Ai -Power Based Blind And Visually Impaired System For Smart Glass

Balaji C[1], Dhanush P[2], Hariprasanna K[3], Bairavaprakash.C.P[4], Mahadevan[5]
[1, 2, 3, 4] Dept of CSE
[5]Assist prof, Dept of CSE
[1, 2, 3, 4, 5] CARE College of Engineering
Approved by AICTE|Affiliated To AnnaUniversity #27, Thayanur, Trichy – 620009

Abstract- *Visual impairment creates major challenges in daily life and mobility, as individuals often struggle to detect obstacles and recognize people around them. To address these issues, smart assistive technologies play a vital role in improving independence and safety. This project uses object detection to identify items ahead, helping users navigate their environment more effectively. It also includes a face recognition system to identify both familiar and unfamiliar individuals. A deep learning-based Convolutional Neural Network (CNN) processes images captured by a camera and classifies them accurately. The detected information is then converted into audio output, providing voice-based guidance to the user and offering a more efficient solution compared to traditional methods like white canes*

Keywords: Visual Impairment, Assistive Technology, Object Detection, Face Recognition, Deep Learning, Convolutional Neural Networks (CNN), Audio Output, Smart Navigation, Computer Vision, Voice Assistance.

I. INTRODUCTION

PROJECT OVERVIEW

This project focuses on developing an intelligent assistive system for visually impaired individuals that helps them navigate safely and independently using AI and deep learning techniques. The system uses a CNN-based model to detect objects, recognize faces, and provide real-time audio feedback.

- Detects obstacles and objects in real time to assist safe navigation.
- Uses Convolutional Neural Networks (CNN) for object detection.
- Recognizes familiar and unfamiliar faces using face recognition technology.

PROBLEM DESCRIPTION

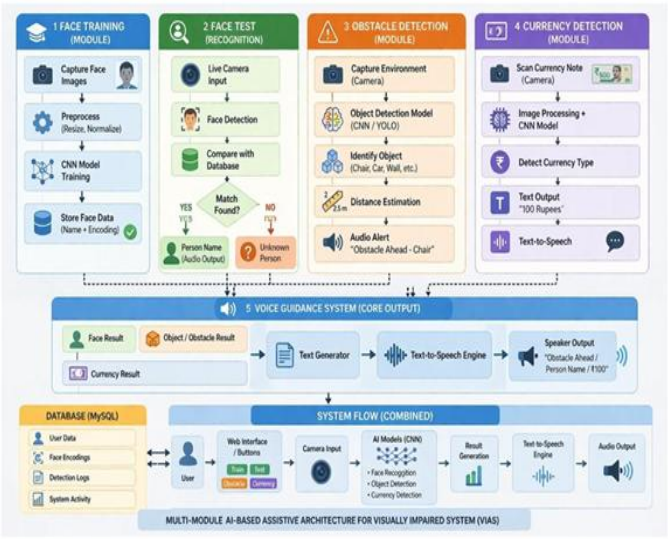
- Visually impaired individuals face difficulty in detecting obstacles in their surroundings.
- Identifying people and objects in real time is challenging without assistance.
- Traditional aids like white canes provide limited environmental information.
- Lack of real-time feedback reduces safety and independence.

II. LITERATURE SURVEY

Many research works focus on developing assistive technologies for visually impaired individuals using deep learning and computer vision. Convolutional Neural Networks (CNN) are widely used for object detection and image classification. Real-time detection models help in identifying obstacles and improving navigation. Face recognition techniques enable identification of known and unknown individuals. These technologies significantly enhance mobility, safety, and independence for visually impaired users.

III. PROPOSED SYSTEM

SYSTEM ARCHITECTURE



The platform comprises:

- Input Layer: Captures real-time video using a camera.
- Processing Layer: Performs image preprocessing and enhancement.
- Detection Layer: Uses CNN-based object detection and face recognition.
- Audio Layer: Converts detection results into voice output.
- Alert Layer: Provides real-time audio alerts to the user.

KEY FEATURES

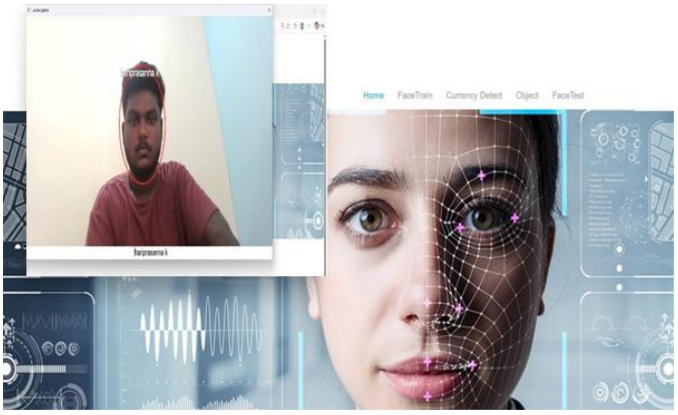
- Real-time object detection for safe navigation.
- Face recognition to identify familiar and unfamiliar people.
- Voice-based guidance system for user interaction.
- Currency detection for independent transactions.

IV. METHODOLOGY

The system follows a deep learning-based approach:

- Capture real-time video input using a camera.
- Extract frames from the video stream.
- Apply preprocessing techniques to improve image quality.
- Use CNN for feature extraction.
- Perform object detection and face recognition.
- Convert detected information into audio output.
- Provide real-time voice alerts for navigation and interaction.

SCREENSHOTS



V. DISCUSSION

STRENGTHS

- Provides real-time assistance for visually impaired users.
- Enhances safety and independence.
- Combines multiple features like object, face, and currency detection.
- Reduces dependency on others.

LIMITATIONS

- Performance may reduce in low-light conditions.
- Requires good camera quality for accurate detection.
- Processing speed depends on hardware capability.

FUTURE WORK

- Improve accuracy using advanced deep learning models.
- Integrate GPS for navigation assistance.
- Develop wearable smart glasses for portability.
- Enhance performance in complex environments.

VI. CONCLUSION

The Project on display is a smart glass that combines the capabilities of a machine vision and obstacle detection and identification sensor. It can be easily promoted and made accessible to those who are visually impaired. It would also aid in the prevention of future injuries. Smart devices may be easily carried, and the system camera can monitor things and faces in the area and show them in audio format.The system's design, functioning mechanism, and principles, as well as certain experiment outcomes, were addressed

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