Thesis Project Portfolio

Autonomous Platooning Golf Cart for Short Distance Campus Travel

(Technical Report)

Autonomous Vehicles and The Social Construction of Safe Roads

(STS Paper)

An Undergraduate Thesis

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Socialtechnical Synthesis

In recent years, autonomous vehicle (AV) research and development has progressed exponentially as the industry continues to grow. The proposed benefits AV's can provide has generated excitement about the future of transportation. However, with any new innovative technology both technical and social conversations arise, and issues are identified as the innovation finds its place in the existing world. The following technical and STS theses discuss the development of autonomous vehicles, and the paths to which they might be able to fit both technically and socially in the world today.

The technical research highlights the process and development behind designing a functioning AV system. Many think of AV's as Teslas and the idea of sleek new cars that can do everything as an all in one vehicle. Platooning however is another method of autonomous driving where multiple vehicles are synched behind a leader. The goal of the project is to develop an autonomous platooning system with two electric golf carts. The first golf cart will be driven normally by a human, and will send information to the second golf cart which would autonomously follow behind. Platooning is simpler than pure autonomous driving, but has many of the same essential technical requirements of fully functioning AV's such as drive by wire. The technical thesis hones in on these requirements and their integration into a vehicle, but does not consider the other nontechnical actors vying for a say in development.

The STS thesis examines how autonomous vehicles are socially constructed in the pursuit of creating "safer roads." AV's are seen as a fit into this ideal as they by definition are supposed to make faster unbiased decisions. Many actors are involved in the development of how AV's will look and function in society. State and local governments, the automotive industry, and opposition groups all play a role in the formative process of AV integration, and each of these

groups define roads differently based on their priorities. Two case studies are developed by looking into Phoenix and New York City and how different social groups have an impact on AV's and the building of roads. These case studies highlight the different ways social groups view AV's and how we as a society are a long way off from full integration without uniform guidelines.

By integrating both the major societal and technical groups, development of AV's can be made more inclusive as multiple viewpoints are heard and have a say in the construction of a potentially societal changing product. The research I conducted this year proved fruitful in developing an autonomously driveable follower vehicle, proof of concepts towards advancements in platooning capabilities, as well as analysis in the effect of AV's on society. I would personally like to thank my professors Tomo Furukawa and Sean Ferguson for providing incredible guidance on being able to insert myself into the world of AV's.