Thesis Portfolio

Window Automate Natural Daylight Assistant (WANDA)

(Technical Report)

Redefining Home with Smart Home Technologies

(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 growth of smart home products has brought many benefits in the home by simplifying many tasks through automation. One of the possible areas of home automation is using window blinds to automatically control natural light entering a space. The technical project seeks to create a device to allow for this automation. The STS topic will explore technology and disability by considering the extent to which smart homes affect the quality of life for elderly and disabled individuals.

The technical project seeks to automate the common window blind in order to allow more natural light into a space throughout the day. The Window Automated Natural Daylight Assistant (WANDA) is a smart window wand. It can be attached to any household window blind to automatically vary the amount of light entering into a space. WANDA will be built with several privacy features and smart features to help the user better control the lighting and comfort of their home. This device hopes to aid many different groups of people from individuals with disabilities to those who would like an easy way to regulate natural sunlight in their homes. This product is in the growing market of smart home devices. The design process for this project made use of various simulation software and test-driven prototyping approaches. The project lasted for one semester and the advisor was be Harry C. Powell, a faculty member of the Charles L. Brown Department of Electrical and Computer Engineering. Financial support for the project was provided solely through the department and there were be no external clients. Available resources for the project included the National Instruments (NI) Laboratory which includes tools for soldering, designing and prototyping solutions. Additionally, there was access to 3D printers across grounds and a local company called WWW Electronics Inc that provided custom PCB soldering services. The technical project culminated in a physical product as well as a conference style paper.

The Science Technology and Society (STS) portion of this thesis sought to determine the effect of smart home technologies on the family in the home. Smart home technologies have great potential to transform the concept of home and help redefine some of the core components. The home is now a place where more non-human actors are now present in the form of smart assistants, thermostats, doorbells, appliances and much more. As a result of these new actors, family dynamics are changing as there are increasingly more human-nonhuman interactions in the home. Actor Network Theory and Mediation Theory were used to understand the role these technologies play in the home and how designers and users can better incorporate them into their spaces. Research was conducted by collecting data from various company advertisements, mission statements and branding to understand how they mobilized potential customers into their networks to bring products into their homes. They achieve this mobilization by appealing to the aspects of home that make it feel safe, secure, and restful in an effort to align the interests of potential customers their own. Done well, smart technologies can enhance the home and continue to make it a place where life takes place for many families.

The technical and STS components of this paper are loosely coupled. The technical project creates a smart window blind for the home and the STS components investigates the general effect of smart devices on families in the home.