Car Sunlight Intensity Sensor

The inspiration for this project was brought out by my experience in attending a defensive driving course, where I learnt that one of the environmental issues that drivers face while being on the road is enough lighting. To be able to drive at an optimal level a driver needs to be able to see where they are going. In this sensor project, I have come up with an idea, where I have used a sensor to detect how bright the environment is, notify a driver if they need to take further action for e.g. if they will need to turn their lights on. There are 3 environmental phases a driver must come across during the time they spend on the road. One is when the environment lighting is “bright”, the other is “shady” and, lastly, when the environment is “dark”.

# “Bright” phase

During this phase, the lighting environment surrounding the photoresistor is bright with clear visibility. The photoresistor readings is higher than “first threshold” (a bench mark which differentiate 1st phase from the 2nd phase) in this phase. A message will then be broadcasted to the driver on the LCD display saying the condition of the environment (in this instance it will be, “Sunlight: Bright”) and an action that the driver may need to take (in this instance it will be, “Drive freely”). The messages indicate that the driver is free to proceed and doesn’t need to take precautions regarding lighting.

# “Shady” phase

In this phase, the surrounding light the photoresistor is dim or shaded with some visibility. The photoresistor readings is lower than the “first threshold” but higher than the “second threshold” (a bench mark which differentiates the 2nd phase from the 3rd phase. During this phase two messages will appear to the driver on the LCD display saying “Sunlight: Shady” and “Drive carefully”. The messages indicate that the driver must take precautions because the environment is shady, and visibility has been reduced.

# “Dark” phase

In the final phase, the surroundings of the photoresistor is completely dark and has little to no visibility. The photoresistor readings is lower than the “first and second threshold”. In this instance, two different messages are displayed to the driver saying “Sunlight: Dark” and “Turn on lights”. The messages indicate that the surrounding is dark with little to no visibility and the driver must turn on their head-lights to proceed safely on the road.

# Hardware Justification

The outstanding equipment used in this project are the photoresistor and the LCD display monitor. The photoresistor was used for light sensitivity detection, it took readings from the surroundings as to run the 3 phases mentioned above. The LCD display monitor was used to display the messages that belonged to each phase. I had also used a potentiometer to vary the contrast on the LCD display monitor to make the messages more readable for the user.

# Insights

This project had its fair share of difficulties. A recurring problem that I had uncovered was that my breadboard was not expansive enough to hold all components I wished to use to expand this project. For example, I wanted to add a LED bulb to indicate that an alert has shown, especially if the message was for the “Dark phase”. I had also wanted to implement another sensor on top of this one, which was somewhat like a “car-bumper” sensor which dictates object vicinity to the front or back bumper of a vehicle. But because of time constraints and breadboard space availability this idea was scrapped.

# References:

# Codes used were taken from SIK guide provided for us to use. But implementation to build the car-light-sensor project was an original idea.

* <https://learn.sparkfun.com/tutorials/sparkfun-inventors-kit-experiment-guide---v40/circuit-1c-photoresistor>
* <https://learn.sparkfun.com/tutorials/sparkfun-inventors-kit-experiment-guide---v40/circuit-4b-temperature-sensor>