Cycling HUD

Project Description

**Problem:** Cyclists are constantly looking for data to track performance during their ride. These performance metrics are generally displayed on a bike computer mounted on the handlebars. The cyclist must take his or her eyes off the road to view the data.

**Hypothesis:** If this data could be displayed in front of the cyclist’s eyes, the safety of the ride could be increased, and data viewing would become more convenient to the cyclist. A solution to this problem is a heads-up-display (HUD) which can provide the cyclist information right in front of his or her eyes.

**Objective:** Create a HUD that could attach to any pair of sunglasses which will receive the data to be displayed from a bike computer and display that data in front of the user’s eyeline.

Approach

**Goal:** The overarching goal of the project is to create a HUD which will attach to athletic sunglasses and can be worn during a bike ride. This HUD will display data in front of the user’s eyes.

**Methods:** The device uses two main parts, the bike computer and the HUD. A small OLED display outputs the data sent from the bike computer to the HUD. The output on the screen reflects off a mirror and travels through a lens which magnifies the output. The output is then displayed on a piece of plexiglass which is placed in front of the user’s eyes. The bike’s speed and distance traveled are calculated using a reed switch mounted to the bike frame and a magnet. The communication between the HUD and the bike computer is done with a microcontroller (Adafruit Feather M0) and an RFM69 packet radio. The HUD and the bike computer are powered by a rechargeable lithium ion battery.

Conclusions

**Results:** I was able to put together a HUD that mounts to a pair of athletic sunglasses. The HUD displays data on a plexiglass strip which can be seen by the user. Pressing a button on the bike computer cycles the data displayed on the HUD. An on/off switch cycles the power and a USB-B plug is used to charge the device.

**Future Improvements:** There are many improvements that could be made to the device in future models. The HUD could be made to attach to already purchased bike computers to make it more accessible to all cyclists. Another improvement could be more data such as heart rate and cadence to be displayed on the device. The device could also be made to fit better with the user’s helmet. Also, with the current design it is larger than it needs to be, and reducing the size would be a great improvement in future iterations of this product.