Arthur Lobins

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ECE153B First Project Proposal

Overview: We intend to create a program that will change the intensity of light emitted by an LED based on the ambient light of the environment.

We propose to use the STM32 microcontroller to upgrade a standard LED light by adding an ambient light sensor to increase energy efficiency. The light sensor will trigger the microcontroller to transmit various sequences of PWM waves through a USB to a LED to reduce power consumption while maintaining the best lightning. However, if issues arise with implementing the USB transmission we will consider back up options such as transmitting the PWM waves over bluetooth or select a different peripheral such as an LCD to display the change in intensity.
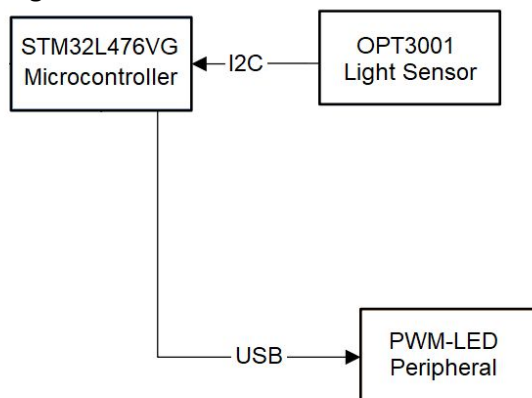
Peripherals:

1. OPT3001 Light Sensor -- OPT3001
2. PWM directed LED peripheral -- Adapter -- LED Light

Serial interface protocols:

1. I2C between microcontroller and OPT3001 sensor.
2. USB between microcontroller and LED peripheral.

Block Diagram:

Responsibility list for everyone in group:

1. Arthur Lobins is in charge of the program logic.
2. Tahereh Mehrjerdy is in charge of peripheral structure.

Software structure: The main program will be a continuous loop controlled with interrupts that are triggered by changes in ambient light using the sensor and the I2C bus. Different lux measurements will change the PWM duty cycle transmitted through the USB line to the LED peripheral to provide the best lighting for the environment.

Google site: https://sites.google.com/view/sensor-lamp/home