Digital Learning Group

HackOrbit 2025

CodeNest

THEME & PROBLEM STATEMENT

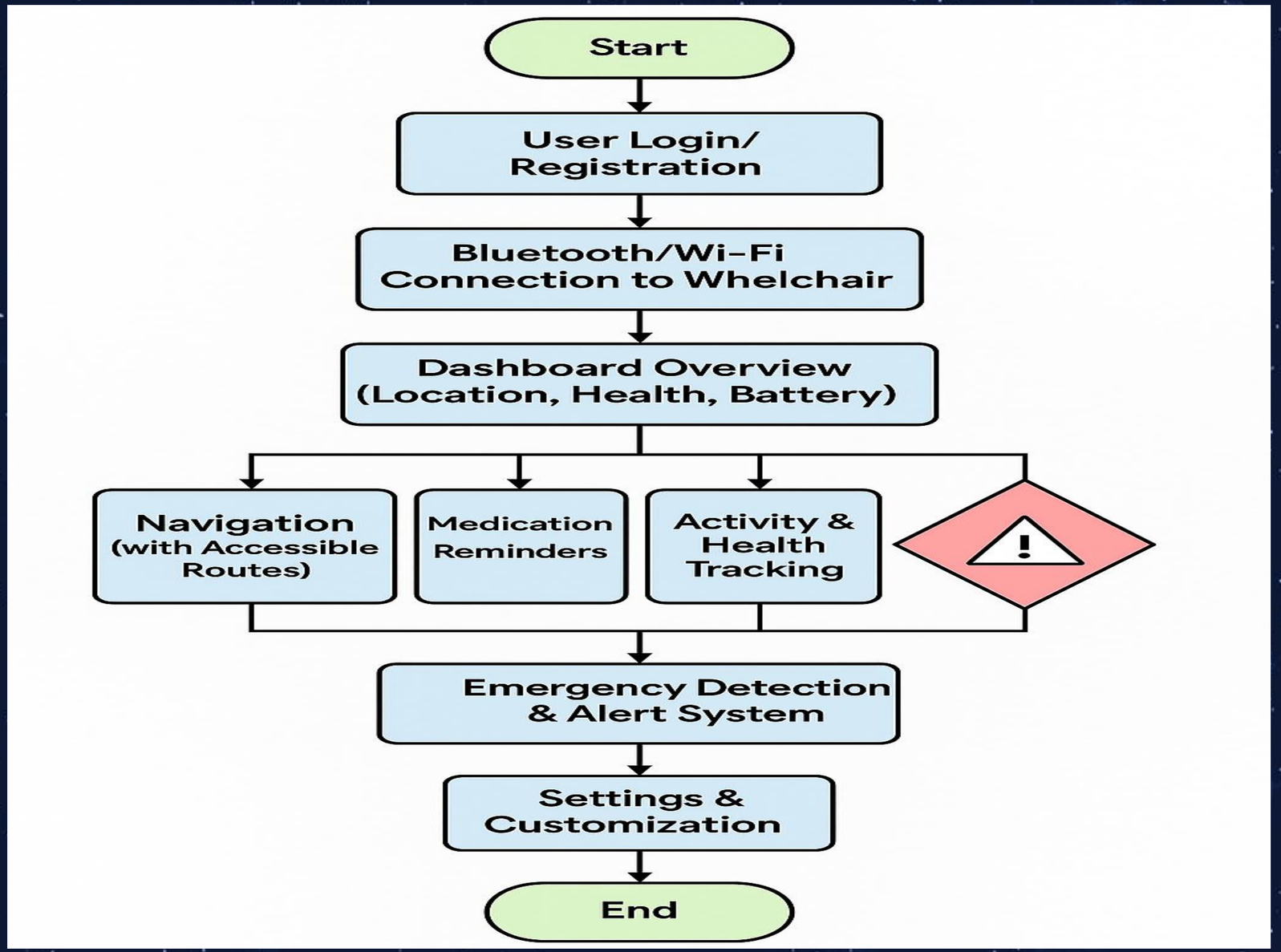
Theme : Healthcare Technology

Individuals with physical disabilities, particularly those who rely on wheelchairs, face numerous challenges in their everyday lives. These challenges range from maintaining a sense of independence and ensuring personal safety to managing their health and daily routines efficiently. Navigating public spaces, accessing health-related services, and responding to emergencies can often be overwhelming without the right support systems in place. Although there are various mobile applications available that cater to specific needs—such as GPS navigation, medication reminders, fitness tracking, or emergency contact systems—these apps function in isolation. As a result, users are forced to manage multiple apps simultaneously, which can be confusing, time-consuming, and inefficient. Moreover, most of these applications are not tailored specifically for wheelchair users. They often lack features like accessible route suggestions, real-time wheelchair movement tracking, or integration with wheelchair sensors that can detect emergencies such as falls, sudden stops, or system failures. The absence of a unified, intelligent platform to manage all these critical needs leads to a fragmented user experience, making it harder for individuals to maintain autonomy and control over their health and mobility. To address this gap, we propose the development of a comprehensive smart app designed specifically for wheelchair users. This app will directly connect with the wheelchair and integrate features such as real-time GPS tracking for safer and more efficient navigation, a customizable medication reminder system, emergency alert capabilities, and activity tracking to monitor health-related data like movement patterns or time spent sitting. The app will also suggest accessibility-friendly routes, ensuring that users can confidently travel in both known and unfamiliar environments. By combining all these functions into a single, user-friendly platform, this solution aims to simplify daily routines, increase safety, and significantly enhance the overall quality of life and independence for individuals with physical disabilities.

PROPOSED SOLUTION

- Live GPS tracking with voice-guided navigation
- Alerts for inaccessible paths (e.g., stairs, steep slopes)
- Custom medication reminders with missed-dose alerts to caregivers
- Activity & fitness tracking with visual reports
- One-tap SOS for emergencies with real-time location + health info
- Fall detection and automatic alerts
- Route suggestions optimized for wheelchair accessibility
- Central dashboard showing all key info (meds, tasks, activity)
- Voice control, high contrast themes, and large-button UI
- Integration with wheelchair sensors (speed, battery, maintenance)

FLOWCHART / DIAGRAM



FLOWCHART / DIAGRAM

- The app starts with user login/registration and connects to the wheelchair via Bluetooth or Wi-Fi.
- A real-time dashboard provides an overview of:
  - GPS-based location
  - Wheelchair health & battery status
- Key modules integrated in the app:
  - Accessible Navigation
  - Medication Reminders
  - Activity & Health Tracking
- Sensors detect emergencies like falls or sudden stops, triggering automatic alerts to caregivers.
- Users can customize features, adjust sensitivity, and control reminders via a settings panel.

FEATURES AND NOVELTY

Features:

- Real-time GPS Tracking with wheelchair-safe routes
- Smart Medication Reminders & Alerts
- Health & Activity Monitoring (e.g., movement, sitting time)
- Emergency Detection (falls, sudden stops)
- Caregiver Alert System (SMS/App notifications)
- Bluetooth/Wi-Fi Integration with Wheelchair
- User-Centric Customization (themes, reminders, language)
- Accessible Interface (voice commands, large buttons)

Novelty:

- Unified Platform: Combines navigation, health, safety & reminders in one app (no need for multiple apps)
- Wheelchair Integration: Direct connection to wheelchair sensors (fall, tilt, battery, etc.)
- Accessibility-First Navigation: Routes curated for wheelchair safety (avoiding stairs, steep paths)
- Real-Time Emergency Response: Auto-alerts caregivers using sensor-triggered events
- Designed *specifically* for wheelchair users — not just generic disability tools

DRAWBACK AND SHOWSTOPPERS

Step	Potential Risk / Show-stopper	Mitigation Plan
1. User Login	- Weak authentication may compromise personal data.	- Use secure login (Firebase Auth / OTP-based). - Encrypt data storage.
2. Bluetooth/Wi-Fi Connection	- Pairing may fail on older devices. - Bluetooth range or interference.	- Use fallback options like Wi-Fi or external BLE module. - Show real-time connection status + retry option.
3. Dashboard Data Fetch	- Real-time data may lag or break. - Power drain from continuous sync.	- Use efficient background services. - Sync every X seconds instead of constantly.
4. Navigation	- No reliable accessible route data in some areas. - GPS may be inaccurate indoors.	- Allow manual route marking by users. - Use hybrid GPS + Wi-Fi-based location detection.
5. Medication Reminder	- User might forget to update timings. - Notifications may fail in background.	- Add calendar sync & multiple reminders. - Use foreground services for important alerts.
6. Activity Tracking	- Incorrect tracking if wheelchair sensors malfunction. - Difficult to interpret movement for different users.	- Calibrate sensors initially. - Allow manual override if needed.
7. Emergency Alerts	- False alarms or failure in critical moment. - No network → alert can’t go.	- Add fall detection sensitivity setting. - Use SMS-based alerts as backup when no internet.
8. Settings & Customization	- Users with low digital literacy may struggle.	- Voice guidance, big buttons, visual cues. - Minimalistic UI with onboarding tutorial.

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Thank you