Thesis Project Portfolio

Automated Air Removal Device for Infusion Pump

(Technical Report)

Impact of Automated Healthcare Technology on Accessibility

(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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Table of Contents

Sociotechnical Synthesis

The topics presented in my two papers are closely related. The idea for my technical project came from my desire to help my dad when he was undergoing treatment for leukemia my third year of college. The infusion pump delivering chemo set of the air-in-line alarm several times per night, making sleep very difficult. I spent most of my nights there silencing it manually because the nurses were understaffed, but the entire time thought that it seemed like a process that could easily be automated. The initial motivation for the project was to reduce the number of alarms in the hospital, and therefore alarm fatigue associated with them. However, this is an end goal and for the sake of a semester long project, trying to silence the alarms in an automated way was more realistic. Trying to fix this one niche problem I noticed when I was spending my nights in the hospital made me wonder how many other inconveniences in hospitals and healthcare could be fixed with automation.

Automation in healthcare is often perceived as an obstacle to better interactions between healthcare providers and patients. My STS thesis looks into a few different automated technologies, including electronic medical records, a web-app therapy service for veterans, and automated infection control algorithms. These were analyzed with the social construction of technology (SCOT) framework to determine their impact on accessibility. Some, such as the EMRs due to the lack of good user interface design, tended to slow down the workflow of practitioners and create or propagate accessibility bottlenecks. However the others were unique solutions that decreased the load taken by primary care and emergency and therefore increased accessibility. After analyzing what it looks like when done correctly, and based on my own anecdotal experience, it could be an error-reducing tool that shifts the practice of healthcare toward a patient-centric approach that focuses on care.

The potential impact of the technical project became larger after analyzing the impacts of other automated technologies. While the impact on the workflow of an individual nurse or a patient trying to sleep is extremely important, the ripple effects on accessibility are much more dramatic. Decreasing the burden these mundane tasks take on healthcare workers allows more patients to receive higher quality care and has the potential to fix the healthcare accessibility crisis the United States faces today.