

Thesis Project Portfolio

Accessible Navigation Mapping: Supporting People with Mobility Disabilities for Wayfinding

(Technical Report)

Improving Accessibility through Wayfinding Applications

(STS Research Paper)

An Undergraduate Thesis

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STS Paper Summary:

Accessibility, in its simplest form, is the practice of making activities, goods, and services easily available to all people, especially to those with disabilities. Many times, what we consider to be routine and simple day-to-day tasks are not always as easy as we believe them to be for individuals with disabilities. For such individuals, these tasks may be particularly demanding and require a considerable amount of effort and adaptation. Therefore, prioritizing accessibility in the design process of these activities, goods, and services with accessibility in mind is essential to ensure that there are no significant barriers to a certain group of people, and that everyone has equal access to the same opportunities.

I provide an explanation and analysis of various currently existing wayfinding and navigation apps and technologies. Along with each application's unique features and functionality, I discuss the impact of the features as well (i.e. software/compatibility, method of data collection, etc.). This helps to identify which features seem to be the most effective, and how wayfinding applications can be improved overall.

As this topic deals with building tools for a specific group, the research methods I used consist of finding, reading, and synthesizing previous literature on this topic. I analyzed previous literature as my main research method, as much of the project is an analysis on existing wayfinding applications— this method of research involves identifying existing applications, finding their building process and features, reading other write-ups, and so on. I focus on the impact on accessibility for individuals with mobility disabilities and how tools can be improved further for them.

Technical Paper Summary:

College and university campuses topography, lacking signage, and constant construction present a challenge for individuals with mobility disabilities to navigate. Wayfinding is more than just simply following a directional route— it is an essential skill that is interconnected with independence, quality of life, mental health, and economic prosperity. Many times, what we consider to be simple day-to-day tasks are not always as easy as we believe them to be for individuals with disabilities. Therefore it is important to create a tool allowing individuals to feel more comfortable in navigating their environment.

Our ultimate goal is to improve the University of Virginia’s campus’ accessibility and increase the ease with which candidates with mobility disabilities navigate grounds by providing a comprehensive wayfinding resource. To create an accessible campus that exceeds ADA standards for students, faculty, staff, and visitors, we will first identify the information and accessibility features needed to better accommodate people with mobility disabilities to navigate on Grounds. This information is collected with types and sources differentiation. Then, a more disciplined process for collecting and analyzing these data will be defined as we complete this project. We will be examining the different barriers within each environment and focus our mapping process only on buildings within the UVA Engineering School. This project will focus on laying the foundations for a wayfinding application as a part of a more comprehensive solution for people with special needs to navigate the school.

We approached this problem by performing a literature review and looked into previous wayfinding projects that have already been done at cities and universities in order to cater the application towards the needs of the University of Virginia students, staff, and faculty. To achieve this, we gathered information on the barriers and features that current individuals with

mobility or temporary disabilities would like to be informed about when navigating the campus in the form of a survey. We will be designing a process to collect information about the existing accessibility features and barriers of designated spaces and how that information can be used to improve current accessibility around grounds. Additionally, we will investigate how the latest technological tools such as AI-powered mapping systems and LiDAR could be leveraged to enhance the navigation experience.

This project will provide actionable and feasible suggestions to improve the interface of the current GES visitor map. After the literature review and discussion with stakeholders, we identified that location of ramps, sidewalk congestion times and locations, and accessible bathroom locations are some of the most important accessibility features to be aware of. Our next step is to send out the survey to better understand the data needed to design the app. This endeavor not only aims to transform the engineering school's approach to accessibility but also serves as a foundational model for a university-wide accessible navigation application in the future.