A Wearable AI-Based System for Women's Safety and Visually Impaired Assistance Using Voice Interaction and Object Detection

Asmita Kashid[1], Sanjyot Balsaraf[2], Shreedhar Vharambale[3] , Prof. Shubhangi Said[4]

Students, Department of AI&DS Engineering[1,2,3]

Professor, Department of AI&DS Engineering[4]

Jaihind College of Engineering Kuran, Maharashtra, India.

Abstract: *The increasing concerns around women's safety and the challenges faced by visually impaired individuals in daily navigation have motivated the development of an intelligent wearable system. This paper presents the design and implementation of AI-powered smart sunglasses, a multifunctional assistive device that integrates real-time object detection, voice assistance, health monitoring, and emergency alert mechanisms. The system leverages state-of-the-art technologies, including the YOLOv8 algorithm for accurate and fast object detection, and OpenAI's GPT-based virtual assistant for hands-free interaction. It is designed to provide three methods for triggering emergency SOS alerts: manual activation via a button, voice command, and automatic activation upon detecting irregular health parameters such as elevated heart rate or sudden falls. These alerts are transmitted through Twilio API using SMS, WhatsApp, and email, ensuring timely communication with emergency contacts. Real-time audio feedback enables visually impaired users to safely navigate their environment by identifying obstacles. Integrated health sensors monitor key physiological data and trigger alerts when anomalies are detected. The system runs efficiently on embedded hardware (Raspberry Pi 4) and provides a user-friendly experience through voice and audio interaction. Comprehensive testing demonstrated high reliability, low latency, and effective real-world applicability. This solution aims to improve personal safety, promote independence, and enhance the quality of life for its users by combining artificial intelligence with practical assistive technology in a compact, wearable form.*

Keywords: AI-powered sunglasses, object detection, women's safety, visually impaired assistance, GPT voice assistant, Twilio API, YOLOv8, health monitoring, wearable technology, emergency alert system