EXECUTIVE SUMMARY

Many people with visual impairments struggle to read physical text that they encounter in their day-to-day life, like restaurant menus and billboards. This struggle affects their quality of life. Ison helps people with visual impairments by providing them with more independence. Ison is a pair of smart reading glasses that converts printed text to speech for the user to hear. Similar products are already on the market, but they are much larger and attract attention. Unlike the competitors, Ison offers discreet reading assistance with other convenient features, like translation and extended battery life. Figure 1 shows an overview of Ison's design.

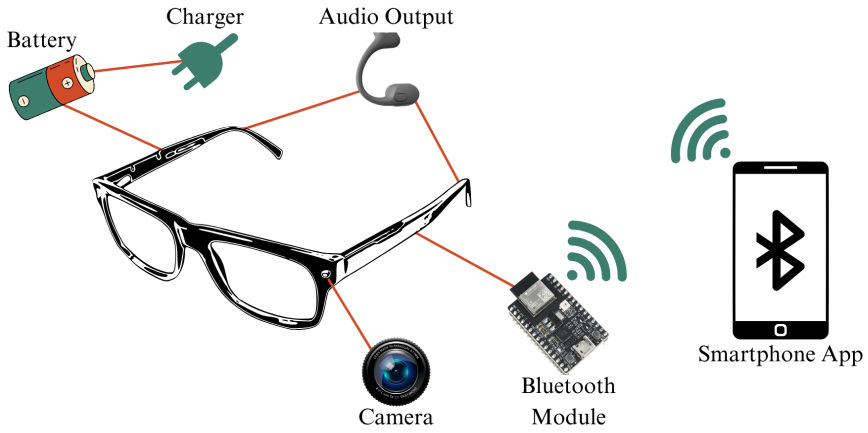

Figure 1: Ison Overview

It is critical that Ison meets the user's needs, so the team followed several constraints and requirements. To ensure Ison users' comfort, the glasses weigh less than 100 grams. The companion app takes less than 5 minutes to set up and uses a screen reader to guide users through the set-up process. To guarantee accurate text recognition, Ison's camera captures images in 1920 x 1080 resolution. Optical character recognition (OCR) software then detects text in these images with 95% accuracy. The audio output has adjustable volume, ranging from 60 to 90 decibels, to provide safe listening. To ensure reliability, the glasses can withstand a 5'8" drop and operate for at least 7 hours on one charge.

Ison's design approach comprises various choices to optimize each subsystem. To enable Ison's functionality, a small Bluetooth module attaches to the glasses to connect them with the user's smartphone. The Ison glasses run on a 3.7-V battery that powers the electronic modules, including the audio transducers, camera, and Bluetooth module. A charging module is connected to the battery which recharges when plugged into a power source. Ison utilizes a built-in OCR model that uses machine learning to recognize text in images. Similar to how humans improve their reading skills through practice, the accuracy of Ison's OCR process improves through machine learning training methods and usage over time.

Ison offers a wearable solution for those who have difficulties with reading. Ison also offers translation capabilities with support for three languages, but the language selection will be expanded upon in the future to accommodate more languages. The companion application has an easily traversable user interface with options to change language, setup Bluetooth, and adjust volume. Furthermore, Ison will offer a variety of frame sizes and styles to accommodate the user's preferences. Ultimately, Ison aims to increase user independence, and the design team plans to add more frame customization and built-in features, such as a smart assistant, Global Positioning System (GPS) navigator, and more.