



COMSATS University Islamabad (CUI)

LAB Assignment 02

Name: Human Computer Interaction

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PROJECT REPORT

Instructor: Dr Tahir Mustafa Madni

M Ruslan Babar	CIIT/FA20-BSE-094/ISB
Syed M Danish	CIIT/FA20-BSE-079/ISB

Abstract

The "Enhancing Accessibility and Communication for Individuals with Visual and Speech Impairments" project aims to develop the "No-Hassel" mobile app, a comprehensive solution to address the challenges faced by individuals with visual and speech impairments in their daily communication and access to information. This report presents a case study evaluating the effectiveness of the app in enhancing accessibility and communication for its target users. The study employs a mixed-methods approach, combining qualitative data from interviews and quantitative data from user testing and surveys. The literature review establishes the importance of user-centered design and assistive technologies in creating inclusive digital experiences. The findings demonstrate that the "No-Hassel" app effectively aids navigation, provides access to written information, and enables real-time communication. However, certain areas such as image recognition accuracy and speech-to-text transcription require improvement. The project underscores the significance of inclusive design and accessible technologies in creating an inclusive digital environment.

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1. Introduction

The "Enhancing Accessibility and Communication for Individuals with Visual and Speech Impairments" project focuses on developing the "No-Hassel" mobile app to address the challenges faced by individuals with visual and speech impairments in accessing and utilizing mobile applications. By incorporating features such as image recognition, text-to-speech conversion, and speech-to-text functionality, the app aims to improve navigation, information access, and communication for its users. This report presents a case study on the "No-Hassel" app, examining its effectiveness in enhancing accessibility and communication for individuals with visual and speech impairments. The findings and recommendations derived from this study contribute to the field of HCI and highlight the importance of inclusive design in creating an accessible digital environment.

2. Methodology

The study utilizes a mixed-methods approach to evaluate the effectiveness of the "No-Hassel" mobile app in enhancing accessibility and communication for individuals with visual and speech impairments. Qualitative data is collected through interviews, while user testing and surveys provide quantitative data. Thematic analysis is conducted on qualitative data, while descriptive statistics are used for quantitative data analysis. This approach provides a comprehensive understanding of the app's impact and user satisfaction, guiding further improvements in accessibility technology.

2.1. User Interviews:

In-depth interviews are conducted with individuals with visual and speech impairments to gather qualitative data regarding their communication and information access needs, preferences, and pain points. The interviews are structured to explore their experiences with existing technologies and their expectations from the "No-Hassel" app.

3. Need Finding Techniques and Analysis

3.1 Contextual Inquiry Scenario:

Alishba, a visually impaired individual, goes to a local supermarket to purchase groceries. The research team observes Sarah's interactions, challenges with the written labels of the products, and needs throughout her shopping experience. They take note of her struggles in locating specific products, reading product labels, and communicating with store staff.

4. Findings and Analysis

4.1 Qualitative Analysis:

The qualitative analysis of the need finding techniques reveals several key findings:

- Individuals with visual impairments face challenges in independently identifying and locating objects, signs, and products.

- Communication barriers hinder interactions with others, including store staff and unfamiliar individuals.
- Limited access to written information, such as product labels, prices, and instructions, poses difficulties in making informed choices.

4.2 Quantitative Analysis:

Thematic Analysis and Coding are conducted to collect quantitative data on user satisfaction, app usability, and perceived impact. The data is analyzed using descriptive statistics to measure the app's effectiveness and identify areas for improvement. The techniques are:

Thematic analysis: Find and understand the main themes and patterns in the data, focusing on important ideas and insights that come up during the interviews.

- Content coding
- In Vivo coding
- Process coding
- Emotion coding
- Dramatical coding

5. Literature Review

The findings from the case study and user testing provide valuable insights into the effectiveness of the "No-Hassel" app in enhancing accessibility and communication. The app's image recognition feature effectively identifies establishments, aiding independent navigation for individuals with visual impairments. Users express high satisfaction with the text-to-speech feature, which enables access to written information. The speech-to-text functionality facilitates seamless communication by instantly translating spoken words into clear text on the screen. Survey results indicate improved independence, connectivity, and enhanced navigation, information access, and communication for app users. However, areas for improvement include image recognition accuracy and occasional inaccuracies in speech-to-text transcription. Overall, the "No-Hassel" app breaks down barriers and improves the lives of individuals with visual and speech impairments, with potential for ongoing refinement.

6. Findings and Analysis

- The "No-Hassel" app effectively identified establishments through image recognition, aiding independent navigation.
- Users expressed high satisfaction with the text-to-speech feature, enabling access to written information.
- The speech-to-text functionality facilitated seamless communication with instant translation of spoken words.
- Survey results showed improved independence, connectivity, and enhanced navigation, information access, and communication.

- Areas for improvement include image recognition accuracy and occasional inaccuracies in speech-to-text transcription.
- Overall, the app breaks down barriers and improves the lives of individuals with visual and speech impairments, with potential for ongoing refinement.

7. Context Scenario

A young woman named Alishba who is blind uses the "No-Hassel" mobile app to communicate and navigate through her day-to-day activities. She launches the app, which welcomes her with an intuitive UI as she moves down the street. When Alishba directs her phone's camera at a neighboring cafe, the software uses image recognition to identify the establishment by name. She can independently locate numerous destinations thanks to this feature. Alishba switches on text-to-speech because she's curious in a scrawled note on a lamppost. She wouldn't have been able to understand the contents of the note without the app's fast conversion of the text to voice. Alishba makes use of the speech-to-text feature when a passing pedestrian approaches her for discussion. When she uses her phone, her words are immediately translated into clear text on the screen. The app then converts the text into synthesized speech, facilitating seamless communication with her conversation partner. As Alishba completes her journey, she appreciates how "No-Hassel" has increased her independence and enabled her to connect with the world. The app's convenient features, such as image recognition, text-to-speech, and speech-to-text, have broken down communication barriers and improved access to information for individuals with visual and speech impairments.

8. Personas



Name: Alishba Khan

Age: 24

Marital Status: Single

Personal Background

Alishba lost her vision at a young age due to a genetic condition. She has adapted well to her visual impairment and is determined to lead an independent life.

Job Experience

Alishba is a recent graduate and currently exploring job opportunities in the field of accessibility and inclusivity.

Computer Proficiency

Alishba is proficient in using screen readers and other assistive technologies on her smartphone and computer.

Usage Of Systems

Alishba has used other accessibility apps and software for navigation and communication purposes.

Motivation

Alishba is motivated to overcome the challenges posed by her visual impairment and wants to leverage technology to enhance her independence and improve her access to information.

Goals

Alishba's primary goal is to be able to navigate her surroundings confidently, independently locate destinations, and communicate effectively with others using assistive technologies.



Name: Sarah Thompson

Age: 30

Marital Status: Divorced

Personal Background

Sarah has a speech impairment resulting from a neurological condition. She is a determined individual and has successfully built a career as a public speaker and disability advocate.

Job Experience

Sarah has extensive experience in public speaking and advocacy, focusing on disability rights and accessibility.

Computer Proficiency

Sarah is highly proficient in using various assistive technologies, including speech-to-text and text-to-speech software, on her smartphone and computer.

Usage Of Systems

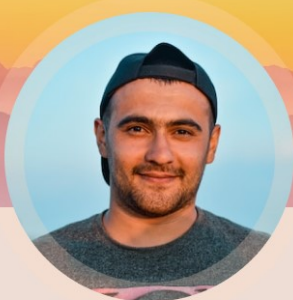
Sarah has used several speech-to-text and text-to-speech applications and devices to enhance her communication in professional and personal settings.

Motivation

Sarah is motivated to break down communication barriers and ensure equal opportunities for individuals with speech impairments. She wants to leverage technology to facilitate seamless communication and promote inclusivity.

Goals

Sarah's goal is to have a mobile app that accurately converts her speech into text and vice versa. She wants to communicate effortlessly with others, both in professional settings and during everyday interactions.



Name: Samir Patel

Age: 35

Marital Status: Married

Personal Background

Samir was born blind and has grown up adapting to his visual impairment. He is an active individual and enjoys outdoor activities.

Job Experience

Samir works as a counselor at a center for the visually impaired, where he provides support and guidance to others facing similar challenges.

Computer Proficiency

Samir has a good understanding of assistive technologies and is proficient in using screen readers and navigation apps on his smartphone and computer.

Usage Of Systems

Samir has used various accessibility apps and navigation tools to enhance his mobility and access to information.

Motivation

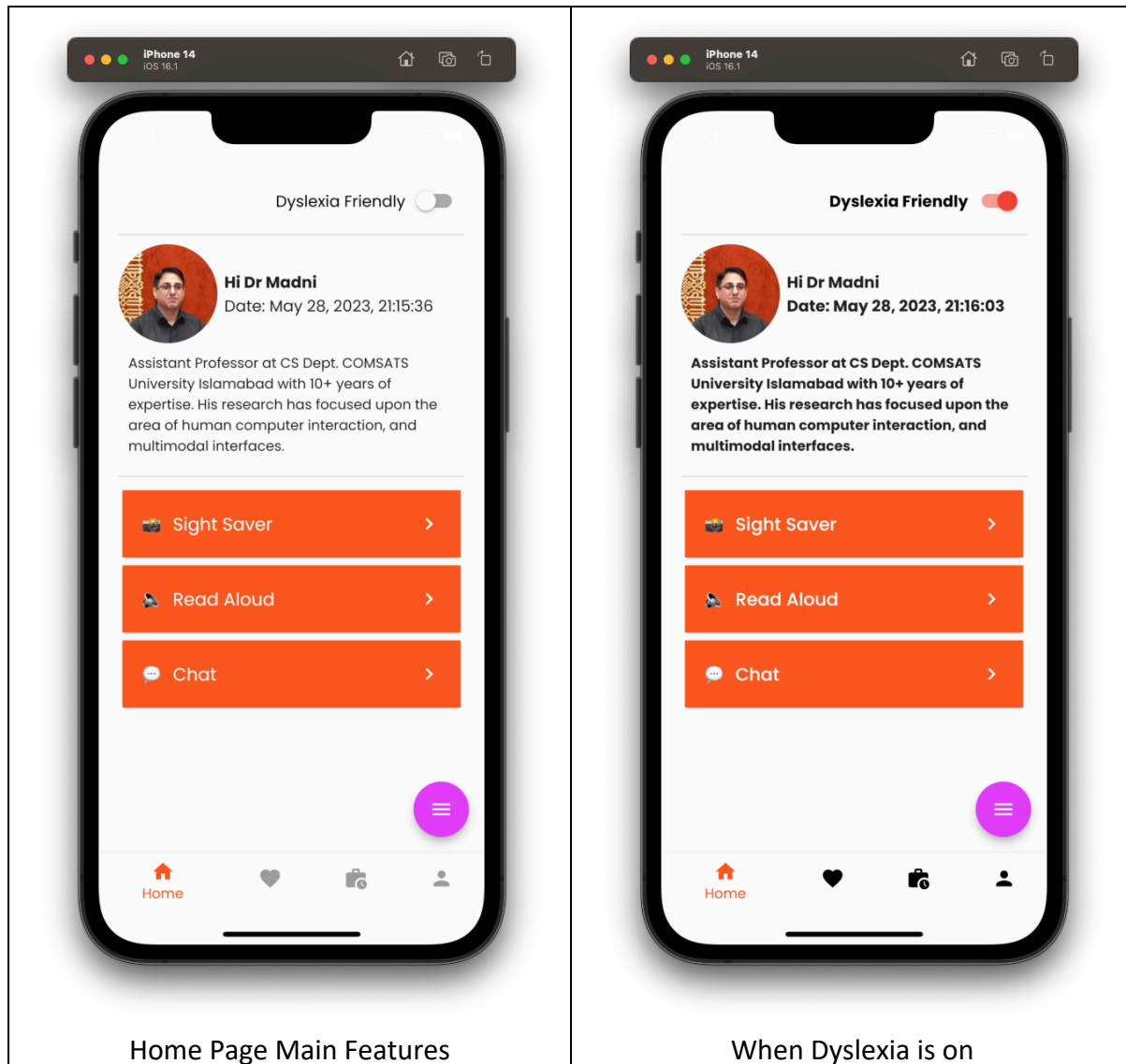
Samir is motivated to explore new places independently and make the most out of his experiences. He wants to stay updated with the latest accessibility technologies and assist others in their journey towards independence.

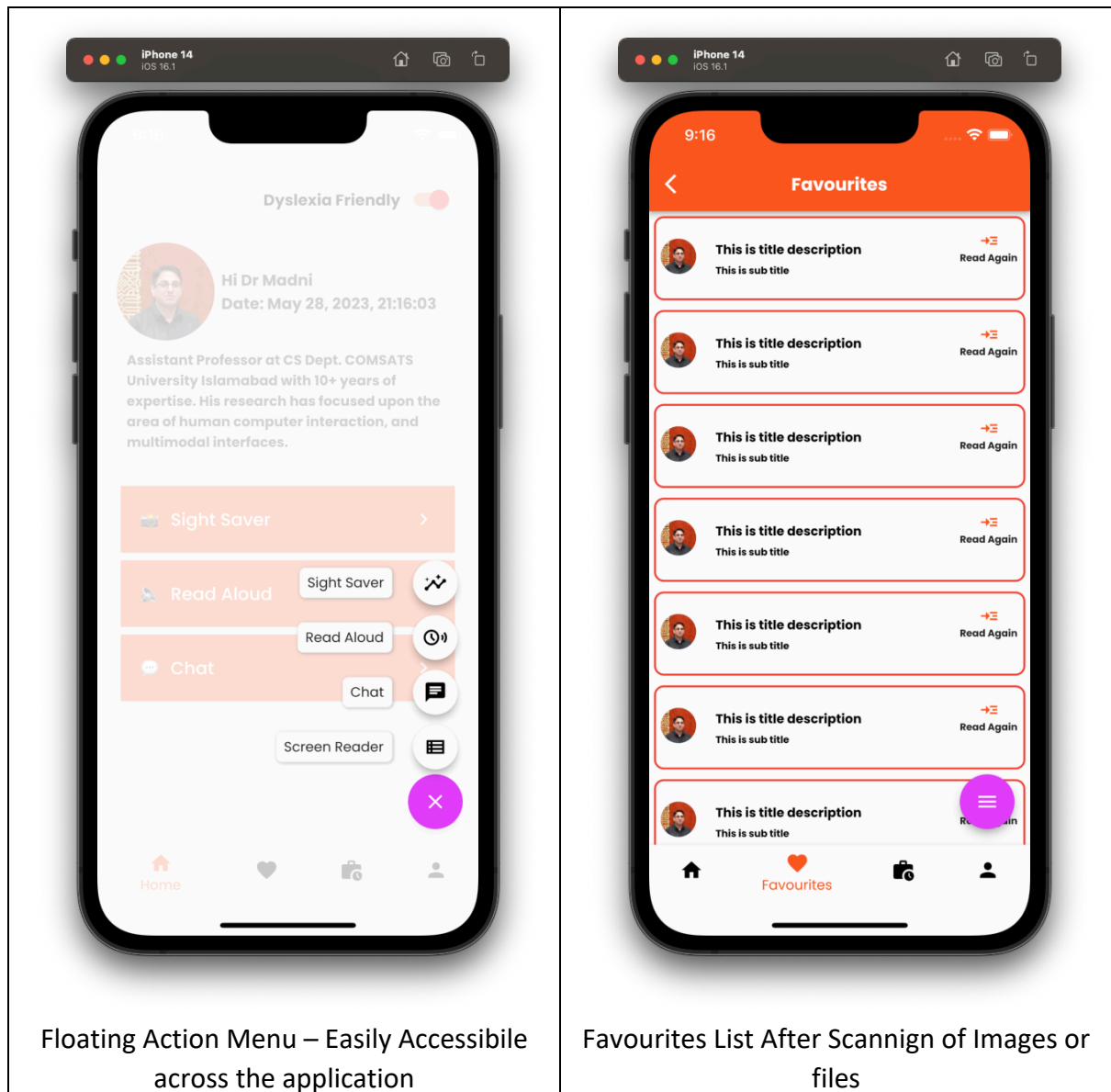
Goals

Samir's goal is to have a mobile app that provides accurate information about his surroundings, including identifying nearby places and reading text on signs or menus. He wants to enhance his outdoor experiences and access transportation schedules conveniently.

9. High Fidelity Prototype

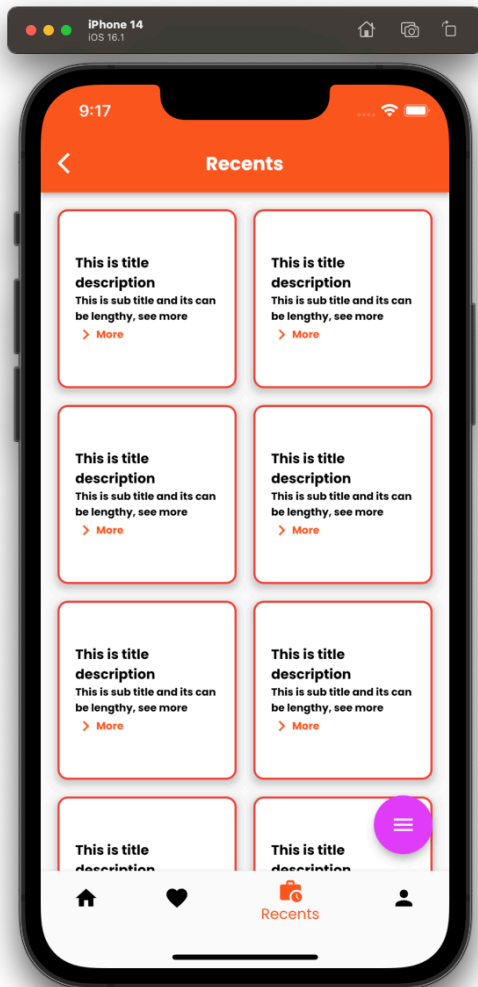
The high-fidelity prototype of the "No-Hassel" mobile application has been developed using the Flutter framework for cross-platform mobile app development. It accurately represents the final app's user interface and functionality, incorporating features such as image recognition, text-to-speech, and speech-to-text. The prototype is coded in Flutter to ensure native-like performance, responsive design, and a visually appealing interface. It serves as a valuable tool for user testing and iterative improvements before final development. Overall, the prototype demonstrates the potential of the "No-Hassel" app in enhancing accessibility and communication for individuals with visual and speech impairments.



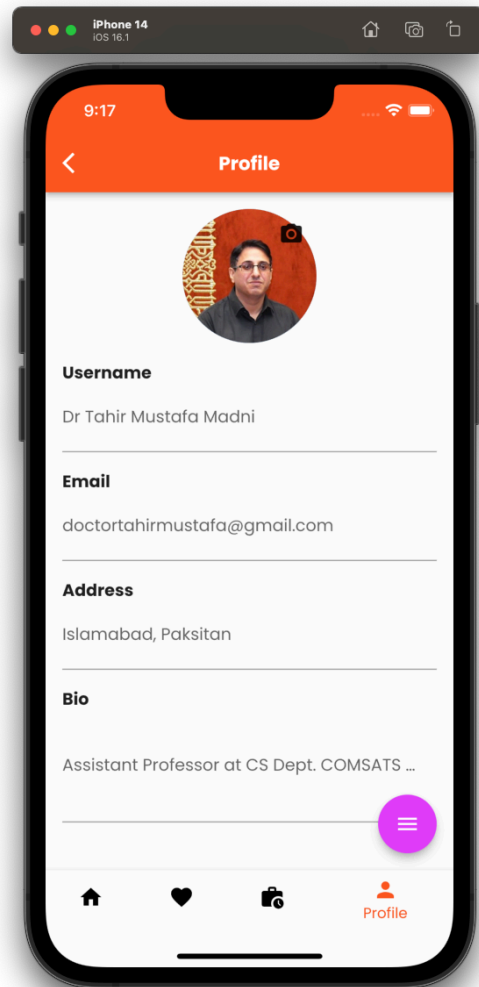


Floating Action Menu – Easily Accessible across the application

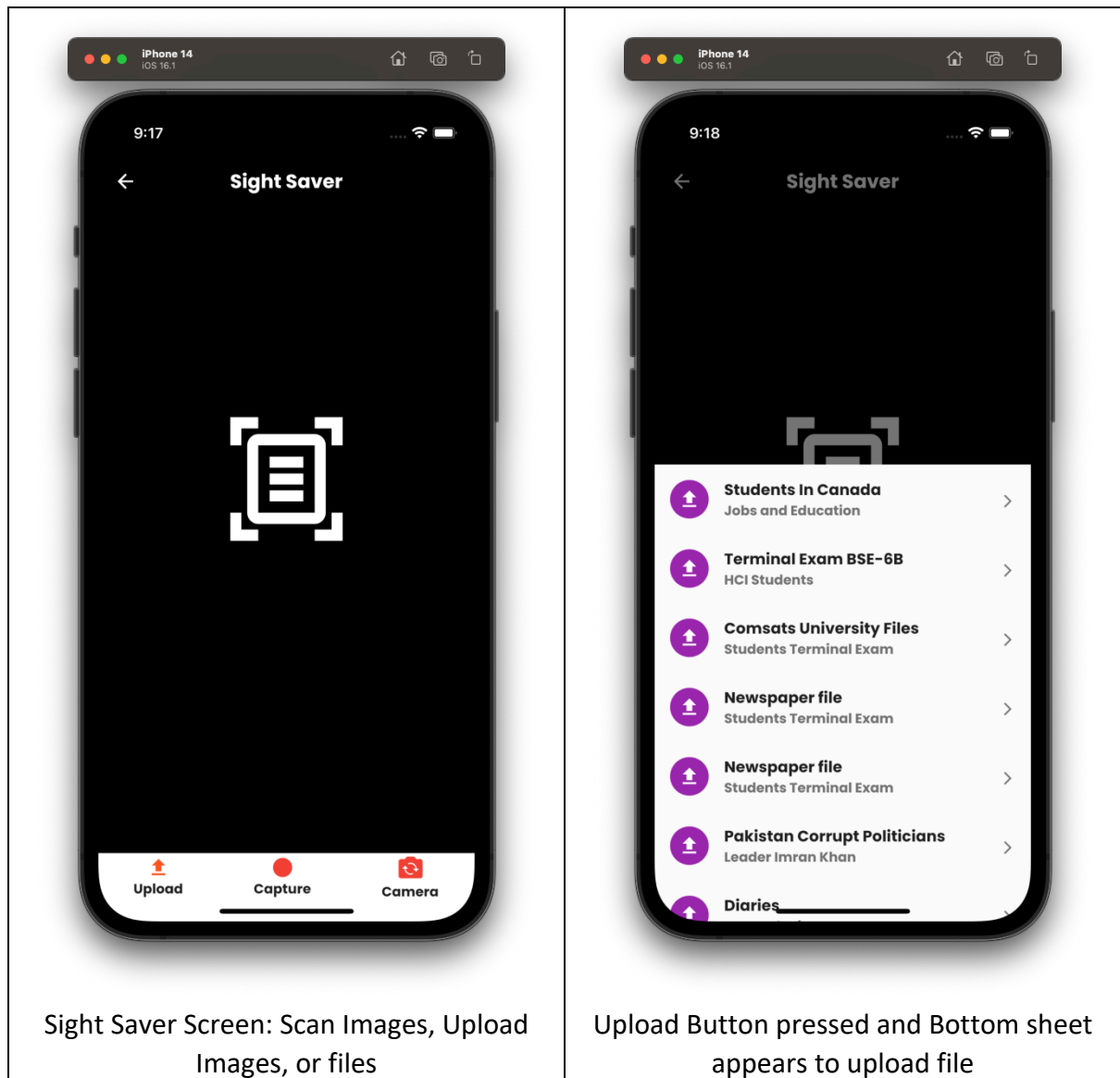
Favourites List After Scannign of Images or files



Most recent Activities

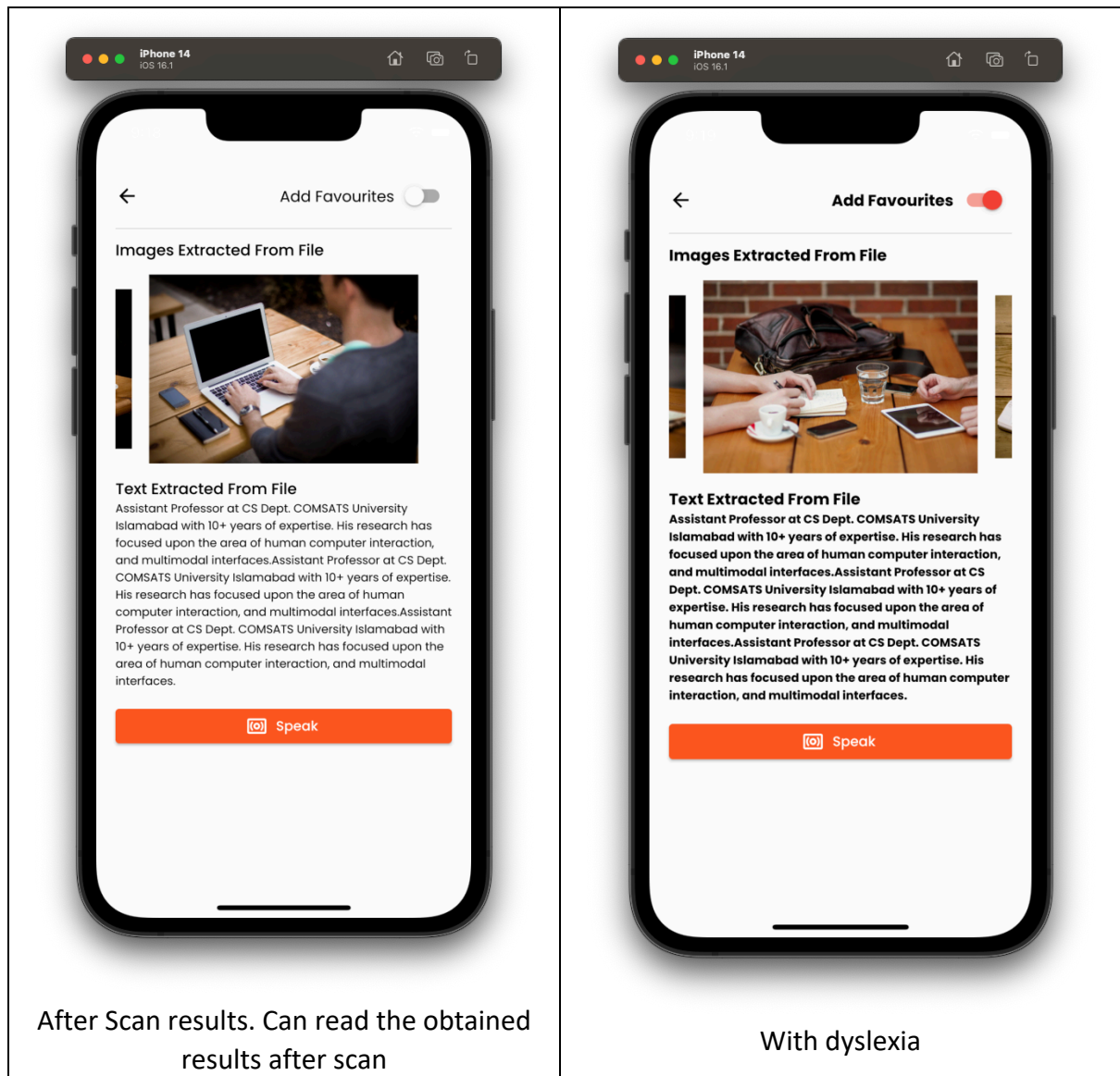


Profile Screen, helps in keeping identity during communication with firends



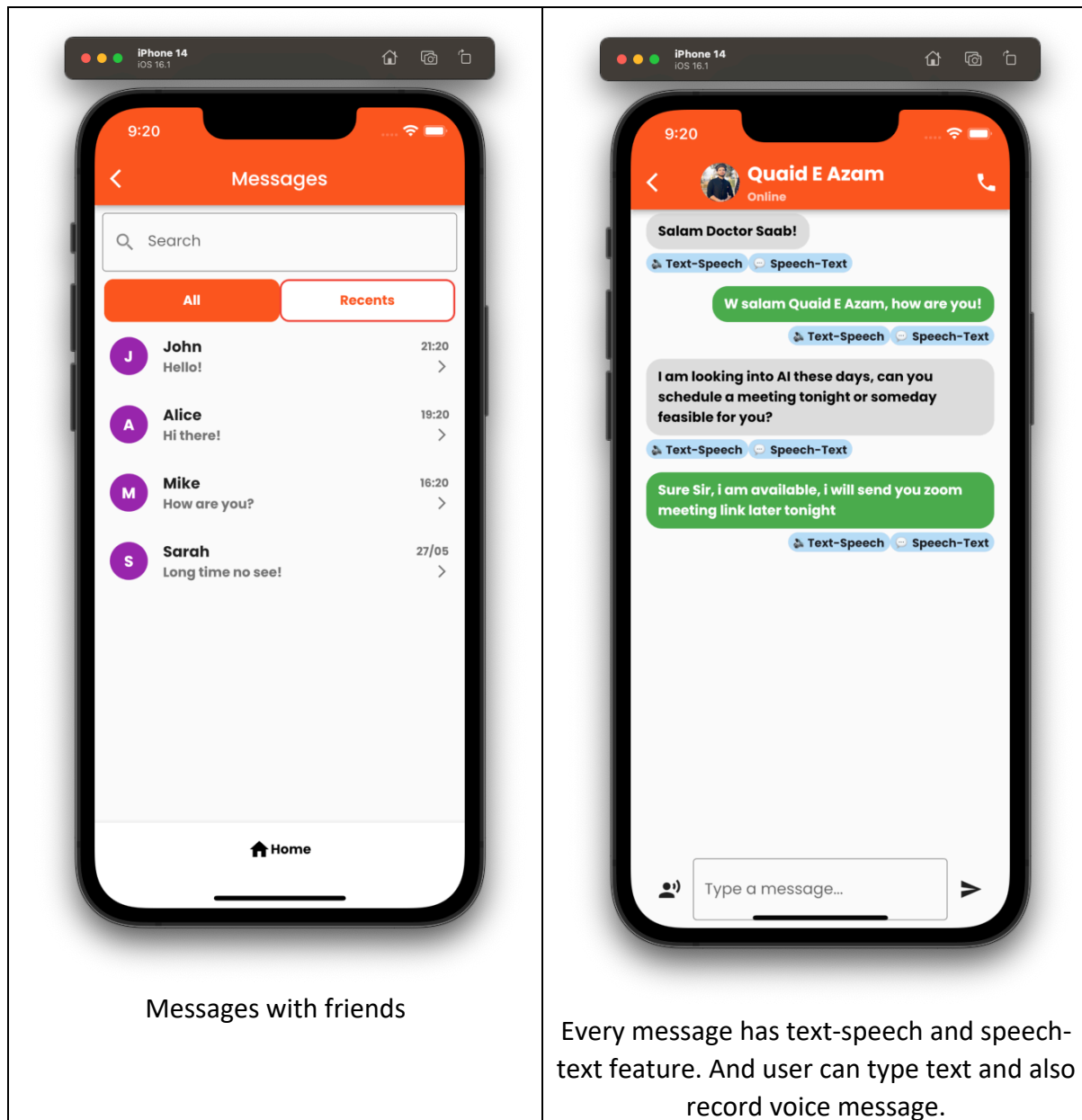
Sight Saver Screen: Scan Images, Upload Images, or files

Upload Button pressed and Bottom sheet appears to upload file



After Scan results. Can read the obtained results after scan

With dyslexia



10. Conclusions and Recommendation:

The "No-Hassel" mobile app demonstrates its potential to enhance accessibility and communication for individuals with visual and speech impairments. The findings suggest that the app effectively addresses the identified challenges and improves the quality of life for its users. However, improvements are needed in areas such as image recognition accuracy and speech-to-text transcription. It is recommended to continue refining these features based on user feedback and technological advancements. Additionally, ongoing user engagement and collaboration with individuals with visual and speech impairments are crucial for ensuring the app remains inclusive and user-centered. The project highlights the significance of inclusive design and accessible technologies in creating an inclusive digital environment for all individual.

11. Limitations and Future Work

The case study and evaluation of the "No-Hassel" app have certain limitations. The sample size of participants may not represent the entire population of individuals with visual and speech impairments. Additionally, the evaluation focused on a specific set of features, and further exploration of additional functionalities could provide a more comprehensive understanding of the app's impact. Future work includes expanding user testing, incorporating user feedback into iterative design processes, and exploring advanced technologies such as machine learning to enhance image recognition and speech-to-text accuracy.