

Smart Glasses for Visually Impaired - Project Report

1. Introduction

This project aims to develop smart glasses integrated with a smart stick to assist visually impaired individuals. It provides obstacle detection using ultrasonic sensors and feedback via a buzzer, along with optional BLE communication to a mobile app. The system is powered by an ESP32 microcontroller.

2. Components Used

- ESP32 Dev Board
- HC-SR04 Ultrasonic Sensor
- Buzzer
- OLED Display (SSD1306)
- Battery (18650)
- Smart Stick Frame or Casing

3. Features

- Real-time obstacle detection using ultrasonic sensor
- Audio feedback via buzzer
- OLED display for distance visualization
- BLE communication for remote data access

4. System Architecture

The system uses an HC-SR04 sensor to measure the distance to obstacles. The ESP32 processes this data

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and activates the buzzer based on proximity. An OLED screen optionally displays distance values. BLE can transmit data to a mobile device.

5. Future Improvements

- Integrate GPS navigation
- Add voice feedback
- Use AI/ML for smarter obstacle classification

6. Conclusion

This project provides a simple yet effective tool to assist visually impaired people in navigating their environment safely. The combination of ESP32, ultrasonic sensing, and feedback mechanisms makes it a practical low-cost solution.