Software Requirements Specification

for

GOROLL

Version 1.0

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1. Project name GOROLL, A platform for accessible journeys and inclusive communities.

2. Introduction

GOROLL is a mobile application developed from firsthand experience working with individuals with mobility impairments. This experience has brought awareness to the various challenges that wheelchair users face when traveling in Thailand. These challenges include inaccessible environments, non-inclusive urban design, and social attitudes that lead to high travel costs and a sense of social exclusion for wheelchair users.

The project's core mission is to foster a more inclusive society by improving the travel experience for wheelchair users. GOROLL aims to reduce travel costs while raising social awareness about the mobility needs of wheelchair users. It also seeks to create a positive impact by empowering accessibility and equity through the promotion of Universal Design, ensuring that everyone can access transportation and tourism conveniently and equally.

What sets GOROLL apart is that it was developed with a deep understanding of the real problems and needs of its users. It is backed by reliable insights from experts in relevant fields. The platform is designed to be accessible and user-friendly, offering customized routes specifically for wheelchair users along with multiple travel options, including public transport and private ride services. In addition, GOROLL features an online community that allows users to share experiences and connect with one another, making it a comprehensive and all-in-one solution for accessible travel.

3. Project objective

1.1. To develop a centralized platform that provides reliable services and information for wheelchair users, with a strong focus on delivering high-quality travel experiences that truly meet their needs.

1.2. To improve the efficiency of travel systems and reduce the financial burden of transportation for wheelchair users.

1.3. To raise awareness and understanding in society regarding the travel challenges faced by wheelchair users, thereby promoting social inclusion and long-term equity.

4. Problem statement

Order	Problem type	Description	Cause and effect	Solution
1)	Difficulty finding information about		**Cause** Information sources are few and unreliable.	Provide information on accessible

	wheelchair-friendly places and route		Effect Results in them spending more time planning their journeys compared to others + unconfident enough to travel alone	locations with routes and method.
2)	High cost of transportation	Wheelchair users have a lower-than-average income but face higher travel costs and have limited transportation options	Cause Specialized transportation services are expensive, and there are fewer cost-effective alternatives. Effect Limits mobility, independence, and economic participation.	Provide suitable cost-saving transportation options (GOROLL Carpool service/other choices for transport) which fit with their wheelchair.
3)	Inconvenience of using public transportation	Wheelchair users face challenges like insufficient ramps, limited space, and poorly maintained lifts.	Cause Public transport systems are not universally designed to accommodate wheelchair users. Effect Leads to safety risks, delays, and reduced accessibility for wheelchair users.	
4)	Lack of social awareness about this problem	People with disabilities are perceived as different, which is one of the factors that discourages them from leaving their homes	Cause The problems of UD places rarely receive attention from society. Effect	Provide information, situation happened in society, leading people aware and

			Many places are not practical for wheelchair user.	change into UD places.

5. Term and definition

Term	Definition
User	Everyone who use the application.
Admin	A person who has permission to control and manage the application.
Map	Tool that displays the appropriate route for users.
Route	A pathway or direction shown on the map that may be manually entered or based on shared data from the community, providing guidance for navigation.
Location	A place or destination shown on the map that has accessibility information, reviews, and photos contributed by users.
Obstacle	A barrier or issue reported by users that may hinder accessibility, such as stairs, broken ramps, or blocked pathways.
Recorded route	A specific pathway captured in real-time by users through the application's recording feature. These routes are saved in the system and can be shared or reused for accessibility navigation.
Route library	A collection of saved routes.
Profile	A user's account details including personal information, preferences, and saved data.
Feed	A dynamic interface showing posts, shared routes, or updates from the community for user interaction.

6. List of stakeholders and their responsibilities

1.1. User

Individuals who utilize the app to interact with its core features, including viewing shared routes, contributing to the community, and navigating accessible locations. Their primary responsibility is to engage with the app to enhance its ecosystem by providing feedback and participation.

1.2. Admin

The person who oversees the platform's operations, managing user accounts and monitoring community activity to ensure posts and interactions align with app policies. They handle data storage securely, review shared routes for quality and accuracy, and provide technical support to both customers and drivers.

7. System Overview

This section provides a high-level description of how the GOROLL system operates across core modules, covering user interactions, content sharing, and administrative functions.

1. **User login**
    a. The user creates the account using email and password.
    b. The user logs into the system by entering their email and password.
2. **Map viewing and interaction**
    a. The user accesses the interactive map interface.
    b. The system displays wheelchair-friendly locations, accessible routes, and reported obstacles based on the user's current zoom level.
    c. The user can zoom in and out to view more or less detail.
    d. The user's current location is displayed as a moving marker and updated dynamically as they move.
    e. The user can toggle the visibility of route layers (show/hide accessible routes).
    f. The user can search for specific locations using the search bar.
3. **Recording a route**
    a. The user taps the "Record Route" button to start recording their journey.
    b. The app begins tracking the user's location in real-time using GPS.
    c. The user can pause the recording at any time during the journey.
    d. When the journey ends, the user stops the recording and can save the route by providing additional information including name and description.
    e. The saved route is stored in the user's library.
    f. The route is automatically saved to the user's personal library and securely stored in the system database.
    g. The system adds the routes to the map.

4. Review locations
    a. The user views accessible locations on the map.
    b. The user selects location to see detailed accessibility information.
    c. The user can submit reviews for locations, rating different accessibility features (parking, entrances, ramps, pathways, elevators, restrooms, seating, staff assistance).
    d. The user may attach photos to support their review and provide visual context.
5. Obstacle reporting
    a. The user views obstacles displayed on the map.
    b. The user verifies the current status of reported obstacles (still present or resolved).
    c. The user can report new obstacles by providing descriptions and uploading relevant photos.
6. Community interaction
    a. The user navigates to the community section to view shared content.
    b. The user browses posts.
    c. The user interacts with posts through likes and comments.
    d. The user creates and shares their own posts including images, videos, and location-based experiences.
7. Admin Dashboard
    a. The admin accesses a centralized dashboard for managing all system data and user activity.
    b. The admin edits or deletes inaccurate, outdated, or inappropriate content from the map or community section.
    c. The admin monitors platform activity and ensures content aligns with accessibility goals and community guidelines.

8. Functional requirements

1. Registration system
    1.1 The system shall allow the user to create a new account with email and password.
    1.2 The system shall require the user to fill in personal information, including name, email address, and telephone number.
    1.3 The system shall allow the user to provide information about their wheelchair during registration, including the wheelchair type, foldability (yes/no), regular dimensions (length, width, height), folded dimensions, and any additional notes.
    1.4 The system shall send email verification upon registration to validate the account.
2. Login system
    2.1 The system shall allow the user to login with their registered email and password.
    2.2 The system shall validate the provided email and password during the login process.

2.3 The system shall allow the user to initiate a password reset request using their registered email.

2.4 The system shall send a password reset link to the user's email for verification.

2.5 The system shall allow the users to logout after login.

3. **Profile and account management system**

3.1 The system shall allow the user to edit their personal information including name, email address, and telephone number.

3.2 The system shall allow user to add and update details of their wheelchair, including foldability (yes/no), regular dimensions (length, width, height), folded dimensions, and any additional notes provided by the user.

3.3 The system shall allow the user to update or remove their profile picture.

3.4 The system shall allow the admin to update user account information.

3.5 The system shall allow the admin to suspend and reactivate user accounts.

4. **Accessibility navigation (manual) system**

4.1 The system shall provide an interactive map interface that highlights accessible routes. Routes marked in green shall indicate full accessibility.

4.2 The system shall show obstacles on the map including sidewalk issues, permanent obstacles, temporally obstacles, or other obstacles.

4.3 The system shall allow user to zoom in and zoom out on the map. Local zoom

4.4 The system shall display locations, obstacles, and accessible routes on the map based on the current zoom level, showing more detailed information as the user zooms in.

4.5 The system shall allow the user to toggle the visibility of accessible routes (show/hide routes).

4.6 The system shall allow the user to view their current location on the map.

4.7 The system shall dynamically update the user's position as they move.

5. **Location system**

5.1 The system shall display wheelchair-friendly locations based on user input and crowd-sourced data.

5.2 The system shall allow user to select a location to view associated images and reviews.

5.3 The system shall allow user to submit a review by selecting a specific area and giving a thumbs up (👍) or thumbs down (👎) based on their experience.

5.4 The system shall allow each accessibility category to be color-coded based on user voting, as follows:

Green: thumbs up > thumbs down

Yellow: thumbs up = thumbs down

Red: thumbs up < thumbs down

5.5 The system shall allow user to filter reviews by time range, such as "Last 24 hours" or "All time".

5.6 The system shall allow the overall accessibility status of a location to be displayed in green only if all seven main core categories — parking, entrance, ramp, pathway, elevator, restroom, seating — are individually marked as green.

5.7 The system shall allow the overall accessibility status of a location to be displayed as yellow if four or more of the seven main core categories are marked as green, but not all.

5.8 The system shall allow the overall accessibility status of a location to be displayed as red if fewer than four of the seven main core categories are marked as green.

5.9 The system shall allow users to upload photos for each specific accessibility feature.

5.10 The system shall provide a search bar that allows user to search for specific locations.

5.11 The system shall allow user to submit a written review as an overall comment for the entire location

5.12 The system shall allow the admin to add new location entries, including location name, description, and accessibility-related details.

5.13 The system shall allow the admin to upload location images when adding or editing location entries.

5.14 The system shall allow the admin to update or delete inaccurate location data submitted by users.

5.15 The system shall allow the admin to update or delete inaccurate or inappropriate location images.

6. **Route Recording (Crowd - sourced data collection)**

6.1 The system shall allow the user to record their route in real-time using GPS tracking.

6.2 The system shall allow the user to pause the route recording at any time.

6.3 The system shall allow the user to stop and save the recorded route.

6.4 The system shall automatically store the recorded route in the system database.

6.5 The system shall allow the admin to review all recorded routes submitted by users.

6.6 The system shall allow the admin to delete route records.

7. **Obstacle Reporting (Crowd - sourced data collection)**

7.1 The system shall allow the user to select a reported obstacle and view its details, including images, category, description, and status.

7.2 The system shall allow the user to report newly discovered obstacles that may affect wheelchair accessibility.

7.3 The system shall allow the user to upload photos, select a category, and provide descriptions for the reported obstacle.

7.4 The system shall allow the user to verify the status of a reported obstacle by selecting whether the obstacle is still present or has been resolved.

7.5 The system shall remove the reported obstacle from the map once the number of users who marked it as “resolved” exceeds the number of users who marked it as “still present.”

7.6 The system shall allow the admin to manually add obstacle reports.

7.7 The system shall allow the admin to edit or delete inaccurate or outdated obstacle reports.

8. Community system
    8.1 The system shall allow the user to create posts by uploading photos or videos with a description, and selecting a relevant category such as Guides & Tips, Equipment Reviews, or Inspiring Stories.
    8.2 The system shall allow the user to interact with posts by liking them.
    8.3 The system shall allow the user to interact with posts by commenting on them.
    8.4 The system shall provide sharing options that allow users to copy a post's link or share it directly to external platforms.
    8.5 The system shall allow the user to delete their own posts.
    8.6 The system shall allow the user to search for posts by keyword, category, or user.
    8.7 The system shall allow the admin to delete posts, images, or videos that violate community guidelines.

9. Nonfunctional requirements

1. Operational requirements
    1.1. The system shall be able to connect to the internet.
    1.2. The system should automatically backup at the end of each day.
    1.3. The system shall support multilingual content, including Thai and English.
2. Performance requirements
    2.1. The system shall respond to image-related requests within 5 seconds.
    2.2. The system shall be maintain 24/7 availability.
    2.3. The system shall be able to support at least 500 concurrent users without performance degradation.
3. Security requirements
    3.1. The system shall protect user data against unauthorized access.
    3.2. The system shall use HTTPS for all communications.
    3.3. The system shall encrypt user passwords using secure hashing algorithms
    3.4. The system shall implement role-based access control (RBAC) for user and admin operations.
4. Cultural and political requirements
    4.1. The system shall comply with the Personal Data Protection Act (PDPA) 2019.
5. Usability requirements
    5.1. The user shall be able to complete registration process within 5 minutes.
    5.2. The system shall integrate with assistive technologies, such as screen readers.
    5.3. The system shall maintain a consistent and accessible color contrast ratio according to WCAG 2.1 standards.

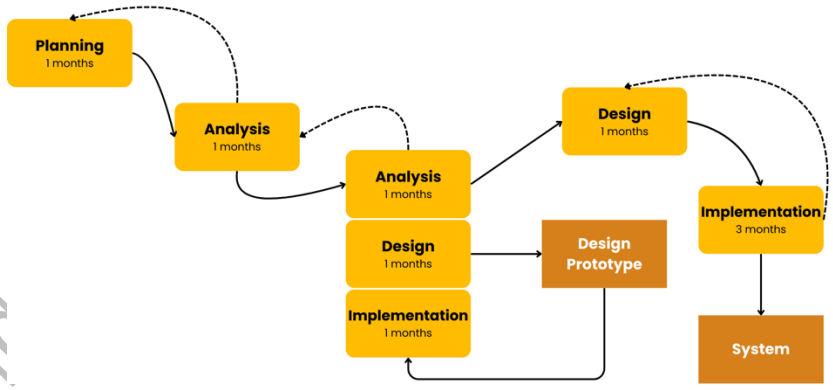
6. Portability

6.1. The system shall be deployable on cloud platforms with minimal configuration changes.

10. SDLC Method

This project adopts the Throwaway Prototyping Model as the Software Development Life Cycle (SDLC) approach. This model was selected to ensure that the system is developed based on real user needs, particularly those of wheelchair users who face complex challenges in mobility and accessibility. An initial interactive prototype was developed and made available via https://gorollth-prototype.vercel.app. It was tested with the target user group, and feedback was gathered to identify usability issues, refine core functionalities, and validate design assumptions.

Throwaway prototyping allows rapid and cost-effective iterations, as the prototype can be quickly modified or discarded without being bound to long-term code architecture. This approach significantly reduces development risk and ensures that the final product aligns with actual user expectations. By prioritizing user-centered design, the team was able to revise features based on direct feedback before moving into full-scale development. As a result, the current prototype is now optimized and ready to be developed into a fully functional mobile application.



11. Resources

Although the project is not yet fully completed, the current version provides a solid foundation and can be used as a reference prototype for future mobile application development.

- Mockup for user (mobile)

- Mockup for admin (desktop)
- Diagram