Mahendra Institute of Technology

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Review - 1

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SMART VISION USING IOT FOR BLIND PERSONS: FROM DARKNESS TO LIGHT

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SMART VISION USING IOT FOR BLIND PERSONS:FROM DARKNESS TO LIGHT

INTRODUCTION

- An IoT-based assistive technology developed to help visually impaired individuals by offering real-time awareness of their surroundings.
- It employs sensors, cameras, and AI-driven voice guidance to identify obstacles, recognize objects, and interpret the environment.
- In the field of education, such technologies enable visually impaired students to access learning materials through smart devices and voice assistants.

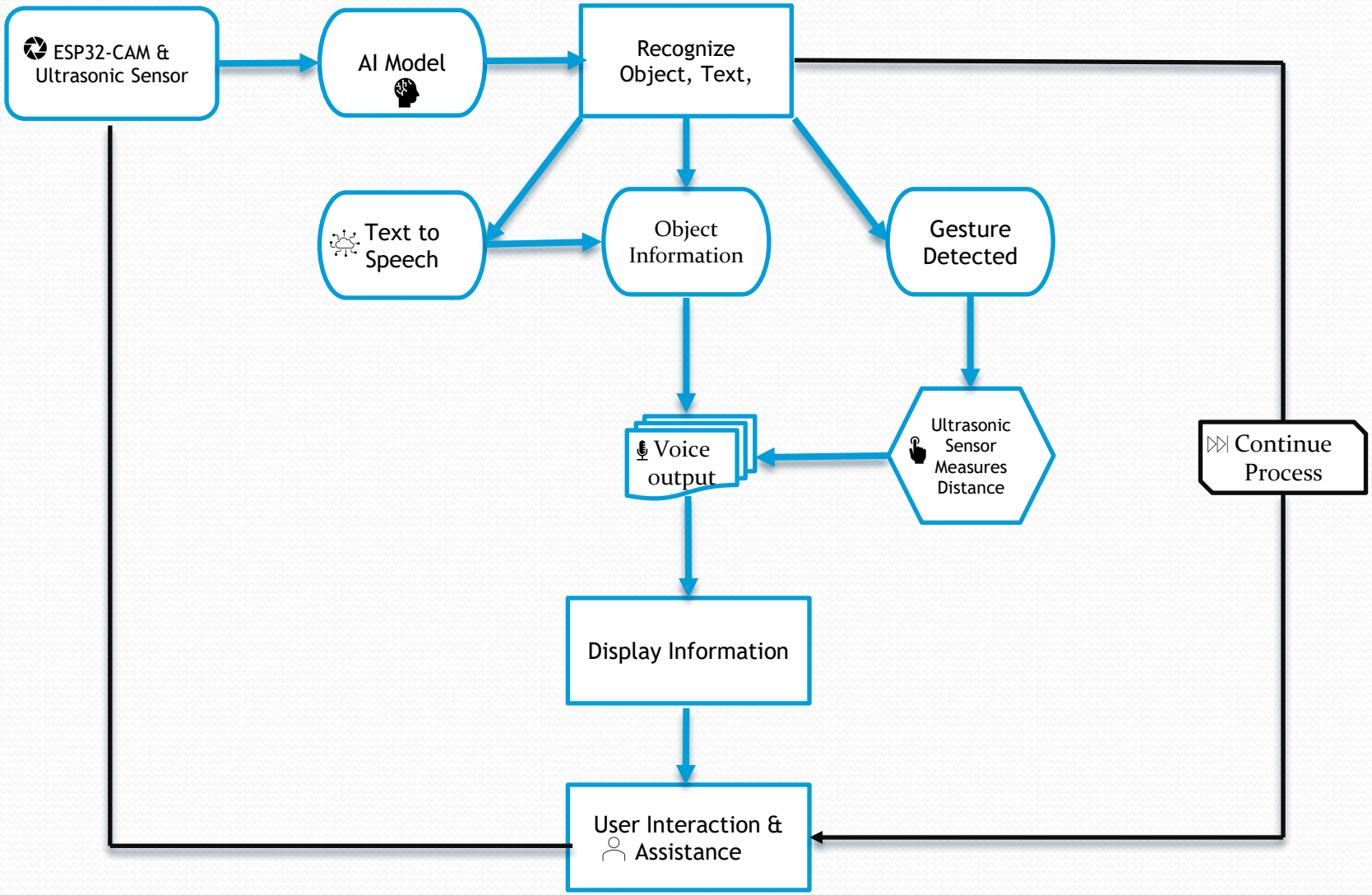
ABSTRACT

- It can **capture images** or allow users to **request specific pages or content**, converting them into **voice output** for better accessibility.

- Smart Vision Using IoT is an innovative solution designed to enhance educational experiences, leveraging AI-driven image processing, voice recognition, and IoT technology.

- The system enhances education with text, diagram, and gesture recognition, providing **contextual voice assistance**. It enables adaptive, personalized learning and remote access, transforming traditional teaching methods.

DATA FLOW DIAGRAM:



EXISTING SYSTEM

- Currently, blind individuals rely on various traditional and technological methods for navigation and daily activities:
- **White Cane** – A widely used tool that helps detect obstacles and changes in terrain through touch.
- **Guide Dogs** – Specially trained dogs assist in mobility by navigating around obstacles and leading their owners safely.
- **GPS** – Based navigation systems help outdoors but fail in indoor environments.
- **Moovit** – Helps users navigate public transport with live bus and train updates.

PROPOSED SYSTEM

- **AI-powered learning assistant** – Provides real-time explanations, summaries, and interactive quizzes.
- **Gesture-based interaction** – Enables students to navigate learning materials using hand gestures.
- **Adaptive learning system** – Personalizes lessons based on student performance and understanding.
- **Smart Navigation and Obstacle Detection System-**Obstacle detection and navigation guidance with haptic (vibration) feedback.

ADVANTAGES

- **Improved Accessibility:** Helps visually impaired individuals access education and navigate through spaces.
- **Increased Independence:** Enables users to perform tasks independently, reducing reliance on others.
- **Personalized Learning:** Offers tailored educational experiences through voice recognition and text-to-speech functionality.
- **Cost-Effective:** Reduces the need for human assistants and expensive specialized equipment.

DISADVANTAGES:

- **Privacy Concerns** – AI-powered vision may raise security and data privacy issues.
- **Internet Reliance** – Some features require a stable internet connection.
- **Environmental Limitations** – Poor lighting or weather conditions can affect performance.

SYSTEM REQUIREMENTS

- **HARDWARE REQUIREMENTS:**

  ESP32-CAM – Captures real-time images for object detection.

  Ultrasonic Sensor – Detects nearby obstacles and measures distance.

- **SOFTWARE REQUIREMENTS:**

  Operating System – Android, Linux.

  AI-model-TensorFlow,PyTorch for object Recognition.

  Microcontroller Programming – Arduino IDE .

LITERATURE REVIEW

BLIND VISION-USING IOT

- Farhan et al. (2022) developed an IoT-based reader device for the visually impaired using Raspberry Pi and OCR to convert text into speech. The system captures text via a webcam, processes it through OCR, and outputs the extracted content as audio, providing real-time accessibility without relying on Braille.

VIRTUAL EYE FOR BLINDS

- Niveditha et al. (2020) developed a smart stick with a camera and Raspberry Pi to aid visually impaired individuals. Using DarkFlow algorithms, the system detects obstacles and provides real-time auditory feedback, while an additional sensor helps avoid puddles, improving navigation and safety.

LITERATURE REVIEW

READER DEVICE FOR BLIND HUMANS

- Tamilarasan et al. (2022) introduced a portable smart vision device for the visually impaired using Raspberry Pi and OpenCV. The system identifies objects, detects obstacles, and provides voice feedback for navigation and daily tasks. It alerts users through vibrations, enhancing mobility and independence.

IOT VISION ALERT FOR BLIND USING INTERDISCIPLINARY APPROACHES

- Annapurna et al. (2024) developed an IoT-based vision alert system using wearable glasses equipped with cameras and sensors to assist blind individuals. The system recognizes obstacles, offers real-time navigation guidance, and enhances user safety and independence.

THANK YOU