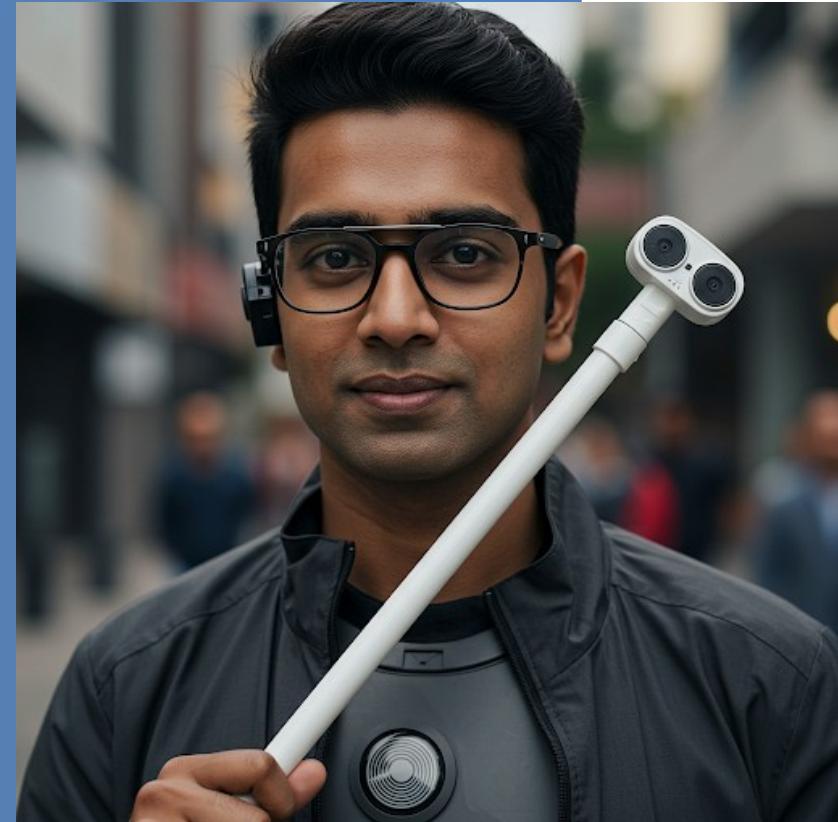




Innovate X Impact - 2025

- **Track** – Assistance For Elderly And Physically Challenged Individuals
- **Title**- **DrishtiGuide** - Your Vision Companion
- **PS Category**- Hardware
- **Team Name** - DrishtiGuide
- **College Name**- Vellore Institute Of Technology, Chennai



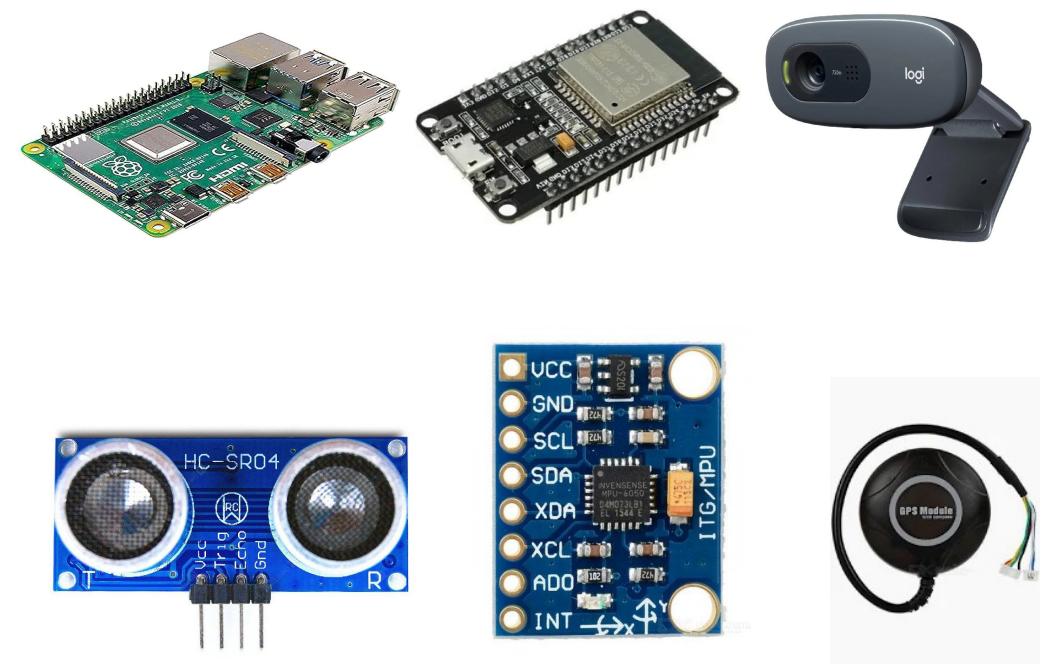


Tech Stack

Software Stack

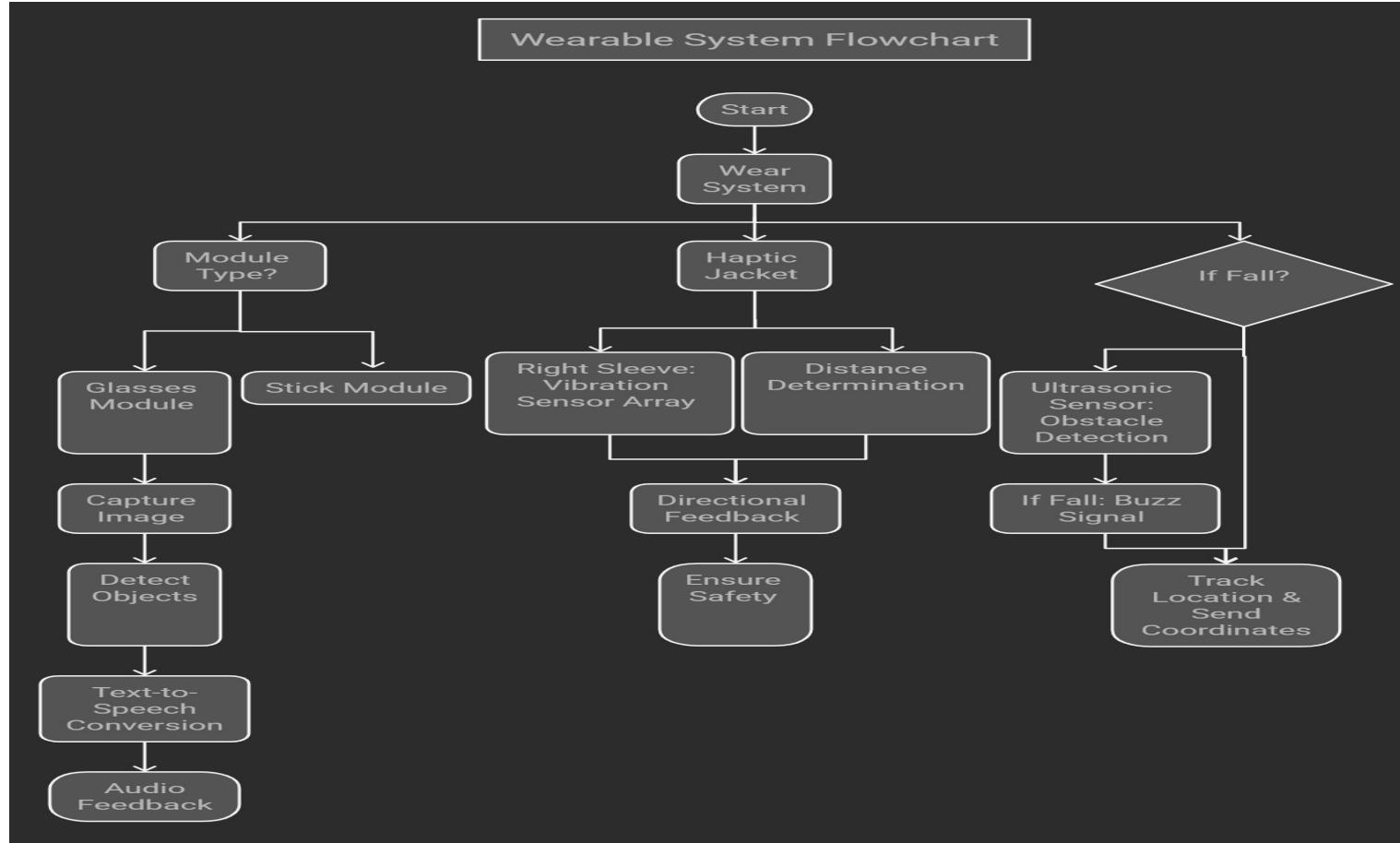


Hardware Stack





TECHNICAL APPROACH





•**Technical Feasibility:**

➤ **Hardware Integration:**

- Utilizes readily available components (Raspberry Pi 4B, ultrasonic sensors, vibration sensor array, etc.) that are proven in similar projects.
- Modular design allows independent testing and seamless integration of the glasses, jacket, and stick modules.

➤ **Software & Algorithms:**

- Open-source libraries such as YOLOv8, OpenCV, and PyTorch enable robust and accurate object detection.
- Efficient real-time processing ensures minimal latency in converting sensor data to actionable feedback.

➤ **Connectivity & Tracking:**

- Mapbox API integration for real-time GPS tracking and location updates.
- Reliable wireless communication via ESP8266 ensures data integrity between modules.



•Economic Viability:

➤ Cost-Effective Components:

- Use of low-cost yet reliable hardware reduces overall production expenses.
- Open-source software minimizes development costs while allowing for continuous improvement.

➤ Scalability:

- Modular architecture makes it easy to upgrade or add features (e.g., additional sensors or navigation aids) without overhauling the entire system.
- Suitable for mass production with potential for partnerships with healthcare and assistive technology organizations.



➤ Enhanced Safety & Navigation:

- Real-time multi-modal feedback (audio, haptic, and ultrasonic) detects obstacles promptly, reducing the risk of accidents.

➤ Increased Independence:

- Empowers visually impaired and elderly users to navigate confidently and autonomously.

➤ Family & Caregiver Connectivity:

- Continuous GPS tracking and immediate alerts keep family members and caregivers informed for prompt assistance.

➤ Cost-Effective & Scalable:

- Utilizes affordable, open-source hardware and software, making it easy to scale and integrate into existing healthcare solutions.

➤ Improved Quality of Life:

- Enhances overall situational awareness, contributing to a more secure, independent lifestyle for users.



➤ **Expanding Market:**

- Growing demand for innovative assistive technologies targeting elderly and visually impaired populations.

➤ **Strategic Partnerships:**

- Opportunities to collaborate with healthcare providers, rehabilitation centers, and government agencies.

➤ **Scalable & Modular:**

- Modular design facilitates easy upgrades and customization, appealing to diverse market segments.

➤ **Cost-Effectiveness:**

- Utilizes affordable, off-the-shelf components and open-source software, ensuring competitive pricing.

➤ **Recurring Revenue Streams:**

- Potential for subscription-based services (e.g., real-time tracking, emergency alerts) and maintenance contracts.



➤ Limitations of Traditional Cane-Based Systems:

- Cane/stick devices typically detect obstacles only at ground level, offering a narrow field-of-view.
- Research indicates that low-mounted sensors often miss mid- to high-level hazards, reducing situational awareness.

➤ Advantages of Glasses-Based Detection:

- **Broader View:** Wearable glasses with integrated cameras capture a comprehensive view of the environment.
- **Early and Enhanced Detection:** Computer vision algorithms enable detection of objects at various heights and distances. This leads to faster, more reliable alerts compared to stick-only systems.
- **Integrated Multi-Modal Feedback:** Combines visual data with audio (text-to-speech) and haptic feedback (vibration sensor array) to improve user safety and independence.

➤ Integrated System Benefits:

- The combination of glasses-based vision with additional sensors (e.g., ultrasonic sensors on the stick) overcomes the limitations of traditional cane methods.
- This approach ensures enhanced obstacle detection and more effective navigation support for visually impaired and elderly users.

➤ Key References:

- Efficient Real-Time Object Detection on Edge Devices (ArXiv)
- Study on Limitations of Traditional Cane Systems (PMC)



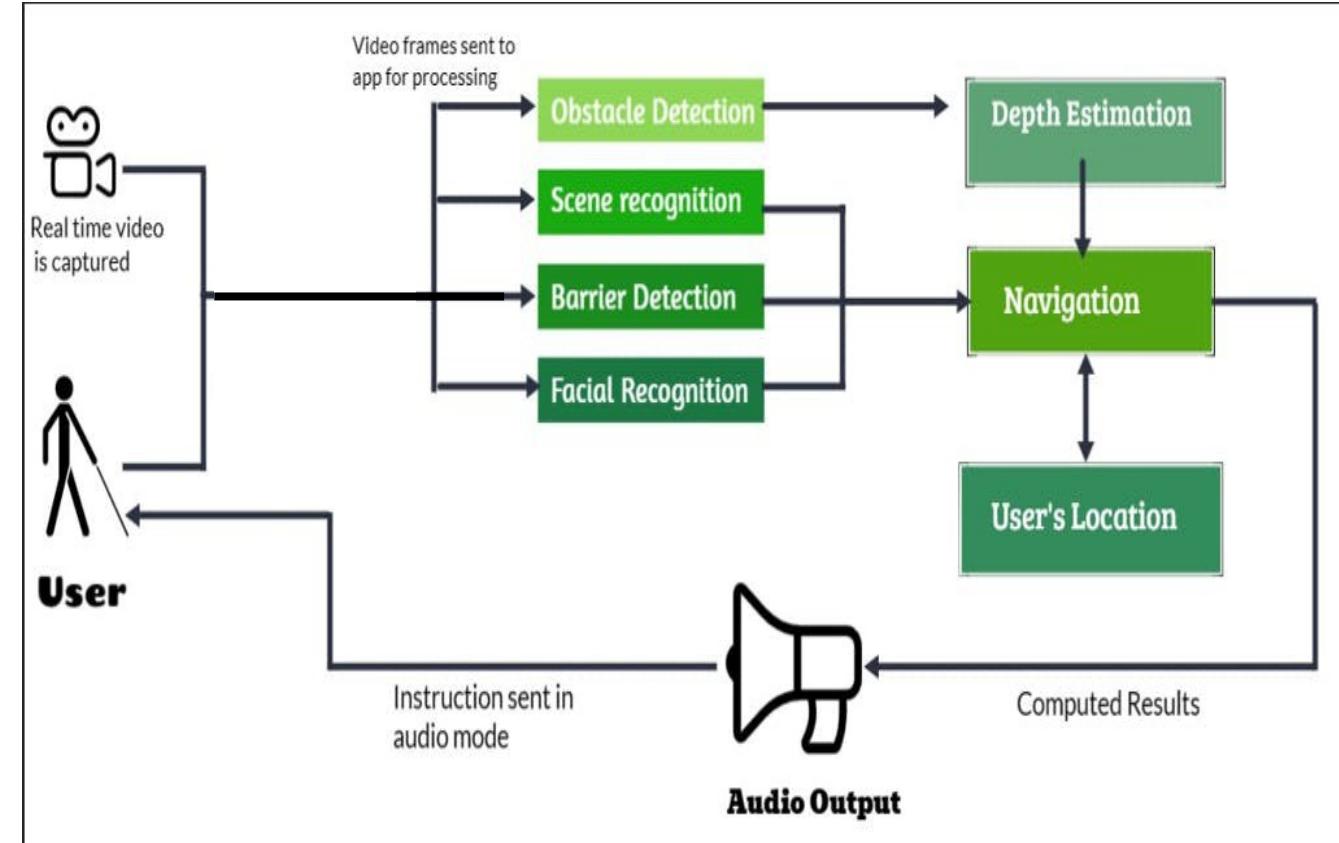
TESTING OF AI – BASED VISION SYSTEM



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TESTING OF AI – BASED VISION SYSTEM





Previous Achievements

- ₹1 Lakh SSV Fund from VNEST VIT Chennai
- Design Patent – No. 411148-001
- Utility Patent – Filed (Approved by SPORIC VIT)
- 1st in NIT Trichy's Pragyan Hackathon
- Top 30 in Electronics Wings Challenge (Global)



Honourable Mentions

- IoT Powered Automated Checkout and Inventory System
- New Age Charging Station
- Farmguard Farm Security With Cellular IoT And AI
- Montessori Edubox
- Flowguard
- Internet Connected Patient Monitoring With Cellular IoT
- Multi Operational Defence Rover
- Aerial Landmine Detection Using Machine Learning
- Nodeguard Wioterminal Mqtt Air Quality Monitor
- Universal Breadboard Powersupply Unit
- Hfips Hand Finger Injury Prevention System
- Pixelpanda A 3d Printed Pc
- Wand Of Illumination
- Component Identifier
- Diy Addictive Arduino 1d Pong Game

EW Project Challenge 2024
Challenge for Creator/ Maker in all of us.

Multi Operational Defence Rover

zoom

**danesh khur...
Danesh Khur...**



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