The Design and Evaluation of User-Interface Prototypes for a Next-Generation Dishwasher Mobile Application
(Technical Report)

The Facebook Cambridge-Analytica Data Scandal and Virtue Ethics
(STS Research Paper)

An Undergraduate Thesis Portfolio

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By

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Socio-technical Synthesis: Smart Dishwasher UI and the Facebook Data Scandal

My technical work and my STS research are broadly connected through the idea of consumer privacy and data security. For consumers, the privacy of data is crucial. Often this data includes personal information such as phone numbers and addresses. If this information were to fall into the wrong hands, there could be disastrous consequences. In my STS research, I focus on a specific data scandal which saw the leak of important consumer data and how the engineers behind Facebook's privacy were morally responsible for this incident. My technical work focuses on the development of a smart dishwasher user interface (UI) that is connected to the online world. While the work does not focus solely on privacy, a large concern about a smart UI is that hackers would be able to access a user's dishwasher due to the connected nature of it when they wouldn't otherwise and, therefore, security was an important consideration in our design of the UI.

In my technical project, I set out to create a UI for dishwashers that would lead to the best dishwashing experience for all people through the use of the latest smart and autonomous technology. In the development of this interface, it is important to consider what factors influence user behavior. A balance between technology and usability of a UI is necessary, as a UI that too technologically advanced can become unusable, but a UI with limited functionality would result in dissatisfaction from the customer. Through my research, I found on user pain points about the dishwashing experience and the reception to a dishwashing app UI through interviews and surveys. This was used to create an app prototype that is undergoing user testing to find how the app can best improve the user dishwashing experience while minimizing concerns such as with user privacy and security that come with the new interface.

My STS research explores the Facebook-Cambridge Analytica data scandal, which involved the leak of over 87 million users' data. The currently discourse around the incident mainly focuses on the consequences of the breach. I, however, analyzed the scandal from an ethical standpoint, arguing that the engineers behind the development of the Facebook Login feature that led to the leak were morally culpable due to their lack of virtues responsible for morally responsible engineers: competence, openness to correction, and seeing the "big picture" as well as the details of smaller domain. Through the lens of virtue ethics, I show how these engineers lacked each one of these traits. The goal of the research is to open up discourse on the responsibility that engineers have to make just and moral decisions when developing technologies, as the decisions and actions engineers make can have a great effect on the safety of the users of the technologies they create.

Working on these two projects simultaneously benefitted me tremendously. My STS research focused on the virtues that the Facebook engineers lacked that caused them to fail overall in their work. The research I did helped me learn the importance of the virtues necessary to be a morally responsible engineer which I applied to my technical work. As I am also engineering a technology by prototyping the dishwasher app UI, the STS research I did helped increase my motivation in making sure that I was being as morally responsible as I could be when working on the prototype. Additionally, the focus on security and privacy in my STS research helped me understand how to avoid similar mistakes in my project. Overall, working on both my STS research and my technical project in tandem has allowed me to be the best engineer I can while also making sure I can make my technology as safe as possible for its users.

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