

Assistive aid for individuals with visual impairments

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Objective

Why This Project?

- Individuals with visual impairments often face difficulties in recognizing obstacles and objects around them.
- Expected Impact: Improve accessibility and provide a practical solution for enhanced mobility and safety.

Technology

- Core Technology: YOLO v9 for image processing and object detection.
- Supporting Tools:
 - Python: Scripting and developing the detection pipeline.
 - Pre-Trained Models: Use models compatible with YOLO v9.
 - Hardware Components: Webcam, Speaker, Arduino(for potential IOT implementation).

Object Detection with YOLO v9

Why YOLO v9?

- YOLO v9 offers improved accuracy, better handling of small objects, and reliable real-time performance. Its balance of precision and speed makes it ideal for assistive software requiring accurate object detection.

Advantages for Our Project:

- Optimized for real-time processing on low-power devices.
- Easy integration with other Python libraries, including Text-to-Speech (TTS) for audio feedback.

Software Implementation with YOLO v9

Detection Pipeline:

- Capture real-time video feed using YOLO v9.
- Process each frame with the pre-trained model, identifying and classifying objects.
- Convert detection results into audio alerts via TTS.

Programming Language & Libraries: Python.

Proposed Solution

Software for Object Detection & Guidance:

- Use AI to process live camera feeds.
- Provide voice-based environment descriptions.

Future Enhancements

- Train custom AI models for enhanced accuracy.
- Add advanced scene interpretation for complex environments.
- Integrate multi-language support for accessibility.

Software Workflow

Software for Object Detection & Guidance:

- Input: Camera captures the surroundings.
- Processing: AI detects objects and hazards.
- Output: Real-time audio feedback through a connected device.

Development Progress

- Completed: Object detection prototype using pre-trained AI models.
- In Progress: Optimizing processing speed and accuracy.

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