Main Goal

Enable indoor navigation on campus with a primary focus on blind and visually impaired users, while remaining usable and helpful for all students and staff, through multimodal interaction (voice, haptics, and visuals) and context awareness via AI and camera input.

Main Features

Context Awareness

- Responds to questions based on live camera input (powered by LLM)
- Camera can be activated at any time, including during navigation
- Describes environment, obstacles, and signs
- LLM acts like a smart assistant (e.g., “What’s in front of me?”)

Campus Positioning + Navigazione (solo concept)

- Accessible and customizable navigation inside the campus
- Works indoors where GPS is limited (e.g., university buildings)
- Offers layered support based on user’s experience level

Adaptive Assistance: *PoliBuddy*

- When needed, user can enter **Assistance Mode** with access to emergency support, retry navigation, or connect with helpers
- Possibility to notify other users on campus who can assist
- Optional link to campus directory (professors, rooms, intercoms)
- A way to connect students inside the campus that want to do activities together

UI Goals

- Primary interaction = voice + haptics
- All interactions must be non-visual-first
- Every piece of information is delivered via at least 2 channels
  (spoken audio + vibration, or spoken + visual)
- Minimal screen content: 1–2 primary actions per state
- Support for multiple user profiles and assistance layers

Accessibility Layers (User-Selectable)

Upon first launch or via Settings:

- Blind/Low Vision → Voice + haptics
- Sighted → Visual + optional voice/haptics

- Hearing Impaired → Visual + haptics only
- Custom Mode → Full control of all feedback settings

Haptic Feedback (Customizable)

This is just a draft: these options should be totally customizable by the user. An idea for default options could be to follow Apple's "Maps" convention.

Action	Default Vibration Pattern
Turn left	1 short pulse
Turn right	2 short pulses
Obstacle ahead	Long continuous vibration
Destination reached	2 short + 1 long pulses
Assistance state activated	Rapid repeated pulses

Core UI States

1. Home State – Start Navigation

Auditory UI

- App launches and says: *"Where do you want to go?"*
- User answers: *"Room T.0.1"*
- App confirms with voice: *"Starting navigation to Room T.0.1 in Building 13."*

Touch/Haptic UI

Do we want to keep these commands? Or does the user rely on the screen reader? for me designing this is more inclusive, but idk how it integrates with the visual UI

- Double-tap anywhere = activate mic
- Swipe down (2 fingers) = open saved locations
- Long press = open Settings
- Swipe right (2 fingers) = enter **Camera State**
- Swipe left (2 fingers) = enter **Assistance State**

Visual UI (optional)

- Top: app name + settings icon
- Center: large mic button
- Bottom: saved destinations (Library, My Classroom, Cafeteria)
- Top-right: Camera icon (starts Camera Mode)
- Bottom-left: Assistance button

2. Navigation State – While Moving

Auditory Feedback

- Instructions triggered at turn points + intermediate distances:
  “Turn left in x meters.”
  “Crosswalk ahead. Stop and wait.”

Haptic Feedback

- Follows standard patterns (customizable as above)

Touch Gestures (2 fingers)

- Swipe up = repeat last instruction
- Swipe left = enter Assistance State
- Swipe right = ask for nearby POIs
- Tap & hold bottom-right = open **Camera Mode**

Camera Button

- Floating on bottom-right corner
- Activates real-time Camera Mode
- Voice command also supported: *“Describe surroundings”*

Visual UI (Optional)

- Top: instruction text (“Turn left in x meters”)
- Middle: progress bar and estimated time
- Map preview (sighted mode)
- Bottom: “Need help?” button

3. Assistance State – Emergency / Lost Mode

Triggers:

- App loses confidence in position
- GPS/WiFi failure
- User swipes left (2 fingers)
- Voice command: “I need help”

Options (via voice, touch, or visuals)

- Try again (recalibrate path)
- Call support and/or emergency contact
- Exit navigation

Community Help Layer (Optional)

- User is marked “Needs Help”

- Nearby users (volunteers) are notified
- Volunteer can assist via call, voice guidance, or location sharing

Voice Prompt

“You seem to be off-track. Would you like to call for help, try again, or exit navigation?”

4. Helper State – Provide Assistance (NEW)

Context: A nearby user receives a request from someone who entered the Assistance State.

Entry Point

- Notification: *“Someone near you needs help. Would you like to assist?”*
- Buttons: [Yes, Help] [No]

UI

- Map showing user’s position and person in need
- Chat/Voice mode to coordinate
- Quick call button
- Option to share location or guide remotely
- Emergency handover: *“Call support on their behalf”*

Interaction Flow

1. Accept request
2. Connect via voice or chat
3. Guide or escort the user
4. Mark “Help completed”

Helper profile can be enabled voluntarily via Settings.

5. Camera State – Context Mode

Activated via

- Home / Navigation UI camera button
- Voice: *“Use Camera”*

Functionality

- Real-time vision + LLM describes environment:
  “Glass door ahead.”, *“Stairs going down on the left.”*
- User can ask:
  - *“Where is the entrance?”*
  - *“Read those signs.”*
  - *“Any obstacles nearby?”*

UI

- Fullscreen camera preview (for sighted users)
- Large mic button at bottom-center
- Top-left “Back” button
- Optional toggle: “Auto-read surroundings”
- Optional: haptic ping when object is detected left/right

Points of Interest (POIs)

- Clearly labeled categories:
    - Safety points
    - Elevators / stairs (with direction)
    - Cafés / rest areas
    - Toilets
    - Offices / intercoms
- Users can query for nearby POIs or receive automatic alerts

Internal Directory & Campus Data (Optional)

- Ask:
    - “Who are the professors on floor 1 of Nave?”
    - “Give me the phone numbers for floor 2.”
- GPT-powered bot fetches directory or room data
- Optional links to intercoms or email

Design Accessibility Guidelines

Typography

- Sans-serif (SF Pro, Inter), ≥18px
- Clear hierarchy, no italics or underlines

Colors

- High-contrast palette
- Compliant with WCAG 2.1 AA/AAA
- No meaning conveyed through color alone
- Emergency actions in bold red (#FF5A5F or similar)

Interactions

- Touch targets ≥48dp
- All gestures paired with haptic/audio feedback
- All screens accessible with screen off (via voice + haptics)
- Full screen reader support
- Always confirm before triggering important actions