Thesis Portfolio

Faraday's Fridge
(Technical Report)

Analysis of the Google Glass Failure and Why Things May Be Different Now
(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, 2021

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Sociotechnical Synthesis

The intelligence of Internet of things networks lies in the ability to collect and communicate data between sensors, devices and the cloud. As a result, these devices beget concerns about surveillance, privacy, and protection of peoples' digital identities. My STS and technical projects address aspects of the social-technical problem that is connecting people and things responsibly with IOT devices. The technical project focuses on the physical implementation of an IOT parking sensor, and the STS project explores, using Actor Network theory, how Google Glass failed as an IOT device due to social factors. This will provide insights about how to better address the social factors regarding IOT devices going forward. Below I will summarize my work and reflect on the process of writing my prospectus for this research, with an emphasis on the value of working on these projects in relation to each other rather than as isolated topics.

For the technical aspect of this project, my team focused on making a smart parking sensor. The parking space will have an inductive loop to detect the presence of a metal body such as a car in the spot. Also, it will have a Bluetooth receiver to check the ID of a beacon embedded in the car, for managing parking permissions. The goal is to automate the permissions process in a parking garage rather than having to rely on a sticker, gate, or license plate inspection. An additional functionality that could be incorporated is payment over Bluetooth, which would allow street parking to be automated without a meter.

The STS project I will focus on is a case study of Google Glass using the framework of Actor Network Theory. Actor Network views everything in the social, natural, and technical world as a network consisting of actors which themselves may be networks. Engineers are the

network builders that bring together these heterogeneous actors into a sociotechnical network. In this case Google was a network builder, whose actor network Google Glass was destabilized due to various rogue actors regarding the social concerns about privacy and surveillance surrounding ubiquitous recording. These factors are often ignored as the media believed Glass to be nerdy and overpriced, but their role is essential to the failure of Glass and sheds light on the importance of addressing these social factors when working with IOT devices.

Working on these two projects has both influenced the direction that each is taking as well as affected the considerations I am making in my designs and research. The idea for my technical project came first, and as a result I had an inspiration for STS research in analyzing a failed IOT device. From there, I started looking into Google Glass without knowing the full story. This of course had to do with people's privacy, surveillance, and data collection of the camera, and it prompted my team to think more about the implications of our technical research so that we would not fail in the same way. We needed to ask ourselves what types of data we were storing and broadcasting. In its current form, every car would be broadcasting out a unique identifier. What type of data could people collect from this, and would our invention lead to more surveillance and less privacy? Although our technical project is not finished yet, this may lead to us tweaking the range of the Bluetooth beacon or the times when signals are put out. A later version may have to incorporate a handshake verification between parking spot and car before outputting the car's identity. Regardless, I'm much more aware of these social factors from my STS research. Working simultaneously on these projects inspired my pure research and impacted my technical work.