

Thesis Project Portfolio

Wearable Assistive Technology: A Hat for the Visually Impaired

(Technical Report)

Consumerism and Privacy: How Consumer Data Collection Impacts Privacy

(STS Research Paper)

An Undergraduate Thesis

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Table of Contents

Sociotechnical Synthesis

Wearable Assistive Technology: A Hat for the Visually Impaired

Consumerism and Privacy: How Consumer Data Collection Impacts Privacy

Prospectus

Sociotechnical Synthesis

The development of embedded systems to aid in mobility of disabled individuals has been a recurring theme in the field of engineering. Specifically, engineers have attempted to develop wearable products that help provide individuals with sensory feedback about their surroundings so that they can navigate their environment unassisted. The technical project developed by the capstone team sought to continue this exploration by designing a visual assistant hat with an integrated embedded system to help guide blind and deaf individuals. The goal of this project was to provide a hands free, self-contained, and compact device for disabled individuals so that they can independently navigate their environment. The team was able to achieve this goal by developing a prototype for a visual assistant device that was unique to any current device on the market.

While there are still improvements that need to be made before the device can be used by the public, this project has given the capstone team the ability to apply degree-related knowledge to design a product that will benefit society in the future. Additionally, this project has given the capstone team the skills necessary to identify the societal implications of creating any publicly available product and the ways in which engineers can prevent potential harm to the end-user. One potential idea that was examined and inspired the STS research project was allowing the device to collect usage data and connect to the internet, which is common amongst most modern wearable devices. This collected data could have been used to make system improvements and allow for the development of other features, such as user location notifications to caregivers or family members. However, this raised several questions about the implications of this data collection and whether or not it would be an infringement on the user's personal privacy.

Data collection has been a practice utilized by numerous technological entities to help provide a better user experience while also increasing the profitability of their online products by using social media, e-commerce, search engines, or other forms of online media. However, the type of user data being collected and methods used have called into question the ethics of these practices. Many consumers find these practices to be invasive and ambiguous, which has ultimately led to the demand for regulation on data collection procedures in order to protect the privacy and welfare of online users. The STS research project examines how privacy advocates, civil libertarians, tech companies, and online advertisers have voiced their concerns on data collection techniques, how the collected data is used, and how each of their actions has shaped current regulation in the United States. Specifically, this project explores each stakeholders' perceived (in)justice of data collection, their view of privacy as either a right or a commodity, and the varying interpretations of common terms found in current legislation. This research project serves to identify the main influences of data collection regulation and how they can be used to better construct equitable legislation for consumers and technology companies.