

Company background

The **Chad William Young Foundation** was formed in 2017 after the tragic death of Chad Young, a mechanical engineering student at Colorado School of Mines, resulting from injuries sustained in a cycling accident.

One of the goals of the foundation is to pursue technological developments in injury prevention in all types of cycling. In consultation with others in the cycling community, we are considering the development of a technological safeguard, rather than a physical safeguard such as helmet, to limit the risk of traumatic brain injury resulting from cycling accidents.

There was an initial project sponsored by the Foundation launched as part of the Capstone Design Project at Colorado School of Mines, in January of 2018. This project was completed and delivered in December 2018. *A copy of the final project report and the presentation poster is attached for supporting documentation.* In this report you will find a safety survey completed by 120 cyclists who participated in the Lookout Mountain Hillclimb

A description of the work to be done

The initial project charter was to consider a technological approach to safety in road cycling of all types; including commuting, recreational, and competitive. After reviewing the Final Report. Here are the recommendations from the 2018 team for additional and subsequent developments. Please see attached report for full background and progress to date.

- Data Collection Automation
- Real Time Feedback
- Additional Data Incorporation

For the summer program, we want to address the first bullet point and as time permits, students can move on to the second and third bullet point keeping in mind end use during their data collection automation and format. Future additional developments are listed to provide for additional flexibility in the design.

Data Collection Automation

The current data algorithm interface is slow and does not allow easy analysis of multiple riders for any given route. (Algorithm provided in Final Report. Attached)

Develop an automated process for collecting data from Strava or other applications resulting in analysis of multiple riders along a single route averaging several hazard profiles as defined. Keeping in mind, the end goal of launching a web service where the cycling community would be able to assess and use, providing real time feedback

Real Time Feedback

Create an alert when the rider is approaching or encountering a hazardous condition, whether through audible tone, handlebar display, vibration or mounted light. The current algorithm assigns a hazard profile to every GPS point recorded along a cyclist route. A couple of possible ideas regarding a device to capture data and alert cyclists:

There are several possible interpretations of this device, but two categories seem likely. First, a hazard profile for a route could be computed outside of the device and then transferred to the device. This has a drawback as it would only work while the user is riding along routes which have been transferred to the device. However, this cuts down on the level of computational hardware required within the device and as such would likely yield the smallest and most unobtrusive physical product for cyclists. The other category for a real-time feedback device is to develop a smartphone app which can pull data from Strava and run it

through the algorithm in real-time. This eliminates the location drawbacks of the first category, it does not require the production of a specialized device as any rider with a smartphone could use it.

Additional Data Incorporation

Providing flexibility to incorporate future risk/hazards into the data analysis such as traffic levels.

The previous Project Team was envisioning automating the data collection of various GPS and hazard profiles using all riders for given route average the data and providing a more thorough developing of the hazard profiles.

- **Any desired skill set for the students**
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- **Preferred team size.** 3-5
- **Location where work should be performed:** All work can be performed on campus. Possible meeting cyclists for better understanding of sport and hazards.

Additional Resources:

The Foundation will provide a used older Apple iPhone for data collection or other project purposes as well as any needed funding up to \$ 1,000 as needed

Intellectual Property:

The Foundation would require that developments and new IP will be assigned to and owned by the Foundation. A typical CSM release will be used for this purpose.

Attachments:

Chad William Young Foundation cwyf.org