Assistive Glasses for the Vision Impaired

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Even though nearly 39 million people worldwide are suffering from some form of profound visual impairment, the available assistive devices designed to help visually-impaired individuals still lack certain qualities such as adequate obstacle detection range and conclusive feedback systems. While the common white cane is helpful to some extent by being simple and straightforward, significant gains to mobility can be achieved with smarter assistive devices. To advance this front, we have designed an assistive device system in the form of sunglasses and bracelets that notify the user with haptic and verbal feedback, while still enabling hands-free usage. By using computer vision technology, the type of obstacle and its distance to the user is calculated and outputted using the vibration motors on the bracelets and the headphone unit on the glasses. This process is run entirely on an Android mobile device to minimize battery loss and lag, while still empowering extra functionality like voice assistants, on-demand optical character recognition and use of GPS services built-in to the Android device. Using widely available hardware like the Raspberry Pi and Adafruit modules, the device was made easily affordable. Fitting all the hardware to a 3D printed enclosure in the form of sunglasses, the comfort and ease of habituation of the assistive device were aimed to be maximized. With magnetically wired and wireless charging, the device's operation time, set as approximately 4 hours by the 1550mAh lithium polymer battery, was aimed to be easily extended.

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