

## **SENIOR DESIGN PROJECT: OPEN SOURCE LANE DETECTION SOFTWARE ABSTRACT**

When contrasting a self-driving car, one of the most important things that the vehicle needs to do is determine the outline of the lane it is traveling in. Lane markings are a key piece of information a driver uses while on the road to determine the direction of travel and stay safe while driving, as the markings show where the driver can drive legally. Thus, it is vitally important that a self-driving vehicle also be able to determine lane markings, and thereby the safe lane of travel.

Before the completion of this project, the autonomous vehicle project has access to a simple lane detection system through available MATLAB project files. While this system worked to some extent, various errors and uncertainties arose while running it in a simulation environment. This is not a system that should be experiencing any errors in detecting the lane, because potential errors could lead to deadly consequences if it is unable to detect the center lane, thus possibly allowing the vehicle to get into a head-to-head collision with another car. These errors in lane detection need to be minimized before the car is allowed on the road.

We were tasked with creating a lane detection system that will be opensource, cheap to implement, and provide accurate lane detection 93% of the time while taking less than 100 milliseconds to respond. This was achieved by using a dual styled detection method. One style used a contrast-based detection method, while the other style would use one based on the color of the road. These two styles would be merged so that the best detected lanes detected in the combination would be used as the lanes for the autonomous vehicle system.

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