

IMAGINE AI

Illuminating the path for the blind



Our Team

We are a team of 4, pursuing a BTech in Computer Science with the same idea and passion for developing this project.

Melissa Manoj Thondoli

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MENTOR

Prof. Ashly Thomas is an experienced Assistant Professor at SJCET. She will serve as the project mentor, guiding and supporting the team throughout the project lifecycle.

Course Outcomes

- CO1:** Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).
- CO2:** Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).
- CO3:** Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).
- CO4:** Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).
- CO5:** Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).
- CO6:** Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply)

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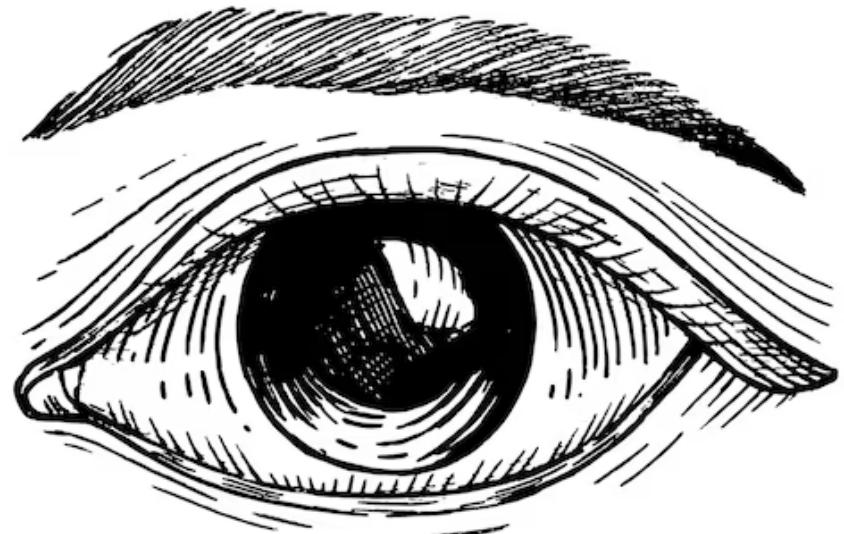
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CONCLUSION

PROBLEM STATEMENT

Vision, the most dominant of our senses, plays a critical role in every facet and stage of our lives. We take vision for granted, but without vision, we struggle to learn, to walk, to read, to participate in school and to work. Globally, at least 2.2 billion people have a near or distance vision impairment. The challenges faced by visually impaired individuals are multifaceted and impactful across various aspects of life.

- Access to information
- Overly helpful individuals
- Societal stigma
- Finding and keeping a job
- Leisure
- Isolation



LITERATURE SURVEY



JOURNALS

Third Eye: Object Recognition and Speech Generation for Visually Impaired(Koppala Guravaiah, Yarlagadda Sai Bhavadeesh , Peddi Shwejan , Allu Harsha Vardhan, S Lavanya)2023

Dynamic Crosswalk Scene Understanding for the Visually Impaired(Shishun Tian, Minghuo Zheng, Wenbin Zou, Xia Li, Lu Zhang)2021

FINDINGS

- YOLOv5 : image detection model
- gTTS (Google Text-to-Speech)
- pyttsx3

Sensor Technology:
The system relies on an Intel RealSense camera, which is likely used for capturing depth information and understanding the three-dimensional aspects of the scene.

ADVANTAGES

- YOLOv5 is fast, easy to use, and capable of achieving state-of-the-art results for object detection tasks.
- The gTTS library is an easy-to-use tool that converts text to speech and allows you to save the output as an audio file.
- pyttsx3 works both offline and online, and is compatible with both Python 2 and 3 versions. It works without any delay.

Understanding the three-dimensional aspects of the scene enhances the system's ability to interpret the environment accurately

Object Detection And Recognition Using TensorFlow For Blind people (P Devika, S P Jeswanth, Billu Nagamani)2022

Advanced Audio Aid for Blind People (Savera Sarwar,Danish Channa) 2022

- Video Capturing Module: Connect this as input to the COCO dataset.
- Image Processing Module: OpenCV
- Object Detecting Module: SSD
- Distance calculation Module: Numpy
- Audio Output Module: pyttsx3

- Operating system: Raspberry Pi
- Object detection: Yolo algorithm
- Training dataset: COCO
- Text reader: OCR Technology in Tesseract
- Convert text to voice: pyttsx3 library in python

OpenCV works with almost all the leading programming languages today, including Python, C++ and Java. One of the main advantages of SSDs is their speed and efficiency. Because they use a single network, they can detect objects in real-time.

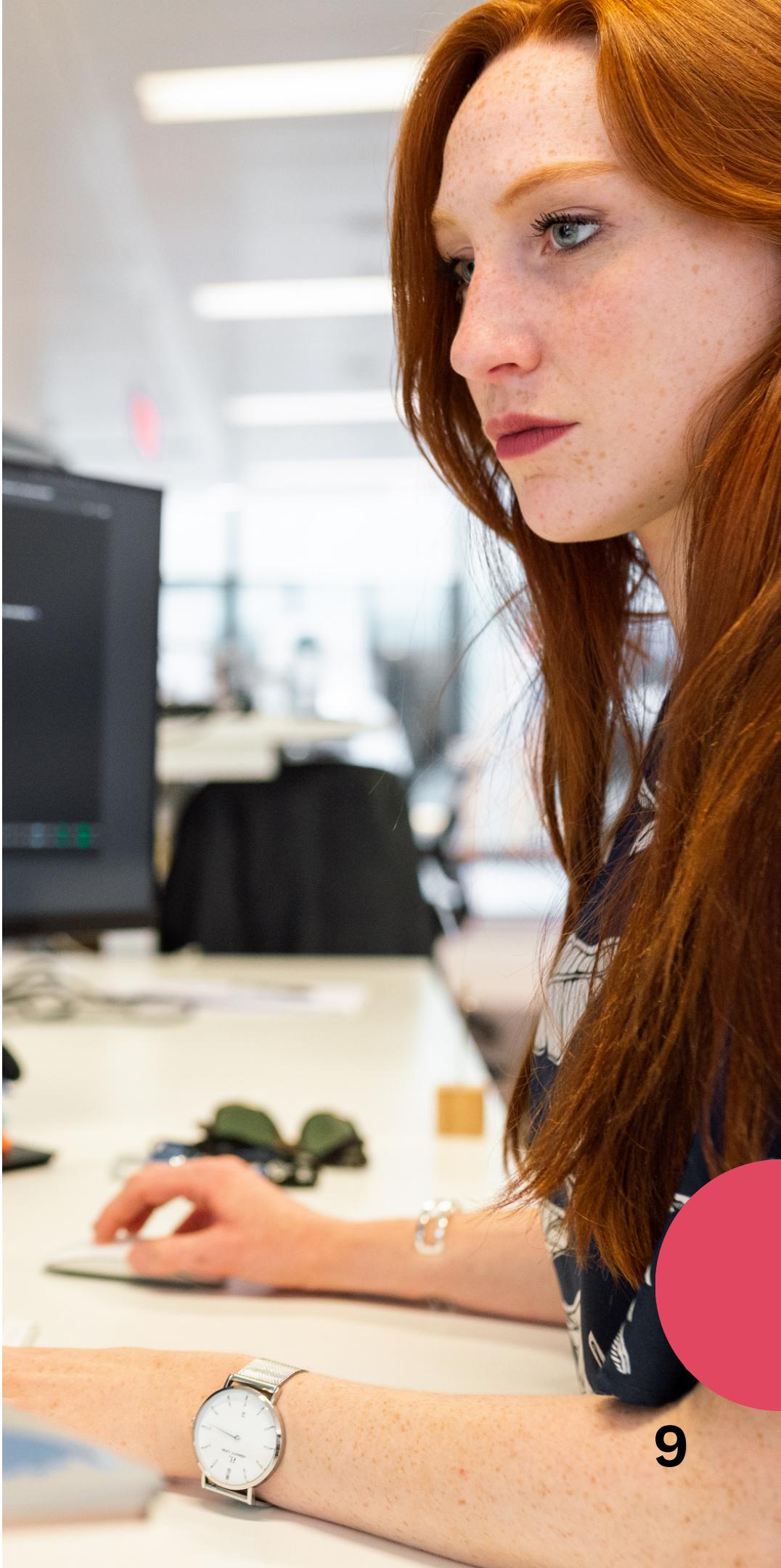
COCO dataset versatility and multi-purpose scene variation serve best to train a computer vision model and benchmark its performance. Information of OCR can be readable with high degree of accuracy.

OBJECTIVE

"ImagineAI" represents a groundbreaking leap in technology, catering specifically to the needs of the visually impaired. This innovative system harnesses the power of machine learning, computer vision, and the Internet of Things (IoT) to bridge the sensory gaps experienced by individuals with visual impairments. Key objectives:

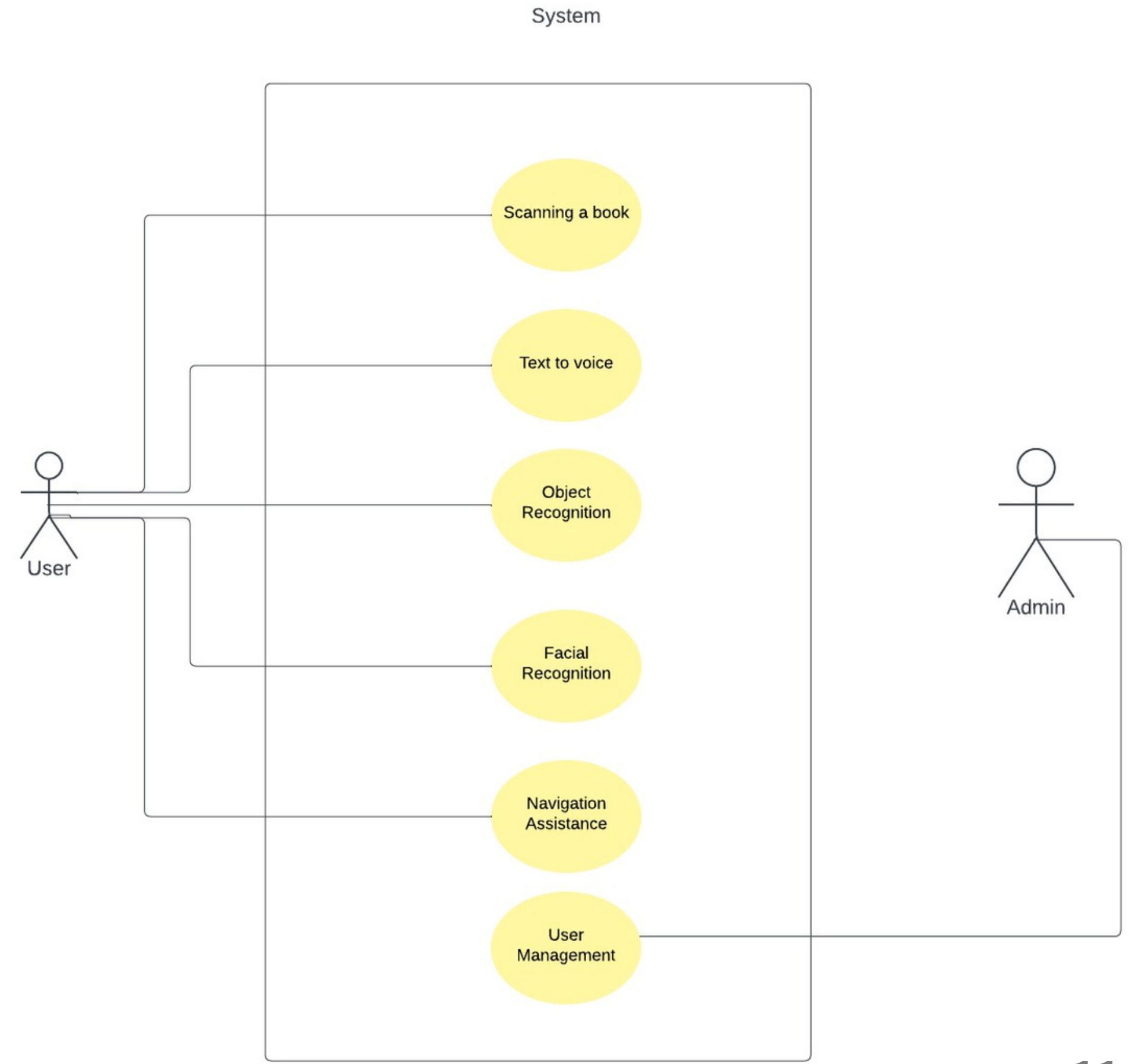
- Object detection
- Navigation
- Read text from books through auditory feedback
- Facial recognition

Above all, "ImagineAI" embodies inclusivity, empowerment, and independence for the visually impaired community. It stands as a testament to how cutting-edge technology can redefine accessibility, enrich lives, and empower individuals by leveraging innovation to create a more inclusive world.

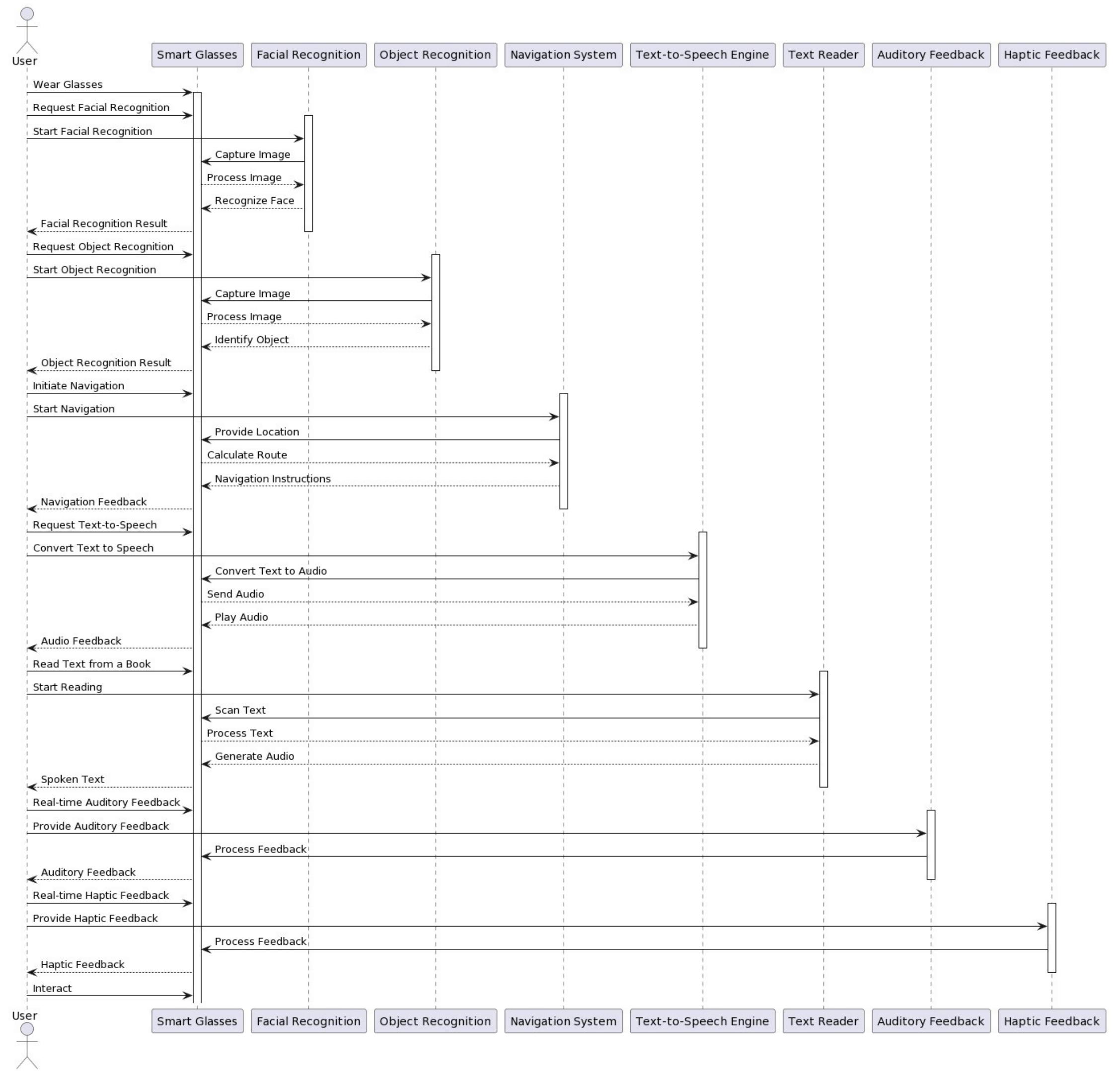


DESIGN DIAGRAMS

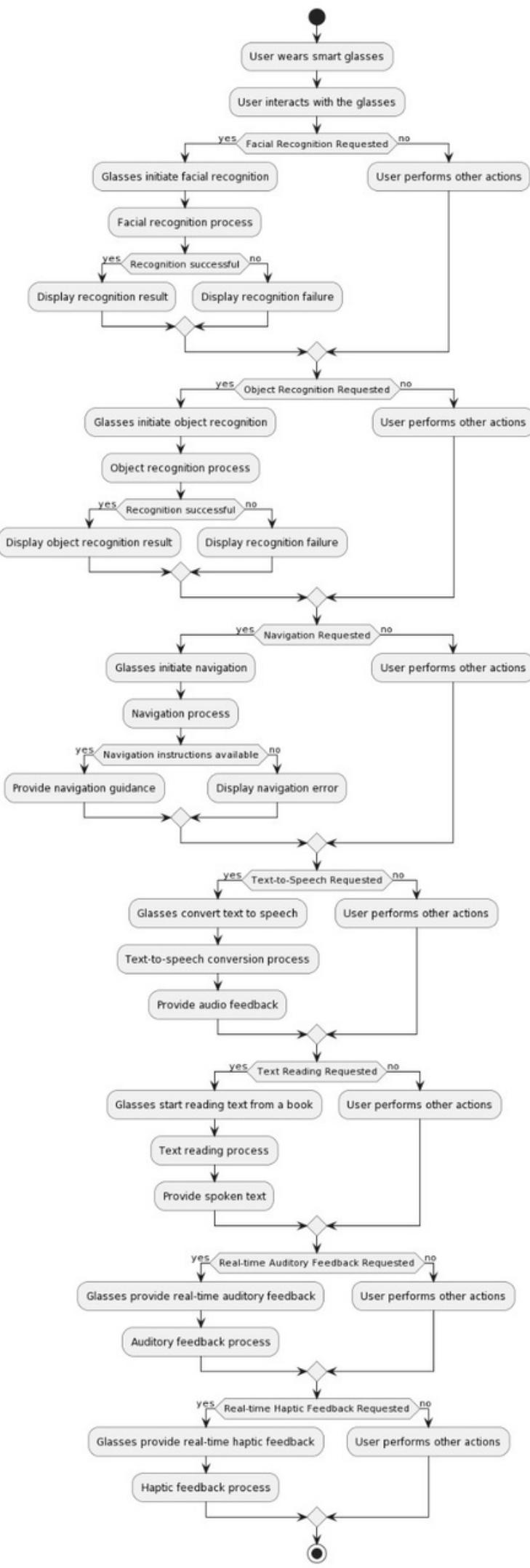
USE CASE DIAGRAM



SEQUENCE DIAGRAM



ACTIVITY DIAGRAM



REQUIREMENT ANALYSIS

To identify the requirements for this project, we contacted a relative of one of our team members who is visually impaired. Based on that we could identify the following functional and non-functional requirements.

FUNCTIONAL REQUIREMENTS

◆ NAVIGATION ASSISTANCE

Users should be provided with navigation assistance to help them navigate their surroundings. This might include real-time directions, obstacle detection, and guidance.

◆ OBJECT RECOGNITION

The system should be able to recognize and identify various objects in the environment. This is valuable for users to understand their surroundings and interact with objects.

◆ TEXT RECOGNITION

The ability to scan and interpret text from documents, signs, or other written materials. This feature allows users to access printed information in their environment.

◆ **FACIAL RECOGNITION**

Facial recognition capabilities can assist users in identifying and recognizing people. This feature is particularly useful for social interactions.

◆ **TEXT TO VOICE**

The system should be able to convert written text into spoken words. This feature enables users to receive information audibly, which is essential for those with visual impairments.

◆ **REAL-TIME AUDITORY AND HAPTIC FEEDBACK**

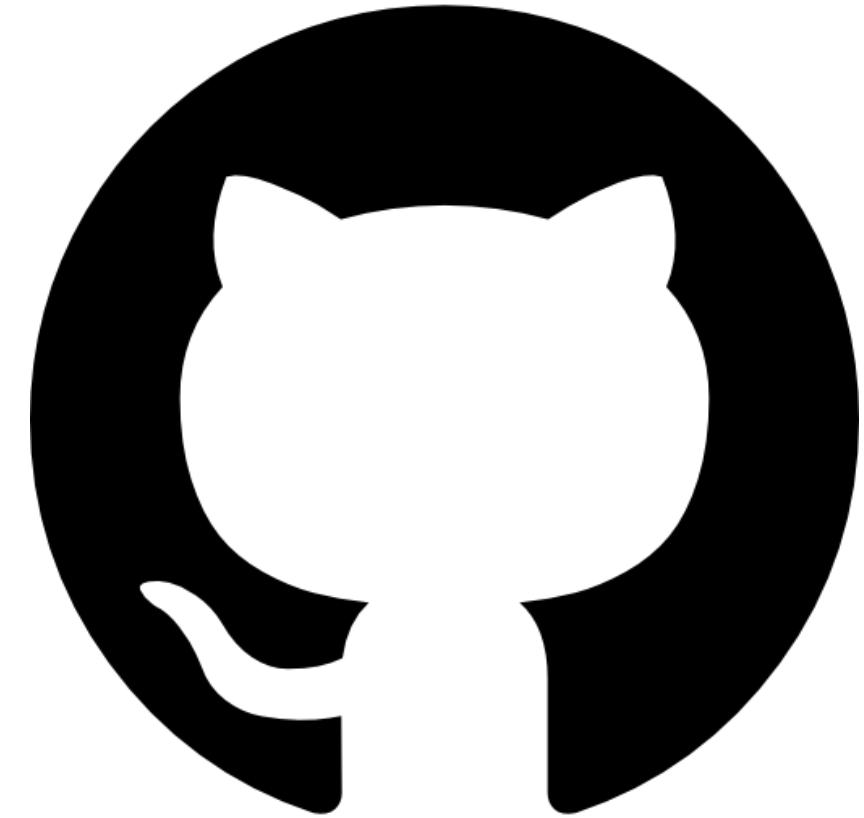
NON-FUNCTIONAL REQUIREMENTS

- ◆ Availability
- ◆ Security
- ◆ Reliability
- ◆ Maintainability
- ◆ Portability
- ◆ Flexibility
- ◆ Robustness

TECHNOLOGY STACK

Python
Tensorflow
OpenCV
Pyttsx 3

GITHUB REPOSITORY



HARDWARE COMPONENTS

OV7670 Camera Module and ESP32
HC-SR04 Ultrasonic Sensor
Arduino UNO R3.
Laptop
Headset



COST ESTIMATION

OV7670 Camera Module and ESP32 - Rs 300 + 700

HC-SR04 Ultrasonic Sensor - Rs 130

Arduino UNO R3 - Rs 2800

Laptop : Rs 25,000 - 100,000

Headset : Rs 100 - 3000

GANTT CHART

ID	Task name	Start	Finish	Duration	Complete	2023				
						Aug	Sep	Oct	Nov	Dec
1	ABSTRACT SUBMISSION	2023-08-04	2023-08-24	15.0 d.	100.0%	<div style="width: 100%; background-color: #e64a4a; height: 10px;"></div>				
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4	REQUIREMENTS GATHERING	2023-09-26	2023-11-16	37.2 d.	100.0%			<div style="width: 100%; background-color: #e64a4a; height: 10px;"></div>		
5	DESIGN DOCUMENTS	2023-10-30	2023-11-15	12.0 d.	100.0%			<div style="width: 100%; background-color: #e64a4a; height: 10px;"></div>		
6	REVIEW 1	2023-11-16	2023-11-16	0.0 d.	0.0%				<div style="width: 100%; background-color: #e64a4a; height: 10px;"></div>	
7	DOCUMENTATION	2023-11-16	2023-12-16	21.8 d.	0.0%				<div style="width: 100%; background-color: #0056b3; height: 10px;"></div>	

CONCLUSION

ImagineAI is more than just a technological innovation; it is a symbol of hope and inclusion. ImagineAI demonstrates the power of technology to uplift communities and empower individuals to overcome challenges. This project is a testament to the potential of innovation to reshape lives and create a more accessible world for the visually impaired.

THANK YOU

Do you have any questions

