Lesson 8 Light/ Dark sensor

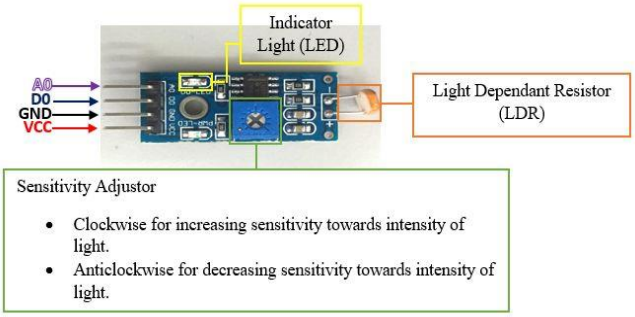
Introduction

In this project you will learn how to use light-dependent resistor (LDR) with the Raspberry Pi. This project can be used for reading the light availability in surrounding.

Principle

A photoresistor, or light-dependent resistor (LDR), or photocell is a resistor whose resistance will decrease when incident light intensity increase; in other words, it exhibits photoconductivity.

A photoresistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.



Hardware Required

- Raspberry Pi 3 Model B
- LDR Module
- Connecting Jumpers
- Power Supply

Hardware Setup

This light sensor module has 3 wires: VCC, GND and Signal. You can use DuPont wires to connect it to the GPIO pins on Raspberry Pi (A/B/B+).

Raspberry Pi Light Sensor Module

3.3v P1 ——————————— VCC (V)
GND P6 ——————————- GND (G)
GPIO4 P7 ——————————— SIGNAL (S)

Python Coding

```
import RPi.GPIO as GPIO

GPIO.setmode(GPIO.BCM)

GPIO.setup(4,GPIO.IN)

for i in range(0,5):

    print GPIO.input(4)
```

Output

If you are in a bright room, using a bowl to cover the module can create a dark environment for it. If you are in a dark place, using a flashlight can trigger the flip as well. You can run the application and see the result change when lighting environment is changed.

When the ambient light intensity is lower than the predefined threshold, the output signal is high. When the light intensity reaches or exceeds the threshold, the signal output is low. Like-

-TRUE
-TRUE
-TRUE
-FALSE
-FALSE

Application

There are countless uses for a light sensor in a circuit. I will just name a few that I thought of while I was writing up this tutorial.

- **Light Activated Alarm** – I mentioned this one earlier, but you can use the LDR to detect when it starts to get light so you can sound an alarm to wake up. If the program and sensor are accurate, then you can the alarm slowly get louder as it gets lighter.
- **Garden monitor** – A light sensor could be used in a garden to check how much sun a certain area of the garden is getting. This could be useful information if you're planting something that needs lots of sun or vice versa.
- **Room Monitor** – Want to make sure lights are always turned off in a certain room? You could use this to alert you whenever light is detected where it shouldn't be.