

Comparison to Other Products (Rick)

The idea of using modern technology to provide assistance to visually impaired people is by no means a new concept. Many products exist; most are wearable devices which provide an augmented reality (AR) experience. Perhaps the most feature-rich example of such a device is the Orcam MyEye. This is a camera which mounts to eyeglass frames using magnets. The camera connects to a smartphone app via Bluetooth, and offers features such as text reading or facial recognition for frequent contacts. Conceptually, it is meant to assist with day-to-day life. There are many variations of this product (e.g. NuEyes, eSight, Acesight), but all are targeted at similar use cases. Our product is meant to assist the visually impaired in an area that these products lack: navigation. As this is such a central part of modern life, older solutions exist (e.g. white canes or guide dogs), but these have their own limitations. Our app provides an elegant, high-tech solution. Aside from having unique functionalities from the other products, it has several other advantages which set it apart.

Our product is cheap. The tools used to make it (i.e. Android app libraries, machine learning libraries) are free and open source, and the data used to create the artificial intelligence powering it is also publicly available online. With this low cost of creation, we expect to be able to offer the app for free. Compared to other visual assistance products, this removes a significant barrier: the Orcam MyEye, for example, currently costs around \$3,500. Alternatives which we previously mentioned are similarly expensive. Unfortunately, the app will not immediately be available on iOS, but this is justifiable because news sources estimate that Android holds approximately 70-80% market share worldwide. Additionally, our app is built to be usable by people who are almost or totally blind. Many of the AR solutions and camera attachments we previously mentioned require at least partial sight to operate and setup. Our app's ability to recognize voice commands allow it to be used without needing to see the screen.

We designed our app to be a unique and accessible solution for the visually impaired. Its targeted feature set and low price allow it to be a useful tool for anyone who has difficulty seeing. It could be used in conjunction with a more expensive product, or completely independently. We expect the usefulness and accessibility of our app to set it apart from other products in this field and make it appealing to many people.

Target Audience (Selin)

The target demographic for our application has a large range of intended users; the app is helpful for a completely blind user, as well as users with mild-moderate vision loss. Since there is no existing aid on the market that was built for the completely blind in mind, we specifically designed this app to relay information in a way that completely blind people can best understand it, which is also inclusive of those who are mild-moderately visually impaired people who have troubles seeing close-up and far-away details.

There is a realistic potential for this tool to be used widely because of the pre-existing pervasiveness of cell phones. By publishing this application on the Android app store, we are able to avoid having to pay any publishing or maintenance costs, ensuring that anyone with an Android smartphone will have access to this tool without us needing to charge for service in any way.

Additionally, many people in the US have access to an Android device, so there's the benefit of having no extra costs to access the software, with the additional benefit that the user would not have to acclimate to using new, bulky, and unfamiliar gadgets.

Through working closely with the American Foundation for the Blind, an existing and well-known organization that focuses on improving the accessibility of everyday activities, we will gain an invaluable means of certifying our application's reliability, and along with it, countless new contacts through which we can market our product.

Societal and Global Impact (Jack)

The broader societal need we are seeking to address is the need for an accessible tool which provides safe on-foot travel for the visually impaired, especially in urban areas. Our product is accessible because it is a mobile application, so the user does not need to pay for additional expensive hardware.

If used widely, it could positively impact society in several ways. First of all, our application could reduce the number of accidents involving visually impaired people. It can aid in emergency situations like when a blind person is isolated from the help of others. The capacity to prevent accidents can be seen especially in urban settings, which the application is specialized for. Additionally, the application would grant visually impaired people comfort and a degree of independence.

This application will not require regulation. It is data-safe. In other words, since the app does not collect or store any information about the user, there is no risk of exposing sensitive data. Additionally, the application has minimal reliance on a network connection which is only used to support the direction service; so the user never needs to connect to a wifi network. Since this is simply a tool to aid the visually impaired, and the use of this application does not impose upon those around the user in any way, no outside regulations are necessary.

One concern may be about the possibility of someone purposely sabotaging the object detection to detect the wrong objects, or fail to detect the right objects. In fact, this is not a realistic concern because the object detection operates based on a pre-trained model that is handcrafted by the developer. Simple checks can be performed in the code to ensure that the correct model is being used by the application .

This application can, however, be put to bad use by the user himself. The issue is over-reliance. This application can help in emergency situations and in low-danger environments, but it is not advised for a severely visually impaired user to choose this application over the physical aid of another human or guide dog if those options are available - especially in high vehicular traffic areas. To reinforce this notion, the application can warn the user when in or near a high-traffic area like a city or highway.

This leads to some international-use concerns related to our application. First of all is the topic of liability. If over-reliance on the application leads to injury, the issue of liability arises. We can include a disclaimer upon the first-time opening of the application that affirms the app's intended use, and warns against over-reliance on the application in hazardous environments. If necessary, we can also include an agreement that places liability of injury on the user, rather than the developer. A separate concern is the variance in the precision of Google Maps across the globe, given that Google Maps powers our direction functionality. If the user is in a location known to be un-mapped or sparsely-mapped, we can warn the user of the potential direction-giving inaccuracies .