Thesis Project Portfolio

Gesture Driven Robotic Vehicle
(Technical Report)

Exploring Public Perceptions of Autonomous Vehicles Through Waymo
(STS Research Paper)

An Undergraduate Thesis

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Table of Contents

Sociotechnical Synthesis

Autonomous vehicles, or self-driving vehicles are a brand new disruptive technology that is often misunderstood by the general public. These autonomous systems utilize a variety of cutting-edge technologies, including radar, lidar, cameras, and ultrasonic sensors, all integrated with machine learning models. Autonomous cars are capable of perceiving their surroundings with remarkable precision, navigating traffic, and making split-second decisions, all without human intervention. Autonomous vehicles have the potential to completely reshape human transportation, yet the technology that controls them is misunderstood. My STS research examines the relationship between producers of autonomous vehicle systems and consumers of these systems, specifically how understanding of these systems affects trust in these autonomous systems.

My technical project is a small gesture driven robotic car. My group and I have created a glove that uses gyroscopic sensors to interpret hand gestures and send those instructions to the car. In turn, the car has a mounted camera and distance sensor that relay information about where the car is through video and haptic feedback. This project is aimed to be a toy for the young teen tech enthusiast. As a small toy, our car has rudimentary systems for preventing crashes compared to large scale systems such as autonomous cars. Our project has only two sensors to mitigate crashes, a simple ultrasonic distance sensor and a camera to monitor where the car is. Through driving with such limited sensing apparatus, it becomes clear why self-driving cars have such an intricate system of sensors. Through the usage of the car, people can understand some of the limitations and benefits of sensors in a robotic system through a fun and engaging platform. While the car remains fully under human control, one can experience the world similarly to an autonomous robotic system, with a view of the real world narrowed down to what is perceivable through sensors.

My STS research first examines the underlying machine learning algorithms as an emergent technology. Through my research I learned how perceptions and understanding of machine learning technologies in the general public influence perceptions of autonomous vehicles. My STS research used Google Waymo as a case study, examining their place in the autonomous vehicle market and how their service has affected autonomous vehicle perceptions.

Using the framework of producers and consumers, I examined the relationship between Waymo and those using Waymo's service. Through examining Waymo I learned how companies are presenting their technologies to consumers in a way that fosters trust in their systems. Looking at the relationship will provide insight for how producers shape trust in autonomous vehicles and how consumers perceive these systems.