## Abstract

This abstract frames the opportunity of preventing right-hook collisions for cyclists by detecting and alerting drivers before a collision occurs.

In recent years, cycling injuries have increased despite the presence of various safety measures in Toronto. Many of these accidents go unnoticed outside the cycling community. Thus, our team aims to enhance safety by improving driver awareness.

To better understand the challenges cyclists face, we spoke to Jun Nogami, a lead organizer from Advocacy for Respect for Cyclists (ARC) who is also involved in various other cycling organizations. He is also an avid cyclist who frequently bikes to and from the University of Toronto.

The primary stakeholders are cyclists and drivers who are directly impacted by right-hook collisions. Secondary stakeholders include pedestrians, cycling coalitions, families of cyclists, government officials, the City of Toronto, and our team. Key requirements for the ideal solution were refined by discussions with Nogami, research on the cycling data, and experiences cycling in Toronto.

Our goal is to keep cyclists safe by increasing driver awareness to prevent right-hook collisions. The implementation of the solution is restricted to small infrastructure changes or additions to bikes. An effective solution must adhere to the three high-level objectives: safety, legality, and accessibility.

Current existing solutions range from bike accessories (namely rearview mirrors on bike handlebars, tail lights with cameras attached, and pool noodle attachments) and car features (such as blind spot detectors and Tesla’s computer vision), to infrastructure (like Dutch-style intersections). These designs enhance cycling safety by increasing cyclists' awareness, which opposes the goal of raising drivers' attention, as cyclists are the most vulnerable in the shared road space. The existing solutions lack the focus on increasing driver awareness and fail to actively detect and prevent right-hook car-bike collisions. Therefore, we aim to find alternative solutions framed by our defined objectives.