Milestone 3: Design Alternatives

A. User Experience Requirements
   1. Relevant User Stories
      i. US1:

         As a person on the UGA campus, I want to be able to render a 360 degree view of a bus stop so that I am better able to locate it.

         1. Justification:

            This user story is relevant to our proposed solution as the problem of study revolves around the user being able to locate bus stops. The current 360 degree feature is offered so that users are able to have a better understanding of the nearby surroundings of their desired bus stop. 3D renderings increase user awareness of their environment and provide an enhanced location-service experience with real-time feedback (Fotis et al.). This is one of the integral functions of the 360 degree feature, as individuals who are unfamiliar with the campus might not recognize bus stops.

      ii. US2:

         As a person on the UGA campus, I want to get directions (walking, cycling, etc.) to a bus stop so that I can get onto a bus that is on that bus stop route.

         1. Justification:

            This user story is relevant to our proposed solution as the problem of study revolves around the user being able to get directions to bus stops. The user needs to be provided step-by-step instructions on how to reach a bus stop so that they are able to get close enough for the 3d rendering of a bus stop to be useful (Biggs, Brandon, et al.). One of the major purposes of the stops page and 360 degree feature is to provide users with directions so that they are able to make their way to a bus stop.

B. Ideation and Preliminary Designs
   1. Alternative Design Solutions
      i. Relevant User Story 1: As a visitor to the UGA campus, I want to be able to render a 360 degree view of a bus stop so that I am better able to locate it.
         1. Group Ideas:

2. Design Solution Idea 1: Our first idea is to create an entirely new tab on the existing navigation bar that is dedicated to 3d rendering. This new section revolves entirely around providing 3d rendering for bus stops and other landmarks on campus which helps improve user engagement and awareness of surroundings (Biggs, Brandon, et al.). The user can either search for a bus stop, and be provided a rendering. Or, they would allow access to their camera upon clicking on the 3D tab, and show their surrounding environment. This provides real-time feedback to the user (Fotis et al.) as the app would then provide the nearest bus stop in a virtual rendering of their environment. The information that this new tab includes would consist of all the bus stops and buildings on campus, and allow the user to select one of these locations to obtain a 3d rendering.

3. Design Solution Idea 2: Another solution would be to redesign the 'stops' tab so that it is a large integrated map that contains interactive bus stop icons. These clickable icons would provide the user with options for a 3d rendering. Being presented with a map instead of a list of nearby stops, users will get a better grasp on the layout of the map in an easier-to-understand, more informational presentation (e.g. surrounding buildings, structures, sidewalks, etc.) (Roth).

4. Design Solution Idea 3: This solution most closely resembles the current existing solution on the app. A list of bus stops is provided on the stops tab, and the user is able to click a 3D button to toggle and then select their desired bus stop and are provided with a 3D rendering of the bus stop. With the 3D rendering of the bus stop, users will be able to walk towards the bus stop with a streamlined in-app 3D model which will help users be more accustomed to their surroundings (e.g. buildings, facilities, etc.) (Roth).

ii. Relevant User Story 2: As a person on UGA campus, I want to get directions (walking, cycling, etc.) to a bus stop so that I can get onto a bus that is on that bus stop route.

1. Group Ideas:

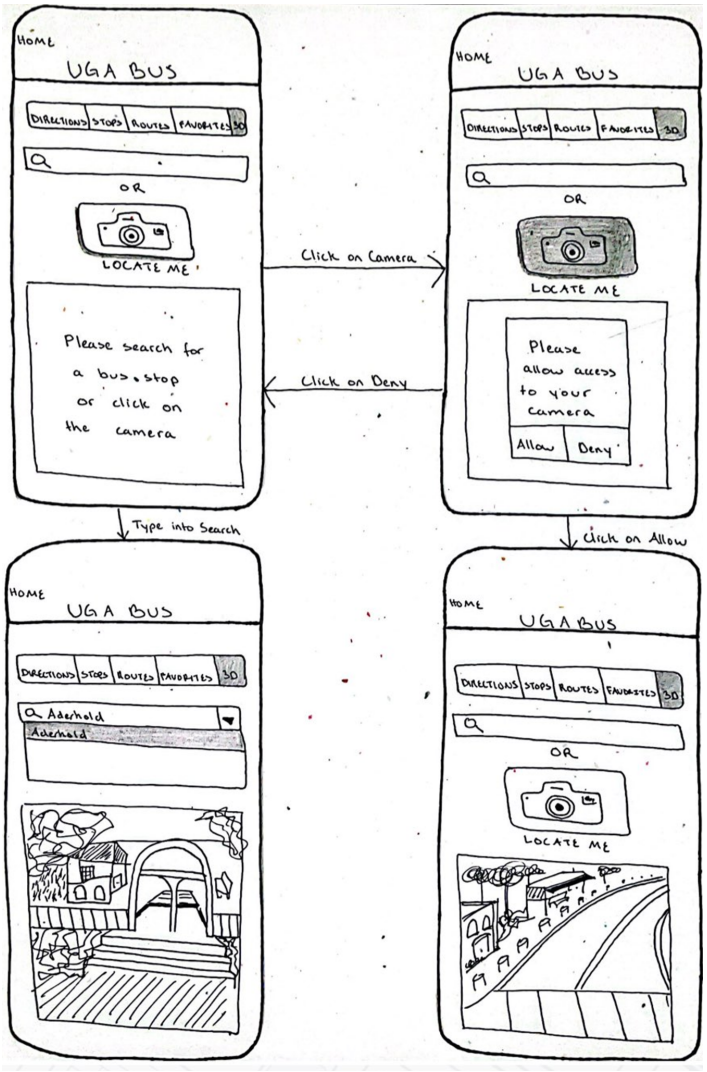
2. Design Solution Idea 1: The first design solution we came up with in order to facilitate a more streamlined experience for locating bus stops is to integrate voice assistance in the event that typing would be an inconvenience, or even an impossibility, say, if the user was cycling. Having a “voice assistance” icon in the search bar would be a perfect solution for this, and as a bonus it would be a great benefit to those with disabilities related to sight (Abdolrahmani, et al.).

3. Design Solution Idea 2: Our second design solution attempts to clean up the user interface as much as possible through a minimalist approach (Darejeh, Ali, and Dalbir Singh). Almost all elements of the interface are removed (including the navbar and other unnecessary information). The user only has to input their destination (and/or departure location) and click ‘get directions’. The directions are then provided in a map view and step-by-step directions at the bottom of the window.

2. Low-Fidelity Wireframes

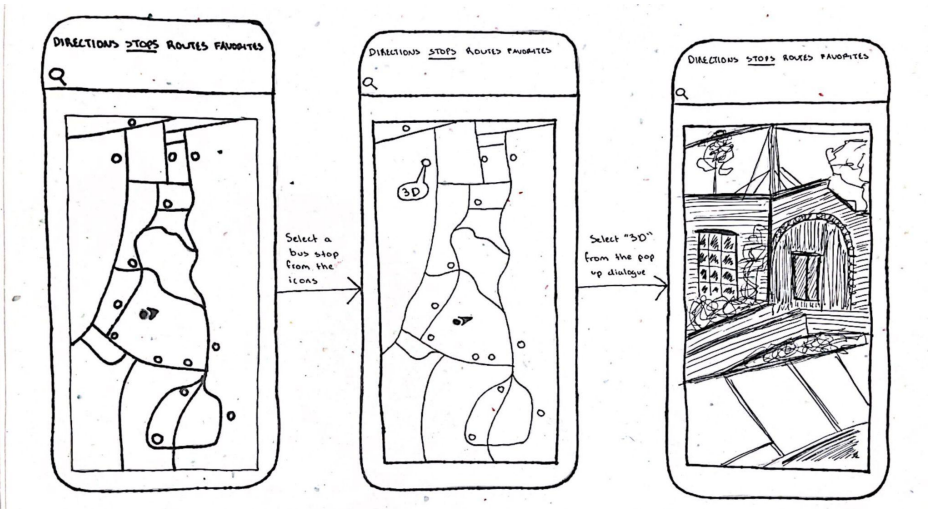
i. Relevant User Story 1: As a visitor to the UGA campus, I want to be able to render a 360 degree view of a bus stop so that I am better able to locate it.

1. Design Solution Idea 1 Wireframe:



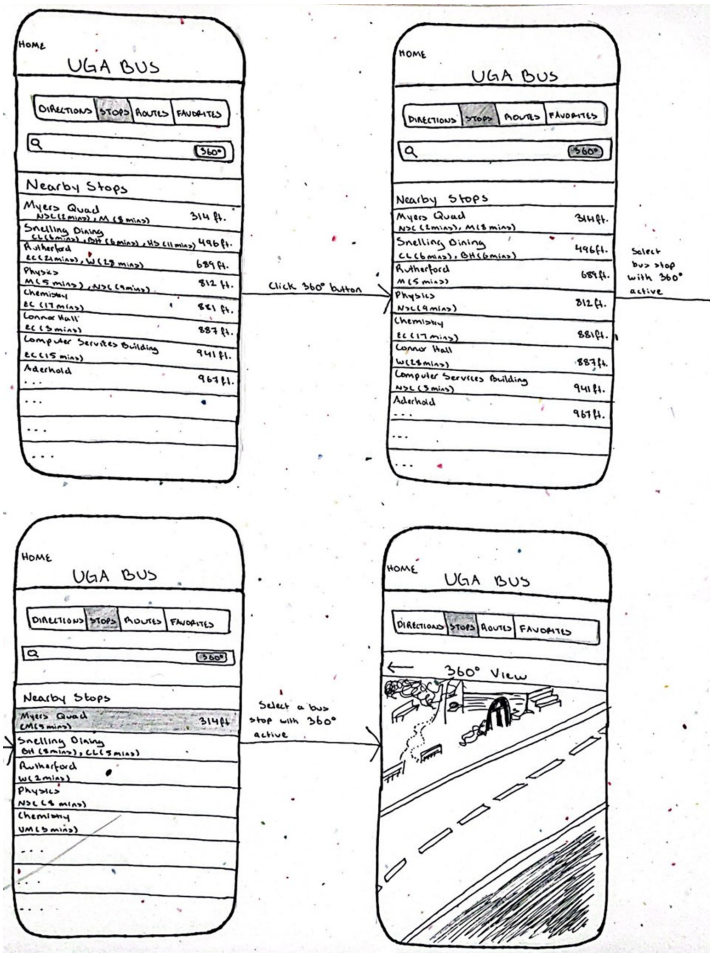
a. Justification: Not every design decision was made with a specific purpose, but rather the elements in conjunction was the main reason behind the choices. The layout of the page is very similar to the existing UGA bus app format, and this is done to encourage familiarity with existing users. These elements include the top bar, as well as the navigation bar. The options on the navigation bar remain the same, with the addition of a new “3d” tab to support the design solution (Biggs, Brandon, et al.). The new tab is designed such that the top search bar has a search icon and ‘search’ text, as well as helpful captions underneath that indicate to the user that they are able to search or click on the camera button. The camera button is designed with a shadow to demonstrate the clicking affordance. Helpful captions are included in response to user interaction.

2. Design Solution Idea 2 Wireframe:



a. Justification: This design solution is justified because integrating an in-app map feature into the application aids the understanding of the user due to its minimalistic approach, reducing the amount of extraneous information the user is presented with. Minimalistic approaches are proven to work because they streamline the user experience - with less information “in your face”, the user has less of a chance to get confused (Darejeh, Ali, and Dalbir Singh.).

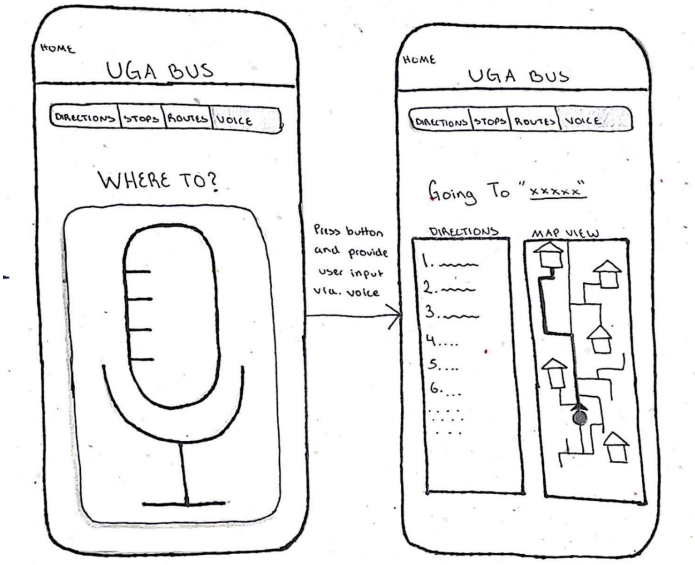
3. Design Solution Idea 3 Wireframe:



a. Justification: This design helps the user experience 3D rendering within the UGA app that gives a streamlined experience (not opening the app in a separate browser) that shows nearby buildings and structures surrounding the bus stop (Roth). Letting the users have perspective of the area allows for easier guidance around UGA's campus with readily available blueprinting for the nearby area. This simplification in design is a notable guideline that better navigates the user to a separate window instead of going outside of the app. Simpler is better is our motto which is backed by our minimalist approach research to keeping the user inside UGA's bus app.

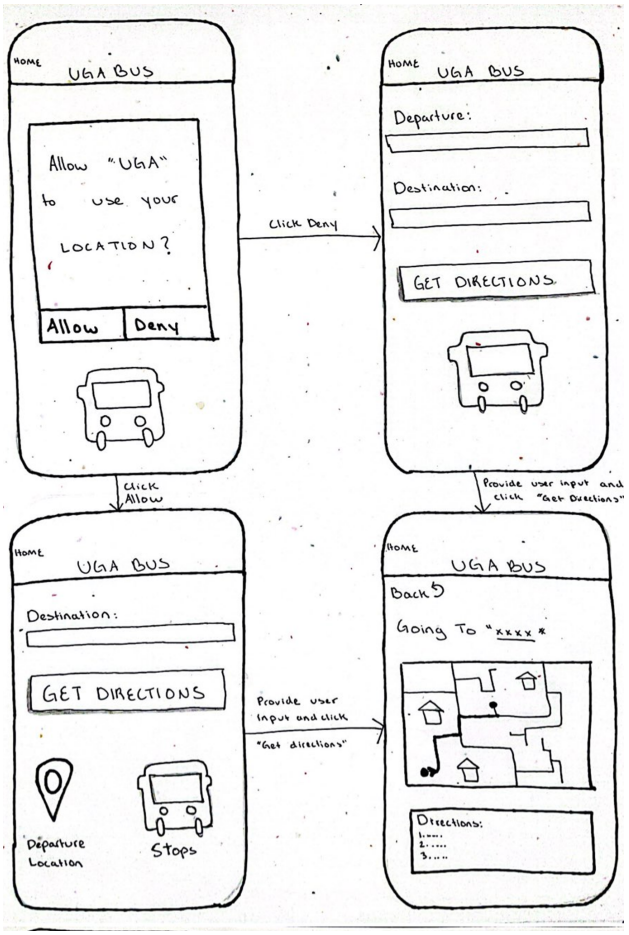
ii. Relevant User Story 2: As a person on UGA campus, I want to get directions (walking, cycling, etc.) to a bus stop so that I can get onto a bus that is on that bus stop route.

1. Design Solution Idea 1 Wireframe:



a. Justification: This design solution revolves around the idea of the User utilizing their voice in order to streamline the direction process, while still preserving the functionality of the other methods. This design also incorporates the idea of minimalism , as once the user selects the "Voice" tab , he/she is presented only with a microphone icon; no unnecessary icons, tabs, or input boxes (Abdolrahmani, et al.). This design not only benefits users that may have disabilities, but also enhances the process for the user to get directions easier. As accessibility features are concerned, the usage of a voice assistant aides people with sight impairments and the ability to successfully navigate a campus without having to rely on visual cues can improve overall user experience quality.

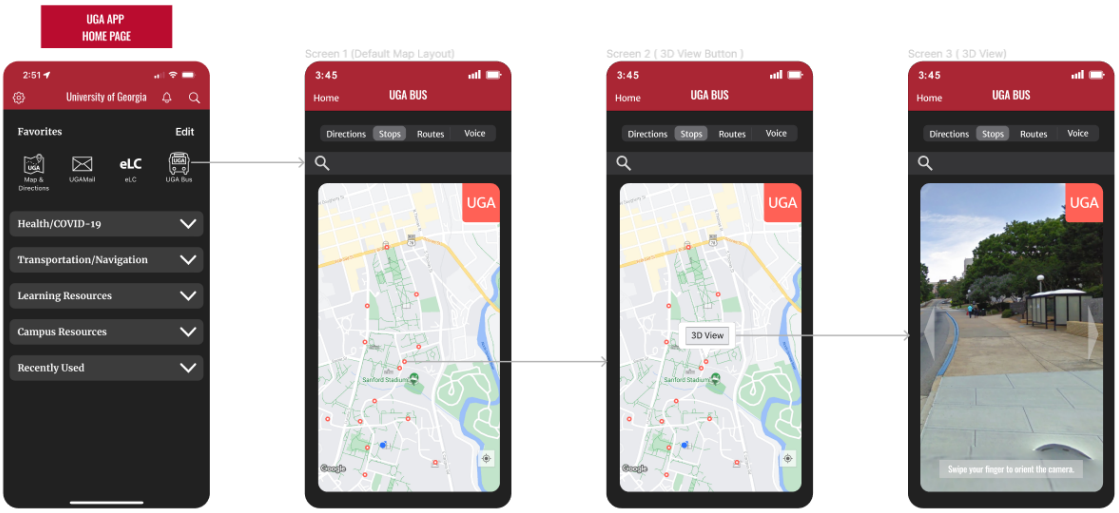
2. Design Solution Idea 2 Wireframe:



a. Justification : This design centers all around minimalism. Once the user has entered the UGA Bus section of the UGA app, nearly all original options/features have been removed, leaving the user with only 3 interactable icons (Icons are arranged differently depending on if User allows location services or not). By using this design, the user should have a simpler, less confusing experience, as there are less options, less room for user-mistakes, and fewer challenges for the user to overcome (Darejeh, Ali, and Dalbir Singh).

C. Detailed Designs

1. User Story 1 Best Design Alternative Mockup:

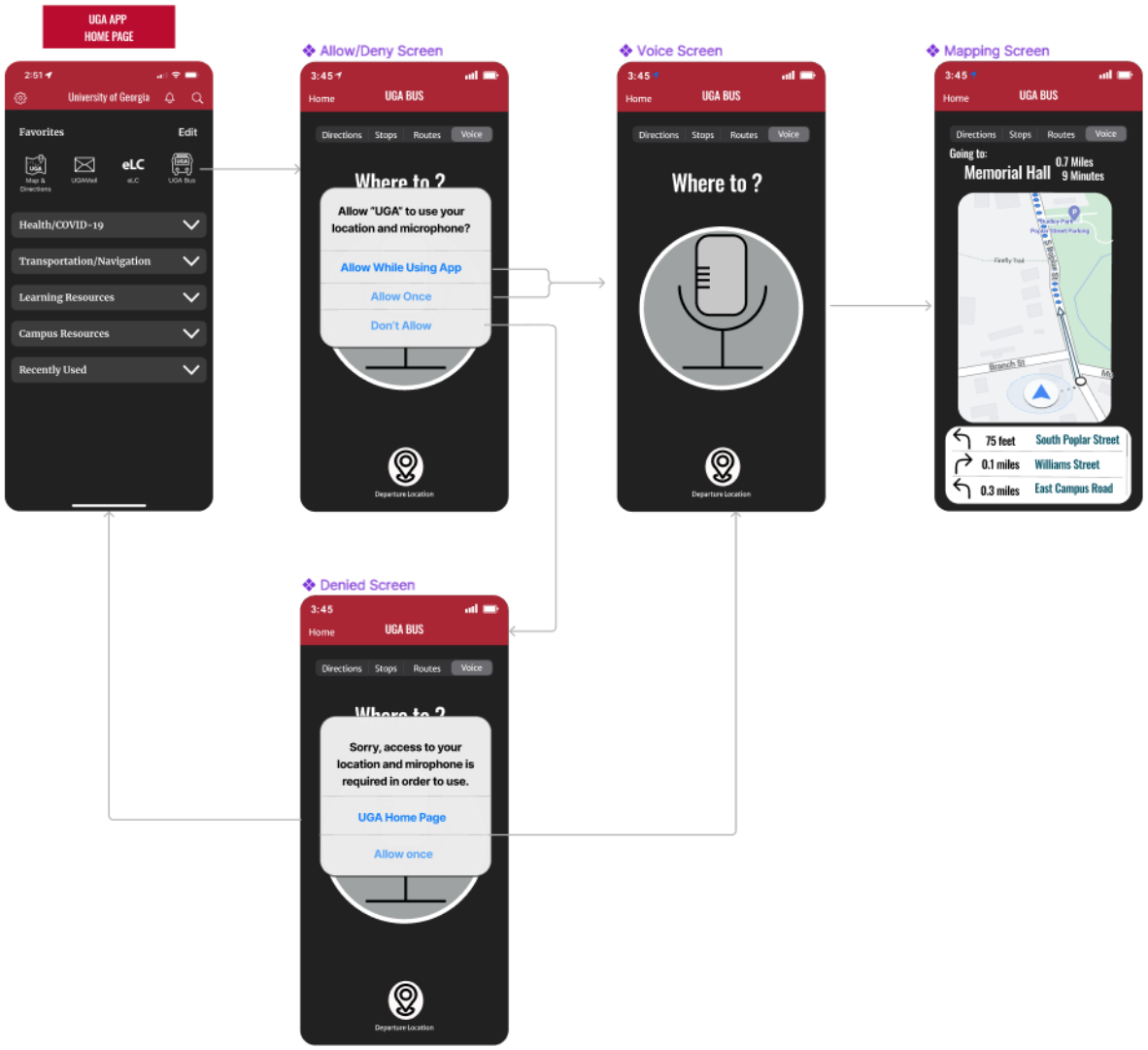


https://www.figma.com/file/xoLUuvqbbXsyzft3TC0YSk/HiFi-Solution-1?node-id=0%3A1

i. Justification

On the stops screen, instead of a list of stops the user is presented with an interactable map that shows their proximity to adjacent bus stops. The user's location is marked as a blue circle with an arrow showing orientation, and bus stops are marked with red circles containing white dots, similar to their appearance on the "Maps and Directions" tab on the home page. We made this design decision because it promotes consistency. Ergo, the user will be able to recognize the use of the icon across different facets of the application. Upon clicking a bus stop, a dialogue box window appears with a noticeable button stating the phrase "3D View", which, in theory, should be relatively self-explanatory. The user knows that it is a button because across many applications, buttons tend to have a shadow underneath, giving the implication that they are "raised". When this button is selected, the user is taken to an integrated Google Maps Street View map, showing them exactly where the bus stop is located and how it looks, and thus the user knows what their destination is. Helpful pop ups such as the arrows on either side of the screen and the text along the bottom let the user know that the map is interactable, and that they can move it around to get an even better understanding of the location.

2. User Story 2 Best Design Alternative Mockup:



https://www.figma.com/file/7nPC10f5u7d8LKf2jxJMWj/HiFi-Solution-2-(Voice)

i. Justification

On the "Voice" screen, the microphone icon is a circle with a white ring around it rather than a rectangular box. This was done because it makes the microphone icon look more like a button, and when being pressed, the ring will change colors denoting that it's picking up the user's voice. A "Location Pinpoint" icon was added to the bottom of the page, as a means for the user to be able to change their departing location (the user's location is default). On the "Mapping" screen, we decided to change from a horizontal split (50:50) of the Map and the Directions to a vertical split (75:25). This gives the map a massive amount of extra space, aiding the display. In order to view all of the directions, a scroll bar was added so that users may scroll through as needed. In addition, we realized an Allow/Deny screen was /necessary (as the app requires Microphone and Location), so we created an Allow/Deny pop-up that is displayed once the user enters this portion of the app. Finally we decided to add the "Location in use" icon to the phone's nav bar. The icon is white when not active and

when location is being requested. The icon turns blue when the user's location is being accessed and in-use.

D. Summary Video

https://www.youtube.com/watch?v=3xGse2SNyPI

E. Citations

Darejeh, Ali, and Dalbir Singh. "A Review on User Interface Design Principles to Increase Software ..." *ResearchGate*, Nov. 2013, https://www.researchgate.net/publication/277589616_A_review_on_user_interface_design_principles_to_increase_software_usability_for_users_with_less_computer_literacy.

Masina, Fabio, et al. "Investigating the Accessibility of Voice Assistants with Impaired Users: Mixed Methods Study." *Journal of Medical Internet Research*, JMIR Publications, 25 Sept. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7547392/.

Ali Abdolrahmani Information Systems University of Maryland, et al. "Towards More Transactional Voice Assistants: Investigating the Potential for a Multimodal Voice-Activated Indoor Navigation Assistant for Blind and Sighted Travelers: Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems." *ACM Conferences*, 1 May 2021, https://dl.acm.org/doi/10.1145/3411764.3445638.

Biggs, Brandon, et al. "Design and Evaluation of an Interactive 3D Map." *Rehabilitation Engineering and Assistive Technology Society of North America*, U.S. National Library of Medicine, 2021, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8341294/.

Liarokapis, Fotis, et al. "Exploring Urban Environments Using Virtual and Augmented Reality." *JVRB*, 24 Jan. 2007, https://www.jvrb.org/past-issues/3.2006/772/view?set_language=en.

Roth, Robert E. "Interactive Maps: What We Know and What We Need to Know." *Journal of Spatial Information Science*, 30 June 2013, https://josis.org/index.php/josis/article/view/35.