GULU UNIVERSITY

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE 2024 - 2025

PROJECT NAME: SafeRoom Temperature Regulation System

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INTRODUCTION

SafeRoom Temperature Regulation System is a student developed temperature regulating system that is mainly aimed at automatically controlling the temperatures in the rooms where services such as health services,administrative services and all other indoor services are provided so as to avoid the need for inconveniences for manual control.

Therefore this regulation system is here to advance you to the new and emerging trends in science in technology alongside your health and work environment

COMPOSITION

This system is developed locally and on a strict financial budget. It consists of electrical components such as a temperature sensor(TMP36) for temperature monitoring, a light dependent resistor(photo-resistor) for light detection, RGB LED's for visual alerts, 4-channel relay module for controlling the AC, Air conditioner for actuation, power supply, and the ESP32 micro-controller board and the serial monitor which enables serial monitoring of the system state and temperature values.

MODE OF ACTION

When installed in a room, a normal temperature,T0, for that room is set in the system and when at normal temperature the GREEN LED gives an ambient green light and this triggers no action from the rest of the system just the serial monitor reads the temperature and indicates the state of the room which is NORMAL.

But when the temperature goes above the normal temperature T0 by 5 degrees for more than one minute, a RED LED is triggered into action which is detected by the photo-resistor that sends a signal to the ESP32 micro-controller that sends data to the serial monitor to display the high temperature value and the state of the room as HOT, and also sends a command to the relay module the controls the AC unit to regulate the room back to NORMAL.

And when the temperature fall below the normal temperature T0 by 5 degrees for more than one minute, a BLUE LED is triggered into action which is detected by the photo-resistor that sends a signal to the ESP32 micro-controller that sends data to the serial monitor to display the low temperature value and the state of the room as COLD, and also sends a command to the relay module the controls the AC unit to regulate the room back to NORMAL.

VULNERABILITIES

This system is strictly limited to a time limit of one minute of determining the temperature and room state and needs an accurate amount of power due to the presence of an AC unit so as to prevent short circuits and other power insurgencies.

There might also been artificial introduction of non-system RGB LED's that might end up causing false alarms

STRATEGIES

Being able to detect the specific and exact direction and angle from which the RGB light is coming from after setting the angles from which the system RGB LEDS are stationed in to minimize the problem of artificial introduction thereby minimizing false alarms.

THANK YOU SO MUCH FOR CHOOSING TO REGULATE YOUR HOUSE AND WORK ENVIRONMENT WITH SafeRoom Temperature Regulatory System. #ERIC GIBAYI