Name(s)

Matthew S. Brawders

Project Number

J1002

Project Title

Automating Cross Polarized Lenses to Control Lux Levels Received by a Sensor

Abstract

Objectives/Goals
My objective is to make a device utilizing crossed polarized lenses to control the amount of light hitting a light sensor. I will see how many total lux I can reduce the light source by and how much range my project has to control light entering the system. Finally, I will try to reach a preset equilibrium by programming the device to either let in more or less light.

Methods/Materials
Light dependent resistor as a light sensor. Light emitting diode used as a meter to display light intensity, a servo motor to control polarized lens orientation. An Arduino board programmed to analyze input from the light dependent resistor, control the light emitting diode meter, and turn the servo motor in response to the light dependent resistor input. Two polarized lenses, breadboard, wires, resistors, flashlight, and various wood items to make platform for lenses and flashlight.

Results
The servo motor could easily turn the lenses to control the light to a preset level when exposed to varying degrees of light. When the lenses were aligned the light was decreased by 95%. Crossing the polarized lenses decreased the light by another 95% which came out to be 99.75% total.

Conclusions/Discussion
My project was mostly a success. The lenses dramatically reduced the total amount of light to the sensor and my device worked well to adapt to light levels to keep a constant amount of Lux on the sensor. Unfortunately, the range of light passing to the light dependent resistor was very limited. The aligned polarized lenses blocked 95% of light, allowing only a 5% range to be controlled by the device I made. One way I could try to improve my project is by using multiple sets of less pigmented polarized lenses to give me a better range or control of how much light enters the system.

Summary Statement

I created an automated system that uses crossed polarized lenses to effectively control the light levels hitting a sensor from a varying light source.

Help Received

My Dad helped me when I got stuck with coding and assembling the project. The Arduino website has circuitry diagrams and coding tutorials.