

Intersect-Assist

User and Installation Guide

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1. Introduction

Motivation

Intersect-Assist is an application built to enrich the abilities of members of the visually impaired community. Specifically, it's built with the purpose of assisting visually impaired users with the three main tasks required in intersection crossing:

- Mapping information regarding intersections.
- Traffic Light detection.
- Veering assistance.

The motivation behind this system came to the team after they observed multiple members of the visually-impaired community as they attempted to navigate through intersections. As a result, the goal of this project is to provide these members with a sense of security and autonomy when crossing an intersection. We hope that this system can one day transcend the prototype phase and provide visually-impaired users with the ability to explore new cities.

A word of Caution

Although this application can greatly diminish the cognitive requirement of performing those tasks, it is very important that users still rely on their own skills in navigating around or through intersections.

2. Installation Instructions and Hardware Requirements

Hardware Requirements

To use the Intersect-Assist application, the requirements right now are the following:

- An Android Smartphone.
- A pair of headphones (preferably bone conduction for safety).

- A lanyard to hang the phone around the neck.
- A laptop to download the APK file.

Installation Instructions

1. Start by downloading the APK file on your laptop from source supplied in the document.
2. Connect your android smartphone to your laptop via usb. You may be prompted to either “Charge your phone” or “Connect it as a Media Device”. Choose the latter.
3. Copy the APK file from your Download destination to a folder of your choice on your Android device.
4. Disconnect your phone and proceed to the folder you chose in the previous step on the phone.
5. Locate the APK file and tap it to begin the installation. Note that you may be required to modify your security settings to allow for installation of third-party applications.

3. Navigating through the application

As mentioned in the previous section, the Intersect-Assist application is built for the visually impaired community. As such, it is a requirement for users to activate TalkBack (Voice Assistant). To do so, please proceed to Applications > Settings > Accessibility > Vision > Voice Assistant and switch this option on. Once you’ve completed this step, you may start the application.

3.1 Main Menu Page

When the application is first started, the user is greeted with the Intersect Assist page (shown below), which displays two buttons: “Intersection Mapping” and “Light Detection and Veering.” The buttons are stacked one on top of the other with “Intersection Mapping” being on top.



When you get to an intersection, you may select the “Intersection Mapping” button to enter this mode or select the “Light Detection and Veering” button if you feel like you don’t require the mapping information.

3.2 Intersection Mapping Page

When you enter the “Intersection Mapping” page (shown below), the user will be greeted with 3 buttons stacked one on top of the other. The highest button is entitled “Mapping Information” which should be activated if they require the information regarding the current intersection. This will provide information about the configuration of the intersection (4-way vs. 2-way), the name of the cross-streets, the number of lanes in each street and their directions. The middle button is entitled “Light Detection and Veering” which should be activated when the user wishes to enter Light Detection and veering mode. This page is covered in section 3.3. The final button is the “Back to Main Menu” which should be used if one wishes to exit the current page to enter Main Menu.



3.3 Light Detection and Veering Assistance Page

In the “light detection menu” page (shown below), the user is first greeted with two buttons, which are similarly stacked one on top of the other. The lower button states “Back to Main Menu”, which allows the user to exit this page and go back to the main menu. The higher button is “Start Detection”.



If pressed, this would start the camera mode and a new page would appear entitled “Detection in Progress” (shown below). At this point, the application will state “Waiting for light to turn green”. And when the light turns green, “The light is green. You may proceed if you feel safe”. As the user crosses the intersection, the application will beep if the user begins veering to one side. If the user veers towards the right, the beep will come from the right ear to push the user to correct their path towards the left. If the user reaches a larger deviation to the right, the application will say “2 o’clock”. This indicates to the user that they are moving towards 2 o’clock and should correct their path towards 12 o’clock.

This submenu page contains one button named “I’m Done”, and the user should use it when they have successfully crossed the intersection and are ready for the next intersection. When “I’m Done” is pressed, the user will be taken back to the “Light Detection Menu” page containing the two buttons “Start Detection” and “Back to Main Menu”.

