

## REMOTE ACCESSIBILITY HELPER



*Remote Accessibility Helper*

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING WITH  
SPECIALIZATION  
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

BATCH NO : 07

A SMART WEB APPLICATION FOR ACCESSIBILITY SUPPORT  
- USING MERN STACK TECHNOLOGY

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# REMOTE ACCESSIBILITY HELPER

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## OBJECTIVE

The objective of this project is to develop an AI-powered platform that enhances digital accessibility for individuals with disabilities. It aims to provide real-time support through features like voice commands, screen reading, and text-to-speech. The system ensures an inclusive user experience by enabling seamless interaction with digital content.



**REMOTE ACCESSIBILITY HELPER**

## ABSTRACT

Empowering individuals with disabilities through technology, the Remote Accessibility Helper is an inclusive, AI-driven platform designed to enhance digital accessibility for users with diverse needs. This platform offers a suite of supportive tools such as voice-to-text conversion, screen readers, text-to-speech modules, and voice-controlled navigation, ensuring seamless interaction with digital content. By integrating real-time assistance features like sign language support prompts, accessibility-friendly games, and adjustable text settings, the system personalizes the user experience to match individual requirements. Whether aiding visually impaired users through audio feedback or supporting motor-impaired individuals via voice commands, this intelligent platform bridges digital gaps and fosters independence. Designed with a user-centric approach, the Remote Accessibility Helper is a powerful tool for making digital spaces more equitable and user-friendly for all.

# **LITERATURE SURVEY**

- 1. Anna Kim, Luis Garcia, Priya Narayanan,** “*Smart Inclusion: An Adaptive Accessibility Assistant Using NLP and Speech Analysis,*” arXiv preprint arXiv:2306.01145, June 2023.
- 2. Ravi Shankar, Meenakshi P., Shubham Rao,** “*A Voice Enabled Framework for Assisting Visually Impaired Users,*” arXiv preprint arXiv:2003.00384, March 2020.
- 3. Natalie Brooks, Daniel Hu, Shreya Mani,** “*Designing Inclusive Interfaces: Challenges and Strategies for Accessibility,*” arXiv preprint arXiv:2310.02367, October 2023.

# LITERATURE SURVEY

PAPER TITLE	APPROACH	OUTCOME
AI-Based Voice Interaction for Enhancing Accessibility in Digital Platforms.	Implements a speech-to-text and voice command system to help users with limited motor control navigate digital interfaces. Uses NLP for command recognition and real-time response. Ensures hands-free interaction across key modules including navigation, login, and content access.	Enabled intuitive hands-free operation for users with mobility impairments. Improved task execution speed and user satisfaction. Reduced dependency on traditional input devices.
Real-Time Screen Reader and Text-to-Speech Integration.	Deploys a screen reader with real-time content reading using AI-based TTS (text-to-speech) engines. Supports navigation through audio cues and verbal prompts across the entire platform interface.	Improved accessibility for visually impaired users. Enabled full interaction with text-based content without visual dependency. Enhanced user independence and satisfaction.
Secure Authentication Disability User with ID Verification.	Implements a secure login and sign-up system using JWT authentication and unique disability ID verification. Ensures that users receive appropriate accessibility features and services tailored to their needs.	Strengthened platform security and personalization. Enabled verified access to disability-specific resources, improving user trust and system integrity.



# EXISTING SYSTEM

In the current landscape of accessibility tools, users with disabilities rely on several pre-existing systems and technologies. These systems have been developed to support people with visual, auditory, motor, and cognitive impairments, but they come with limitations when compared to what an AI-powered, adaptive system like the Remote Accessibility Helper can offer.

## LIMITATIONS

1. Limited Support for All Disabilities
2. Voice Command Recognition Issues
3. User Interface Challenges
4. Device and Browser Compatibility
5. Security and Privacy Concerns
6. Performance Overhead
7. Accessibility Testing Limitations
8. Scalability Issues
9. Multilingual Support
10. Customization for Specific Needs



*AI Powered Interview Preparation System*

# PROPOSED SYSTEM

The Remote Accessibility Helper is an AI-powered, web-based platform designed to enhance digital accessibility for users with diverse disabilities. The proposed system aims to overcome the limitations of traditional accessibility tools by offering personalized, real-time, and adaptive support to ensure an inclusive digital experience. It combines multiple assistive technologies into a unified platform to help users navigate websites, access content, and interact with online services more efficiently and independently.

## **ADVANTAGES**

1. Inclusive and Universal Design
2. Voice-Enabled Interaction
3. Real-Time Adaptability
4. Centralized Accessibility Features
5. Enhanced User Independence
6. Interactive and Engaging Modules
7. Secure and Simplified Authentication



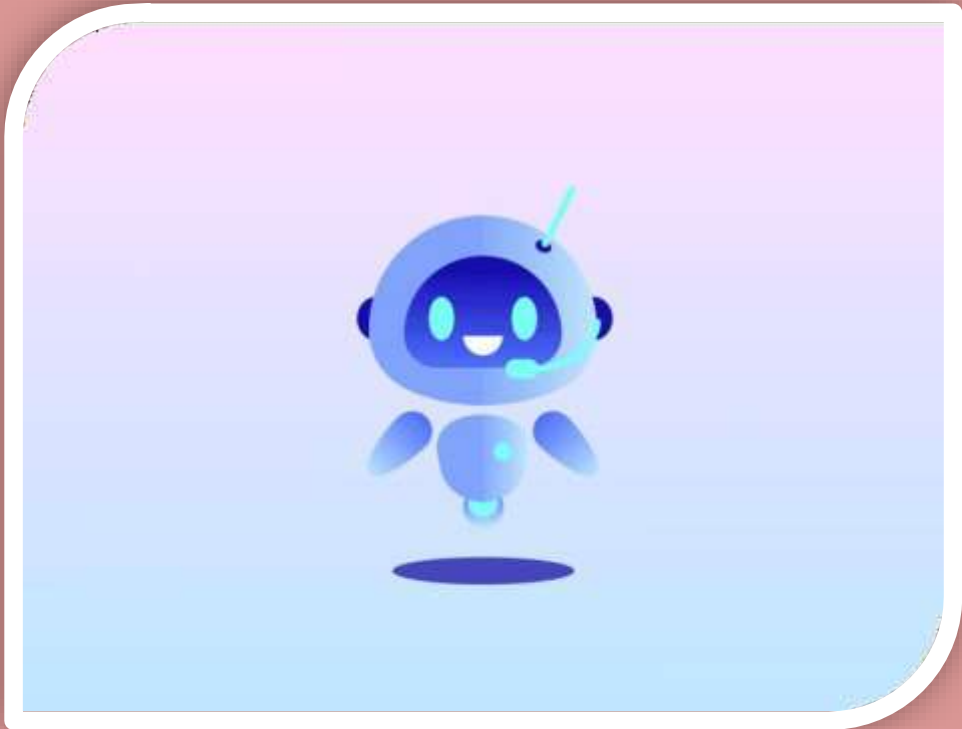


# Introduction to Remote Accessibility Helper

Accessibility plays a crucial role in ensuring equal opportunities for individuals with disabilities to interact with technology and digital environments. However, many existing systems lack the necessary support to provide seamless accessibility, creating barriers for users with visual, auditory, cognitive, or mobility impairments. The Remote Accessibility Helper project is designed to address these challenges by offering a comprehensive, AI-driven remote assistance system that enhances digital accessibility and real-time support. This project integrates assistive technologies, AI-powered tools, and user-friendly interfaces to provide personalized support. Key features include real-time remote assistance through video, voice, or text-based interactions, allowing users to seek help from human assistants or AI-based virtual helpers. Additionally, the system supports screen-sharing and remote control functionalities, enabling guided troubleshooting and assistance. The project also ensures compatibility with various assistive devices, including screen readers, braille displays, and voice-controlled interfaces, making it adaptable to diverse user needs.



# SYSTEM REQUIREMENTS



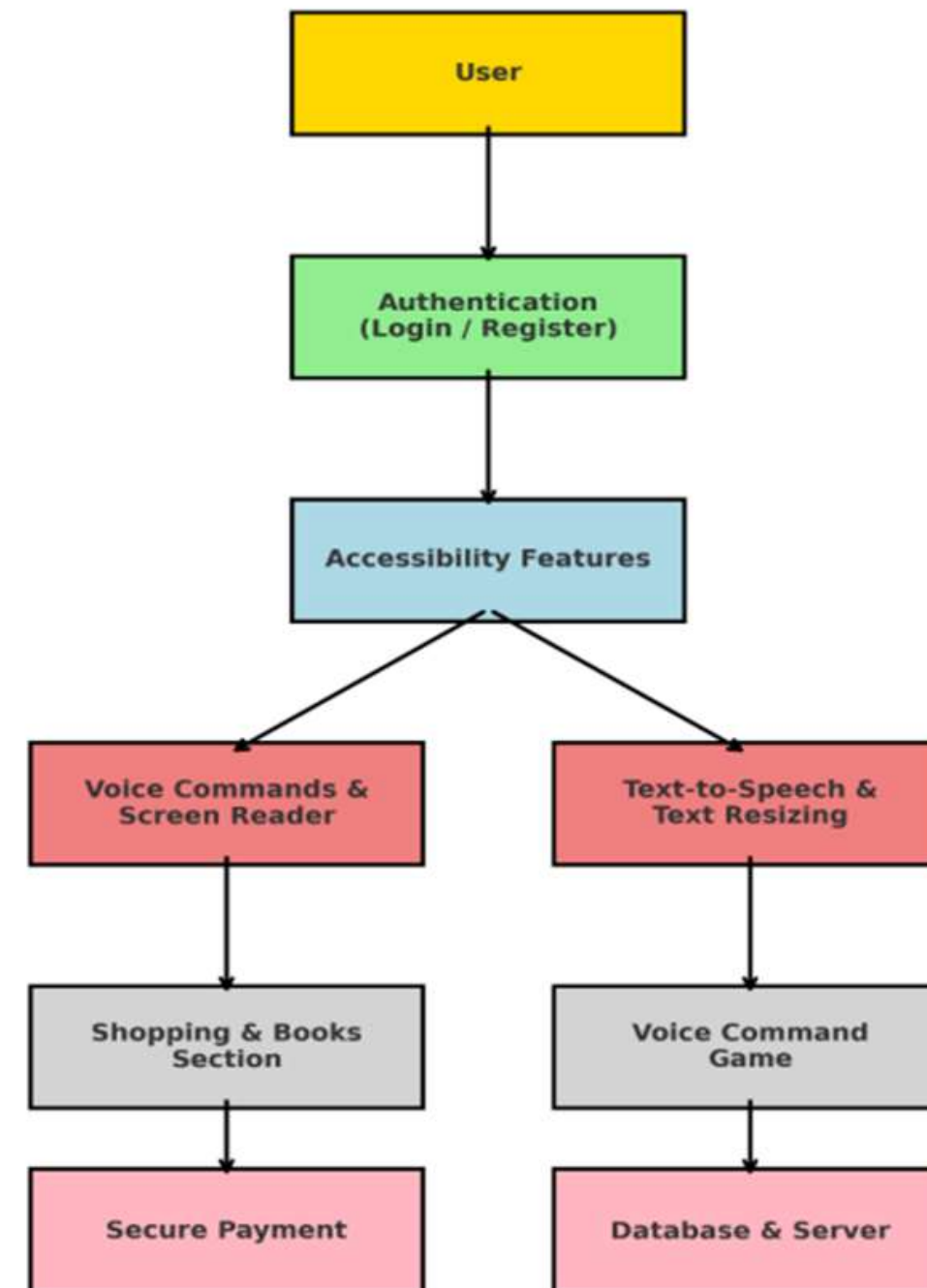
## HARDWARE REQUIREMENTS

MINIMUM (Required for Execution)		MY SYSTEM (Development)
System	Pentium IV 2.2 GHz	i5 Processor 12 <sup>th</sup> Gen
Hard Disk	20 GB	500 GB
Ram	1 GB	8 GB

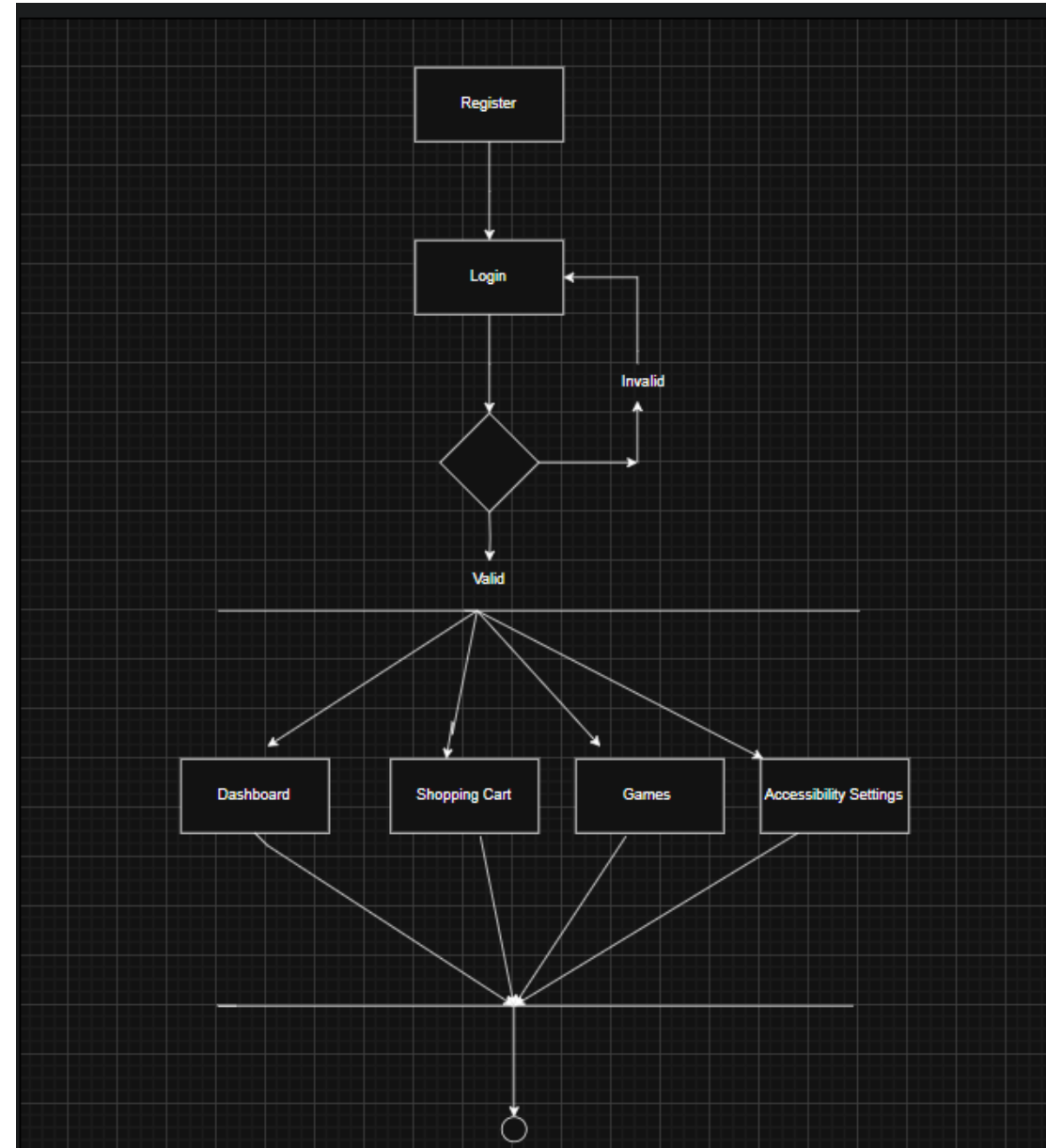
## SOFTWARE REQUIREMENTS

Operating System	Windows 10/11
Development Software	Node 22.12.0
Programming Language	NodeJS
Domain	Artificial Intelligence
Integrated Development Environment (IDE)	Visual Studio Code
Front End Technologies	HTML5, CSS3, Java Script,ReactJS
Back End Technologies or Framework	NextJS
Database (No SQL)	MongoDB
Database Software	MongoDB Server
Web Server or Deployment Server	Nginx Web Server
Design/Modelling	Rational Rose

# SYSTEM ARCHITECTURE



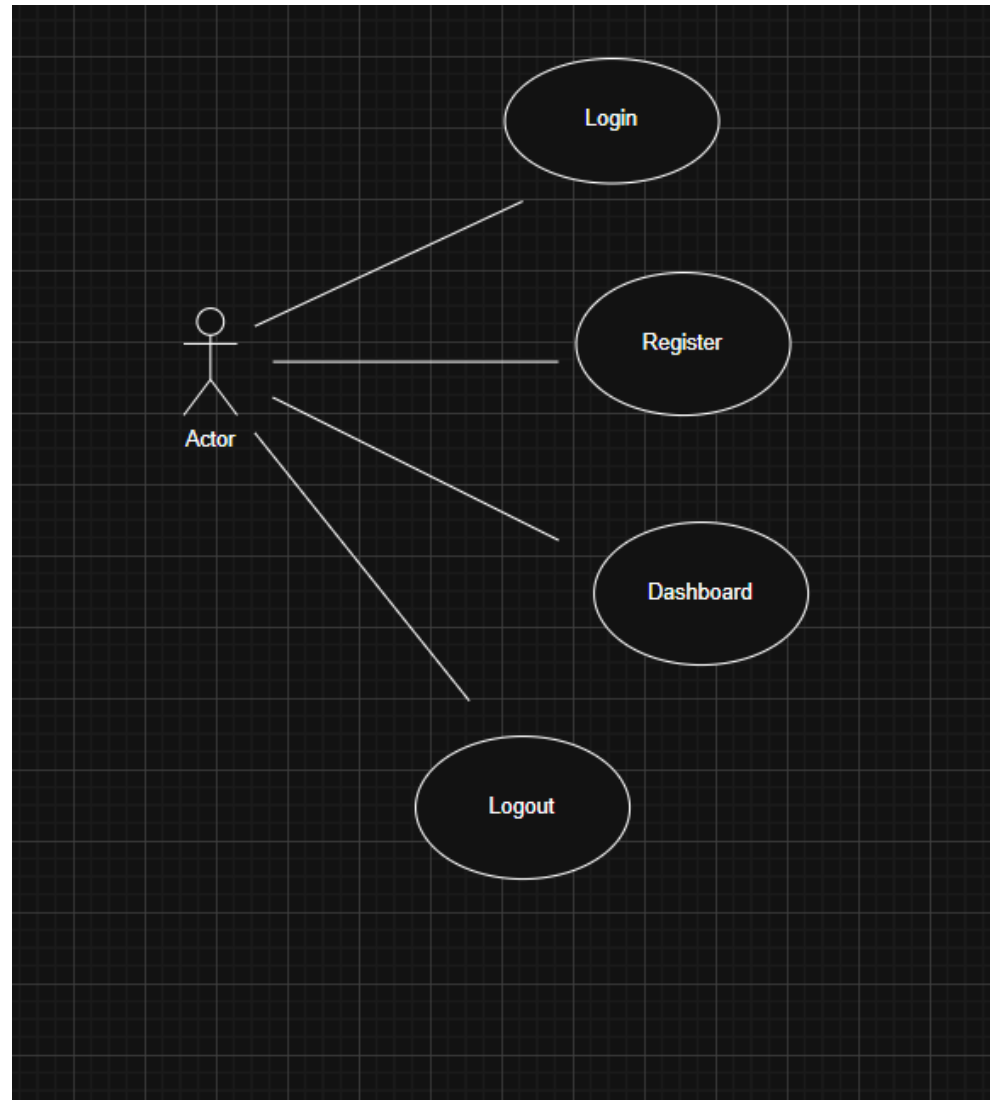
# UML DIAGRAMS



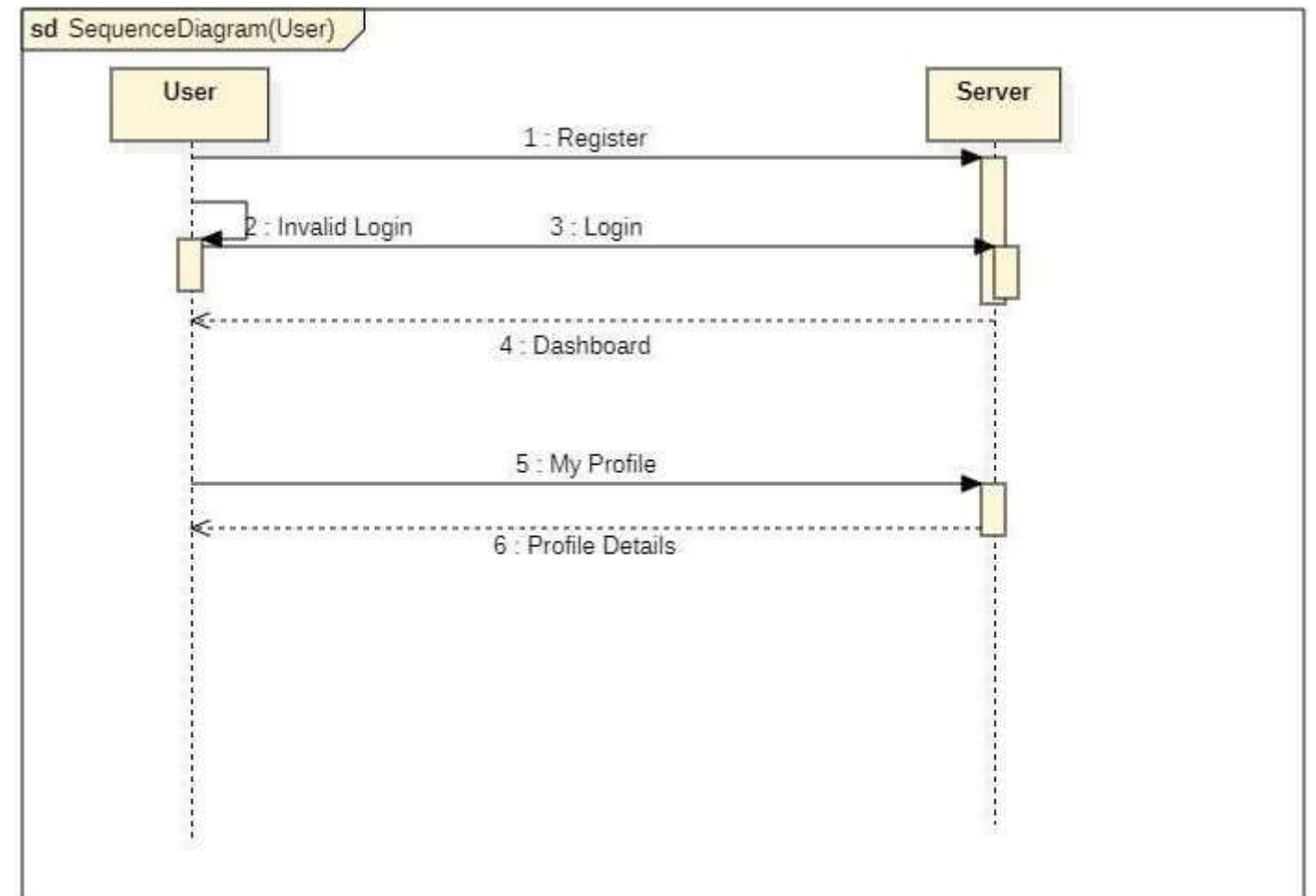
**ACTIVITY DIAGRAM**

# UML DIAGRAMS

## USE CASE DIAGRAM

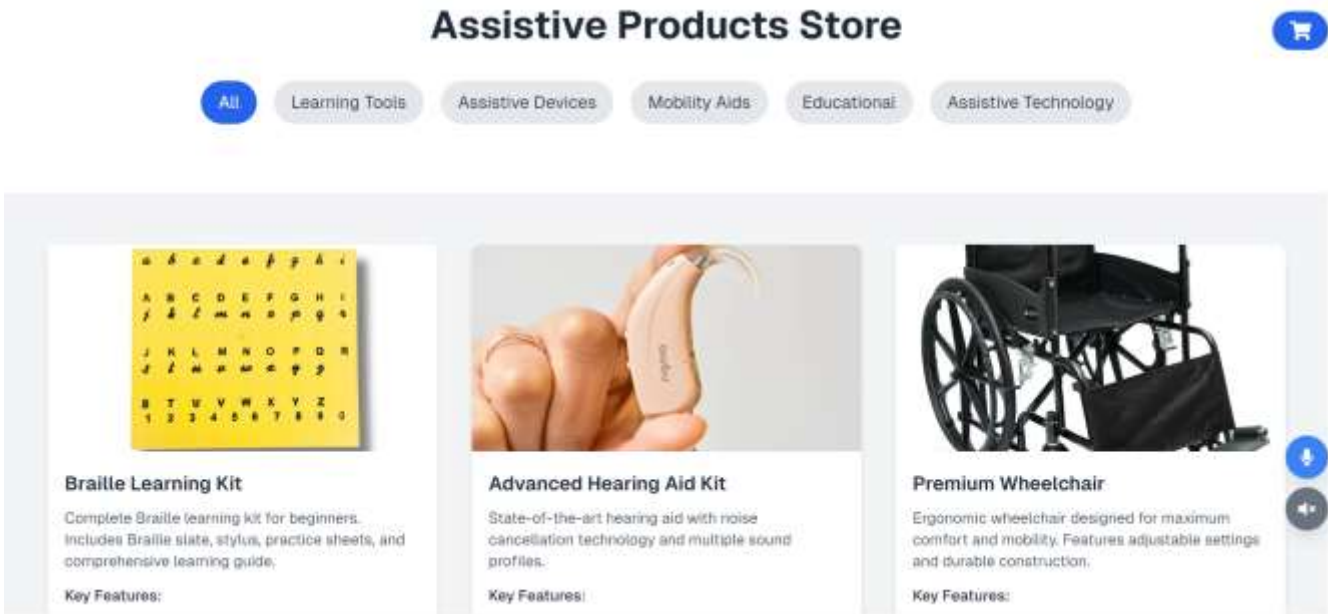
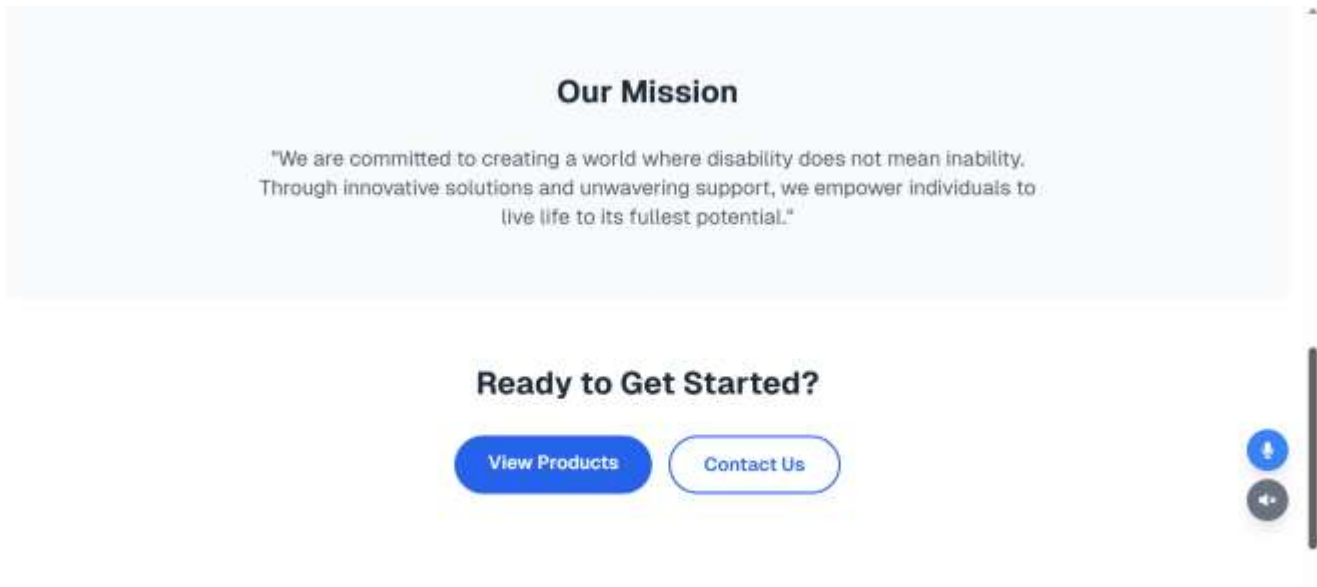
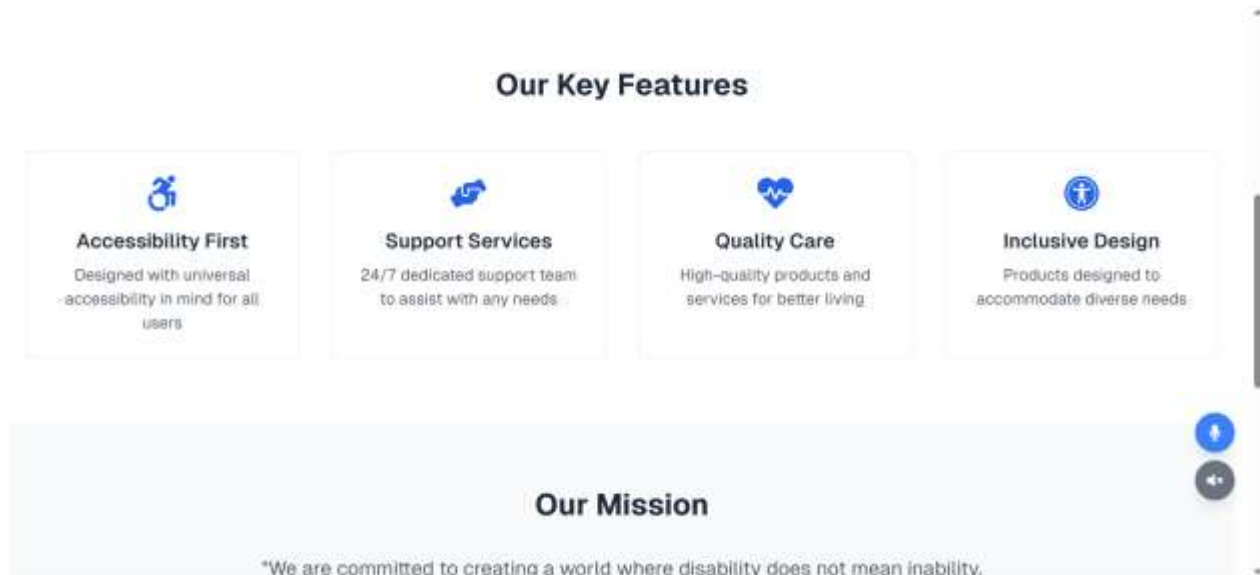
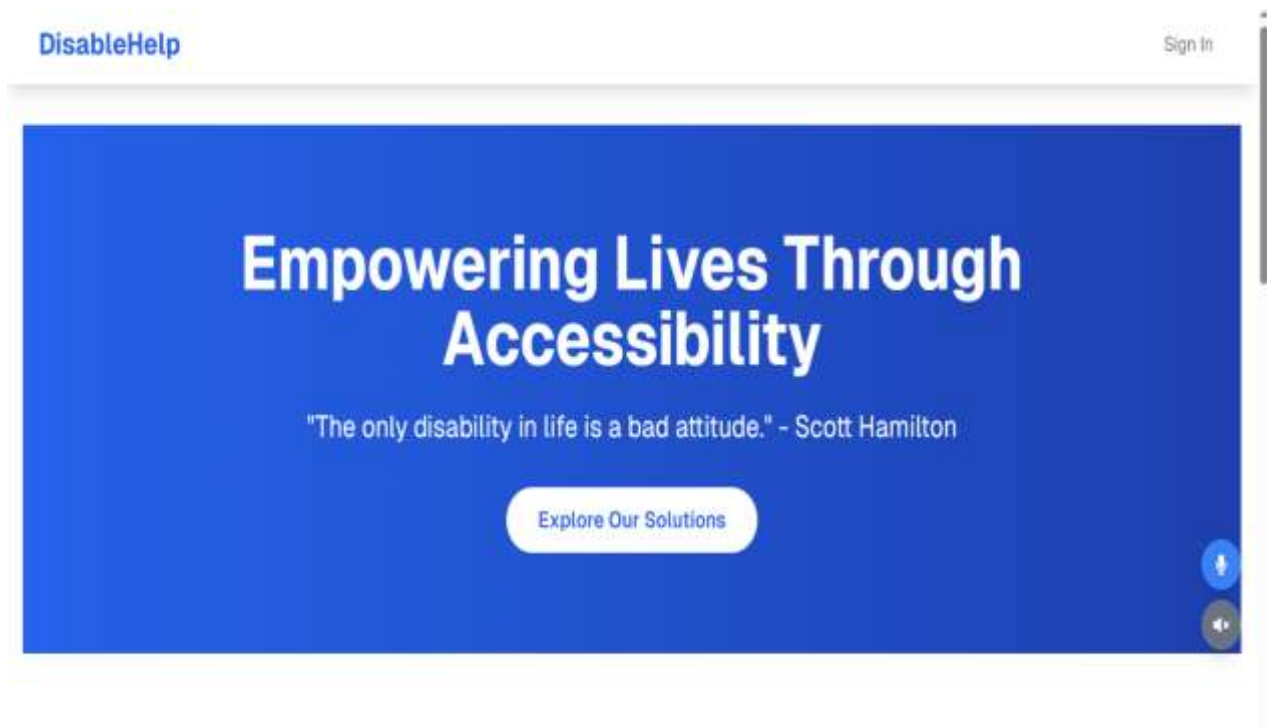


## SEQUENCE DIAGRAM



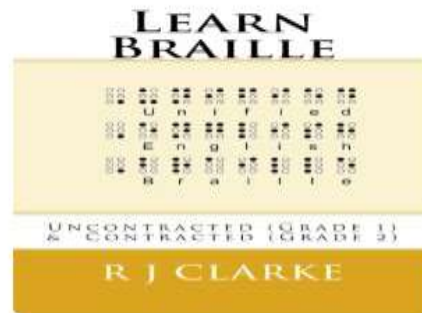


# OUTPUT SCREENSHOT'S



# OUTPUT SCREENSHOT'S

## Books



### Introduction to Braille

A beginner's guide to learning Braille.

₹19.99

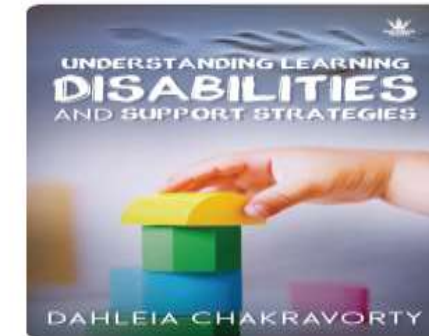
Add to Cart



### Sign Language Handbook

A comprehensive guide to understanding and using sign language.

₹15.99



### Accessible Tech for All

Learn about the latest accessible technology tools for individuals with disabilities.

₹25.99



## Video Library



### Introduction to Sign Language

A beginner-friendly video introducing basic sign language.



### Understanding Braille

Learn about Braille and how it works in this informative video.



### Disability Awareness

A video on understanding different types of disabilities.



## Choose Your Quiz Topic

Select Topic

-- Select a Topic --

☐ Enable Blind Mode

Start Quiz



# OUTPUT SCREENSHOT'S

**Choose Your Quiz Topic**

Select Topic

-- Select a Topic --

-- Select a Topic --

Braille Literacy

Disability Awareness

Assistive Technologies

Sign language



**Voice Tools**

Convert speech to text and text to speech

Text Input/Output

hi

Start Recording Speak Text Stop Speaking Copy Text

## Accessibility Settings

### Text Size

Normal Large Larger

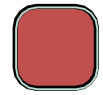
### High Contrast

Enable High Contrast

### Reduced Motion

Enable Reduced Motion

# BENEFITS OF USING AN REMOTE ACCESSIBILITY HELPER PLATFORM



## **Real-Time Assistance**

Get instant help without waiting for in-person support.



## **Increased Independence**

Empower users to manage their own tech with guided support.



## **Access from Anywhere**

Support is available regardless of the user's location.

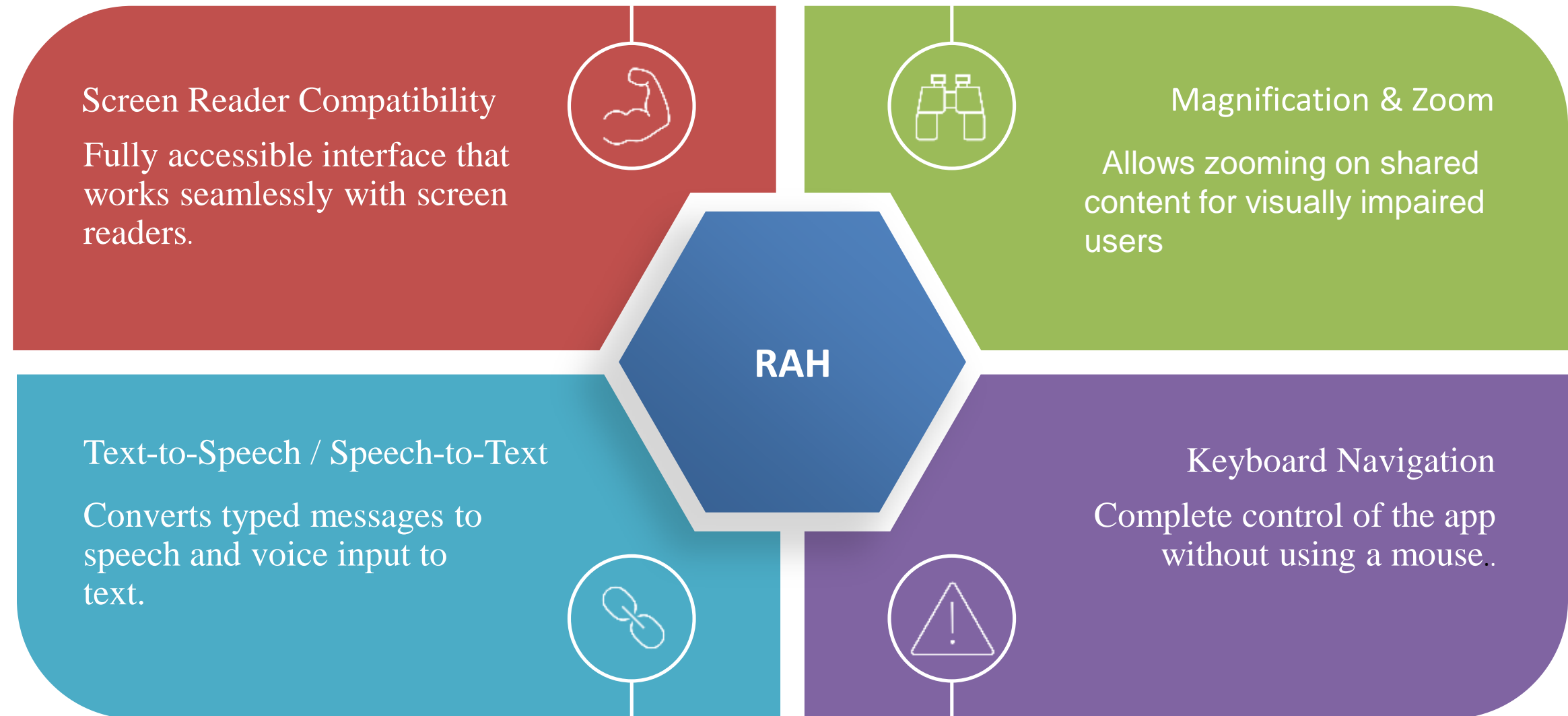


## **Cost & Time Efficiency**

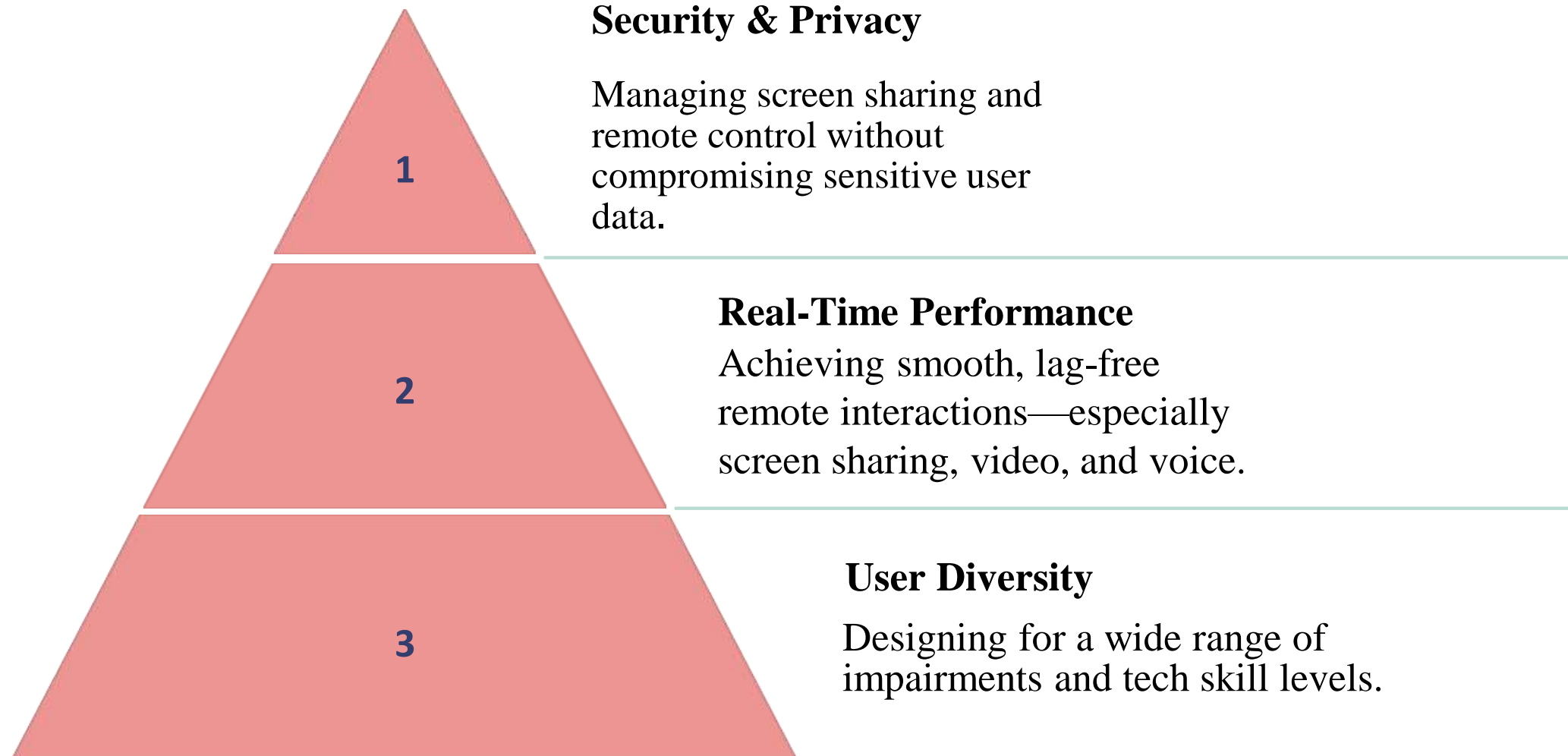
Saves both time and resources for users and support teams.



# FEATURES OF REMOTE ACCESSIBILITY HELPER



# CHALLENGES IN DEVELOPING AN REMOTE ACCESSIBILITY HELPER PLATFORM



# FUTURE TRENDS IN REMOTE ACCESSIBILITY HELPER



## Better Integration with Assistive Tech

Seamless compatibility with smart glasses, eye-tracking devices, voice assistants, and braille keyboards.



## Intelligent Navigation Help

Real-time guided navigation using voice or visual cues to help users perform tasks independently before needing full remote control.



## Augmented Reality (AR) Support

Helpers can guide users by drawing, pointing, or highlighting things on-screen (like an AR overlay).

# CONCLUSION AND KEY TAKEAWAYS

The Remote Accessibility Helper project represents a significant step toward inclusive technology by providing real-time, remote support tailored to users with disabilities. It bridges the gap between accessibility needs and technical support, empowering users with greater independence, while ensuring they receive timely and personalized assistance. Through the integration of features like screen sharing, voice communication, and assistive technology compatibility, the app enhances the digital experience for people with varying impairments. Despite challenges related to security, performance, and accessibility compliance, the project lays a strong foundation for scalable, user-friendly, and secure support solutions. As digital inclusivity continues to gain momentum, the Remote Accessibility Helper app holds great potential to evolve with future trends like AI assistance, AR guidance, and deeper personalization, ensuring it remains a vital tool in promoting equal access to technology.





# KEY TAKEAWAYS

1. Empowers users with disabilities through real-time remote support.
2. User-centric and accessible design is essential for effectiveness.
3. Strong focus on privacy and security builds user trust.
4. Cross-device and assistive tech compatibility enhances usability.
5. Future-ready design enables integration with AI, AR, and personalization.

# REFERENCES

[1]0020Mingzhe Li, Xiuying Chen, Weiheng Liao, Yang Song, Tao Zhang, Dongan Zhan, Rui Yan, “EZInterviewer: To Improve Job Interview Performance with Mock Interview Generator.” arXiv preprint arXiv:2301.00972, January 2023

[2] Fadel M. Megahed, Ying-Ju Chen, Joshua A. Ferris, Cameron Resatar, Kaitlyn Ross, Younghwa Lee, L. Allison Jones-Farmer, "ChatISA: A Prompt-Engineered Chatbot for Coding, Project Management, Interview and Exam Preparation Activities," *arXiv preprint arXiv:2407.15010*, June 2024.

[3] Taufiq Daryanto, Xiaohan Ding, Lance T. Wilhelm, Sophia Stil, Kirk McInnis Knutsen, Eugenia H. Rho, "Conversate: Supporting Reflective Learning in Interview Practice Through Interactive Simulation and Dialogic Feedback," *arXiv preprint arXiv:2410.05570*, October 2024.



THANK YOU