

## CSC318 A4 Write-Up

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### Description:

For our group's solution, we have decided to tackle the issue of safe navigation for urban cyclists. For cyclists that need help navigating on the road, it is very difficult for them to receive directions while riding their bikes without being distracted. Simply using a mobile application has its own set of challenges, as looking at a phone screen when cycling is a source of visual distraction, which can put the cyclist in danger. The cyclist could also attempt to memorize the map beforehand, but that could lead to inaccurate interpretations, and will require the cyclist to pull over a lot to check for further directions.

In order to provide a safe navigational tool, we have decided to attach two LED light cuffs to the bicycle handlebars, which will be connected via bluetooth to the application. One of the lights will blink to signal the cyclist to turn left or right at the next intersection, and both of the lights will blink to indicate an error, and prompt the cyclist to pull over and recalibrate the system. These light signals are highly visible and easy to recognize, so they will require minimal attention from cyclists, and help them keep most of their attention on the road. The cuffs also have 6 buttons on the side for brightness adjustment. The application will prompt the user to set the brightness level 1 - 5, depending on the brightness of the environment, and prompt the user to turn the cuffs off and detach them after the cyclist completes the trip.

The cuff design also very light and portable, and can be easily detached when the user is finished using it. The band of the cuff is slightly flexible, making it versatile enough to be used on all standard bicycle handlebars. The device is also waterproof, and can be used even when raining or snowing.

### Scenario of use:

Kate needs to bike to pick up a package from the post office, which closes in about an hour. Since she doesn't remember exactly how to get there, she consults her phone application for help. After inputting her current location and the destination, the application retrieves the possible paths, some including more bike lanes than others, and ranks the routes by the number of bike lanes on each. Kate consults the time each route will take, and selects the one she thinks would be the safest. The application then prompts Kate with the current weather and road conditions on her route, and since it is darker, suggest that Kate uses both a helmet and reflective gear/bike lights. The application then prompts Kate to mount the LEDs and set the light level to 2, a lower brightness level for night usage, and then connects the lights to the application. After the lights are connected, the application tells Kate that she is ready to go.

While on the road, the cuff on either the left or right handlebar of Kate's bike blinks to tell Kate to turn at the next intersection. The signal is bright and concise, and can be seen by Kate in her peripheral vision without taking her eyes off the road. After Kate arrives at the post office safely,

she gets off of her bike, and is prompted by the application to turn off the lights and remove them before exiting. Kate removes the cuffs and locks her bike before going into the post office.

#### Critical Assessment:

This design solution meets several of the project's design principles, especially making the design easy to use as well as smart and responsive. The device and application are very easy to use, as the application will prompt the user at every step along the way with specific instructions, including when and how to set up LEDs for each trip. The solution is smart and responsive in the sense that it takes into consideration all of the precautions the user should take before each trip, which means the user will not need to do any guesswork on their own. The solution is built to provide simple, easy instructions to understand instructions along the way, and is equipped to deal with all errors in a way that is as stress-free as possible for the user.

This design solution, however, does not adequately address the user's autonomy and safety concerns. Although the solution provides a safe solution for giving clear, concise instructions on the road, and does not divert the user's attention from the traffic, it also does not take into consideration many of the user's other safety concerns, such as weather conditions and types of roads available. This solution is also does not prompt users with suggested safety gear, which may also influence the user to make safer choices on the road. Furthermore, the solution does not allow the user to choose the path that they prefer the most, which could vary by factors such as time, terrain, and road types/conditions.