SE 6361.001
Phase 1 Project
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Team Navigation
Team URL:

https://github.com/RealSao/CS-SE-6361.001

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Project Description:

The project involves developing a smartphone application, called Theia, to assist blind individuals in navigating indoor spaces safely and efficiently. The app will provide step-by-step navigation, detect and communicate obstacles, and offer emergency assistance when needed.

Functional Requirements:

1. **Navigation Assistance**

- **1.1** The system shall allow users to input the destination location manually or select from suggestions based on user routines or schedules.
- **1.2** The system shall compute and communicate possible routes to the destination and accept user preferences.
- **1.3** The system shall guide the user step-by-step by specifying actions such as:
    - **1.3.1** Distance to walk (e.g., "Walk for 2 minutes or 30 steps").
    - **1.3.2** Stop points (e.g., "Stop and turn right").
- **1.4** The system shall suggest the next actions based on user schedules or habits.

2. **Obstacle Detection and Collision Avoidance**

- **2.1** The system shall detect obstacles using smartphone sensors.
- **2.2** The system shall notify the user with instructions to avoid collisions (e.g., "Move to the left").

3. **Emergency Assistance**

- **3.1** The system shall detect falls and notify emergency contacts automatically.
- **3.2** The system shall allow users to manually trigger an emergency call or message if needed.

Non-Functional Requirements:

1. **Safety and Reliability**

- **1.1** The system shall ensure safe navigation indoors by accurately detecting obstacles.
- **1.2** The system shall reliably deliver emergency alerts with minimal delay.

2. **Usability and Accessibility**

- **2.1** The system shall provide voice-guided instructions for visually impaired users.

- **2.2** The system shall allow customization of alert volume and frequency.
- **2.3** The system shall support multiple languages for accessibility.

3. **Performance**

- **3.1** The system shall compute routes and detect obstacles with a response time of less than 2 seconds.

4. **Battery Life**

- **4.1** The system shall minimize battery consumption by optimizing background processes.
- **4.2** The system shall notify users when battery levels are low, suggesting power-saving options.

5. **Extensibility**

- **5.1** The system shall allow future integration of new sensors and features without significant redesign.

Issues with Preliminary Definition Given

2.1.1 Issue: Route Selection for Blind Users

Issue Description

The definition states that the app will give the user a route that they feel most comfortable with. However, since the users are blind, it is unclear how they would evaluate and choose a preferred route.

Options

1. The system provides the fastest route by default.
2. The system allows the user to define preferences based on past navigation patterns.
3. The system provides route recommendations based on environmental factors like fewer turns or familiar paths.

Decision and Rationale

Option 2 is selected. The system will learn from the user's past routes and recommend routes accordingly. This ensures a balance between familiarity and efficiency while accounting for individual comfort.

2.1.2 Issue: Lack of Clear Emergency Escalation Path

Issue Description

The definition mentions emergency assistance but does not specify the priority levels for different types of emergencies (e.g., fall detection vs. getting lost).

Options

1. Treat all emergency cases equally and trigger the same response.
2. Assign priority levels based on severity (e.g., a fall immediately triggers emergency calls, while being lost first prompts user verification).
3. Allow users to set preferences for emergency responses.

Decision and Rationale

Option 2 is chosen. Prioritizing emergency response based on severity ensures that urgent situations receive immediate attention, while minimizing unnecessary emergency contacts.

2.2 Issues with II.2 Software System Requirements: Functional Requirements

2.2.1 Issue: Navigation in Bathrooms

Issue Description

Navigating in bathrooms presents unique challenges, as it would require the app to use the smartphone camera to detect obstacles, which might raise privacy concerns.

Options

1. Use LiDAR or ultrasonic sensors instead of the camera for obstacle detection.
2. Disable navigation in bathrooms and rely on prior knowledge or external assistance.
3. Allow users to input known layouts of frequently used bathrooms for guidance.

Decision and Rationale

Option 1 is chosen. LiDAR or ultrasonic sensors ensure privacy while still enabling effective navigation.

2.2.2 Issue: Differentiating Falls from Other Movements

Issue Description

The document doesn't specify how the system should differentiate between a fall and other sudden movements (e.g., sitting down quickly or dropping the phone).

Options

1. Implement a combination of accelerometer, gyroscope, and barometer sensors to detect impact and velocity changes.
2. Use machine learning models trained on real-world fall detection datasets.
3. Require user confirmation after a suspected fall before triggering emergency alerts.

Decision and Rationale

Option 1 is selected as the primary method, with an option for user confirmation (Option 3) to reduce false positives. This approach ensures accuracy while minimizing unnecessary emergency notifications.

2.3 Issues with II.3 Software System Non-Functional Requirements

2.3.1 Issue: Data Privacy and HIPAA Compliance

Issue Description

The document does not specify how user data will be protected, particularly concerning compliance with privacy regulations like HIPAA.

Options

1. Implement end-to-end encryption and strict access controls.
2. Store data only locally on the user's device, minimizing cloud storage.

3. Follow industry best practices, including anonymization and explicit user consent for data collection.

Decision and Rationale

Option 1 is chosen, combined with Option 3 for regulatory compliance. This ensures that sensitive navigation data remains secure while providing necessary transparency.

2.3.2 Issue: Voice Recognition Capabilities

Issue Description

The document mentions voice recognition but does not define its capabilities. Should it support multiple languages, speech impediments, or different accents?

Options

1. Use a basic voice recognition system with standard English support.
2. Implement multilingual support with customization for speech patterns.
3. Use an AI-driven speech recognition model that adapts to individual users over time.

Decision and Rationale

Option 3 is selected. AI-driven voice recognition ensures inclusivity by adapting to each user's speech pattern, improving usability for diverse populations.

WRS

3.1 W

3.1.1 Problem

Blind people have trouble navigating UTD campus buildings safely and efficiently, as canes, guide dogs and other aids have limitations

3.1.2 Goal

Create a smartphone app that helps blind people navigate using sensors, voice guidance and other emergency features

3.1.3 Improved Understanding of 2.1

Domain: Indoors

Stakeholders: Blind people, family, friends, caretakers, accessibility services, emergency assistance, and other people

Functional Objectives: indoor navigation, alternate route suggestions, emergency assistance, collision detection

Non-Functional Objectives: Safe, fast, accurate and user-friendly navigation, customizable features

3.2 RS

3.2.1 Functional RS – Improved understanding of 2.2 Software System Requirements: FRs

FR 1:System shall allow the user to navigate indoors at UTD.

FR 2:System shall allow for user to input destination.

FR 3: System shall detect obstacles and potential collisions and warns the user.

FR4: System shall have a way of detecting if the user falls.

FR 5: System shall have a of allowing the user to contact caretaker if they're lost.

FR 6: System shall call emergency services or contact caretaker if needed.

FR 7: System shall provide hazard alerts.

FR 8: System shall allow the user to navigate bathrooms without the use of phone cameras.

FR 9: System shall give the user directions to direct them to their desired location.

FR 10: System shall give the user multiple routes.

FR 11: System shall tell the user to walk the correct distance.

FR 12: System shall tell the user to turn at the right place.

FR 13: System shall figure out the user's schedule or habit to make route suggestions.

FR 14: System shall accept voice commands for searching destinations and interacting with the system.

FR 15: System shall provide the user with audio instructions regarding directions and collision detection.

FR 16: System shall be able to detect the user's current position.

FR 17: System shall be customizable for user.

3.2.2 Non-functional RS – Improved understanding of II.3 NFRs

NFR 1: System shall ensure that the navigation is safe, accurate and fast.

NFR 2: System shall provide a user friendly interface.

NFR 3: System shall keep the user safe.

NFR 4: System shall be customizable .

NFR 5: System shall be easily modifiable for future changes.

NFR 6: System shall respond to route changes quickly.

NFR 7: System shall be responsive with minimal latency.

NFR 8: System shall keep the User's data secure.

NFR 9: System shall minimize battery consumption.

NFR 10: System shall provide multiple language options.

NFR 11: System shall be compatible with IOS and Android.

Improved Understanding:

Clarified Preliminary Definition:

Theia helps blind individuals navigate indoor spaces safely and efficiently. The original definition had gaps, such as how users would pick a comfortable route. Since they cannot see their surroundings, Theia will learn from past navigation patterns and suggest familiar routes.

Bathroom navigation was another issue, as cameras raise privacy concerns. Instead, Theia will use LiDAR or ultrasonic sensors to detect obstacles.

The system also needed a better way to distinguish falls from normal movements. Theia will use accelerometers, gyroscopes, and barometers to detect real falls and avoid false alarms. Emergency response was unclear, so Theia will now assign priority levels. Falls will trigger an automatic emergency call, while being lost will first prompt user confirmation. Voice recognition was not well-defined, so Theia will support multiple languages and adapt to different speech patterns, including accents and impairments. These updates make Theia a smarter, safer, and more accessible navigation tool.

Clarified Domain Description:

Theia operates within indoor environments, such as multi-floor buildings with classrooms, offices, washrooms, lounges, and elevators. These areas present unique challenges for blind individuals, including navigating hallways, avoiding obstacles, and determining the correct location for turns and stops. The primary users are blind individuals who require guidance to move between locations safely. Secondary stakeholders include family members and caretakers, who may assist in setup or emergency situations, accessibility service providers responsible for supporting blind individuals, emergency responders who handle critical incidents, and building management teams that maintain infrastructure for accessibility.

The indoor setting requires a navigation system that does not rely on visual cues but instead provides clear audio instructions and tactile feedback. Since these spaces often change—such as furniture rearrangements or temporary obstructions—the system must adapt in real-time to detect and communicate these changes effectively.

Clarified System Description:

Theia is a smartphone application that assists blind individuals in navigating indoor spaces by providing step-by-step voice guidance, obstacle detection, and emergency support. Users can manually input their destination or allow the system to suggest locations based on their routine behavior. Theia will then compute the safest and most efficient route while considering environmental factors and past user preferences.

The app will use LiDAR and ultrasonic sensors to detect obstacles, ensuring that navigation in sensitive areas, such as bathrooms, remains private and secure. In case of emergencies, Theia will detect falls using motion sensors and determine the appropriate response based on severity. For navigation, the app will provide detailed walking instructions, including distance measurements and turn notifications. Voice recognition will allow users to interact with the system using spoken commands, with support for multiple languages and different speech patterns.

The system will also be designed for high performance and efficiency. Navigation requests will be processed within two seconds, and background processes will be optimized to reduce battery consumption. To protect user privacy, Theia will implement end-to-end encryption and comply with HIPAA standards. The app will be available on both iOS and Android, making it accessible to a wide range of users.

Traceability Between Clarified Domain and System Description:

The system features directly address indoor navigation challenges. Since blind users cannot rely on sight, Theia focuses on voice guidance and real-time obstacle detection. Because indoor spaces have complex layouts, Theia gives detailed walking instructions and alternative routes.

Emergency handling is crucial since falls and getting lost can happen indoors. Theia detects falls using motion sensors and prioritizes emergency responses. Privacy is also key, so Theia avoids cameras and uses LiDAR and ultrasonic sensors instead.

To enhance accessibility, Theia supports multiple languages and adapts to different speech patterns. Customization options allow users to adjust volume, navigation speed, and alert frequency. Since users may have different devices, Theia works on both iOS and Android. By aligning system features with domain needs, Theia ensures safe, accessible, and reliable indoor navigation.

As-Is and To-Be Scenarios:

AS-IS: Can Not Notify Caretakers if Emergency

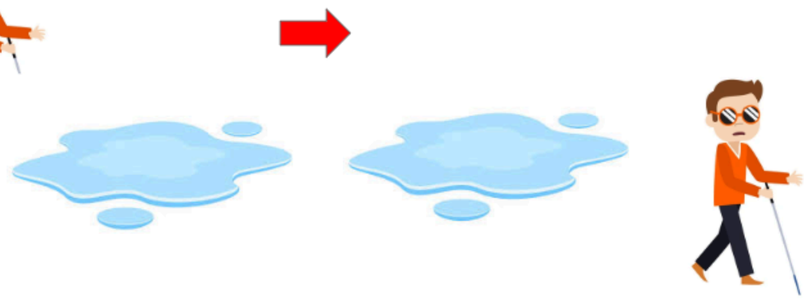
- *"I need to keep moving forward."*
- (Steps onto the wet surface, loses balance, and falls to the ground.)
- *Ahh! I slipped! That really hurt..."*
- (Lies on the floor, disoriented and in pain.)
- *"I need help... but I don't have a way to notify anyone."*
- (Time passes, but no one arrives because there was no emergency alert.)
- *"If only someone knew I was in trouble..."*

AS-IS: Missing the Correct Room

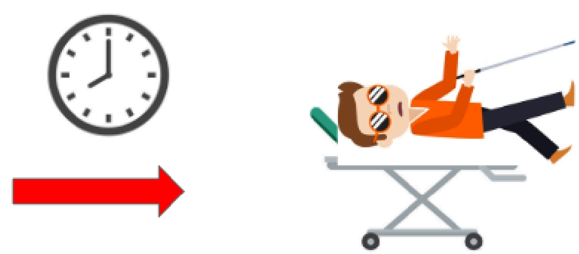
- *"I need to find Room 205. I think I should be close by."*
- (Reaches out to the first door and opens it.)
- *"Excuse me, I think you have the wrong room."*
- *"Oh! Sorry about that. I'll try the next one."*
- (Moves to the next door, unsure if it's correct.)
- *"I really wish I had a way to confirm the room number before entering..."*

TO-BE: App Notifies User of Hazards

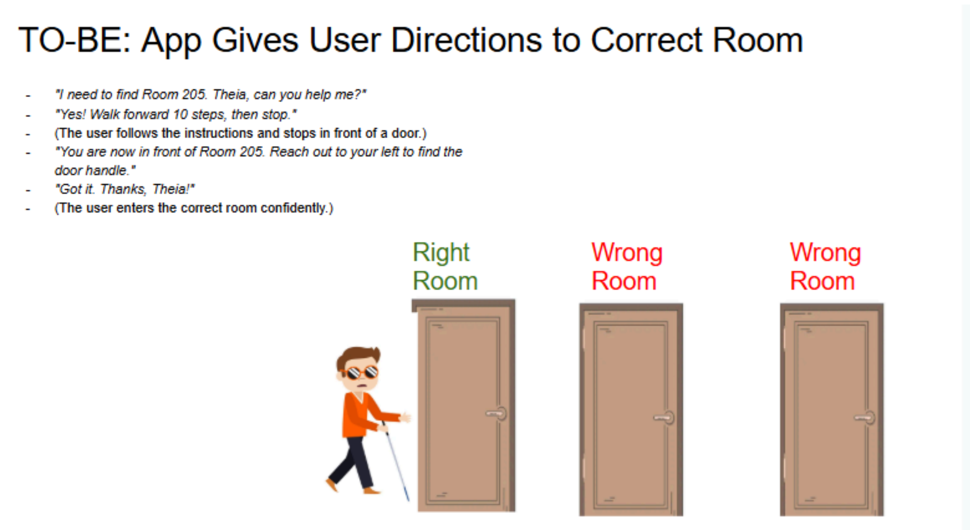
- *"Caution! Wet floor detected ahead. Adjust your path slightly to the right to avoid slipping."*
- *"Thanks, Theia! Adjusting my direction now."*
- (The user safely walks around the hazard and continues forward.)
- *"That was easy! No falls, no worries."*



TO-BE: App Notifies Emergency Services and Caretakers if Needed



- *"Ahh! I fell! I need help..."*
- *Fall detected! Checking for movement..."*
- (A few seconds pass.)
- *"No movement detected. Alerting your emergency contacts and nearby assistance."*
- (A caretaker or emergency responder receives the alert and arrives shortly.)
- *"We got the alert! Are you okay?"*
- *"Thank you! I couldn't call for help myself, but Theia took care of it."*



5. Traceability

The following table describes W, FR and NFR.

W	FRS	NFRS
3.1.1 Problem: Blind people struggle with safe and efficient indoor navigation	FR 1: The system shall allow the user to navigate indoors at UTD	NFR 1: System shall ensure that the navigation is safe, accurate, and fast.
3.1.2 Goal: Create a smartphone app to help blind people navigate using sensors, voice guidance, and emergency features.	FR 2: The system shall allow for the user to input destination.	NFR 2: System shall provide a user-friendly interface.
	FR 3: System shall detect obstacles and warn the user	NFR 3: System shall keep the user safe.
	FR 4: System shall have a of detecting if the user falls	NFR 4: System shall be customizable.
	FR 5: System shall have a way of allowing the user to contact a caretaker if they're lost.	NFR 5: System shall be easily modifiable for future changes.

	FR 6: System shall call emergency services or contact a caretaker if needed.	NFR 6: System shall respond to route changes quickly.
	FR 7: System shall provide hazard alerts.	NFR 7: System shall be responsive with minimal latency.
	FR 8: System shall allow the user to navigate bathrooms without using phone cameras.	NFR 8: System shall keep the User's data secure.
	FR 9: System shall give the user directions to direct them to their desired location.	NFR 9: System shall minimize battery consumption.
	FR 10: System shall give the user multiple routes.	NFR 10: System shall provide multiple language options.
	FR 11: System shall tell the user to walk the correct distance.	NFR 11: System shall be compatible with iOS and Android.
	FR 12: System shall tell the user to turn at the right place.	
	FR 13: System shall figure out the user's schedule or habit to make route suggestions.	

	FR 14: System shall accept voice commands for searching destinations and interacting with the system.	
	FR 15: System shall provide the user with audio instructions regarding directions and collision detection.	
	FR 16: System shall be able to detect the user's current position.	
	FR 17: System shall be customizable for user.	

Forward Traceability (FR → NFR):

Functional Requirements (FR)	Linked Non-functional Requirements (NFR)
FR1: User indoor navigation	NFR 1 (safe, accurate, fast), NFR 3 (user safety), NFR 7 (responsive), NFR 11 (compatibility)
FR2: Input destination	NFR 2 (user-friendly), NFR 7 (responsive), NFR 11 (compatibility)
FR3: Detect obstacles and collisions	NFR 1 (safe, accurate, fast), NFR 3 (user safety), NFR 7 (responsive)

FR4: Detect user falls	NFR 3 (user safety), NFR 7 (responsive)
FR5: Contact caretaker if lost	NFR 3 (user safety), NFR 7 (responsive)
FR6: Call emergency services/caretaker	NFR 3 (user safety), NFR 7 (responsive), NFR 8 (data secure)
FR7: Provide hazard alerts	NFR 1 (safe, accurate, fast), NFR 3 (user safety), NFR 7 (responsive)
FR8: Navigate bathrooms without phone cameras	NFR 2 (user-friendly), NFR 3 (user safety), NFR 8 (data secure)
FR9: Give directions to location	NFR 1 (safe, accurate, fast), NFR 2 (user-friendly), NFR 7 (responsive)
FR10: Give multiple routes	NFR 1 (safe, accurate, fast), NFR 2 (user-friendly), NFR 6 (quick response)
FR11: Indicate correct walking distances	NFR 1 (safe, accurate, fast), NFR 2 (user-friendly), NFR 7 (responsive)
FR12: Prompt correct turns	NFR 1 (safe, accurate, fast), NFR 2 (user-friendly), NFR 7 (responsive)
FR13: Suggest routes based on schedule/habit	NFR 4 (customizable), NFR 5 (modifiable), NFR 2 (user-friendly)

FR14: Accept voice commands	NFR 2 (user-friendly), NFR 7 (responsive), NFR 10 (language options)
FR15: Provide audio instructions	NFR 2 (user-friendly), NFR 3 (user safety), NFR 7 (responsive), NFR 10 (language options)
FR16: Detect user's position	NFR 1 (safe, accurate, fast), NFR 7 (responsive)
FR17: Customizable for user	NFR 4 (customizable), NFR 5 (modifiable), NFR 2 (user-friendly)

Backward Traceability (NFR → FR):

Non-Functional Requirements (NFR)	**Linked Functional Requirements (FR)**
NFR 1: Safe, accurate, fast navigation	FR 1, FR 3, FR 7, FR 9, FR 10, FR 11, FR 12, FR 16
NFR 2: User-friendly interface	FR 2, FR 8, FR 9, FR 10, FR 11, FR 12, FR 13, FR 14, FR 15, FR 17
NFR 3: User safety	FR 1, FR 3, FR 4, FR 5, FR 6, FR 7, FR 8, FR 15
NFR 4: Customizable	FR 13, FR 17

NFR 5: Easily modifiable	FR 13, FR 17
NFR 6: Quick response to route changes	FR 10
NFR 7: Responsive with minimal latency	FR 1, FR 2, FR 3, FR 4, FR 5, FR 6, FR 7, FR 9, FR 11, FR 12, FR 14, FR 15, FR 16
NFR 8: Data security	FR 6, FR 8
NFR 9: Minimize battery consumption	FR 1, FR 3, FR 7, FR 14, FR 15, FR 16
NFR 10: Multiple language options	FR 14, FR 15
NFR 11: Compatible with iOS and Android	FR 1, FR 2

Questionnaire:

Scale (for agreement questions):

1. Strongly Disagree
2. Disagree

3. Neutral
4. Agree
5. Strongly Agree

Scale (for frequency questions):

1. Never
2. Rarely
3. Occasionally
4. Often
5. Always

Navigation Behaviors and Preferences

1. When navigating indoor spaces, I prefer to have multiple route options available. (FR 10)
 (Agreement scale)

2. I rely heavily on audio instructions when navigating unfamiliar indoor environments. (FR 15)
 (Agreement scale)

3. I often memorize routes or rely on habits when navigating frequently visited indoor places. (FR 13)
 (Frequency scale)

4. When traveling indoors, accurate information about walking distances is essential to me. (FR 11)
 (Agreement scale)

5. Precise directions, such as exactly when and where to turn, significantly increase my confidence while navigating. (FR 12)
 (Agreement scale)

Safety Considerations

6. I frequently encounter obstacles indoors that are difficult for me to detect without assistance. (FR 3, NFR 3)
 (Frequency scale)

7. I have experienced or worry about falling or becoming injured when navigating indoors. (FR 4, FR 6)
 (Frequency scale)

8. Immediate alerts to hazards, like wet floors or blocked pathways, are critical for my safety. (FR 7, NFR 3)
 (Agreement scale)

9. I prefer having the ability to quickly contact a caretaker or emergency services if I feel lost or unsafe. (FR 5)
 (Agreement scale)

Accessibility and Independence

10. Navigating independently without relying on my phone's camera is important to my sense of independence. (FR 8)
 (Agreement scale)

11. I frequently use voice commands to interact with assistive devices or technology. (FR 14)
 (Frequency scale)

12. I prefer navigation systems that provide audio feedback instead of tactile or visual cues. (FR 15)
 (Agreement scale)

13. Knowing my exact indoor position significantly enhances my ability to independently navigate. (FR 16)
 (Agreement scale)

Customization and Personalization

14. I prefer navigation systems that can be customized to my individual habits and schedule. (FR 13, FR 17, NFR 4)
 (Agreement scale)

15. Having navigation instructions available in my preferred language greatly improves usability. (NFR 10)
 (Agreement scale)

Technical Performance Expectations

16. Quick response times from a navigation system are essential when I'm moving indoors. (NFR 5, NFR 6, NFR 7)
 (Agreement scale)

17. Battery consumption matters significantly to me when selecting assistive technology for daily use. (NFR 9)
 (Agreement scale)

18. I typically use assistive navigation technology on an iOS device. (NFR 11)

- Yes

- No

19. I typically use assistive navigation technology on an Android device. (NFR 11)

- Yes

- No

Privacy and Security Concerns

20. I am concerned about how navigation technology handles and protects my personal data. (NFR 8)
 (Agreement scale)

21. I prefer navigation technologies that limit the sharing or storage of my personal navigation data. (NFR 8)
 (Agreement scale)

Ease of Use and Modification

22. Navigation technology must be straightforward for me or my caretaker to update or modify. (NFR 5)
 (Agreement scale)

23. I value having a simple, intuitive interface even if I rely primarily on audio navigation. (NFR 2)
 (Agreement scale)

Theia User Manual:

Helping blind users safely navigate indoor spaces

What is Theia?

Theia is a smartphone app designed to help blind and visually impaired users navigate indoor spaces like college buildings. It gives step-by-step audio directions, helps avoid obstacles, and sends emergency alerts when needed.

Getting Started

1. **Download the app**
 Theia is available on both Android and iOS. Go to the app store and search for "Theia Navigation".

2. **Set up your profile**
 You can enter:

   - Your name
   - Preferred language
   - Emergency contact info
   - Any routine destinations (like your classroom or restroom)

3. **Turn on permissions**
 Theia will ask to use:

   - Location (to know where you are)

    - Microphone & speaker (for voice commands and feedback)
    - Motion sensors (to detect movement or falls)

Using Theia

1. Choose Your Destination

- You can say the name of your destination (e.g., “Student Lounge”)
- Or select from suggestions based on your past visits or class schedule.

2. Start Navigation

- Theia tells you:
    - Where to walk (“Walk straight for 20 steps”)
    - When to turn (“Stop. Turn left.”)
    - What to avoid (“Obstacle ahead. Move slightly to the right.”)

3. Navigate Bathrooms Privately

- Theia uses non-camera sensors like LiDAR or ultrasound.
- This ensures privacy and comfort in sensitive spaces.

Emergency Help

Fall Detection

- If Theia senses a fall, it will:
    - Automatically send an alert to your emergency contact and emergency services
    - Or ask you to confirm if you're okay

Lost or Unsafe?

- You can say “Help me” to:
    - Call your caretaker and/or emergency services
    - Or send a message with your location

Voice Commands

You can use your voice to:

- Start navigation
- Search for destinations
- Change settings

Theia understands different accents and speech patterns, and learns your voice over time.

Customization Options

- Change alert volume and frequency
- Pick your preferred language
- Set power-saving mode if your battery is low

Privacy & Security

- All your data is encrypted
- The app follows HIPAA privacy rules
- You control what data is stored or shared

Performance & Battery

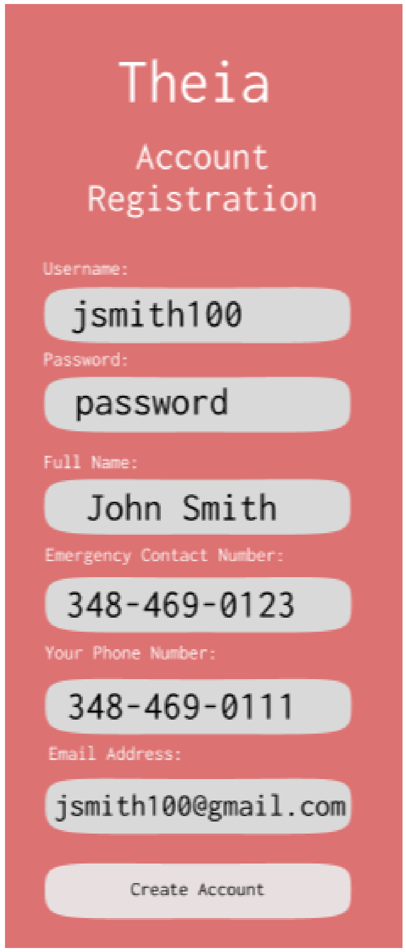
- Theia responds to commands in under 2 seconds
- It uses sensors without draining your battery
- It reminds you if the battery is running low and suggests actions

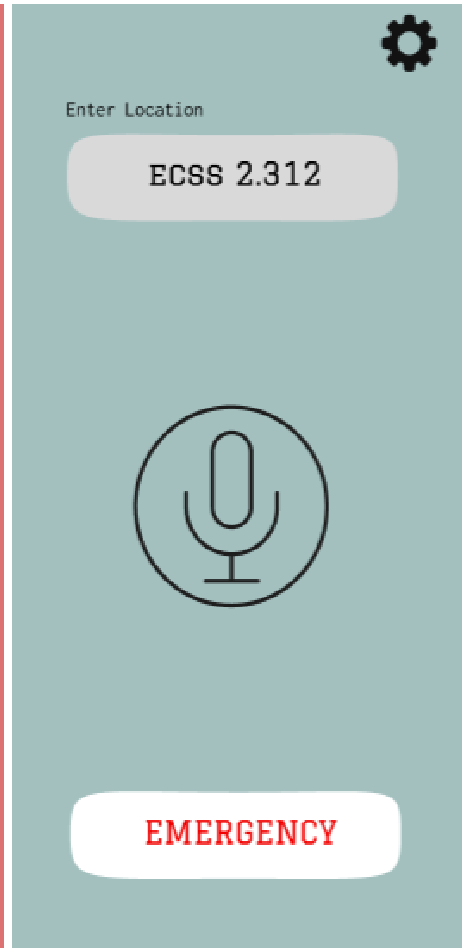
Safety Tips

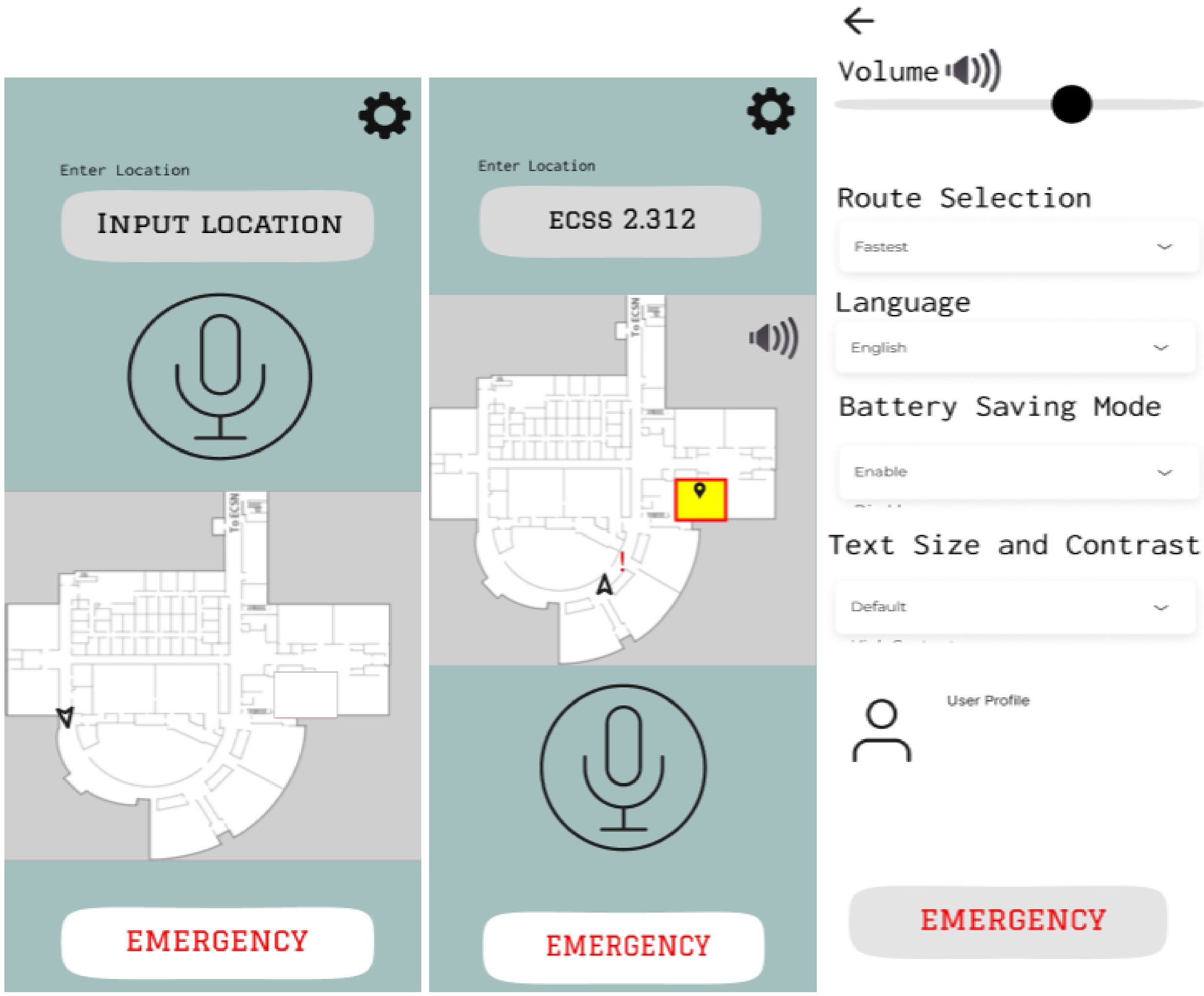
- Always make sure your phone has sufficient charge while using Theia
- Keep Bluetooth and location on
- Check your surroundings if Theia pauses or gives unclear instructions
- You can ask a helper to review the app with you the first time

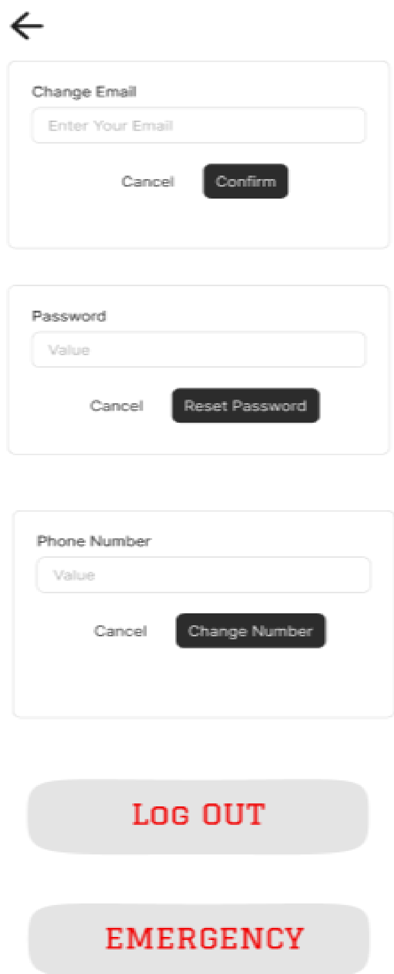
Prototype:


Theia
Username:
jsmith100
Password:
****
Login
Create Account


Theia
Account Registration
Username:
jsmith100
Password:
password
Full Name:
John Smith
Emergency Contact Number:
348-469-0123
Your Phone Number:
348-469-0111
Email Address:
jsmith100@gmail.com
Create Account


Enter Location
ECSS 2.312
EMERGENCY


Enter Location
INPUT LOCATION
EMERGENCY
Enter Location
ECSS 2.312
EMERGENCY
Volume
Route Selection
Fastest
Language
English
Battery Saving Mode
Enable
Text Size and Contrast
Default
User Profile
EMERGENCY



Meeting Minutes:

Date	Location	Attendees	Topics Discussed	Work Assigned

1/25/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Worked on Preliminary Project Plan and completed it	Review project details more in depth and prep for start of project work
2/2/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Created and started Phase 1 Document	Get understanding of starting work with project requirements
2/9/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Added FRs and NFRs to document	Look into issues section of project(As-Is, To-Be)
2/16/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Completed issues portion of the document	Planned to work on 3.1 and 3.2 of the WRS document

				and get ready to start mockup
2/23/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Completed improved understanding section and setup Figma workspace	Work on mockup prototype on Figma
3/2/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Worked on prototype in Figma	Finalize prototype and move on to presentation content
3/10/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Finalized presentation submission	Prep for presentation
3/30/25	Discord	Ajay Rao Tonghong Sun Farrel Raja	Finalized Phase 1 Project and submitted	Prep for Phase 2

Reference

Preliminary Plan, WRS, AS-IS and To-Be Scenario Slides - Professor Chung
ChatGPT - Questionnaire

Index

Why us:

- Safe navigation
  - Uses real-time voice guidance and obstacle detection.
- User friendly
  - Customizable route preferences based on user habits.
  - Supports multiple languages and speech patterns.
- Fast Response
  - Priority-based emergency response ensures safety.
- Care about Privacy
  - Privacy-focused (LiDAR/sensors instead of cameras).

Creeping Rate:

Based on the complexity and evolving nature of assistive technology, we expect to accommodate a creeping rate of up to 20% throughout the project. This allows flexibility for user feedback from testing, adjustments in safety or accessibility features, and changes based on stakeholder input.