Microcontroller & Embedded Systems (MTS-311)

DE-44 Mechatronics

Syndicate – C

Project Proposal
Basarat

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BASARAT: Smart Glasses for the Visually Impaired.

Objective:

The goal of this project is to design and develop smart glasses that assist visually impaired individuals by providing real-time navigation, obstacle detection, and object recognition. These glasses aim to enhance their mobility, independence, and confidence in navigating daily environments.

Project Overview:

The smart glasses will incorporate a combination of sensors (ultrasonic, LiDAR) and computer vision technology to detect obstacles and provide auditory feedback to the user. A small camera integrated into the glasses will capture the surrounding environment and, through machine learning algorithms, recognize common objects, read text, and identify faces. This information will be conveyed to the user through audio output, using either bone-conduction earphones or Bluetooth connectivity with a smartphone app.

Features:

Obstacle Detection: Camera will scan the surroundings for obstacles within a range and provide haptic or auditory warnings.

Object Recognition: The system will recognize everyday objects (e.g., doors, chairs, people) and announce them to the user via voice feedback.

Text-to-Speech (TTS) Integration: The glasses will be able to read text, such as signs or labels, using optical character recognition (OCR) and convert it to speech.

Navigation Assistance: Integration with GPS and mapping services for providing directions, helping users move independently in outdoor environments.

Target Audience:

The primary users of this technology are visually impaired or blind individuals who require assistance in navigating and interacting with their surroundings. The glasses are designed to be lightweight, ensuring comfort for prolonged use.

Technology Stack:

Hardware: Esp CAM, earphones.

Software: Python, OpenCV for computer vision, TensorFlow for object detection, Google TTS API for audio output.

Expected Impact:

This project aims to significantly improve the quality of life for visually impaired individuals by providing them with a portable and user-friendly assistive device. Smart glasses will offer a sense of independence, enabling users to navigate unfamiliar environments and interact more confidently with the world around them.

Timeline:

Phase 1 (Month 1-2): Research and prototype development

Phase 2 (Month 3-4): Hardware integration and software implementation

Phase 3 (Month 5): Testing and user feedback

Phase 4 (Month 6): Final adjustments and product launch

Conclusion:

Smart glasses will empower visually impaired individuals to live more independently and confidently. With real-time guidance and obstacle avoidance, they will experience greater autonomy in their daily activities.