Senior Mode: Digital Accessibility Guidelines for Elder

A PROJECT REPORT

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF THE DEGREE
OF

MASTER OF DESIGN
IN
INTERACTION DESIGN

Submitted by

AKSHAT SHARMA (2K22/MDID/02)

Under the supervision of
Prof. Partha Pratim Das

DEPARTMENT OF DESIGN
DELHI TECHNOLOGICAL UNIVERSITY
(Formerly Delhi College of Engineering)
Bawana Road, Delhi 110042
May, 2024

<u>CANDADIDATE'S DECLARATION</u>

I, Akshat Sharma, Roll No. 2K22/MDID/02, student of M.Des (Department of design), hereby declare that the project dissertation titled "Senior Mode: Digital Accessibility Guidelines for Elder", which is submitted by myself to the Department of Design, Delhi Technological University, Delhi, in partial fulfilment of the requirement for the award of degree of Master of Design, is original and not copied from any source without proper citation. This work has not previously formed the basis for the award of any Degree, Diploma Associateship, Fellowship or other similar title or recognition..

Place: Delhi

Date: 19.06.2024

Akshat Sharma

DEPARTMENT OF DESIGN
DELHI TECHNOLOGICAL UNIVERSITY
(Formerly Delhi College of Engineering)
Bawana Road, Delhi 110042

<u>CERTIFICATE</u>

I hereby certify that the Project Dissertation titled "Senior Mode: Digital Accessibility Guidelines for Elder" which is submitted by Akshat Sharma, Roll No. 2K22/MDID/02, Department of Design, Delhi Technological University, Delhi, in partial fulfilment of the requirement for the award of the degree of Master of Design, is a record of the project work carried out by the students under my supervision. To the best of my knowledge this work has not been submitted in part or full for any Degree or Diploma to this University or elsewhere.

Place: Delhi

Date: 19.06.2024

Prof. Partha Pratim Das

Supervisor

<u>ACKNOWLEDGEMENT</u>

I would like to express my sincere gratitude to Prof. Partha Pratim Das, my college mentor for his continued guidance and support in the thesis project. I truly thank him for his valuable insights and assistance.

I extend my appreciation to all the participants and friends who contributed to the primary research, enriching this work with diverse perspectives and valuable input. Their encouragement and collaboration were instrumental in the successful completion of this thesis.

Place: Delhi

Date: 19.06.2024   Akshat Sharma

ABSTRACT

As technology becomes a bigger part of our daily lives, it is easy to forget that not everyone finds their way around these devices effortlessly. Many senior citizens lose their way in the modern apps of today. Whether it is banking, booking a cab, buying grocery or something as simple as understanding the interfaces filled with small text and confusing navigations. This project, "Senior Mode," is all about bridging the Digital Divide and enhancing the accessibility of Modern technology and inclusive for older adults.

The idea emerged through observing seniors face real issues because of inadequate guidance, confusing navigation, small & non-legible text, and incomprehensible interfaces. My aim was to find pain points of potential users through Survey, Research, and User Interviews, and to work my way towards a practical solution.

From designing simplified layouts and introducing voice-based commands to conducting a user backed accessibility audit of popular apps, this project explored and discovered new ways to improve usability for seniors. The result is a set of Comprehensive Accessibility guidelines and prototypes for a more inclusive digital experience for the elders.

This is not just about making apps easier to use; it is about empowering older adults to feel confident and independent in the modern digital world. With population aging on the rise, projects like this are a step toward building an inclusive world where technology works for everyone.

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CHAPTER 01
INTRODUCTION

1. Introduction

1.1. <u>Project Overview</u>

As the world becomes increasingly digitized, the integration of technology into daily life has significantly improved convenience and efficiency across all age groups. However, the rapid pace of technological advancement has often left behind certain populations, particularly senior citizens, who face considerable challenges in navigating modern digital interfaces. The Senior Mode project seeks to bridge this digital divide by creating an accessibility mode tailored to the needs of elderly users, particularly in the context of ride-booking applications. Through this initiative, the aim is to empower older adults in India to interact confidently and independently with digital systems, thereby improving their overall quality of life.

This thesis explores the challenges faced by elderly users due to both physiological and psychological barriers to technology adoption. The Senior Mode project was conceived to address these barriers, offering a solution that simplifies navigation, enhances readability, and reduces cognitive load for users above the age of 60. Grounded in a user-centric design approach, this project applies best practices in accessibility and usability to create an inclusive digital experience for a demographic often overlooked in mainstream design. Through iterative research, user testing, and design development, the project presents an accessible, intuitive interface that allows seniors to comfortably engage with a ride-booking app while preserving their autonomy.

1.2. <u>Motivation Behind the Project</u>

The motivation for the Senior Mode project stems from the increasing marginalization of elderly populations in the digital sphere, particularly in India, where the elderly population is projected to double by 2050. As digital platforms become integral to essential services such as healthcare, transportation, and banking, the exclusion of senior citizens from these platforms results in a critical accessibility gap. My personal interaction with senior citizens, including my

grandfather's experience with chronic illnesses and his struggles to navigate digital applications, further highlighted the urgency of addressing this issue.

Despite the prevalence of smartphones and mobile applications, elderly users continue to encounter significant barriers—ranging from difficulty in reading small text, confusion over complex navigation, to fear of making mistakes that could have unintended consequences. This project was also motivated by the broader neglect of accessibility considerations in mainstream app development, where the focus is often placed on visually appealing designs that fail to accommodate users with reduced motor skills, vision impairments, or cognitive decline. In light of this, the Senior Mode project emerges as a response to the negligence of design practices that are largely geared towards younger, tech-savvy users, leaving senior citizens to struggle with tools meant for universal use.

Additionally, this project seeks to challenge the perception that seniors are inherently unable to adapt to technology. Instead, it postulates that with appropriate design interventions—focused on simplicity, clarity, and guidance—older adults can be effectively integrated into the digital age. This project is also an advocacy for greater awareness among designers and developers about the importance of creating inclusive and accessible products that cater to all age groups, not just the technologically proficient.

1.3. <u>Scope of the Report</u>

The scope of this thesis is to present a comprehensive account of the Senior Mode project, encompassing its research foundations, design process, and final outcomes. This report will document the end-to-end journey of the project, beginning with a thorough investigation into the digital accessibility challenges faced by senior citizens, particularly in the Indian context. It will then delve into the design principles and ideation that guided the development of an accessible interface for a ride-booking application, with a focus on addressing both psychological barriers and usability concerns.

The report will also present the research methodologies employed in the project, including primary user research in the form of surveys with elderly participants, as well as secondary

research through literature review and analysis of existing accessibility guidelines, such as WCAG 2.2. A critical component of this project was conducting an accessibility audit of a widely-used ride-booking app (e.g., OLA), which revealed several key usability and accessibility issues, serving as the foundation for the design improvements proposed in Senior Mode.

Moreover, the report will offer an in-depth discussion of the design solutions created, including the development of user personas, wireframes, and high-fidelity prototypes. The solutions will be evaluated based on accessibility best practices and validated through user testing with elderly participants. The report will conclude with a discussion on the challenges encountered during the design process, key learnings, and potential future directions for the Senior Mode project, including its applicability to other digital platforms beyond ride-booking applications.

In summary, this thesis not only presents a solution to a specific accessibility problem but also advocates for a larger paradigm shift in the approach to designing digital products for elderly users. Through this report, I aim to contribute to the growing body of knowledge on inclusive design, while also offering practical insights for developers and designers looking to make their products more accessible to aging populations.

CHAPTER 02
LITERATURE REVIEW

2. LITERATURE REVIEW

2.1. <u>Introduction</u>

The increasing reliance on digital technologies has revolutionized access to information, services, and communication worldwide. However, this rapid digital transformation has created a significant barrier for specific demographics, particularly older adults, who often face difficulties adapting to modern technology. The "digital divide" refers to the gap between those who can access and effectively use digital tools and those who cannot, with older populations being disproportionately affected. This issue is especially critical in countries like India, where diverse socioeconomic conditions further exacerbate the exclusion of seniors from the digital ecosystem

The Senior Mode project aims to address this digital divide by developing accessibility guidelines tailored to older adults. By focusing on designing user-friendly digital interfaces, the project seeks to enhance the usability of smartphones, applications, and other modern tools, ensuring that seniors can engage with digital products independently and confidently.

2.2. <u>Aging and Technology Adoption</u>

2.2.1. Cognitive Challenges

Aging often results in cognitive changes that impact an individual's ability to interact with complex systems. These changes include declines in memory retention, slower decision-making, and reduced attention spans.

Seniors may struggle with:
- Memory retention: Difficulty recalling multi-step processes, such as navigating layered menus.
- Cognitive load: Interfaces with dense layouts or excessive information can overwhelm older users, making technology adoption daunting.

Simplifying navigation, avoiding unnecessary complexity, and designing interfaces with predictable patterns can help mitigate these issues.

Figure 1: Population by broad age groups in India, 1961-2026
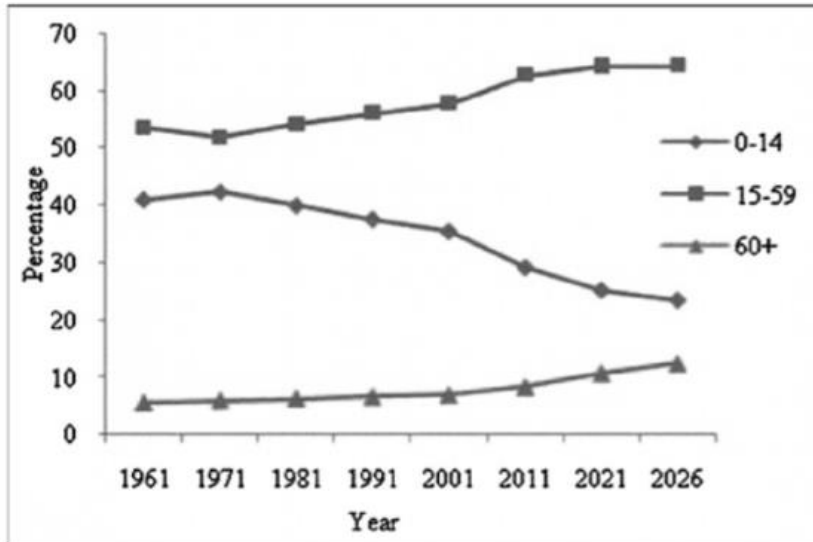
Source: William. J. A. (2018, June). Senior Citizens Usage Towards and Perception of Modern Technology in India- Research Gate.

2.2.2. Sensory Limitations

Age-related sensory impairments also hinder the effective use of digital devices.

- Vision: Common conditions like presbyopia and reduced contrast sensitivity make it difficult for seniors to read small text or distinguish between low-contrast elements.
- Hearing: Audio cues or instructions may be inaccessible to users with hearing impairments unless supplemented by visual signals.

Accessible design must incorporate larger, adjustable text sizes, high-contrast color schemes, and multimodal interaction methods to accommodate these challenges.

2.2.3. Physical and Motor Challenges

Declining motor skills, such as reduced dexterity and tremors, present another barrier for seniors. Small touch targets, swipe gestures, or interfaces requiring precise control often exacerbate these issues. Features like larger buttons, simplified gestures, and alternative input options, such as voice commands, can significantly enhance usability for older users.

2.2.4. Psychological Barriers

Psychological factors, including fear of technology and low self-efficacy, discourage many seniors from engaging with digital tools. Concerns about making irreversible errors or navigating complex interfaces foster a cycle of avoidance. By incorporating clear feedback systems, guided tutorials, and error-tolerant designs, digital products can build confidence and reduce anxiety among senior users.

2.3. Accessibility in Digital Products

2.3.1. Existing Guidelines and Limitations

The Web Content Accessibility Guidelines (WCAG) provide a foundational framework for digital accessibility, focusing on principles such as perceivability, operability, understandability, and robustness. While WCAG addresses general accessibility needs, its recommendations often fall short of catering to the unique requirements of elderly users.

Research highlights several areas where WCAG could be extended:
- Larger touch targets and simplified layouts.
- Voice-enabled interfaces for hands-free operation.
- Error prevention mechanisms that reduce the risk of user mistakes.

Figure 2: Four principles of accessibility

Source: Jensen, T.C. (2023, October 17). How to navigate WCAG 2.2.

2.3.2. Elderly-Specific Recommendations

Age-specific accessibility needs include:

- Visual enhancements: Features like high-contrast modes and customizable font sizes.
- Simplified navigation: Streamlined menus and shortcuts to essential functions.
- Feedback and guidance: Real-time instructions and notifications that reassure users and clarify actions.

These tailored guidelines are integral to the Senior Mode project, ensuring inclusivity for senior citizens with diverse abilities.

2.4. <u>Inclusive Design Principles</u>

2.4.1. Simplicity and Clarity

Inclusive design emphasizes reducing cognitive load by creating interfaces that are intuitive and straightforward. Key strategies include:

- Avoiding jargon and overly technical language.
- Designing consistent layouts with clear visual hierarchies.
- Using familiar metaphors and symbols to guide user interactions.

2.4.2. Multimodal Interaction

Incorporating multiple input and output methods enhances usability for a diverse audience. Examples include:

- Touch: Large, responsive buttons for easier interaction.
- Voice commands: Enabling hands-free navigation for those with motor impairments.
- Keyboard shortcuts: Providing alternatives for users less familiar with touchscreens.

2.4.3. Gradual Onboarding

Incremental introduction of features, supported by step-by-step tutorials and contextual help, can ease the learning curve for seniors. This approach fosters confidence and reduces frustration.

2.4.4. Flexibility and Customization

Allowing users to personalize their experience—such as adjusting text size, color contrast, and input methods-empowers seniors to interact with digital products according to their preferences and abilities.

2.5. <u>Challenges in Existing Digital Interfaces</u>

2.5.1. Neglect of Senior Needs

Mainstream digital platforms often prioritize aesthetics and functionality for younger, tech-savvy audiences, overlooking the accessibility requirements of older users.
Common issues include:

- Cluttered interfaces that overwhelm seniors with excessive options and advertisements.
- Reliance on gestures or navigation patterns that are non-intuitive for older users.
- Inaccessible language and terminology that hinder comprehension.

2.5.2. Inconsistent Implementation of Accessibility Features

Accessibility options, such as screen readers or high-contrast modes, are often underutilized due to poor integration or lack of awareness. Seniors may struggle to locate or enable these features, further alienating them from digital platforms.

2.6. Success Stories and Case Studies

2.6.1. Effective Accessibility Modes

Operating systems like iOS and Android have introduced dedicated accessibility modes that simplify interfaces, enhance readability, and integrate voice commands. These efforts demonstrate the potential for inclusive design when accessibility is prioritized.

2.6.2. Lessons from Ride-Booking Apps

While ride-booking platforms like Uber and Ola have revolutionized urban mobility, their interfaces remain largely inaccessible to seniors. Challenges such as jargon-filled instructions and cluttered layouts highlight the need for dedicated senior-friendly modes. The Senior Mode project builds on these insights by proposing redesigned interfaces tailored to elderly users.

2.7. Contributions of the Senior Mode Project

2.7.1. Accessibility Guidelines for Seniors

The Senior Mode project synthesizes academic research and user feedback to develop comprehensive guidelines for senior accessibility. Key recommendations include:
- Larger touch targets and minimalistic designs to reduce physical and cognitive strain.
- Voice-enabled navigation and interactive tutorials to build confidence.
- Customizable settings that empower seniors to adapt interfaces to their needs.

2.7.2. Redesigning Digital Interfaces

The project focuses on redesigning commonly used applications, such as ride-booking platforms, to demonstrate the practical application of its guidelines. By incorporating intuitive layouts, simplified workflows, and multimodal inputs, these redesigned interfaces aim to enhance usability for seniors.

2.7.3. Bridging the Digital Divide

By addressing the psychological, physical, and cognitive barriers faced by seniors, the Senior Mode project contributes to bridging the digital divide. Its user-centered approach ensures that digital products are accessible to all, fostering inclusion and independence.

2.8. Conclusion and Future Directions

The integration of older adults into the digital ecosystem is essential for fostering inclusivity and enhancing their quality of life. Accessibility is not merely a technical consideration but a social imperative that enables seniors to engage with essential services, maintain independence, and participate actively in society.

The Senior Mode project exemplifies a proactive approach to addressing the digital divide, offering practical solutions grounded in user research and inclusive design principles. Future efforts should focus on:

- Educating designers about the unique needs of seniors.
- Promoting participatory design methods that involve seniors in the development process.
- Advancing research to evaluate the effectiveness of accessibility features in real-world scenarios.

By prioritizing accessibility and user empowerment, the Senior Mode project sets a benchmark for designing digital products that cater to the needs of older adults, ensuring that no one is left behind in the digital age.

CHAPTER 03
PROBLEM STATEMENT

3. PROBLEM STATEMENT

3.1. Introduction

This section defines the core challenges that senior users face in accessing digital applications, particularly those arising from design and technical limitations. It elaborates on user pain points, obstacles encountered by designers and developers, and the dual psychological and technical barriers experienced by senior users, leading to consolidated problem statements that guide the project's objectives.

Figure 3: Challenges faced by seniors
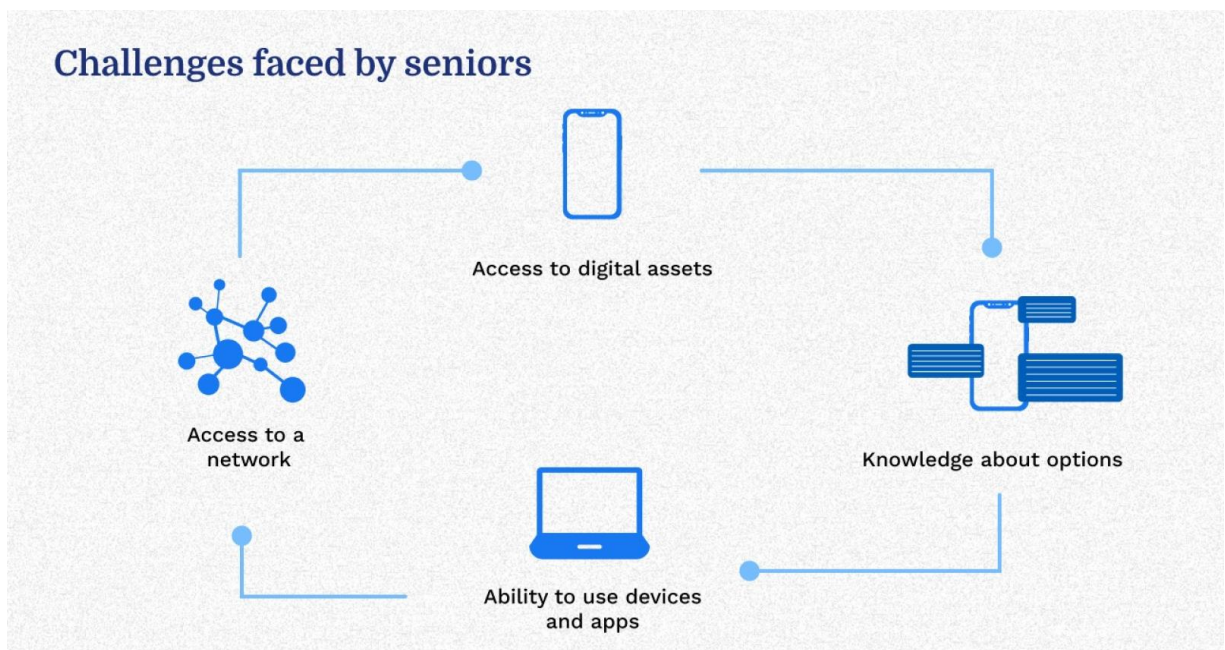
Source: Monsoonfish Inc. (2023, March 31). Addressing the Digital Divide in Elderly Population through Agetech UX.

3.2. Identified User Pain Points

Primary research insights reveal the following user pain points that elderly users encounter when interacting with digital applications:

- Navigation Difficulties: Many seniors struggle with app navigation due to complex interfaces, hidden features, and unclear button labels, which often result in hesitation and errors.

- Text Size and Readability: Small text sizes and insufficient color contrast are common issues, impairing the readability of information and causing discomfort, especially for those with deteriorating vision.

- Inaccessible Input Methods: Common actions, such as typing and selecting small touchpoints, become challenging due to reduced dexterity and precision in motor skills. This is compounded by interfaces that lack alternative input methods, such as voice-based interactions.

- Anxiety and Fear of Error: Seniors express heightened anxiety about making errors in unfamiliar digital environments. This psychological barrier discourages experimentation and limits their technology use.

- Lack of Guided Support: Many elderly users prefer human assistance or explicit instructions to help them understand app functions. However, existing applications often provide limited guidance, increasing reliance on family members or caregivers.

3.3. <u>User Behaviors and Consumption Patterns</u>

Designers and developers face several challenges in making digital applications accessible for senior users:

- Limited Emphasis on Accessibility: Accessibility guidelines are often deprioritized due to time constraints or limited awareness. As a result, elderly-friendly features such as larger touch targets, simplified navigation, and alternative input options are frequently overlooked.

- Complexity in Implementing Accessibility Standards: Implementing comprehensive accessibility standards like WCAG requires specialized knowledge and resources, which may not always be available or prioritized within development teams.

- Balancing Aesthetics with Functionality: While aesthetically pleasing designs attract a broad user base, they may not always align with accessibility needs. Designers are often challenged to balance visually engaging designs with functional features that cater to seniors.

- Lack of Senior-Centric Research: Many designers rely on generalized user research, which seldom addresses the specific cognitive and physical requirements of elderly users. This gap leads to an underrepresentation of senior users in UX and UI decision-making processes.

3.4. Psychological and Technical Barriers for Senior Users

Elderly users face unique psychological and technical barriers that deter them from fully engaging with digital applications:

- Psychological Barriers: Seniors often carry a belief that digital technology is beyond their understanding or usability, creating a mental block that discourages engagement. They may fear that any mistake could cause irreparable damage, adding to their reluctance.

- Technical Challenges: Limited exposure to evolving technologies means that many elderly users are unfamiliar with modern digital interactions, such as swiping or tapping. This lack of familiarity makes even basic tasks appear complex, contributing to feelings of frustration.

- Cognitive and Sensory Decline: Age-related cognitive and sensory decline, including memory loss, decreased attention span, and slower processing speed, further hinders

digital adoption. Standard app interfaces do not typically accommodate these changes, exacerbating the challenge for senior users.

3.5. <u>Final Problem Statements</u>

Based on the identified pain points, challenges, and barriers, the following problem statements define the core issues that the Senior Mode project aims to address:

- Reinforcing Senior Users' Confidence in Digital Technology: There is a need to create applications that reinforce confidence in senior users by providing simple, intuitive designs that cater to their cognitive and physical needs.

- Encouraging Accessibility-Driven Design Practices: Designers require accessible design standards that are easy to implement and specifically tailored for elderly users to address their unique challenges.

- Empowering Seniors through Usable and Familiar Interfaces: Digital applications should leverage accessible design principles, enabling seniors to interact with technology using familiar, straightforward features without the constant need for external assistance.

CHAPTER 04
RESEARCH METHODOLOGY

4. RESEARCH METHODOLOGY

4.1. <u>Overview</u>

This section outlines the methodology employed to investigate accessibility issues faced by elderly users in digital interactions, with particular focus on ride-booking applications. The research methodology comprises three primary parts: primary research through user surveys, secondary research through literature review and accessibility guidelines, and a comparative audit of an existing ride-booking application.

4.2. <u>Research Objectives</u>

The research aimed to uncover the multifaceted challenges senior citizens face with modern digital applications, particularly focusing on accessibility and usability concerns in ride-booking apps. Specific objectives included:

1. Identifying barriers to technology adoption among older adults.
2. Analyzing the psychological and technical factors contributing to digital resistance.
3. Auditing an existing ride-booking app (OLA) to uncover accessibility and usability gaps.
4. Integrating user and secondary research insights to propose actionable design solutions.

4.3. <u>Research Design</u>

A mixed-methods approach combining primary and secondary research was used. The study was divided into three components:

1. Primary Research: Surveys and interviews to capture elderly users' firsthand experiences and preferences.
2. Secondary Research: Reviewing scholarly articles, white papers, and accessibility guidelines.
3. Accessibility and Usability Audit: A detailed audit of the OLA app using accessibility guidelines like WCAG 2.2 to identify design flaws and opportunities

4.4. <u>Primary Research</u>

1. Survey Design

   The survey targeted elderly users to understand their challenges with digital applications. Key areas included:

       a. Interaction challenges: Identifying specific pain points.

       b. Psychological barriers: Gauging fear, anxiety, or reluctance.

       c. Preferences: Gathering input on features that could improve usability.

2. Participant Demographics

       a. Age Group: Participants primarily consisted of elderly users aged 60 and above.

       b. Sample Size: The survey had a limited sample size of 20 participants.

       c. Digital Literacy: Mixed levels of digital literacy, with some having minimal experience with mobile applications and others more familiar but still facing significant challenges. Overall ranging from basic to moderate.

       d. Location: Primarily Delhi NCR, with some participants from other urban and sub-urban areas of the country.

3. Interview Structure

       a. Open-ended discussions with five participants.

       b. Focused on usability barriers, emotional experiences, and feature suggestions

4.5. <u>Secondary Research</u>

1. Sources

   A review of research papers and guidelines related to:

       a. Accessibility for elderly users.

       b. Behavioral patterns and technology resistance among seniors.

       c. Case studies on successful accessibility implementations in digital platforms.

2. Key References

       a. Articles on population aging and technology adoption.

b. WCAG 2.2 guidelines for accessible digital design.

  c. Best practices from usability and accessibility case studies.

3. Purpose

  a. Validate findings from primary research.

  b. Adapt evidence-based guidelines into design recommendations.

4.6. <u>Accessibility and Usability Audit</u>

1. Audit Focus

  a. Conducted on the OLA ride-booking app.

  b. Evaluated the app's adherence to accessibility principles, usability heuristics, and elderly-friendly design practices.

2. Criteria for Analysis

  a. Text readability (size, contrast, font).

  b. Navigation complexity.

  c. Accessibility options (voice commands, alternative input methods).

  d. Feedback mechanisms and error prevention.

4.7. <u>Sampling and Data Collection</u>

1. Sampling Strategy

  A stratified sampling approach ensured diversity in socioeconomic background, age, and tech literacy.

2. Data Collection Tools

  a. Google Forms for surveys.

  b. Manual coding for interview transcripts.

  c. Accessibility testing tools for app audit.

CHAPTER 05

RESEARCH ANALYSIS

5. RESEARCH ANALYSIS

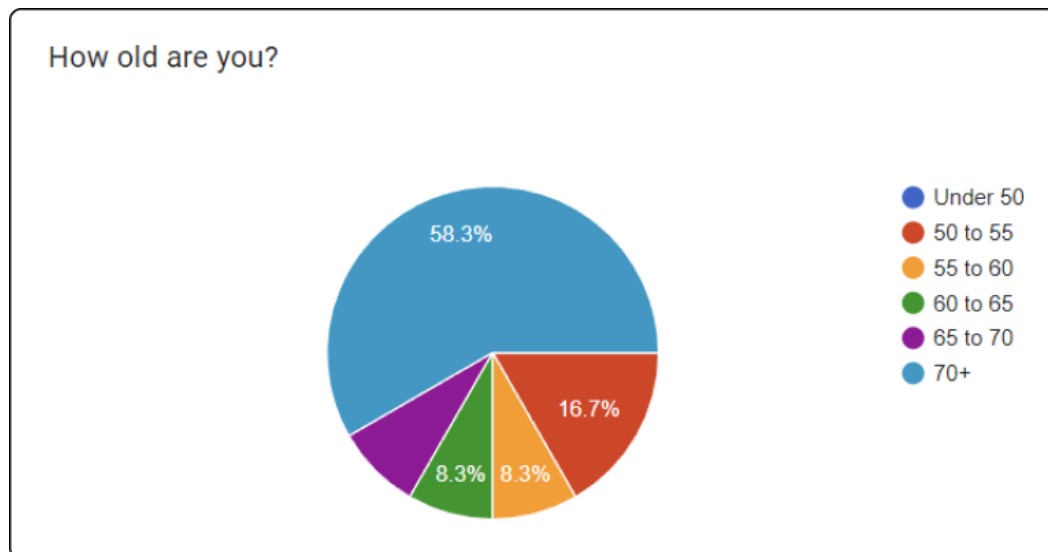### 5.1. Primary Research Findings
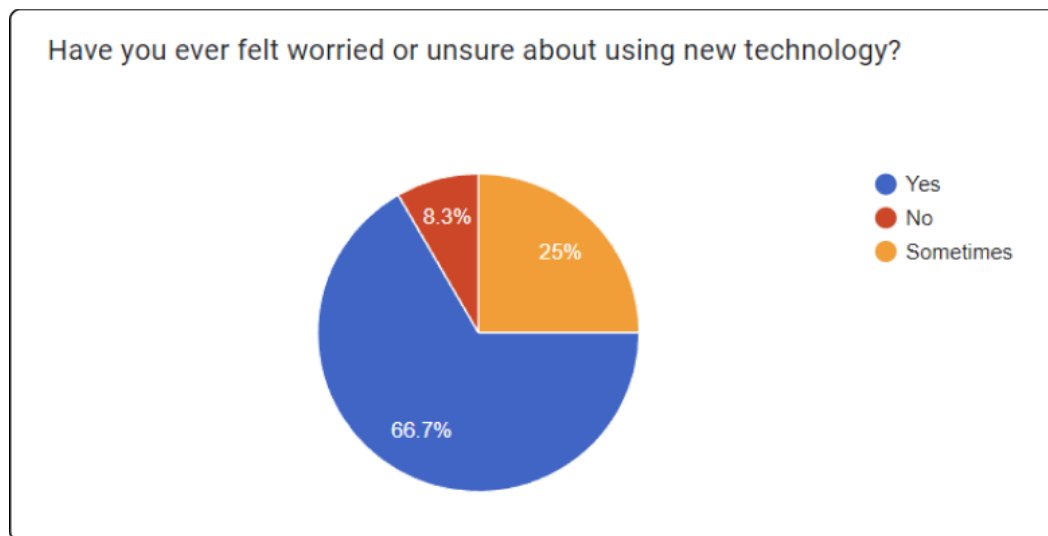
1. Survey Analysis: The survey revealed several key insights:

   - User Demographics:

Figure 4: Survey Questionnaire 1

How old are you?

- Under 50
- 50 to 55
- 55 to 60
- 60 to 65
- 65 to 70
- 70+

58.3%
16.7%
8.3% 8.3%

Figure 5: Survey Questionnaire 2

Have you ever felt worried or unsure about using new technology?

- Yes
- No
- Sometimes

8.3%
25%
66.7%

- Navigation and Comprehension Challenges: Around 72.7% of respondents reported difficulty understanding button functions, and over 58% found app interfaces overwhelming.

Figure 6: Survey Questionnaire 3

Have you ever felt worried or unsure about using new technology?
Can you tell us why you might feel this way (You can choose multiple options)

Option	Percentage
I worry about making mistakes.	(41.7%)
Technology seems too complicated.	(58.3%)
I'm afraid of breaking something.	(16.7%)
I don't understand how it works.	(41.7%)
I am comfortable with the new technology.	(8.3%)
I need guidance first to know how and what to do.	(8.3%)

Figure 7: Survey Questionnaire 4

Which of these tasks can you accomplish using your Smartphone? (You can choose multiple options)

Task	Percentage
Calling	(100%)
Messaging (SMS or WhatsApp)	(83.3%)
Social Media (Facebook, Insta...)	(83.3%)
Streaming services/OTT (YouT...)	(58.3%)
Payment/ Transaction (UPI, W...)	(33.3%)
Bill Payments (Mobile recharge...)	(25%)
Ride Booking (Ola, Uber, Rapid...)	(16.7%)
Online Shopping (Amazon, Flip...)	(25%)
Food Ordering (Swiggy, Zomat...)	(16.7%)
Hotel, Train or Flight Booking (I...)	(16.7%)

- Preference for Instructional Support: Approximately 83.3% preferred that someone guide them through unfamiliar digital processes, and 66.7% favoured simple, step-by-step instructions.

Figure 8: Survey Questionnaire 5

What parts of using technology do you find tricky or hard to understand? (You can choose multiple)

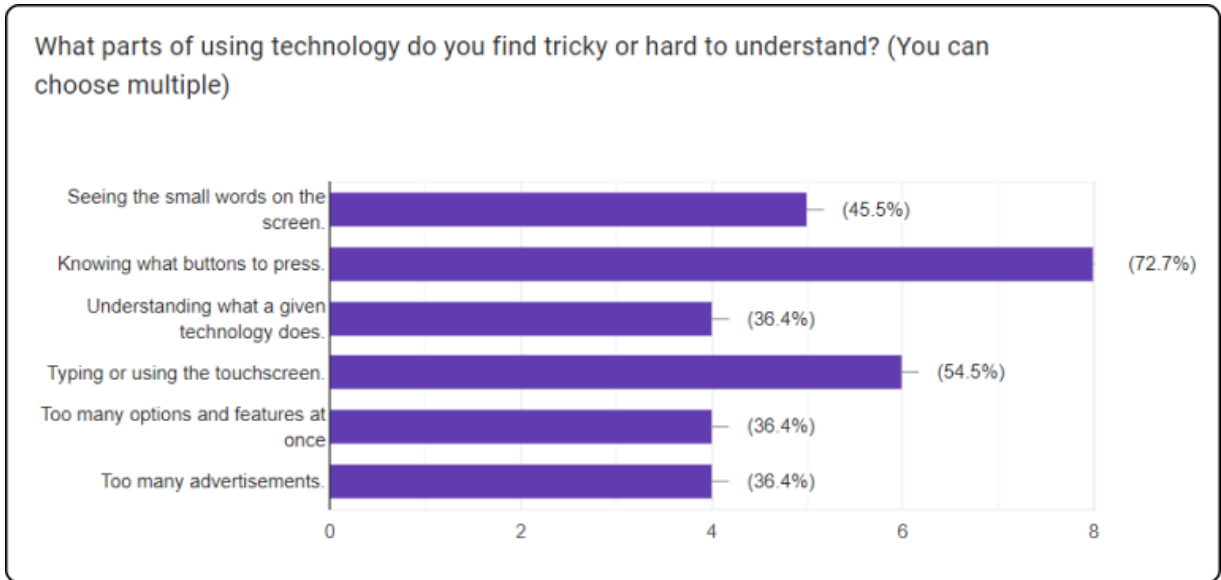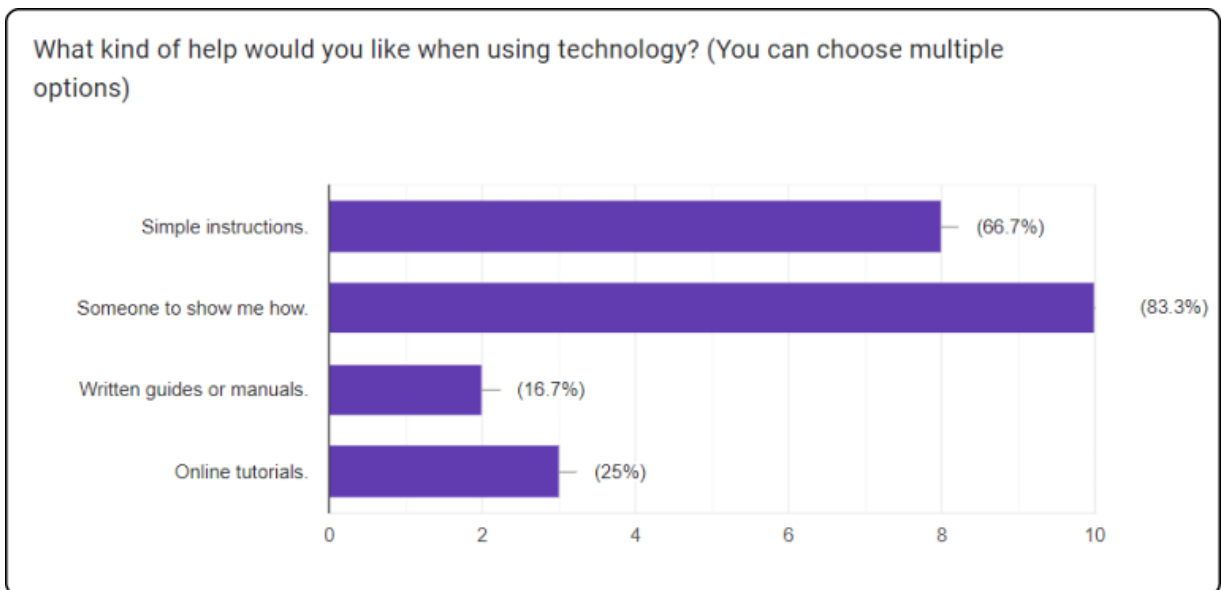| Category	Value
Seeing the small words on the screen.	(45.5%)
Knowing what buttons to press.	(72.7%)
Understanding what a given technology does.	(36.4%)
Typing or using the touchscreen.	(54.5%)
Too many options and features at once	(36.4%)
Too many advertisements.	(36.4%)

Figure 9: Survey Questionnaire 6

What kind of help would you like when using technology? (You can choose multiple options)

Category	Value
Simple instructions.	(66.7%)
Someone to show me how.	(83.3%)
Written guides or manuals.	(16.7%)
Online tutorials.	(25%)

- Psychological Barriers: Many participants expressed anxiety about engaging with technology due to fears of making mistakes or breaking the system, leading to a hesitancy to try new applications.

- Visual and Cognitive Constraints: Common struggles included reading small text, interacting with intricate menus, and completing actions under time pressure.

These findings highlighted a pressing need for accessible, user-friendly designs that accommodate physical, cognitive, and psychological limitations.

2. Interview Insights
- Participants highlighted frustration with hidden or overly technical features.
- Some users felt overwhelmed by promotional ads and unnecessary notifications.

5.2. <u>Secondary Research Findings</u>

1. Key Insights from Research Papers
- Digital Hesitance: Psychological resistance among seniors stems from fear of failure and perceived complexity.
- Design Principles: Larger text sizes, voice-based navigation, and error-tolerant systems were emphasized in existing literature.
- Accessibility Gaps: Case studies revealed that even apps marketed as "accessible" often fail WCAG compliance tests due to oversight of elderly-specific needs.

2. Best Practices Incorporated
- Larger touchpoints and uncluttered interfaces.
- Visual and audio feedback for actions.
- Consistent, jargon-free language.

5.2.1. WCAG 2.2 Guidelines and Accessibility Criteria

The Web Content Accessibility Guidelines (WCAG) 2.2 offer practical recommendations for creating accessible digital interfaces. Key criteria include:

- Perceivability: Use larger fonts, ensure high contrast, and provide alternatives like text-to-speech where feasible.

- Operability: Ensure that interfaces are keyboard-accessible, support clear and descriptive navigation, and eliminate reliance on mouse-only interactions.

- Understandability: Maintain consistency in language and labeling, provide clear instructions, and avoid ambiguous terms.

- Robustness: Design for compatibility with older devices and browsers to ensure inclusivity for a diverse user base.

5.3. Accessibility and Usability Audit of OLA App

1. Audit Findings
    a. Small Text and Button Sizes: Key information, such as OTPs and fare details, was presented in small, low-contrast text, making it difficult for elderly users to read.
    b. Cluttered Interface & Navigation Challenges: The app's homepage displayed an overwhelming amount of information, including promotional ads and non-essential options, which detracted from the primary task of booking a ride
    c. Color-Dependent Cues: Essential cues, such as vehicle availability, relied on color alone, which can be problematic for users with color vision deficiencies.
    d. Accessibility Gaps:
        i. No voice-based commands or alternative input methods.
        ii. Jargon-heavy error messages without actionable suggestions.

e. Feedback and Guidance:
    i. Lack of clear feedback on button presses.
    ii. Limited onboarding support for new users.

Figure 10: Updated Problem Flow
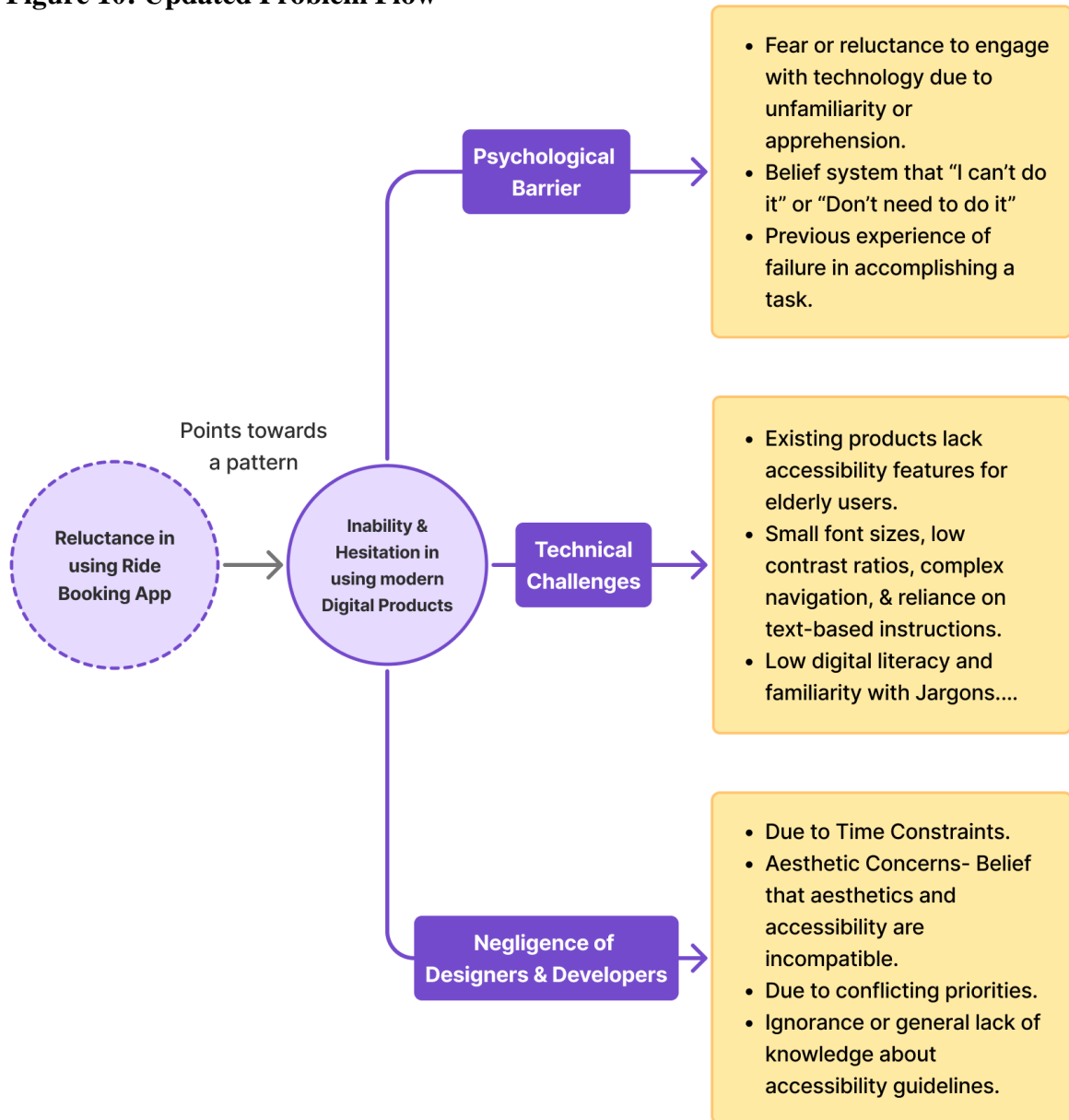
Source: Author

2. Key Takeaways from Audit
    a. Immediate Needs: Simplified navigation and larger touchpoints.
    b. Long-Term Goals: Dedicated accessibility settings tailored for seniors.

5.4. <u>User Personas</u>

To ensure the project addresses real-world challenges faced by elderly users, two user personas were developed. These personas, based on primary and secondary research insights, highlight key user needs and guide the design process.

Persona Description
1. **Persona 1: Rajesh Kumar**
    - Age: 68
    - Location: Delhi
    - Occupation: Retired Government Employee
    - Digital Literacy: Basic

    a. Overview: Rajesh Kumar values independence and uses basic smartphone features like calling, messaging, and reading news. He struggles with complex interfaces, small text, and fears making mistakes while navigating digital platforms.

    b. Key Needs:
        - Simple interfaces with large, readable text.
        - Clear guidance and error prevention mechanisms.
        - Trust-building features to boost confidence.

2. **Persona 2: Nirmal Patel**
    - Age: 72
    - Location: Bengaluru
    - Occupation: Retired School Teacher
    - Digital Literacy: Moderate

a. Overview: Nirmal Patel is a tech-curious individual who uses digital tools for learning and convenience. However, she finds small buttons, cluttered layouts, and navigation complexity frustrating.

b. Key Needs:
- Streamlined navigation and larger touchpoints.
- Assistance features like voice commands.
- Secure and user-friendly interfaces to reduce anxiety.

5.5. <u>Thematic Analysis</u>

1. Recurring Themes
   a. Psychological hesitance combined with usability barriers prevents technology adoption.
   b. Senior users value simplicity, clarity, and support in design.

2. User Needs and Design Opportunities
   a. Clear, consistent feedback mechanisms.
   b. Intuitive navigation with fewer steps.
   c. Voice-guided navigation and error correction systems.

5.6. <u>Conclusion of Analysis</u>

The research confirmed that accessibility and usability challenges, coupled with psychological hesitance, are key factors deterring senior citizens from embracing ride-booking apps. Insights from the OLA app audit, user surveys, and referenced research papers were synthesized to create targeted design solutions, including an accessible "Senior Mode."

CHAPTER 06

IDEATION: DESIGNING ACCESSIBLE DIGITAL SOLUTIONS FOR OLDER ADULTS

6. IDEATION: DESIGNING ACCESSIBLE DIGITAL SOLUTIONS FOR OLDER ADULTS

6.1. Introduction to Ideation

In response to the challenges outlined, this section explores a range of potential solutions for overcoming the identified psychological, design, and technical barriers faced by elderly users. Each solution pathway targets core issues while emphasizing inclusivity, usability, and ease of access. The ideation process considered real-world applicability, simplicity in design, and the potential for fostering greater independence among senior users.

The solutions developed during this phase not only aim to address immediate usability concerns but also propose long-term design practices that prioritize accessibility for seniors as a core value in digital product development.

6.2. Problem Analysis and Existing Challenges

6.2.1. Psychological Barriers

One of the main reasons seniors are hesitant to adopt digital technologies is the psychological barrier stemming from long-standing beliefs and fears. Key concerns include:

- Trust Deficit: Older users often perceive modern apps as unreliable or untrustworthy.
- Change Resistance: Many seniors view technology as a domain designed exclusively for younger generations.
- Fear of Mistakes: Anxiety about making errors or being unable to navigate interfaces exacerbates their reluctance.

6.2.2. Technical Resistance

Technical knowledge gaps hinder older adults from engaging with digital tools. Challenges include:

- Limited Knowledge: Seniors frequently lack the foundational knowledge required to use mobile apps effectively.
- Interface Complexity: Existing app designs often incorporate advanced functionality and jargon that overwhelm users.
- Issues with Input: Difficulties with text inputs, navigation, and understanding app terminology make interactions cumbersome.

6.2.3. Physiological Challenges

Age-related physical limitations also present significant barriers to technology use. These include:

- Vision Impairments: Difficulty reading small text or distinguishing low-contrast elements.
- Motor Skill Decline: Challenges in performing precise actions, such as tapping small icons or using swipe gestures.
- Cognitive Changes: Slower decision-making and reduced ability to recall complex workflows.

6.3. **Existing Problem Flow**

The current interaction pattern for older adults using digital applications is fraught with obstacles, leading to disengagement. The Existing Problem Flow highlights:

- A lack of workable knowledge and intuitive interfaces.
- Technical hurdles, including text input difficulties and incomprehensible app language.
- Psychological and physiological resistance, compounded by the perception that modern apps are not designed for seniors.

These issues reinforce the belief among older users that "these apps are made for the younger generation," further widening the digital divide.

Figure 11: Existing Problem Flow
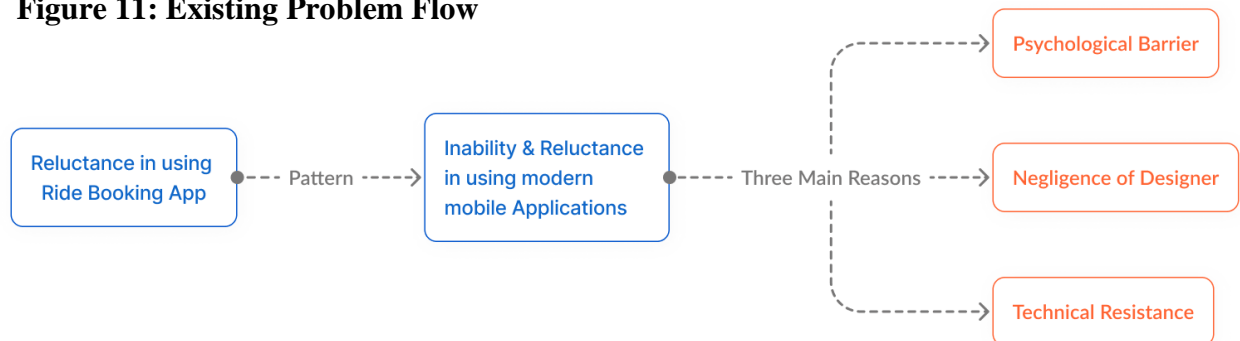
Source: Author

6.4. Ideation Process and Proposed Solutions

6.4.1. Exploring Possible Solutions

To address the challenges identified, the ideation process focused on developing innovative and inclusive solutions. Key principles guiding the ideation include:

- Creating a sense of belonging and inclusivity for seniors within digital ecosystems.
- Simplifying the learning curve while maintaining essential functionality.
- Reinforcing trust and belief in the usability of modern applications.

6.4.2. Proposed Solutions

1. **Dedicated Senior Mode in Existing Apps**

   This solution involves introducing a Senior Mode within existing applications. The mode would feature:

   - Accessible Design: Larger touchpoints, simplified navigation, and high-contrast visual elements.
   - Voice Interaction: Hands-free input methods for ease of use.
   - Intuitive Tutorials: Step-by-step guides and contextual help tailored to senior users.

**Figure 12: Solution flow for Psychological Barriers**
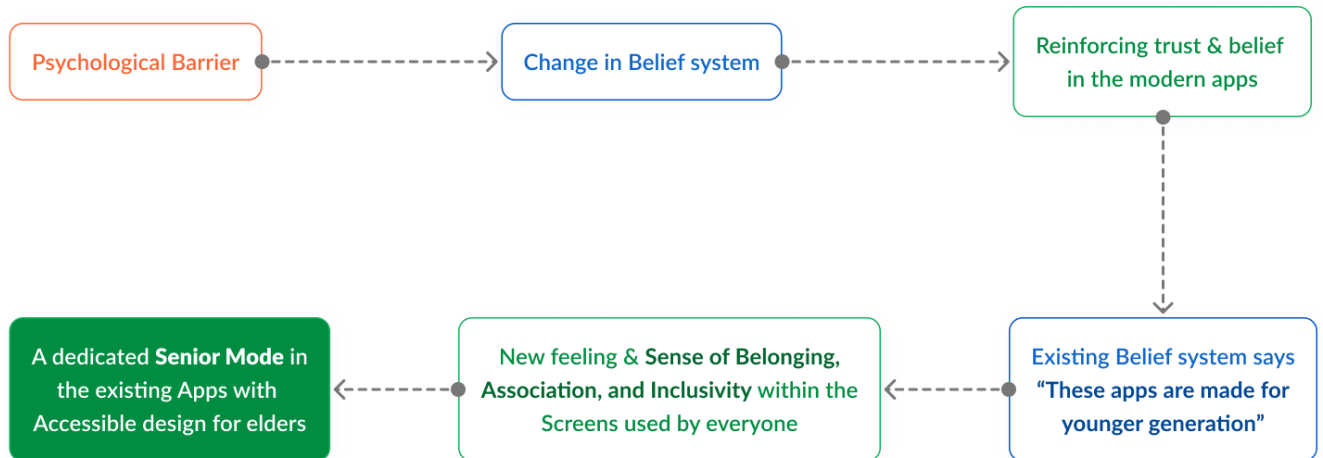
Source: Author

2. **Simplified Accessibility Guidelines for Older Adults**

   Developing a set of senior-specific accessibility guidelines to inform app design. Key recommendations include:

   - Readable Interfaces: Large, scalable fonts and visual aids.
   - Alternative Input Options: Voice commands and gesture-free navigation.
   - Error Forgiveness: Easy undo actions and clear, supportive error messages.

Figure 13: Solution flow for Technical Resistance
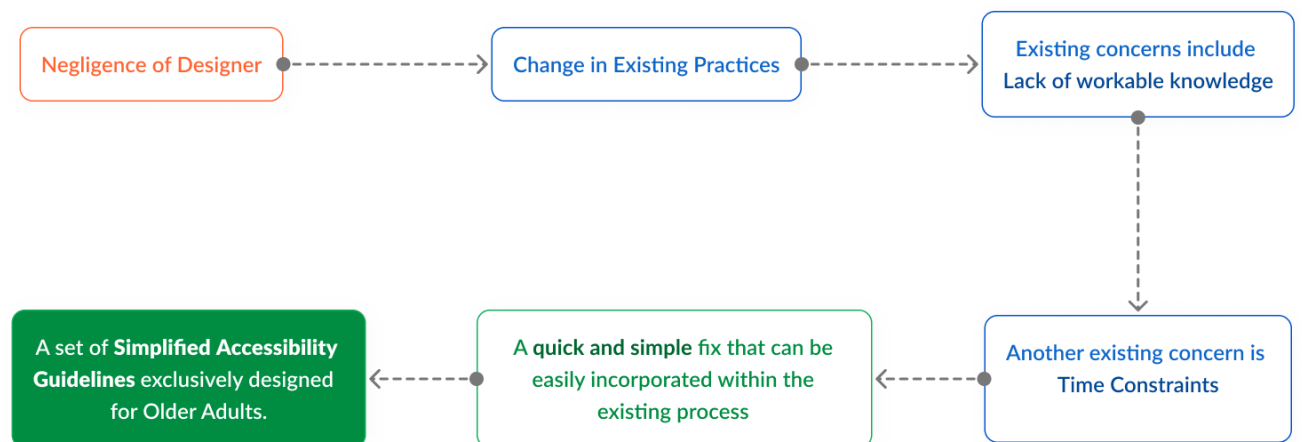
Source: Author

3. **Inclusive and Intuitive Design Enhancements**

   Integrating features that cater to both the technical and physiological challenges faced by seniors:

   - Customizable Interfaces: Allowing users to adjust settings like text size, color contrast, and input methods.
   - Simplified Workflows: Reducing the number of steps required to complete tasks.
   - Familiar Design Patterns: Incorporating universally recognized symbols and layouts.

**Figure 14: Solution flow for Physiological Challenges**
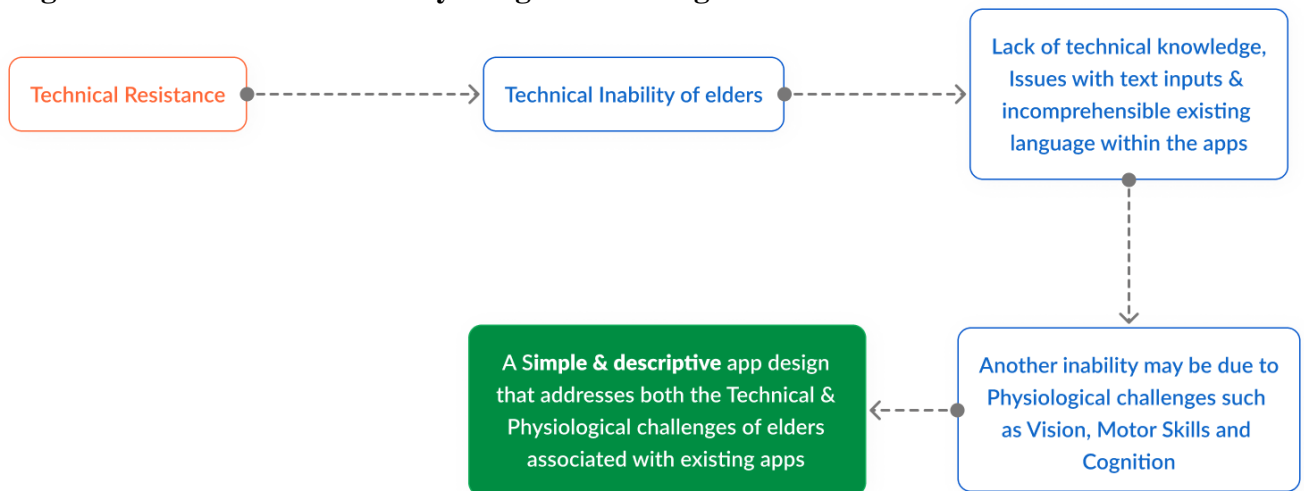
Source: Author

6.5. Extended Problem Flow: Bridging the Gap

The ideation process identified a new interaction flow to overcome existing challenges:

1. Reinforce Trust: Address seniors' belief systems by demonstrating the reliability and user-friendliness of modern apps.
2. Simplify Processes: Replace complex workflows with intuitive, step-by-step interactions.
3. Empower Users: Equip seniors with the tools and confidence to use digital technologies independently.

This extended flow emphasizes inclusivity and addresses psychological, technical, and physiological barriers comprehensively.

Figure 15: Extended Problem Flow
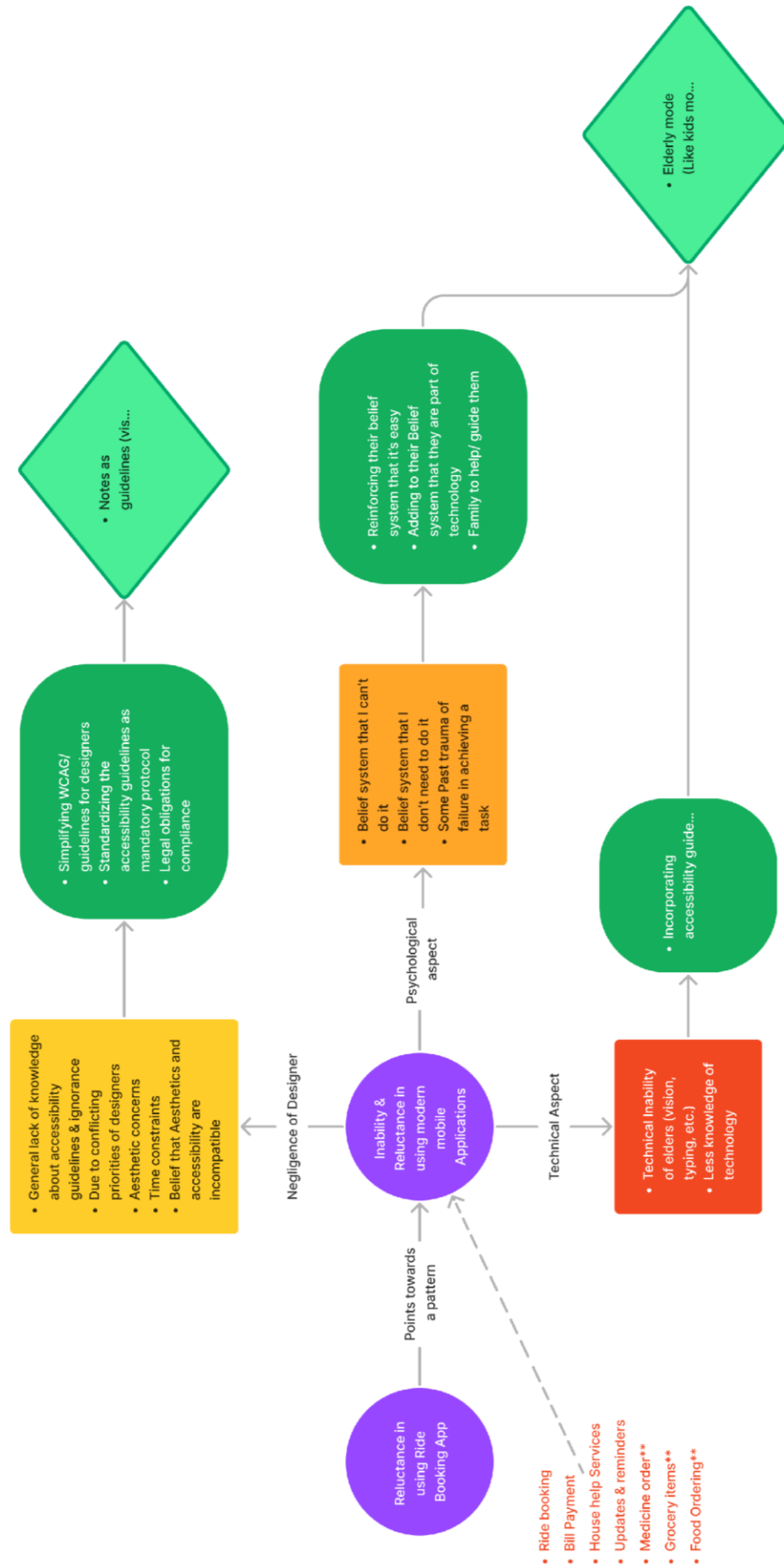
Source: Author

6.6. Key Goals of the Ideation Phase

The ideation phase culminated in the following objectives:

1. Developing Accessible Design Solutions: Prioritize inclusivity to bridge the digital divide for seniors.
2. Simplifying Technology Use: Reduce complexity and create a welcoming experience for older users.
3. Promoting Psychological Ease: Build confidence and trust through intuitive and supportive interfaces.

By aligning design solutions with the needs and limitations of older adults, the ideation phase sets the stage for the development of accessible and impactful digital products.

CHAPTER 07

ACCESSIBILITY GUIDELINES FOR SENIOR CITIZENS

7. ACCESSIBILITY GUIDELINES FOR SENIOR CITIZENS

To design digital solutions that accommodate the unique needs of elderly users, adherence to specific accessibility guidelines is crucial. These guidelines, developed through both primary and secondary research, focus on the common physical, cognitive, and psychological barriers encountered by senior users, especially those with limited technological familiarity. The guidelines outlined here have been carefully aligned with the principles of the Web Content Accessibility Guidelines (WCAG) 2.2, adapted for the Indian elderly population.

7.1. Text and Visual Clarity

A large proportion of elderly users struggle with small text sizes and low contrast, both of which contribute to reading difficulties and navigation errors. Visual clarity in design ensures that content is easily readable and comprehensible at a glance.

- **Larger Text Sizes**: Minimum text size should be set at 16–18px, with options for further adjustments to accommodate varying levels of vision impairment. Heading sizes should follow a logical hierarchy to enhance readability and aid in quick content scanning.

- **High Contrast Ratios**: Background and foreground elements must meet a minimum contrast ratio of 4.5:1 to ensure clarity. High contrast color schemes, such as dark text on a light background, make content more distinguishable, especially for users with cataracts or age-related macular degeneration.

- **Readable Fonts**: Sans-serif fonts, such as Arial and Helvetica, are preferred for their legibility. Avoid decorative fonts that complicate reading, especially on small screens.

7.2. Simplified Navigation

A simplified, intuitive navigation structure is fundamental to ensuring that elderly users can access essential features without confusion or frustration.

- **Reduced Menu Options**: Limit navigation menus to 3–5 core actions per screen, prioritizing primary tasks like "Home," "Settings," and "Help." Clear labeling, with recognizable icons and straightforward language, minimizes cognitive load.

- **Consistent Layout**: Maintain uniform placement of elements across all screens to reinforce familiarity. Repetition of layout structure helps users form mental models, facilitating faster recognition and reducing errors.

- **Breadcrumbs and Back Buttons**: Provide breadcrumbs or clear "Back" buttons to aid navigation and allow users to easily retrace their steps, fostering confidence and reducing the feeling of being "lost" in the app.

7.3. Input and Interaction Design

Given the age-related motor limitations often experienced by elderly users, input methods must be adapted for ease of use, particularly on touchscreen devices where precise movements are challenging.

- **Larger Touch Targets**: Touchpoints should measure a minimum of 44x44 pixels, ensuring that buttons and links are accessible without requiring precise motor control.

- **Alternative Input Methods**: Incorporate voice-assisted controls and keyboard accessibility to offer flexible interaction methods. For tasks requiring text entry, predictive text and autocomplete functions can ease the process.

- **Error Tolerance and Undo Options**: Allow users to easily undo actions and confirm steps, reducing anxiety over mistakes. Confirmation dialogs and "Undo" buttons help prevent irreversible actions and support a stress-free experience.

7.4. <u>Audio and Visual Cues</u>

To support users with visual or hearing impairments, audio and visual cues act as reinforcing aids to ensure that essential information is communicated effectively.

- **Audio Feedback**: Enable audio feedback to confirm successful actions, like completed bookings or profile updates. This approach can serve as positive reinforcement for users hesitant to navigate digital interfaces.

- **Visual Feedback for Interactive Elements**: Highlight interactive elements (e.g., buttons, toggles) through color changes or slight animations to visually cue users on tappable areas. This measure helps those with low digital literacy identify actionable components.

- **Subtitles and Transcriptions for Audio Content**: For any audio or video material, provide subtitles or text transcripts. Subtitles ensure that users with hearing impairments or difficulty processing spoken language can still access the information presented.

7.5. <u>Cognitive Support</u>

Many elderly users benefit from designs that simplify decision-making and reduce cognitive load, aiding comprehension and enhancing usability.

- **Clear Instructions and Simple Language**: Use plain, concise language with familiar terminology, avoiding technical jargon. When necessary, provide short explanations alongside complex terms to ensure clarity.

- **Progress Indicators and Task Segmentation**: For multi-step tasks, such as account setup or booking, include progress indicators to show users where they are in the process. Segmenting tasks into smaller steps can prevent overwhelm and guide users smoothly through each phase.

- **Visual Simplicity**: Minimize on-screen elements to reduce distractions and avoid overloading the user's field of vision. Clean, clutter-free layouts enable elderly users to focus on completing one task at a time.

7.6. Psychological Reassurance and Encouragement

To address the psychological barriers to technology adoption often experienced by elderly users, design elements must encourage a sense of empowerment and comfort.

- **Guided Onboarding**: Introduce key app features through a step-by-step tutorial during the onboarding phase, familiarizing users with basic functionality in a supportive environment.

- **Error Reassurance**: Provide comforting messages when users make mistakes, reassuring them that errors are part of the learning process. This approach alleviates fear of failure and fosters confidence in navigating the app.

- **Visual Familiarity**: Use familiar icons and colors that resonate with elderly users, avoiding highly modern or abstract designs that may feel intimidating. A consistent, warm color palette, familiar symbols, and a "human" touch can help elderly users feel more comfortable interacting with digital products.

7.7. Testing and Iterative Improvements

The process of designing for elderly accessibility must include ongoing usability testing with elderly users to identify areas for further improvement.

- **Usability Testing with Senior Participants**: Conduct frequent usability testing sessions with elderly users, specifically observing pain points and areas where guidance is required. Iterative testing ensures that updates respond directly to the needs of senior users.

- **Feedback Loop**: Incorporate user feedback into the design process to continuously refine features and interactions based on real-world use cases. A feedback mechanism within the app, such as a "Report an Issue" button, allows users to share challenges, making the app adaptive to evolving accessibility needs.

Figure 16: Simplified Accessibility Guidelines For Seniors

	Best Practice ✓	**Avoid** ✗
Text size	**Larger Text Size** Min. text size 14px with **bold** and 18px regular	Using text size smaller than 14px, especially in regular
Text contrast	**Higher Text contrast** with background. Use 4.5:1+ contrast ratio.	Using Text color contrast lower than 3:1 for essential elements.
Touch points	**Larger Touch Points** at least 48×48px, separated by min. 8–10px	Using smaller touch points that demand precision.
Page Layout	**Linear and Logical** Layout with adequate spacing	Using a layout that is spread across the screen i.e. Cluttered.
Language	**Simple & Understandable** language with definition for complex terms	Using Jargons and Abbreviations without proper explanation.
Navigation	Providing **Breadcrumb Trail & Descriptive titles** for page awareness.	Using Vague Titles and uncertain and Obscure screen location info.

Typography	**Sans-serif Fonts** that are clean and easy to read. Eg. Inter, Arial, Helvetica, etc.	Using aesthetic fonts and formatting style such as italics over readability.
Button/Links	**Descriptive Labels** with context should be used for CTAs and redirecting links.	Using Ambiguous, Misleading links that cause doubt and anxiety.
Input assistance	**Speech-to-Text** input alternative for a smoother data capture.	Relying excessively on the on-screen keyboard for data input.
Data Visualization	**Color Independent Visualization** using patterns and labels.	Using just colors to represent division of different legends.
Pop-ups & Ads.	**Caution to be taken** while using pop up/ads. to avoid cognitive load.	Using excessive pop-up and banners that throws of the user from task.
Animation	**Minimize animations** and dynamic representation of data.	Using several moving elements on the screen and causing mental load.
Success Feedback	**Visual & audio cue** when a task is successfully completed.	Giving inadequate success feedback that make user question the process.

Source: Author

Note: Data based on research sources:

w3.org (2023, October 05). Web Content Accessibility Guidelines (WCAG) 2.2.

Grabowski, S. (2023, July 4). A guide to interface design for older adults. Adchitects.

CHAPTER 08

ACCESSIBILITY AUDIT OF EXISTING RIDE-BOOKING APP

8. ACCESSIBILITY AUDIT OF EXISTING RIDE-BOOKING APP

The accessibility audit of a popular ride-booking app was conducted to assess its usability and accessibility for elderly users. This audit identifies key areas that hinder effective interaction for senior users, especially those facing age-related physical, cognitive, and psychological challenges. The app was evaluated against specific accessibility guidelines, highlighting design elements that require modifications to ensure a more inclusive experience for elderly users.

8.1. Overwhelming Home Screen

The app's home screen is cluttered with multiple icons, categories, and promotional ads. Elderly users may experience difficulty identifying core functionalities due to the excessive visual stimuli.

- **Issue**: Lack of visual hierarchy. Essential information, like the "Book a Ride" feature, is not prominently displayed, resulting in user confusion and potential missteps.

- **Recommendation**: Simplify the home screen by prioritizing primary functions (e.g., ride booking) with larger, well-labeled buttons. Remove or minimize secondary elements, such as promotional ads, to improve focus.

8.2. Small Text and Icon Sizes

Small text and icon sizes pose challenges for seniors, particularly those with reduced vision. Key features such as booking options, driver details, and ride costs are difficult to read and interact with, increasing the likelihood of errors.

- **Issue**: Text and icons fall below the recommended size for optimal readability and interaction.

- **Recommendation**: Increase the font size to at least 16px for readability and make touch targets a minimum of 44x44 pixels, ensuring ease of interaction. Implement a text-scaling option in the settings for customizable accessibility.

Figure 17: Accessibility Audit of Existing App- Homepage
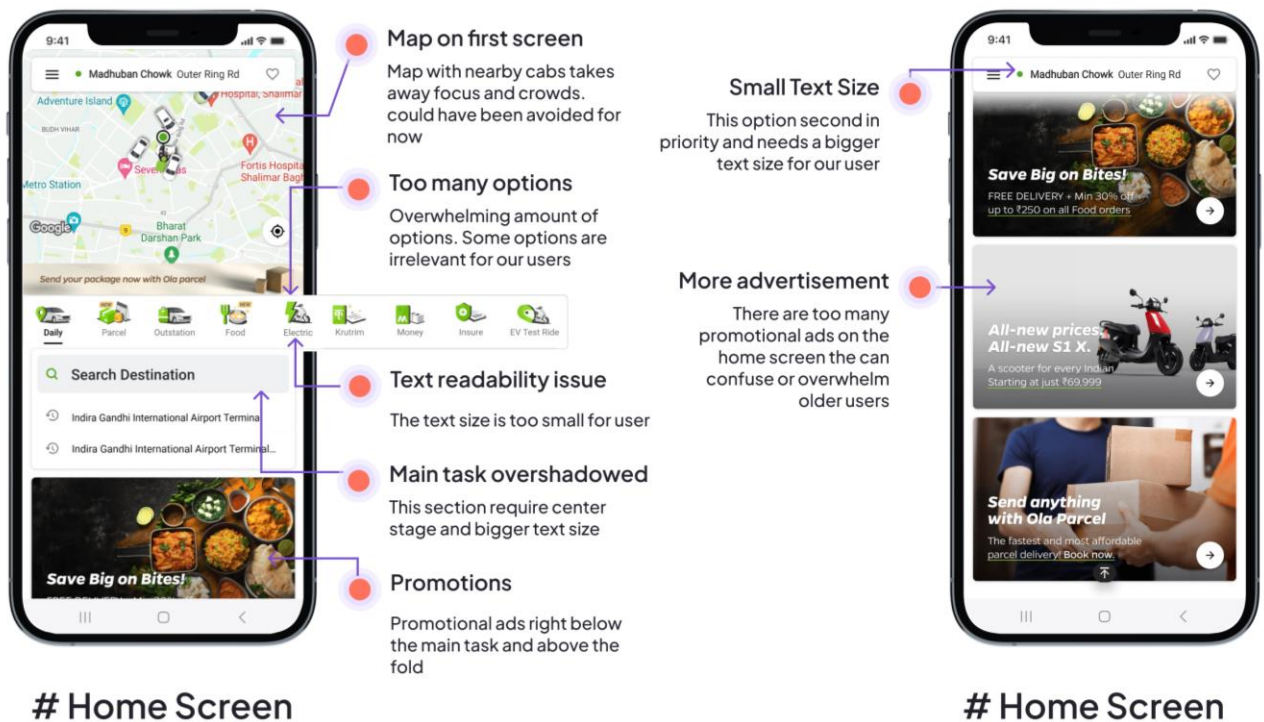
Source: Author
Note: Data based on source:
Ola Cabs (2024, April 20). Ola Cabs Android App.

8.3. <u>Reliance on Color-Coding for Information</u>

The app uses color-coding to convey information, such as distinguishing active options or highlighting promotional discounts. Seniors, particularly those with vision impairments or color-blindness, may struggle to interpret information if color is the sole indicator.

- **Issue**: Inaccessible use of color-coding without supplementary cues.

- **Recommendation**: Include additional visual cues, such as icons or underlines, to enhance color-coded elements. This addition ensures that users can comprehend functionality without relying on color differentiation alone.

8.4. <u>Excessive Jargon and Complex Terminology</u>

The app frequently employs complex terminology, including abbreviations and technical jargon that may confuse elderly users who are less familiar with digital language.

- **Issue**: Excessive use of jargon and unfamiliar terms can intimidate and alienate elderly users, decreasing their confidence in using the app.

- **Recommendation**: Replace technical jargon with simpler, commonly understood language. For instance, terms like "promo codes" could be rephrased to "discount codes," facilitating understanding for users with low digital literacy.

8.5. <u>Lack of Alternative Input Methods</u>

Text-based interactions, such as entering addresses, can be cumbersome for elderly users with dexterity issues. The app lacks alternative input methods like voice commands, which could simplify interactions and enhance accessibility for users who struggle with typing on touchscreens.

- **Issue**: Heavy reliance on text input increases the cognitive and physical load on senior users.

- **Recommendation**: Integrate voice-based input as an alternative to text, allowing users to input addresses or commands through speech. Additionally, implement predictive text suggestions for location inputs to reduce typing demands.

Figure 18: Accessibility Audit of Existing App- Vehicle & Trip page
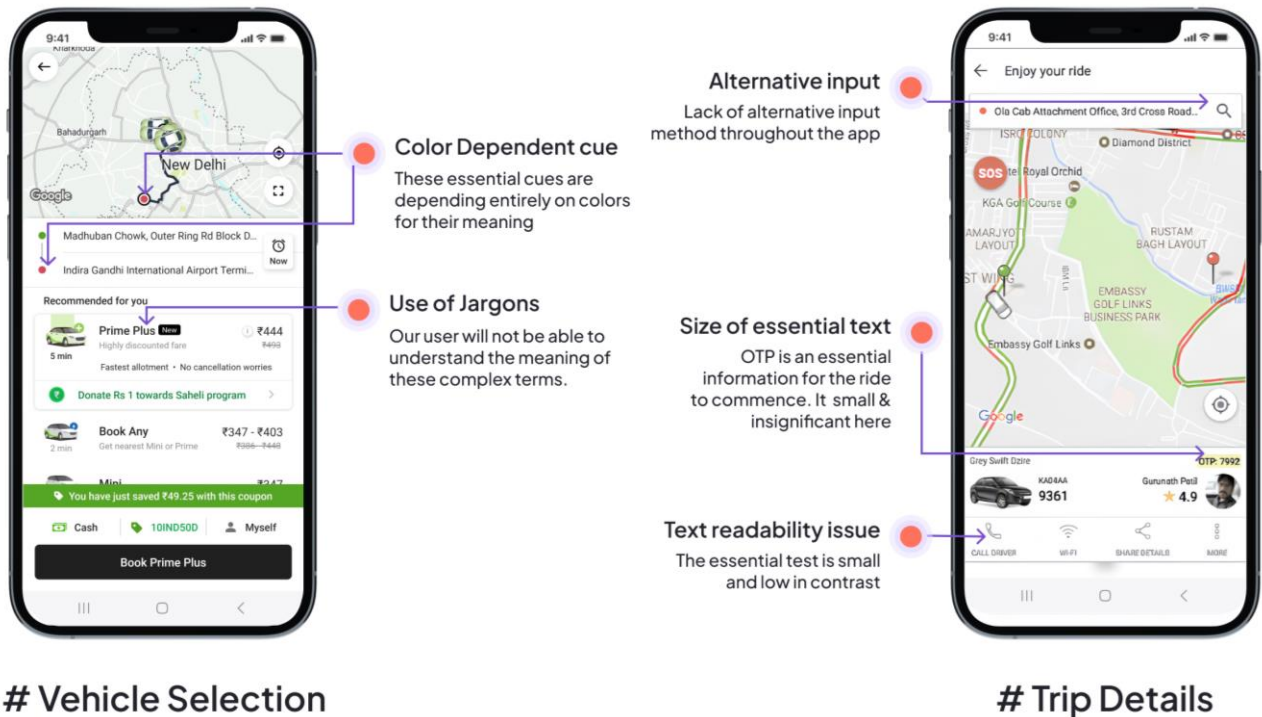
Source: Author
Note: Data based on source:
Ola Cabs (2024, April 20). Ola Cabs Android App.

8.6. <u>Absence of Clear Navigation Aids</u>

Navigational options lack clear labeling, leading to difficulties in retracing steps or finding essential features. Elderly users often need guidance to feel oriented and confident within an app, and the lack of breadcrumbs or a prominent "Back" button exacerbates disorientation.

- **Issue**: Insufficient navigation aids increase the risk of confusion, making it challenging for users to explore or return to previous screens.

- **Recommendation**: Implement breadcrumb navigation and a well-defined "Back" button, providing elderly users with clear indicators of their location within the app and enabling straightforward navigation.

8.7. Inadequate Visual Feedback for Actions

The app's interface does not provide sufficient visual feedback for user actions, leaving elderly users uncertain whether they have successfully tapped a button or completed a task. This lack of feedback can increase anxiety and discourage further interaction.

- **Issue**: Insufficient feedback upon completing actions may make users question the functionality, leading to hesitation and frustration.

- **Recommendation**: Incorporate visual feedback, such as button color changes or brief animations, to reassure users that their actions have been successfully registered. For instance, upon tapping the "Book" button, the button could change color or flash briefly.

8.8. Lack of Personalization Options

The app does not allow for customization to accommodate varying accessibility needs, limiting its usability for elderly users with unique requirements such as text enlargement, color adjustments, or simplified navigation.

- **Issue**: Lack of adaptability and personalization reduces the app's flexibility to meet diverse user needs, particularly for those with specific accessibility requirements.

- **Recommendation**: Add personalization options, enabling users to adjust text size, color contrast, and interface complexity based on their preferences. Allowing users to customize the app layout or enable a "senior mode" can improve accessibility by tailoring the interface to individual needs.

8.9. <u>Summary of Audit Findings</u>

The accessibility audit reveals that the current ride-booking app design does not adequately meet the needs of elderly users. Key barriers include small text, reliance on color-coding, complex navigation, lack of personalization, and the absence of alternative input methods. Addressing these issues would enable a more inclusive and user-friendly experience for elderly users, empowering them to interact confidently with the app's functionalities.

CHAPTER 09

FINAL DESIGN SOLUTION

9. FINAL DESIGN SOLUTION

The Final Design Solution for "Senior Mode" addresses the needs of elderly users by providing a simplified, accessible ride-booking experience. The design balances ease of use with functionality, ensuring seniors can interact with digital features comfortably and confidently. This solution outlines key elements and design enhancements, crafted specifically to overcome the accessibility challenges identified in the audit of existing ride-booking apps.

9.1. Overview of the Senior Mode Feature

Senior Mode as an Accessibility Solution: The Senior Mode feature introduces an accessible interface that reduces cognitive load, optimizes readability, and enhances navigation. Tailored for users with visual, motor, and cognitive impairments, Senior Mode emphasizes simplicity and familiarity to foster comfort with digital interactions. The design minimizes extraneous elements and focuses on core functionalities, using clear language and a hierarchical layout that prioritizes essential information like ride booking and trip tracking.

9.2. Wireframe Ideation

The wireframes represent the foundational design blueprint for the "Senior Mode" accessibility features within the ride-booking application. These visual drafts provide a clear depiction of the restructured user interface tailored to meet the needs of elderly users. Each element in the design emphasizes simplicity, accessibility, and usability while adhering to the accessibility guidelines established earlier in this project.

Key features showcased in the wireframes include:
1. **Simplified Navigation**: Intuitive pathways that guide users step-by-step without overwhelming options.
2. **Saved Destinations**: Prominently displayed shortcuts for frequently visited places like "Home," "Market," or "Airport."
3. **Voice Interaction**: A dedicated voice input option for seamless ride booking without relying on text inputs.

4. **Readable Interface**: Enlarged buttons, clear labels, and uncluttered layouts to reduce cognitive and physical strain.

5. **Alternative Input Methods**: Provisions for users to select pickup and drop-off locations via map interaction or dropdown menus.

6. **Clear Feedback**: Confirmation prompts and visual cues to ensure users are confident at each step.

These wireframes form the basis for the subsequent high-fidelity designs, bridging the gap between ideation and implementation. They reflect the user-centric approach adopted in this project, focusing on making digital tools more inclusive for elderly users.

Figure 19: Wireframe Ideation Screen
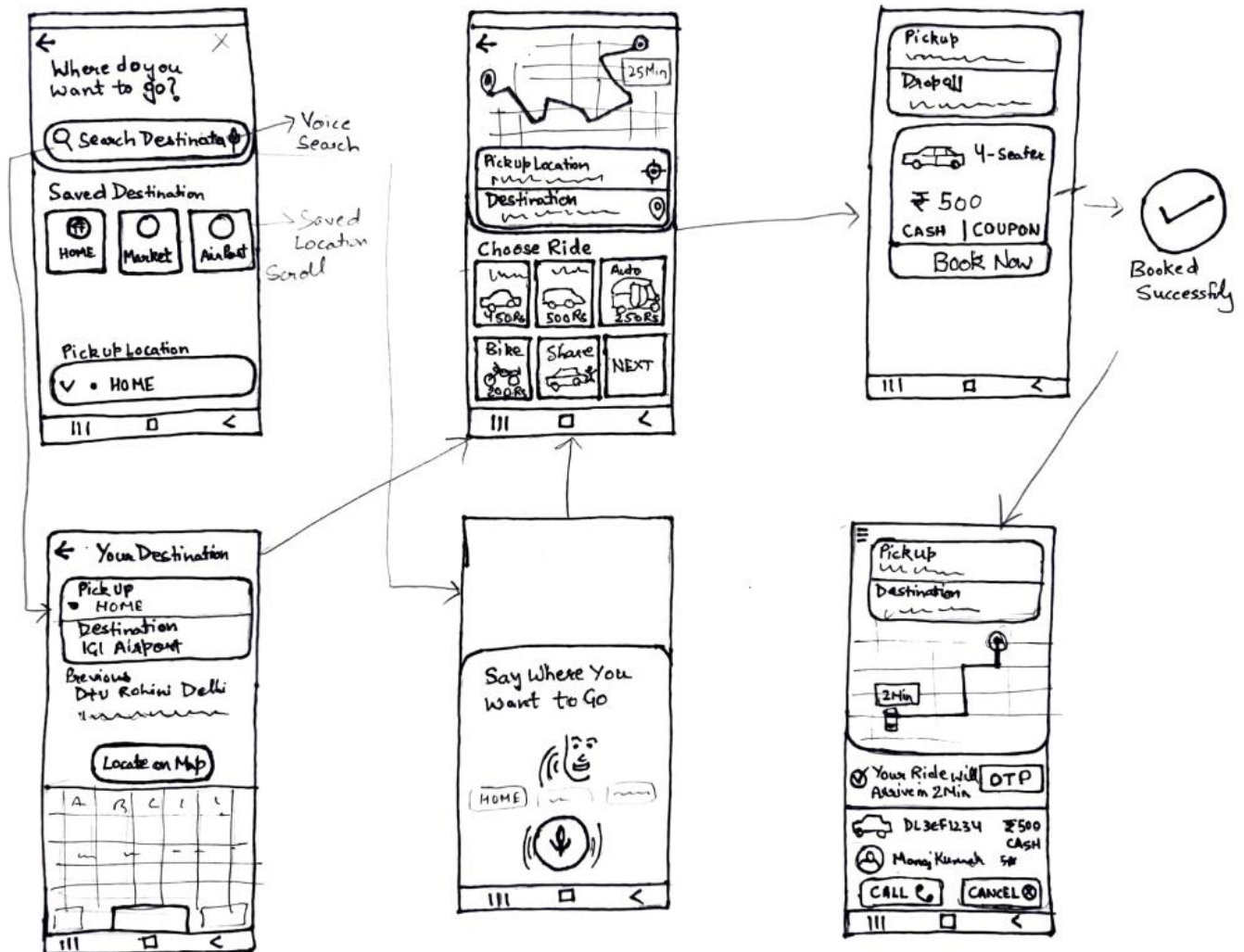
Source: Author

9.3. <u>Key Design Enhancements</u>

Several design enhancements define Senior Mode, each grounded in accessibility best practices and targeted to meet the specific needs of senior users.

1. **Larger Touchpoints and Text**

   a. Rationale: Small touch targets and text are significant barriers for seniors, often leading to errors and frustration.

   b. Solution: In Senior Mode, text size is increased to at least 16px, while touchpoints, including buttons and icons, are a minimum of 44x44 pixels. These dimensions reduce visual strain and enable easier interaction, especially for users with reduced dexterity. Additional line spacing enhances readability, and larger icons ensure intuitive navigation, minimizing the likelihood of mistaken selections.

2. **Speech-to-Text Integration**

   a. Rationale: Many elderly users face difficulties with typing, often resulting from motor skill impairments or unfamiliarity with digital keyboards.

   b. Solution: Senior Mode incorporates a speech-to-text feature, allowing users to verbally input addresses or instructions. This integration reduces the need for typing, accommodating those with motor limitations and enhancing usability. The feature includes clear audio cues to guide users in starting and stopping voice commands, along with error feedback if the system does not recognize the input.

Figure 20: Senior Mode (Ola)- Hi-Fidelity Screen Home
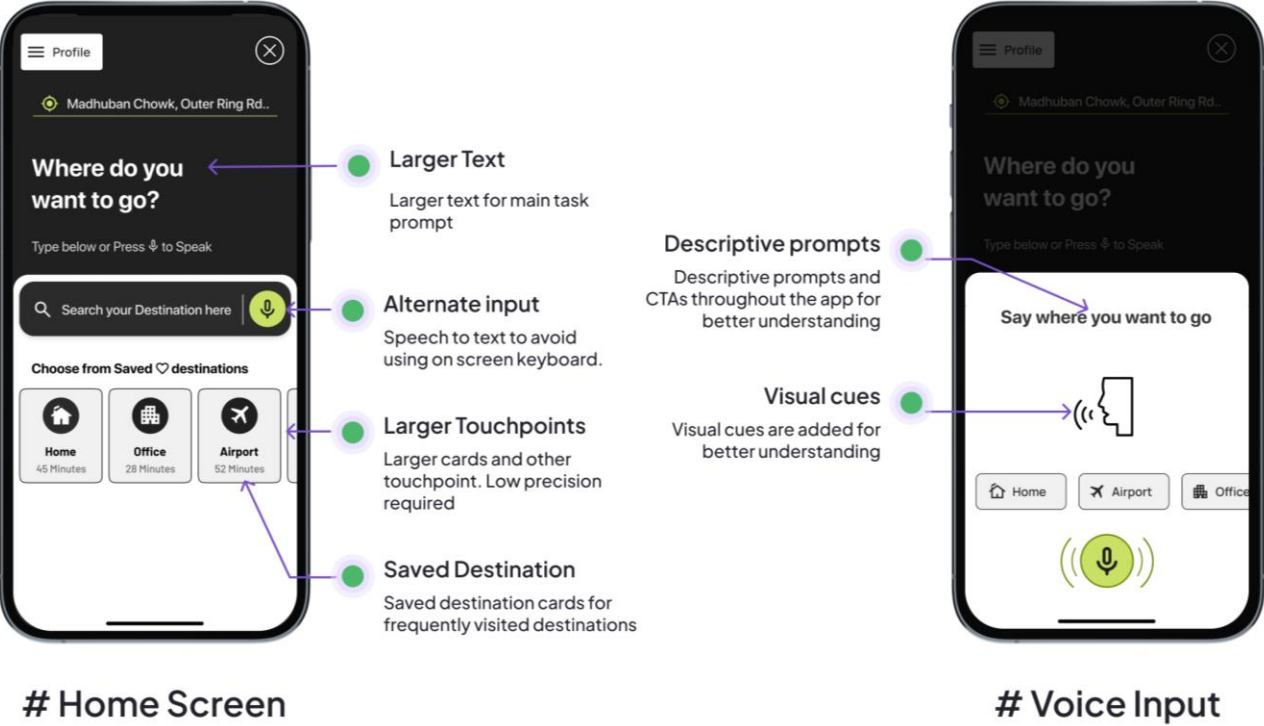
Source: Author

3. Saved Destinations for Frequent Use

a. Rationale: Memory retention can be a challenge for seniors, making it difficult for them to remember specific addresses or locations they frequent.

b. Solution: Senior Mode provides a "Saved Destinations" feature, enabling users to store frequently visited locations, such as home, hospital, or family members' residences. By reducing the need to repeatedly input addresses, this feature minimizes cognitive load, speeds up the booking process, and ensures seniors can book rides independently and confidently.

4. Voice Input Functionality

  a. Rationale: Physical limitations or a lack of familiarity with touchscreens may make text-based interactions challenging for elderly users.

  b. Solution: Voice input functionality allows users to initiate commands verbally. By integrating this feature, Senior Mode offers an intuitive, accessible alternative to touchscreen interactions, enabling users to book rides or select vehicle types through spoken commands. Voice input also accommodates those with impaired vision or limited mobility, creating a hands-free interaction option that aligns with accessibility guidelines.

Figure 21: Senior Mode(Ola)- Hi-Fidelity Screen Trip
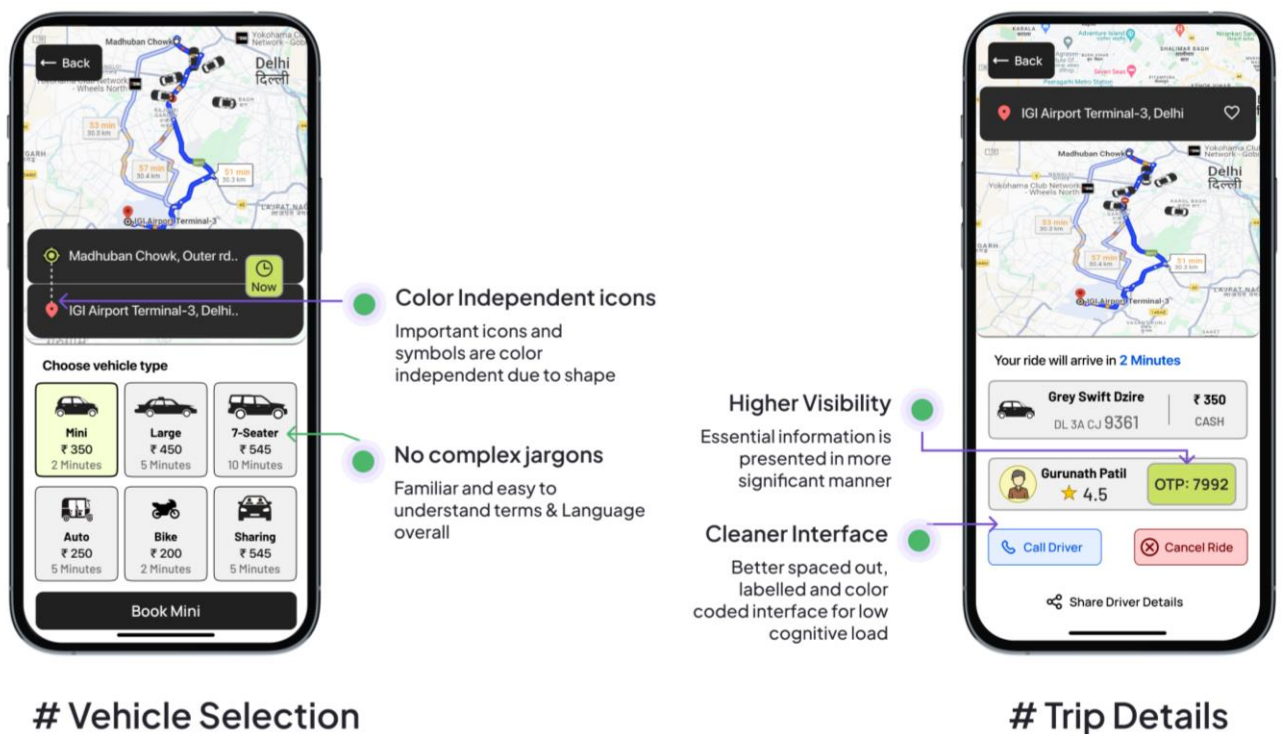
Source: Author

9.4. <u>App Interface Demonstrations</u>

Senior Mode includes a set of redesigned interfaces tailored to address usability challenges. These redesigned pages emphasize readability, clear navigation, and streamlined functionality, providing elderly users with an accessible, comfortable ride-booking experience.

1. Redesigned Home Screen

   The redesigned home screen is minimalistic, with large, high-contrast buttons that prioritize essential functions. Core features like "Book a Ride," "Saved Destinations," and "Recent Rides" are prominently displayed, eliminating the clutter found in traditional ride-booking interfaces. By minimizing distractions and focusing on core tasks, the home screen enables elderly users to navigate confidently.

2. Redesigned Vehicle Selection Page

   In Senior Mode, the vehicle selection page offers simplified options with larger text and icon sizes, presenting only a limited selection of vehicle types. Each option is accompanied by an illustrative icon, clearly labeled with readable, high-contrast text. This setup ensures that users can easily distinguish between vehicle options and select their preferred ride without confusion or cognitive overload.

3. Redesigned Trip Details Page

   The trip details page in Senior Mode provides a clear, concise layout displaying vital information such as the destination, estimated arrival time, and driver details. Visual feedback, such as color changes or brief animations, reinforces successful actions, like confirming the ride. Additionally, the page includes options for voice input and the saved destinations feature, further simplifying the experience and offering multiple interaction modalities.

CHAPTER 10

CHALLENGES AND KEY LEARNINGS

10. FINAL DESIGN SOLUTION

Designing Senior Mode required a nuanced understanding of accessibility, psychological barriers, and the balance between functional and aesthetic design. This section discusses the challenges encountered throughout the project, insights gained into the psychological and practical barriers seniors face with technology, and reflections on the balancing act between accessible design and visual appeal.

10.1. Challenges in Designing for Seniors

- Understanding the Varied Needs of Seniors
  The first major challenge was recognizing that senior users are not a monolithic group. Differences in digital literacy, physical abilities, and personal attitudes toward technology vary widely across this demographic. Designing a single, universally effective solution required iterative testing to capture these varied needs. It was challenging to incorporate features that suited users with diverse accessibility needs, such as those with impaired vision, limited mobility, or cognitive decline.

- Addressing Skepticism and Psychological Hesitation
  A prevalent barrier encountered was the psychological resistance many seniors feel toward adopting new technology. Some elder participants expressed mistrust in digital platforms and were apprehensive about making mistakes. Designing an interface that could ease these fears—by offering clear feedback, reassurance, and a simplified layout—was crucial to encouraging engagement but required substantial iterations.

- Designing for Digital Literacy Levels
  Another major challenge was accommodating users with varying levels of digital literacy. Some participants were comfortable navigating basic digital tasks, while others were unfamiliar even with icons and buttons. Developing a solution that was intuitive for complete beginners yet sufficiently functional for more tech-savvy seniors presented a significant design constraint.

10.2. Insights into Psychological Barriers and Technology Adoption

- The Role of Familiarity in Reducing Anxiety

One key learning was the importance of familiarity in mitigating seniors' anxiety about technology. Seniors showed a greater willingness to engage with technology when they saw elements they could relate to or were already familiar with. The integration of familiar language, recognizable icons, and streamlined features created a level of comfort that encouraged further exploration.

- Trust as a Prerequisite to Interaction

Gaining the trust of senior users was essential for engagement. Seniors were more inclined to interact with the app when assured of its safety and simplicity. Clear messaging, minimal error points, and visual cues helped build this trust. Seniors were observed to interact more confidently with the app as they began to trust the interface, confirming that trust-building should be a primary objective in senior-oriented design.

- Understanding Nonverbal Cues as Accessibility Barriers

Feedback from seniors indicated that nonverbal cues, such as color-based feedback, are often overlooked as barriers. Colorblindness or decreased color perception can render certain visual cues ineffective. This insight underscored the importance of using multiple forms of feedback—such as audio signals, text prompts, and contrasting color schemes—to make the interface accessible to all users, regardless of visual ability.

10.3. Design vs. Accessibility: Balancing Aesthetics and Functionality

- Aesthetic Simplification without Compromising Functionality

The intersection between aesthetic design and functionality was often difficult to navigate. Aesthetic features such as animations or complex layouts can enhance user engagement in general audiences, but for senior users, simplicity and clarity took precedence. Creating a visually appealing design while maintaining usability required stripping back superfluous design elements. This balance was achieved by focusing on a clean, uncluttered interface with high readability and straightforward navigation.

- Reevaluating Standard Design Norms for Accessibility

  Working with accessibility guidelines for seniors revealed the necessity of revisiting traditional design norms. Standard practices, like the placement of icons or assumptions around users' understanding of interface structures, were often ineffective for senior users. This experience highlighted the importance of adopting flexible design norms that prioritize inclusivity over convention, especially for populations with distinct accessibility needs.

- Prioritizing Function Over Visual Elements

  Designing Senior Mode highlighted the tension between functional requirements and visual aesthetics. Prioritizing function meant focusing on readable fonts, larger icons, and uncluttered layouts, sometimes at the expense of the interface's visual appeal. However, user feedback showed that seniors appreciated this design direction, valuing clarity over complexity. This experience reinforced that accessibility often demands a departure from conventional design aesthetics to better serve the specific needs of the audience.

CHAPTER 11
CONCLUSION AND FUTURE SCOPE

11. CONCLUSION AND FUTURE SCOPE

The Senior Mode project has endeavored to address the accessibility needs of elderly users by developing an inclusive and functional design that caters to diverse digital literacy levels and physical abilities. This section synthesizes key findings, evaluates the project's impact, suggests improvements, and explores future applications for the design principles developed.

11.1. Summary of Key Findings

The project highlighted several critical insights into the unique barriers elderly users face when interacting with digital products. Key findings include the significant role of psychological factors—such as fear and distrust—in hindering seniors' adoption of technology, as well as the impact of physical challenges like reduced vision, hearing, and dexterity. Additionally, seniors expressed a strong need for familiar, clear, and supportive interfaces that prioritize readability, straightforward navigation, and immediate feedback.

Iterative user testing validated that simplified, intuitive interfaces designed according to accessibility guidelines, such as WCAG 2.2, can substantially improve user experience for elderly populations. Specific design features, including larger text, high-contrast elements, accessible touchpoints, and alternative input methods, enhanced ease of use and built user confidence. These findings underscore the importance of comprehensive, human-centered design strategies in crafting accessible products that truly cater to the needs of elderly users.

11.2. Impact of the Senior Mode Project

The Senior Mode project has significant potential to impact digital accessibility for the elderly by raising awareness among designers and developers about the critical importance of inclusive design. This project promotes accessibility as an essential facet of the digital design process rather than an afterthought. Beyond design insights, the project serves as a resource for incorporating accessibility principles into mainstream products, reinforcing that inclusive design contributes to user independence and satisfaction.

The project's findings and proposed solutions can inform the design of digital interfaces beyond ride-booking applications. By addressing both physical and psychological challenges, the Senior Mode concept has the potential to reshape how elderly users experience technology, fostering a more inclusive digital environment and promoting greater technology adoption among seniors.

11.3. Potential Improvements and Next Steps

While the Senior Mode project offers a strong foundation for accessible design, certain areas warrant further development. Future iterations could incorporate a broader spectrum of accessibility features, such as customizable font sizes, color schemes, and more adaptable navigation options. Additional user testing with a wider, more diverse senior demographic could yield deeper insights into varying needs across socioeconomic and geographical contexts, particularly among rural populations.

Integrating advanced technology, such as voice recognition and natural language processing, could further simplify interaction for elderly users with limited mobility or low digital literacy. Future studies could also examine the psychological aspects of digital accessibility in greater detail to develop strategies that ease seniors' anxiety and skepticism toward technology use.

11.4. Expanding the Concept to Other Digital Products

The accessibility principles and solutions developed in the Senior Mode project are adaptable to various digital products and services. Expanding these concepts to healthcare applications, government service portals, social media, and e-commerce platforms can enhance digital inclusivity across different sectors. By integrating customizable accessibility features into a wider range of applications, designers can promote user confidence and reduce the digital divide among elderly users.

In healthcare, for example, Senior Mode's accessibility framework could make telemedicine platforms and patient portals more accessible to elderly patients, allowing them to manage their health independently. Similarly, in e-commerce, Senior Mode principles could facilitate an easier shopping experience, empowering seniors to engage confidently with online transactions.

Expanding the reach of accessible design can help more elderly users benefit from the conveniences of the digital age, ultimately contributing to a more inclusive, age-friendly digital landscape.

CHAPTER 12
REFERENCES

12. REFERENCES

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13. APPENDICES

Appendix A: Survey Questionnaire

Title: Understanding Seniors' Engagement with Mobile Applications

Questionnaire: Demographic Information

1. How old are you?
    a. Under 50
    b. 50-55
    c. 55-60
    d. 60-69
    e. 70-79
    f. 80 or older

2. Gender:
    a. Male
    b. Female

3. Do you consider yourself a senior citizen?
    a. Yes
    b. No

4. Have you ever felt worried or unsure about using new technology?
    a. Yes
    b. No
    c. Sometimes

    4.1. Can you tell us why you might feel this way? (Choose all that apply)
    a. I worry about making mistakes.
    b. Technology seems too complicated.

    c. I'm afraid of breaking something.

    d. I don't understand how it works.

    e. Other (please specify) _____

5. Which of these tasks can you accomplish using your Smartphone? (You can choose multiple options)

    a. Calling

    b. Messaging (SMS or WhatsApp)

    c. Social Media (Facebook, Instagram, Twitter etc.)

    d. Streaming services/OTT (YouTube, Netflix, Hotstar etc.)

    e. Payment/ Transaction (UPI, Wallet, Banking etc.)

    f. Bill Payments (Mobile recharge, Electricity bill, Broadband, DTH etc.)

    g. Ride Booking (Ola, Uber, Rapido etc.)

    h. Online Shopping (Amazon, Flipkart, Myntra etc.)

    i. Food Ordering (Swiggy, Zomato, etc.)

    j. Hotel, Train or Flight Booking (IRCTC, OYO, Makemytrip, Goibibo etc.)

6. What parts of using technology do you find tricky or hard to understand? (You can choose multiple)

    a. Seeing the small words on the screen.

    b. Knowing what buttons to press.

    c. Understanding what a given technology does.

    d. Typing or using the touchscreen.

    e. Too many options and features at once

    f. Too many advertisements.

    g. Other (please specify) _____

7. What kind of help would you like when using technology? (Choose all that apply)

    a. Simple instructions.

    b. Someone to show me how.

    c. Written guides or manuals.

    d. Online tutorials.

  e. Other (please specify) _____

8. Can you think of anything that would make using technology easier for you?

9. What changes would you suggest to make technology more helpful for seniors like you?

Appendix B: Ethical Considerations

1. Participants' personal data was anonymized and securely stored.

2. Informed consent was obtained before conducting surveys or interviews.

3. The study adhered to WCAG 2.2 and broader ethical research guidelines.