



**“AI-Powered Assistive Device for Enhancing Mobility and  
Independence of Visually Impaired Individuals”**

**Bachelor of Technology  
in  
Computer Science & Engineering**

**RESEARCH WRITING AND ETHICS**

***Submitted by:***

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
FACULTY OF ENGINEERING  
PES UNIVERSITY**

(Established under Karnataka Act No. 16 of 2013)  
100ft Ring Road, Bengaluru – 560 085, Karnataka, India

# Proposal for Funding: Empowering Independence through AI-Powered Assistive Technology

## 1. Project Title

AI-Powered Assistive Device for Enhancing Mobility and Independence of Visually Impaired Individuals

## 2. Principal Investigator (PI)

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## 3. Co-Principal Investigators (Co-PIs)

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## 5. Submitted To

AICTE (All India Council for Technical Education)

## 6. Abstract

This project seeks to empower individuals who are visually impaired by developing an affordable and effective AI-powered assistive device.

Designed with input from the visually impaired community, the device interprets surroundings using advanced computer vision and natural language processing to provide real-time auditory feedback.

By enhancing mobility and independence, this innovation aims to reduce reliance on caregivers and open new doors for social inclusion.

## 7. Objectives

1. Developing a Wearable Device: A compact, lightweight, and user-friendly device equipped with cameras and sensors to seamlessly integrate into daily life.
2. Advanced AI Integration: Implementing algorithms that detect objects, recognize obstacles, and narrate the environment in an intuitive manner.
3. Real-World Testing: Conducting field trials with direct user engagement to ensure the device meets practical needs and expectations.
4. Promoting Affordability: Ensuring the solution is cost-effective to maximize its accessibility for economically challenged individuals.

## 8. Background and Need

Millions of visually impaired individuals face barriers that limit their independence and quality of life. While assistive technologies exist, their high costs and limited capabilities fail to meet the needs of many.

This project addresses the gap by delivering an affordable, comprehensive solution that empowers users to navigate complex environments confidently and safely. Imagine a user independently identifying traffic signals, crowded pathways, or grocery aisles, transforming daily challenges into manageable tasks.

## 9. Methodology

- Phase 1: Understanding User Needs: Engaging with visually impaired individuals through interviews and focus groups to identify specific challenges and desirable features.
- Phase 2: Design and Prototyping: Building a wearable device integrating cameras, sensors, and advanced processors optimized for real-time performance.
- Phase 3: AI Development: Creating robust algorithms for object recognition, obstacle detection, and contextual narration, trained on diverse datasets.
- Phase 4: User Trials: Testing the device in real-world scenarios, gathering feedback to refine usability and accuracy.
- Phase 5: Scalability Planning: Developing strategies for mass production and distribution to ensure wide accessibility.

## 10. Budget Estimate

1. Hardware Components (INR 5,00,000): Essential for cameras, sensors, and processing units to ensure accuracy and durability.
2. Software Development (INR 1,00,000): Costs for licenses and tools to design intuitive AI and NLP algorithms.
3. Prototyping (INR 2,00,000): To create initial models for real-world testing and validation.
4. Personnel (INR 3,00,000): Supporting research assistants and technicians who will

contribute to hardware assembly, AI programming, and testing.

5. Travel for Trials (INR 1,00,000): To collaborate with diverse users across different regions and collect meaningful insights.

6. Miscellaneous (INR 50,000): Accommodating unforeseen expenses that arise during development and testing.

Total Budget: INR 13,00,000

## 11. Outcomes and Impact

This initiative will result in a transformative device that provides:

1. Independence and Dignity: Users can navigate public spaces, commute, and manage daily tasks without constant assistance.
2. Community Empowerment: A tool that encourages social participation and inclusion for visually impaired individuals.
3. Technological Advancement: A new benchmark for affordable, AI-driven assistive devices, inspiring further innovation.

## 12. Ethical Considerations

- Data Privacy: User data collected during trials will be anonymized and securely stored, with strict adherence to ethical guidelines.
- Inclusivity: The project will prioritize accessibility, ensuring that the final product addresses diverse needs and abilities.

## 13. Declaration

We hereby declare that the information provided in this proposal is accurate and complete to the best of our knowledge.

We commit to adhering to ethical standards and guidelines set by the funding agency throughout the project lifecycle.