EXECUTIVE SUMMARY

People with visual impairments struggle to read physical text, like restaurant menus and billboards, which affects their quality of life. Ison aids with that struggle by providing our users with more independence. Ison is a pair of smart reading glasses that reads text in the world and converts text-to-speech for the user to listen. Similar products are already on the market, but they stand out when worn, and some even require subscriptions to unlock features. Unlike the competition, Ison offers discreet reading assistance with further features, like translation and a long battery life, for a one-time payment. Figure 1 shows the high-level overview of Ison's design and the subsystems interactions.
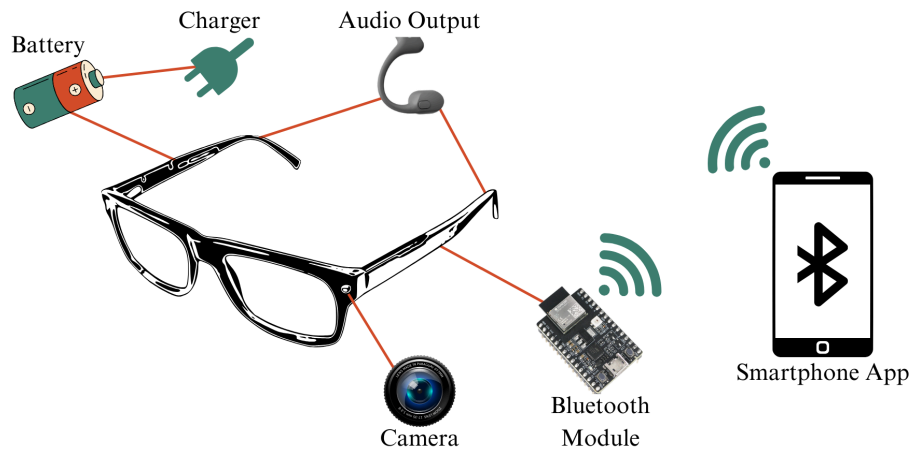

Figure 1: Ison Overview Diagram

To ensure our users' comfort, Ison 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. Moreover, to guarantee accurate text recognition, Ison's camera captures images in 1920x1080 resolution, and Optical Character Recognition (OCR) software detects text in these images with 95% accuracy. The audio output for the device must be within 60 to 90 decibels to ensure a safe but audible listening experience. As for the reliability of the glasses, they can withstand a 5'8" drop and operate for at least 7 hours on a single charge.

To enable Ison's functionality, a battery-powered Bluetooth system is attached to Ison glasses. Ison runs on a 3.7-V battery that powers the electrical modules on the glasses, which includes the audio transducers, camera, and Bluetooth module. A charging module is connected to the battery to recharge when plugged into a power source. As for the software, Ison's built-in OCR model uses machine learning (ML) to recognize text in images. Similar to how humans improve their reading skills through practice, the accuracy of Ison's OCR process can and will improve through ML training methods and usage over time.

Ison offers a wearable solution for those who have difficulties with reading. Outside of reading assistance, Ison also offers translation and the language selection will be expanded upon to offer most widely spoken languages. Moreover, the companion app has an easily traversable user interface with concise selections for language and volume. Furthermore, Ison will offer a variety of different frame sizes and styles to accommodate the user's preferences. Ultimately, Ison is designed to increase user independence, and the team has plans of adding more customization and features, such as word finder, navigator, and more.