

Thesis Project Portfolio

Autonomous Platooning Golf Cart for Short Distance Campus Travel

(Technical Report)

Opposition to Autonomous Vehicles as Threats to Employment

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Spring, 2022

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Table of Contents

Sociotechnical Synthesis

Autonomous Platooning Golf Cart for Short Distance Campus Travel

Opposition to Autonomous Vehicles as Threats to Employment

Prospectus

Sociotechnical Synthesis

Autonomous vehicles have increased in popularity with recent advances. The technical project is about the design and development of an autonomous vehicle that can follow a human driven vehicle. The STS research paper focuses on the social challenges that are arising with the arrival of autonomous vehicles by analyzing the relevant social groups. The developers of autonomous vehicles will need to resolve not only the technical but the social challenges also to ensure success of self-driving technology.

The technical project uses two club car golf carts as the basis for the development of vehicle autonomy. The objective is to create a leader-following system, in which one golf cart autonomously follows a human driven golf cart. The system is intended to be used for short distance campus transportation. Such a system can provide increased accessibility for disabled, elderly, and student passengers. The design process begins with gathering information on customer needs and developing technical objectives to guide the development. The motion subsystems, including the acceleration, steering, and braking on the follower cart were developed to be drive by wire. The cameras and the LiDAR on the leader cart are used for mapping the surrounding environment, localization, and object detection, including vehicles and pedestrians. The leader cart also detects the follower golf cart and communicates wirelessly with the follower cart about the distance between the two vehicles. Based on the data received, the follower cart follows the leader cart autonomously, while maintaining a safe following distance.

With the increasing presence of autonomous vehicles on roads, the societal attitudes have raised concerns over the adoption of this new technology. Transportation drivers in truck, taxi, and transit industries have opposed self-driving vehicles due to concerns of job loss due to automation. The STS research paper applies the Social Construction of Theory to analyze the

relevant social group, which includes transport drivers, autonomous vehicle developers, and policymakers. The paper analyzes the methods, such as unionization, lobbying, and protests, used by social groups representing transportation drivers to express their opposition and demands. This analysis provides insight into the barriers that may impede the adoption of autonomous vehicles. The degradation in the quality or loss of driving jobs is a concern for drivers who rely on driving for employment. The implications for developers of self-driving vehicles and policymakers are considered. With transport drivers viewing autonomous vehicles as a threat to employment, autonomous vehicle manufacturers and policymakers need to address the skepticism to ensure successful adoption of self-driving vehicles.