

The Creation of a Wearable Device Using Artificial Intelligence Technologies to Aid the Visually Impaired

Shareef, Omar (School: Saint Edward's School)

The visually impaired face a range of different problems, notably their inability to interact socially and independently. Such challenges range from basic tasks such as recognizing something they are holding to more complex tasks such as recognizing others or familiarizing themselves to unknown situations. Many wish they did not have to rely on others to aid in recognizing their surroundings, especially if these surroundings are novel and unfamiliar. This project entails the creation of a hardware device in the form of a glove which uses artificial intelligence, more specifically Convolutional Neural Networks (CNN), Single Shot MultiBox Detectors (SSD), Optical Character Recognition (OCR) algorithms, and other computer vision technologies to identify surrounding objects, faces, and text. The device is comprised of a Raspberry Pi mini-computer which processes all of the images, a camera module which takes images of surroundings, and an external battery pack to power the device. An array of buttons are placed on the device, each with a different function (object, face, or text recognition), and results of what the device finds are outputted through speakers/headsets connected to the device. Such a device would aid the visually impaired, helping them become socially independent and not needing to rely on others for assistance. At this time, the device is successfully able to recognize detected objects with an accuracy of 95.6% as well as detected faces with an accuracy of 98%. Although the text recognition algorithm is functional, text is unable to be recognized due to the image quality of the camera not being sufficient. Moreover, the device is relatively inexpensive with a total cost of \$65.

Awards Won:

Third Award of \$1,000