Assistive Glasses for the Vision Impaired: Continuation

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Last year, 43.3 million individuals were estimated to be completely blind, while close to 300 million suffered from moderate to severe vision impairment. By 2050, these numbers are predicted to increase to upwards of 60 and 450 million respectively, yet the assistive devices available for vision-impaired individuals prove lacklustre in functionality, accessibility, and affordability. This project devises an alternative assistive device system to help blind people navigate through daily life. The fundamental function of the device is to constantly perform object detection and relative distance calculation, solely based on computer vision, to caution the user against incoming obstacles, road features, and warning signs. After each detection cycle, about every 200 milliseconds, the user receives feedback in haptic and audio feedback using the haptic feedback bracelets on each wrist and the open-backed in-ear headphone. To reduce the power consumption and heat output of the Assistive Glasses, the entire detection cycle is run on an Android device using the YOLOv5 object detection framework. The device is designed in a head-mounted form, in the shape of glasses, and a pair of haptic feedback bracelets to enable hands-free usage. The casings of the devices are designed in a modular sense with adjustable constraints to ensure compatibility with different age groups. The electronics consist of open-sourced or widely available modules and development boards, allowing for it to be constructed within a budget of 100 US Dollars.