Adaptive Lean-Angle Headlight

Mock Design Review

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Block Description
This block is an integral part to the functioning of our device. The sensing unit will take in power as its primary input to drive the various sensors and logic chips we have in this block. The two main outputs from this block are the speed and the tilt angle. These two outputs will be piped into the logic unit where our controller and algorithm will determine which LEDs to turn on in the LED array, based on these inputs.

Requirements and Verification

The R/V table for the position sensor can be seen below:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sense tilt angle accurately (plus or minus 2 deg) from 0 to 60 deg</td>
<td>1. Place Tilt sensor on level surface and calibrate</td>
</tr>
<tr>
<td></td>
<td>a. Tilt sensor to the right in 2 degree increments</td>
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<tr>
<td></td>
<td>b. Verify tilt from data logging console with protractor</td>
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<tr>
<td></td>
<td>c. Repeat steps in left hand</td>
</tr>
</tbody>
</table>
We intend to use a voltage regulator to power all the modules in this project. We have an operating voltage of 3.6 V for the LED Array. We will design this ourselves, due to its importance to our project. The schematic details how we will place it in the circuit. The regulator is a three terminal device, with common ground.
Safety Statement

We intend to test our project on a motorcycle. The motorcycle we intend to use is a red 2013 Honda CBR500r. The owner of the motorcycle is Prithwi Roy (one of our group members). Prithwi Roy accepts full liability of all damages to the motorcycle should anything happen to it, and accepts that his safety and well-being is in his own hands, and the University of Illinois will not be at fault should anything happen to Prithwi or his motorcycle.

Signature: ______________________    Date: _____________________

Safety Gear

The rider of the motorcycle will wear gloves, jacket, pants that cover from waist to ankle, boots, and a DOT approved helmet at all times when operating the motorcycle.

Motorcycle Maintenance

The rider will make sure that the following motorcycle components are functional before every time the motorcycle will be used:

- Low beam headlight
- High beam headlight
- Turn signals
- Horn
- Front brake
- Rear brake
- Brake light

The rider will make sure that the tires have enough tread such that there is proper road traction

While operating the motorcycle

The rider will be stop the testing on the motorcycle if:

- A chemical or burning odor is sensed
- The motorcycle becomes uncomfortably hot
- Any liquids are leaking from the motorcycle
- The gears are slipping or not shifting smoothly
- The clutch is not engaging properly
- The throttle is not acting linearly (“bucking”, jerky delivery of power)
Smoke is coming from anywhere on the motorcycle
Steering is compromised by tension in the steering rack

Rider State
Prithwi will not operate the motorcycle if he hasn’t received enough sleep or had any substances that would alter his mental and physical state (cough medication, alcohol, pain medication). Furthermore, Prithwi will not operate the motorcycle if he is injured in a way that would affect the safe operation of the motorcycle (eg. broken limb that hinders mobility).

Testing Environment
The testing on a motorcycle will not be done on public roads, as the the lights have not been reviewed for legality. Therefore we will test the motorcycle in a parking lot with very few cars. We will only test in parking lots that we have been given permission to use.

Circuit Safety
We are not using any high voltage or high current components for our project, so general lab safety will be followed. We will make sure that power sources will not be punctured. Also we will make sure that extreme care is taken while soldering components, as the soldering iron is very hot. Lastly, we will make sure that our circuit is isolated from any water or high humidity.