Objectives

- Some features included in the helmet will be shown in a head-up display
- Continuous rear view live feed (1080p at 30fps)
- Crash detection with automatic Emergency Contact (impact greater than 15g will call emergency services)
- Motorist’s Blind Spot detection (1.7 meters to the left and right side)
- Power consumption should not exceed 6W.
- Provide safety features to the helmet user while not exceeding the $2000 budget

Background

- 75% of accidents were found to involve a motorcycle and a passenger vehicle, while the remaining 25% of accidents were single motorcycle accidents.
- In the single vehicle accidents, motorcycle rider error was present as the accident precipitating factor in about two-thirds of the cases, with the typical error being a slide-out and fall due to overbraking or running wide on a curve due to excess speed or lack of side bite. [University of Southern California, Motorcycle Accident Cause Factors and Identification of Countermeasures Volume I: Technical Report]

Problem

- Riding motorcycles has been considered dangerous for years and motorcycles have lagged behind cars in terms of safety features. When compared to passenger vehicles, some of the disadvantages motorcycles have are: Limited rear-view mirror range, reduced field of vision when wearing a helmet, and a higher risk of death when involved in an accident.

Overview

- Raspberry Pi: Brains of the system. Collects information from sensors, processes, and then displays it.
- Accelerometer: Measures the systems acceleration in respect to G forces
- Ultrasound Sensor: Uses an ultrasonic sound wave to act as a rangefinder and assist in blind spot detection.
- Camera: Camera sends footage of your rear view to the visor.
- Phone: Connected to system provides navigation and communication to the helmet.
- Head up display(HUD): Displayed onto the visor will be the vehicles speed, rear view live feed, and blind spot warnings.

Software FlowChart

- Raspberry Pi

Ethics

There were no ethical infractions during the implementation of this project. We made use of available open-source software while avoiding any copyright violations. We are committed to finish this project while maintaining personal integrity, honesty, and responsibility. We also made sure that any final testing will be in a safe environment for the research participants.

Conclusions

Since one out of four motorcycle accidents don’t involve another vehicle, we want to give riders the peace of mind when riding alone, that our helmet will keep them safe. By combining current technology, we are trying to provide a helmet that is not only safer, but convenient and more advanced than anything else that is available.