Eco-Eye: Object Detection System for Blind People

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Abstract: *Visually impaired individuals face significant challenges when it comes to navigating their environment. This project presents a cost-effective and efficient solution for improving mobility through a smart navigation system designed for the visually impaired. Utilizing Raspberry Pi, a camera, and advanced object detection techniques, the system eliminates the need for traditional ultrasonic sensors. By incorporating computer vision, object detection algorithms, and text-to-speech (TTS), the system identifies objects and provides real-time feedback via audio. Furthermore, the system includes an emergency alert feature that allows the user to press a dedicated button to send an email to a guardian, containing their location and a picture of the surroundings. This solution aims to enhance mobility, safety, and independence for visually impaired individuals, while being simple, scalable, and user-friendly. The system is also designed to be affordable and accessible, with future potential for more complex features such as obstacle classification, path guidance, and AI-based personalized navigation.*

Keywords: Object Detection, YOLOv3, Raspberry Pi, Assistive Technology, Blind Assistance, COCO Dataset, Edge Detection, Real-Time Processing