Team #11

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Lumi Sense:

Light that adapts to your environment

"Lumi" originates from "luminous" (light), emphasizing the property of light.

"Sense" stands for perception and intelligence, highlighting the environmental perception functions of the table lamp, such as temperature and humidity monitoring and automatic adjustment of light color.

This name is concise and memorable, embodying the combination of intelligence and light, and is highly suitable for the intelligent table lamp project.

Introduction

It's a smart desk lamp that automatically adjusts its color based on ambient temperature, creating varied visual effects, and can be controlled remotely via a mobile phone.

It enhances the comfort of any home or office environment by providing adaptive lighting that responds to temperature changes. It also offers convenience and flexibility by allowing users to control the lamp and monitor environmental conditions remotely, creating a smart, connected lighting experience.

Smart home enthusiasts, users who want to improve their workspace or living experience, can help those who want to better control the environment.

When users turn the lamp on, it will detect environmental changes according to the temperature and humidity sensor, and the light will change according to the environment, and users can adjust the brightness of the table lamp remotely.

Market Analysis

Intended customers: Students and staff who need more intelligent and diverse lighting changes to meet their different learning and life scenarios. Those who want to have better interaction with the surrounding environment

Competition: It can be independently transformed according to the ambient temperature, which is more intelligent. There are many smart table lamps on the market that can be used to adjust more different colors and brightness, and our smart table lamps provide more interaction with the environment on this basis.

Price: $50

Requirements:

1. Functional requirements:

The lamp must automatically change color in response to changes in temperature.

The lamp must be able to display the current time and date.

The desk lamp may synchronize time via Wi-Fi.

The desk lamp may support subsequent remote control through the mobile App.

2. Performance requirements:

The color response of the lamp must be adjusted in time according to temperature changes, and the response time should not be too long.

The time and date display must be accurate and the error should not be large.

3. Physical and environmental requirements:

The lamp must be portable and the overall weight should not exceed 1 kg.

The size of the lamp should be suitable for desktop use.

The lamp must be able to work properly in the ambient temperature range of 0°C to 40°C.

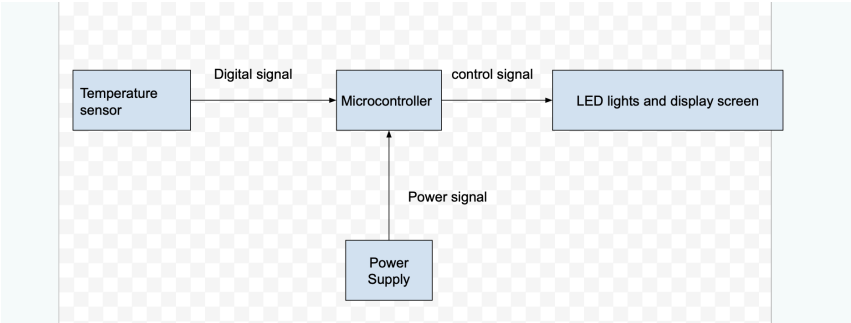
4. Security requirements:

The lamp must be protected from overheating.

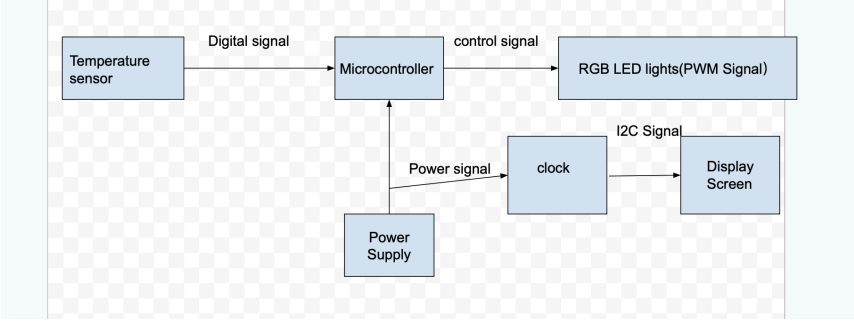
The shell of the lamp should be made of flame retardant material to prevent the risk of fire.

System Architecture:

Level 0 diagram:



Level 1 diagram:



Design Specification:

1. Sensor:

Temperature sensor: DHT11 or DHT22 (digital sensor, low cost, moderate accuracy, suitable for simple projects)

2. Processor:

Arduino UNO R4 WiFi

3. Actuator (output) :

RGB LED strip: WS2812 (individually controllable LED, single-wire protocol, full color gamut supported)

4. Power Supply:

Power Supply: 5V USB or rechargeable battery (lithium battery)

5. Mechanical design:

Case: 3D printed or acrylic lamp shade

Diffusion plate: Frosted acrylic or polycarbonate for evenly distributing the light of an RGB LED

Internal fixation: For fixing electronic components (microcontrollers, sensors, wiring)

6. Firmware:

Programming language: C/C++ with Arduino framework Development

7. Environment

Arduino IDE (easy to use, ESP32 support)