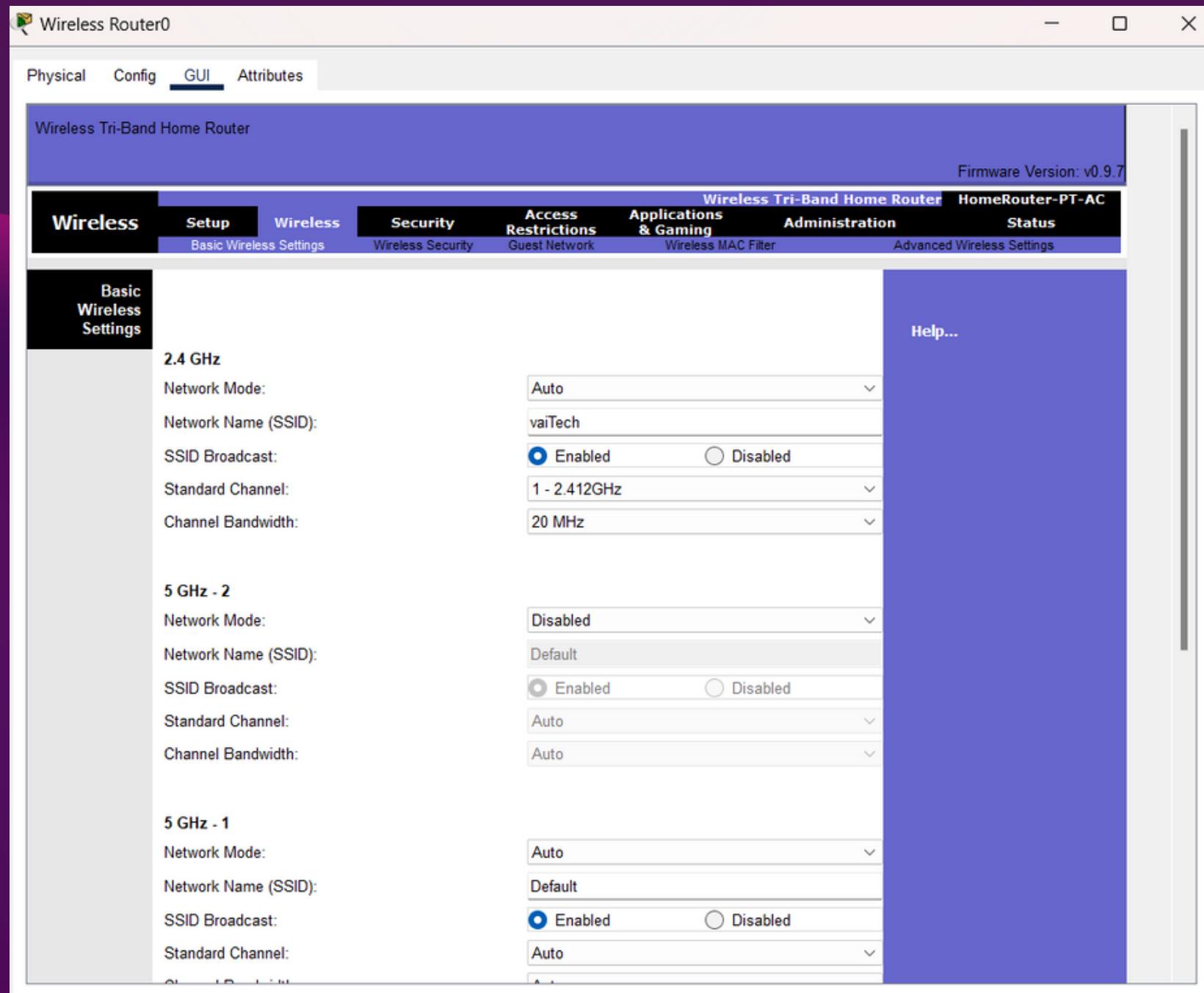
Smart Garden System



CALCULATIONS AND IMPLEMENTATION

Device Name	Interface	IP address	Subnet Mask	Default Gateway
IoT server	FastEthernet0	192.168.1.10	255.255.255.0	192.168.1.1
Wireless Router	FastEthernet0	192.168.1.1	255.255.255.0	0.0.0.0
Laptop	Wireless0	192.168.1.101	255.255.255.0	192.168.1.1

CALCULATIONS AND IMPLEMENTATION



CALCULATIONS AND IMPLEMENTATION

Laptop0

Physical Config Desktop **Programming** Attributes

IoT Monitor

IoT Server - Device Conditions

Home | Conditions | Editor | Log Out

Actions	Enabled	Name	Condition	Actions
Edit Remove	Yes	gate open	m detector On is true	Set gate On to true
Edit Remove	Yes	gate close	m detector On is false	Set gate On to false
		sprink on	Match all: <ul style="list-style-type: none">waterLevel Water Level <= 10.0 cmp detector On is false	Set sprinkle Status to true
		sprink off	Match all: <ul style="list-style-type: none">waterLevel Water Level <= 10.0 cmp detector On is true	Set sprinkle Status to false
		sprink off2	waterLevel Water Level > 11.0 cm	Set sprinkle Status to false

Add

This screenshot shows the 'Device Conditions' section of the IoT Monitor application. It lists five conditions with their names, descriptions, and actions:

- gate open: m detector On is true, Set gate On to true
- gate close: m detector On is false, Set gate On to false
- sprink on: Match all:
 - waterLevel Water Level <= 10.0 cm
 - p detector On is false, Set sprinkle Status to true
- sprink off: Match all:
 - waterLevel Water Level <= 10.0 cm
 - p detector On is true, Set sprinkle Status to false
- sprink off2: waterLevel Water Level > 11.0 cm, Set sprinkle Status to false

Physical Config Desktop **Programming** Attributes

Web Browser

< > URL <http://192.168.1.10/home.html> Go Stop

IoT Server - Devices

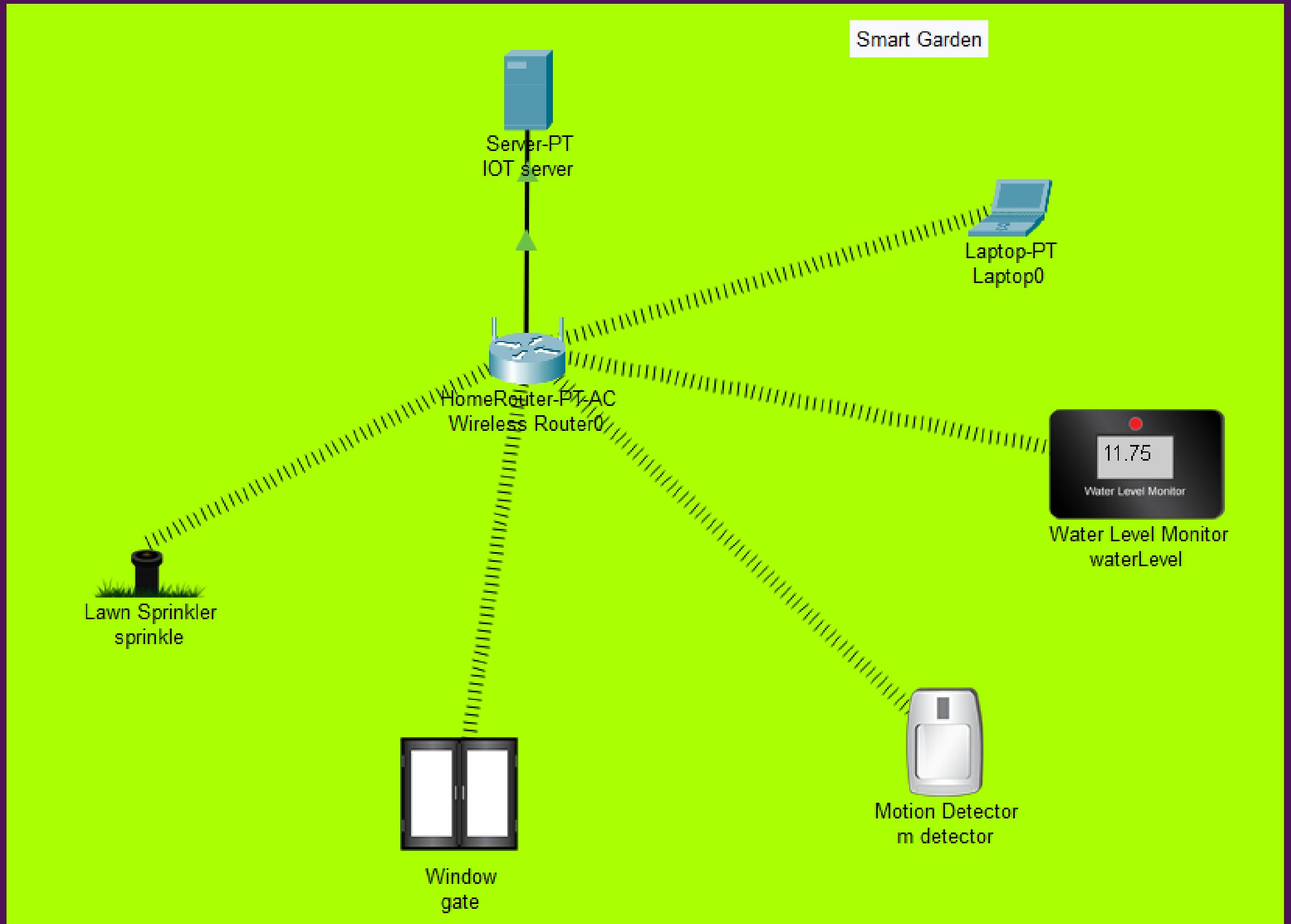
Home | Conditions | Editor | Log Out

▶ ● sprinkle (PTT08100GO4-)	Lawn Sprinkler
▶ ● waterLevel (PTT0810B3P2-)	Water Level Monitor
▶ ● m detector (PTT0810JO3S-)	Motion Detector
▶ ● gate (PTT0810M741-)	Window

This screenshot shows the 'Devices' section of the Web Browser interface. It lists four devices with their names, PIDs, and types:

- sprinkle (PTT08100GO4-), Lawn Sprinkler
- waterLevel (PTT0810B3P2-), Water Level Monitor
- m detector (PTT0810JO3S-), Motion Detector
- gate (PTT0810M741-), Window

Implementation



INFERENCE

In conclusion, the Smart Garden System project is an innovative technology that combines automation, data analysis, and customization to improve gardening practices. The use of components such as sprinklers, water level monitors, sensors, and gates enables the system to monitor and respond to environmental factors in real-time, resulting in efficient use of resources and better plant growth. The system promotes sustainable and environmentally friendly gardening practices by reducing waste and conserving water. Additionally, the application provides gardeners in deciding and preventing overwatering or underwatering. The project has the potential to revolutionize the way we garden, and as technology continues to advance, we can expect even more exciting developments in this area.

RESULT

Thus, IoT-based smart garden system was successfully designed and implemented in Cisco Packet Tracer.