THEIA

Indoor Navigation for Visually Impaired Users

Team LagZilla

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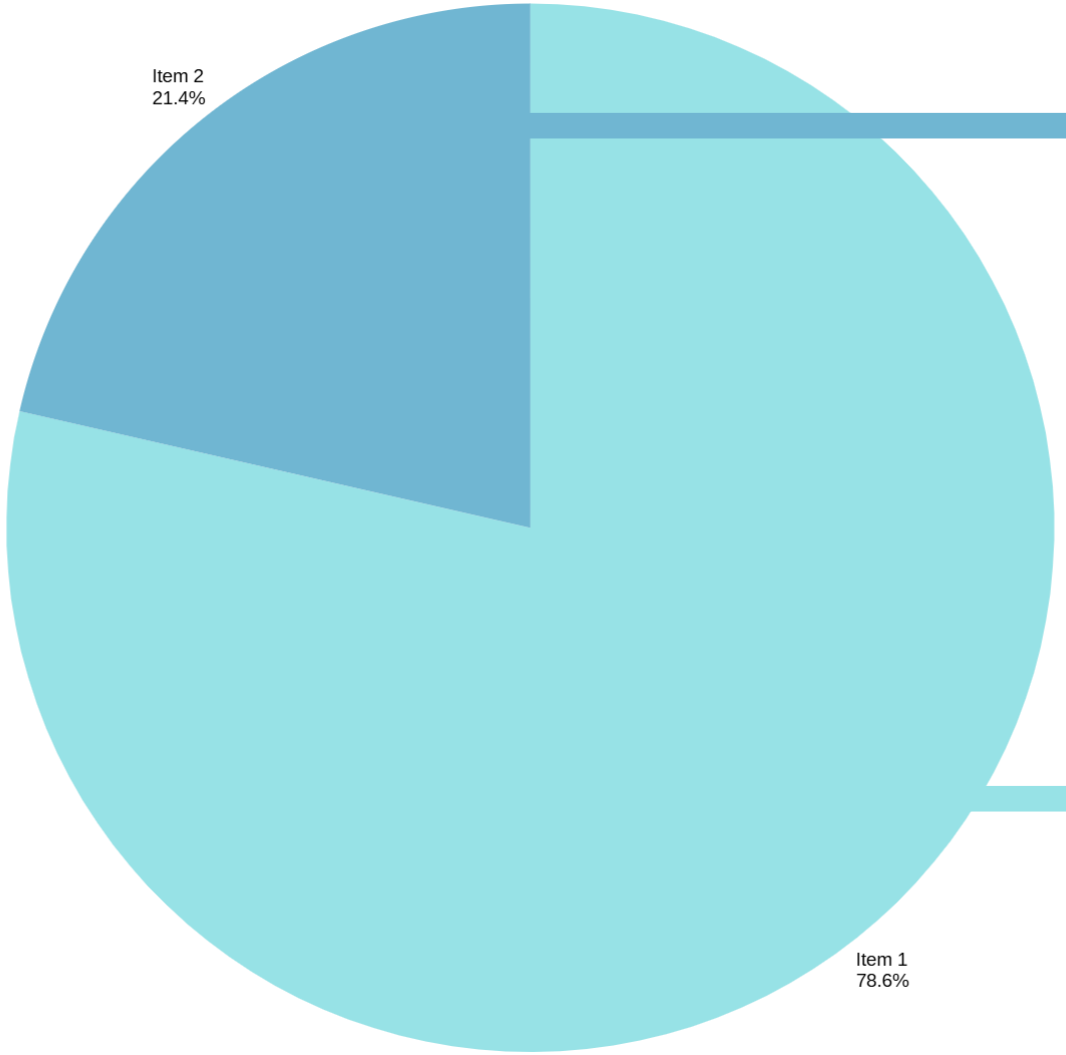
Phase II Presentation

Functional Requirement Coverage



3 functional requirements not being used: mainly floorplan storage, saving favorited locations, and enhanced haptic feedback

11

3

Our scenarios were diverse and covered ~80% of the overall functional requirements of the WRS.

Scenario 1

Stevie is trying to go to his next classroom.

The THEIA app asks Stevie to give his current location and the destination.

The app calculates the route from the current location to the destination.

THEIA tells Stevie to "walk ahead 10 steps, then turn left.“

Using THEIA, Stevie successfully makes it to his destination without hurting himself.

Functional Requirement Analysis

Scenario 1

Functional Requirement ID	Functional Requirement Description	Scenario Specific
FR-1	Voice destination input	Stevie tells THEIA his current location & destination
FR-2	Touch destination input	Alternate way to set classroom if voice fails/noisy
FR-3	Audible navigation instructions	“Walk ahead 10 steps, then turn left”
FR-6	Continuous step-by-step guidance	Keeps guiding Stevie until arrival
FR-7	Warnings for obstacles & stairs	Prevents Stevie from bumping into things
FR-9	Route calculation & options	THEIA computes route from current location to classroom
FR-12	Store floorplans for navigation	Uses building map of Stevie’s school

Implementation Checklist & Prototype Demo

Scenario 1

Functional Requirement ID	Functional Requirement Description	Notes
✓ FR-1	Voice destination input	Model used was a little poor, voice recognition unconcise
✓ FR-2	Touch destination input	Tedious scrolling UI
✓ FR-3	Audible navigation instructions	
✓ FR-6	Continuous step-by-step guidance	Prototype next button
✗ FR-7	Warnings for obstacles & stairs	
✗ FR-9	Route calculation & options	Mocked
✗ FR-12	Store floorplans for navigation	Third party permissions

Scenario 2

Maria (caretaker) wants to help her son Stevie become more independent in navigating around campus. Maria opens THEIA on Stevie's phone and accesses caretaker mode.

She configures the app settings based on Stevie's needs: sets audio guidance to use step-based instructions (since Stevie prefers counting steps), adjusts voice volume to a comfortable level, enables route preferences to avoid stairs when possible, and sets up his emergency contacts (herself as primary, his roommate as secondary).

She also inputs his frequent destinations (two classroom buildings, the library, the dining hall) so Stevie can quickly select them.

When Stevie uses THEIA, the app is already customized to work the way he needs it to.

Scenario 2

Functional Requirement Analysis

Functional Requirement ID	Description	How it's Used Here
FR-8	Configuration menu for caregiver to adjust navigation preferences, audio controls, and haptic feedback	Maria adjusts audio volume, step-based instructions, route preferences, emergency contacts
FR-14	Allows the caregiver to manage user profiles, including accessibility preferences, emergency contacts, and personalized settings	Maria sets emergency contacts and configures his preferred destinations

Scenario 2

Implementation Checklist & Prototype Demo

Functional Requirement ID	Description	Notes
✓ FR-8	Configuration menu for caregiver to adjust navigation preferences, audio controls, and haptic feedback	
✓ FR-14	Allows the caregiver to manage user profiles, including accessibility preferences, emergency contacts, and personalized settings	

Scenaario 3

Stevie falls and his phone flies away. THEIA's fall detection using the phone’s internal gyroscope activates:

After 10 seconds with no movement, THEIA provides an audio prompt: "Are you okay? Say YES if you need help.”
Stevie responds "YES“. THEIA asks Stevie: “Are you able to move? Would you like help locating your phone? Say YES or NO.” (THEIA has a beeping sequence for assisting in locating the phone)
Stevie replies “NO”: THEIA sends precise location ("Engineering Building, Floor 2, near Room 215"). Calls 911 with precise location data, Stevie's information, and Maria's contact. THEIA also calls and texts Stevie’s caretaker with his location.

Emergency responders receive exact location and can dispatch directly to the right building and floor, reducing response time to under 5 minutes.

Functional Requirement Analysis

Scenario 3

Functional Requirement ID	Description	How it's Used Here
FR-10	Fall detection	Used to determine if Stevie has fallen, triggering the responses
FR-11	System provides automatic contact of emergency services in case of emergency.	Calls 911 and provides Stevie's information, his location, and caregiver number. Additionally, texts Stevie's caregiver (Maria).
FR-12	Store floorplans for navigation	Used for location to send to emergency services / contact

Implementation Checklist & Prototype Demo

Scenario 3

Functional Requirement ID	Description	Notes
✓ FR-10	Fall detection	
✓ FR-11	System provides automatic contact of emergency services in case of emergency.	
✗ FR-12	Store floorplans for navigation	Already covered – no way to download floor plans due to third party permissions

Conclusion

As it currently stands, THEIA works as a great complement, not a substitute.

Scenarios covered most functionality $\frac{11}{14}$ (80%), with the prototype covering $\frac{8}{11}$ (73%) of that portion, or $\frac{8}{14}$ (60%) overall.

QUESTIONS?