## Abstract

Existing research on control for autonomous vehicles is largely focused on the performance of control algorithms when applied to cars; buses have not been investigated as much. Furthermore, existing studies indicate that people would display largely positive attitudes to using autonomous buses in residential and urban areas [1], indicating the value of research which investigates control of autonomous buses. To provide insight on the capabilities of commonly used control algorithms when applied to autonomous buses or trucks, this study compared multiple lateral control algorithms on how well they can maneuver a long vehicle around three courses resembling urban environments. Control algorithms compared included the Stanley and pure pursuit controllers, as well as two new controllers which aim to improve upon the weaknesses of both controllers. Research was carried out in a kinematic simulation which recorded the steering angle and cross track error from the front axle for each controller at 50km/h. The Stanley controller had a low frontal cross track error; however, it had a large steering angle and large changes in steering angle. The pure pursuit controller performed quite well, with a smoother change in steering angle, but the cross-track error was much larger than for the Stanley controller. This suggests that an algorithm which can utilize the ability of the Stanley controller to maintain a low cross track error while keeping a low steering angle change will perform the best for long vehicles.