To Pass or Not to Pass: A Vehicle-to-Vehicle Project (V2V) to Inform Drivers of Safe Passing Maneuvers

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Abstract

Changing lanes, passing vehicles, and merging are among the most dangerous maneuvers that drivers perform on a daily basis. Currently, vehicles must rely on sight alone when overtaking vehicles, which can be a safety hazard when a larger vehicle is involved. Accidents composing this category could be reduced if drivers received data in real time concerning whether they are able to safely pass the vehicle in front of them, particularly larger vehicles.

Research in Vehicle-to-Vehicle (V2V) communication has experienced a surge in interest with efforts to prevent automobile accidents. A previous project at <university> developed a feasible alternative that utilized radar and supersonic sensors to deliver an auditory alert to the driver warning him or her of an imminent collision. Using this concept of radar to detect oncoming vehicles, we proposed to develop a V2V product targeted at larger, sight obscuring vehicles to serve as nodes in order to inform automobiles intending to overtake them whether the action can be done safely.

To prevent as many of these collisions as possible, we proposed to design two subsystems. One subsystem was integrated into the larger vehicle to receive oncoming traffic information, specifically the speed and distance of the car(s) directly ahead. The subsystem would then perform the necessary calculations to determine if the car attempting to perform an overtaking maneuver could do so safely, then transmit the results. The second subsystem was a Raspberry Pi that received the information from the first subsystem and displayed either "Safe to pass at the following speed: _____ mph" or "Not Safe to Pass, Please Wait."

This poster will present the final design and the test results. In addition, comments on future work will be provided.