Software Requirements Specification

for

ECO WAY FINDER

Prepared by

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1. Introduction

1.1 Purpose

The purpose of the Clear Way Finder based on Air Quality Index (AQI) is to provide users with a tool that helps them navigate and make travel decisions based on real-time air quality information. Increase awareness among users about the current air quality conditions in different areas, empowering them to make informed decisions about their travel routes..

1.2 Document Conventions

In the Software Requirements Specification (SRS) for our clear way finder based on air quality project, we adhere to standard typographical conventions with consistent font styles and sizes. Priority levels for requirements are clearly indicated, ensuring that higher-level priorities are assumed to be inherited by detailed requirements, unless otherwise specified..

1.3 Intended Audience and Reading Suggestions

- Developers: To understand technical specifications, system architecture, and implementation details.
- Project Managers: To grasp project scope, timelines, and resource requirements.
- Marketing Staff: To gain insights into the tourism planner application's features and unique selling points.
- Users: To comprehend the application's functionalities, usage guidelines, and benefits.
- Testers: To identify test cases, scenarios, and expected outcomes during the testing phase.
- Documentation Writers: To extract information for user manuals, guides, and support documentation.

1.4 Product Scope

The Clear Way Finder system aims to provide users with real-time air quality information and assist in finding the clearest route based on air quality data.Develop a user-friendly system that integrates real-time air quality data with navigation services to help users make informed decisions about their travel routes.
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1.5 References

The document does not currently reference external sources. All information presented is specific to the project "Eco way finder" and is internally generated based on project requirements and goal..

2. Overall Description

2.1 Product Perspective

The Clear Way Finder based on Air Quality Index is conceptualized as an advanced and user-centric system designed to redefine the way individuals plan and navigate their journeys. Positioned as an essential tool within the transportation and environmental sectors, it seamlessly integrates with users' daily routines, offering a dynamic and personalized solution to enhance their travel experience.

Key Characteristics:

User-Centric Design: *The system prioritizes intuitive user interfaces and interactive features to ensure a positive and engaging experience for users at every stage of their travel decision-making process.*
Collaborative Platform: *Fostering a sense of community, the Clear Way Finder enables users to share air quality insights, travel experiences, and route recommendations, creating a collaborative and vibrant ecosystem focused on environmental awareness.*
Real-Time Intelligence: *Leveraging real-time air uality data sources, the system provides users with timely updates on air quality conditions along their routes, local events, and potential adjustments to enhance overall travel safety and well-being.*
Adaptive Customization: *The Clear Way Finder offers adaptive customization options, allowing users to tailor their travel routes based on personal preferences, health considerations, and a commitment to minimizing exposure to poor air quality.*
Integration with Third-Party Services: *Seamless integration with external services ensures comprehensive travel planning, including considerations for accommodation bookings, transportation options, and activity reservations related to air quality.*
Privacy and Security: *Prioritizing user trust, the system employs robust encryption measures to secure user data, ensuring the privacy and confidentiality of air quality preferences and travel information.*
Dynamic Air Quality Planning: *Utilizing intelligent algorithms, theClear Way Finder estimates the air quality conditions along potential routes, providing users with insights into healthier and safer travel options without compromising efficiency.*
Mobile Accessibility: *Designed for accessibility across various devices, including mobile phones, the Clear Way Finder empowers users to plan and manage their routes conveniently from anywhere, fostering a seamless and connected travel experience.*

This user-centric and technologically advanced system aims to empower individuals to make informed travel decisions, prioritizing health, safety, and environmental considerations.

2.2 Product Functions

The Clear Way Finder based on Air Quality Index offers a range of functions designed to provide users with a comprehensive and user-friendly experience in planning and navigating routes based on air quality considerations.

User Management

1. User Registration and Profile Creation
- Allow users to register accounts on the platform.
- Facilitate the creation and customization of user profiles.

2. User Profile Management and Preferences
- Enable users to manage their profiles, including personal details and preferences related to air quality sensitivity.
Trip Planning

3. Destination Input, Travel Date Selection, and Preference Specification
- Provide interfaces for users to input destination details and select travel dates.
- Allow users to specify preferences, including air quality thresholds and health considerations.

4. Automated Generation of Personalized Trip Itineraries
- Automatically generate personalized trip itineraries based on input criteria and real-time air quality data.

Budget Estimation

5. Calculation of Estimated Budgets Based on User Preferences
- Utilize intelligent algorithms to estimate budgets considering user preferences and travel parameters.

6. Real-time Budget Adjustments and Insights
- Provide real-time adjustments to estimated budgets based on changing factors.

- Offer insights into cost-effective travel options without compromising air quality considerations.

Booking Services

7. Accommodation Booking with Options for Various Lodging
- Facilitate accommodation bookings, considering air quality conditions in the vicinity.
- Offer options for various lodging preferences.

8. Integration with External Platforms for Transportation Bookings
- Seamlessly integrate with external transportation services for booking options aligned with air quality preferences.

Activity Recommendations

9. Dynamic Suggestions for Activities and Attractions
- Dynamically recommend activities and attractions based on air quality conditions and user preferences.

10. User Customization of Suggested Activities
- Allow users to customize suggested activities based on individual interests and preferences.

These functions collectively form the core features of the Clear Way Finder based on Air Quality Index, providing users with a powerful tool for informed and health-conscious travel planning..

2.3 User Classes and Characteristics

User - The user provides input data such as preferred travel routes, starting location, destination, mode of transportation, and time of travelSpecifies personal preferences, including acceptable air quality thresholds, health considerations, and any specific constraints related to travel May customize trip parameters based on individual preferences, such as scenic routes, preferred transportation modes, and specific points of interest. Receives real-time air quality information, clear route recommendations, and notifications regarding potential changes in air quality along the selected route.
System - Gathers real-time air quality data from connected sensors along potential travel routes.
Utilizes intelligent algorithms to analyze air quality conditions and recommend the clearest and healthiest routes for users..

2.4 Operating Environment

Hardware Platform:
- *This eco way finder operates on standard computing hardware, including desktops, laptops, tablets, and smartphones.*
- *No specific hardware dependencies: system requirements are tailored for common computing devices.*

Operating System:
- *Compatible with major operating systems, including:*
- *Microsoft Windows (Windows 10 and above).*
- *macOS (macOS 10.13 and above).*
- *iOS (iOS 11 and above).*
- *Android (Android 5.0 and above).*

2.5 Design and Implementation Constraints

Regulatory Compliance: *The tourism planner must comply with relevant data protection laws, ensuring the secure handling of user information and adherence to privacy regulations.*
Hardware Limitations: *Optimize resource usage to accommodate various user devices, considering factors such as processing power, memory, and storage capacity.*

Interfaces and Integrations: *Ensure seamless integration with third-party services for accommodation bookings, transportation options, and activity reservations. Align with the interfaces provided by external platforms to facilitate smooth data exchange.*
Technology Stack: *Development is constrained to the agreed-upon technology stack, including specified programming languages, frameworks, and databases.*
Parallel Operations: *Implement solutions to handle concurrent user activities during collaborative planning to maintain data consistency and avoid conflicts.*
Language and Localization: *Support multiple languages to cater to a diverse user base.*
Implement localization features to adapt to regional and cultural differences in date formats, currency symbols, etc.
Security Considerations: *Adhere to robust security protocols, including encryption, secure authentication processes, and protection against common security vulnerabilities.*
Comply with any additional security standards outlined by the customer.
Design Conventions and Standards: *Follow agreed-upon design conventions and programming standards for consistency and maintainability. Document code and designs according to established standards.*
Customer Maintenance Responsibility: *Clearly define responsibilities for ongoing software maintenance between the development team and the customer's organization. Establish procedures for software updates, bug fixes, and post-implementation support.*

2.6 User Documentation

The user documentation will be delivered in electronic formats, accessible online through the system interface, ensuring easy and immediate access for users. The documentation will adhere to standard technical writing conventions and will be regularly updated to reflect system enhancements.

2.7 Assumptions and Dependencies

The Eco way finder operates under certain assumptions and dependencies. Key assumptions include users' reliable internet access, accurate input, and active engagement. Dependencies include the availability and stability of third-party APIs, effective security protocols, and compliance with data protection regulations. Success relies on the collaborative efforts of users, adherence to regulatory standards, and the adaptability of the system to changing user needs and technological environments. Continuous monitoring and adaptation to these factors are vital for the project's success..

3. External Interface Requirements

3.1 User Interfaces

Present clear and concise route recommendations based on real-time air quality data.Key components include trip planning, budget estimation, accommodation booking, activity recommendations, and collaborative features Intuitive input forms for specifying travel details, including starting location, destination, and preferred travel time Ensure a seamless experience across various devices, including desktops, tablets, and mobile phones..

3.2 Hardware Interfaces

The Eco way finder primarily relies on standard computing hardware, including desktops, laptops, tablets, and smartphones. There are no specific hardware interface requirements beyond those inherent to these common devices. The application is designed to be compatible with various operating systems, ensuring accessibility across different hardware platforms.

3.3 Software Interfaces

A detailed description of the system's functionalities, interfaces, and constraints. It defines the logical characteristics of user interfaces, outlines hardware and software interfaces, and specifies design constraints and dependencies. Additionally, the specification includes assumptions, regulatory compliance details, and user classes, providing a comprehensive guide for the development and maintenance of the software. Continuous monitoring and adaptation to changing factors are essential for the success of the project. Detailed design specifications, including user interface details, are documented separately in a User Interface Specification.

3.4 Communications Interfaces

The Eco way finder employs a robust set of communication interfaces to facilitate efficient data exchange and interaction. Utilizing HTTP/HTTPS, RESTful APIs, WebSockets, JSON, and OAuth for authentication ensures secure and seamless communication between the client and server. Integration with external services, email services, and messaging platforms enhances the application's functionality, enabling real-time updates, secure transactions, and user engagement. SSL/TLS protocols contribute to the overall security of data during transmission. These communication interfaces collectively form the backbone of the Tourism Planner, providing a reliable and responsive user experience..

4. System Features

System features collectively provide users with a comprehensive and user-friendly experience, catering to their diverse travel needs and preferences. The user aims to enhance trip planning, collaboration, and exploration while ensuring data security and privacy..

4.1 System Feature 1

4.1.1 Description and Priority

Users can initiate trip planning by entering their destination, travel dates, and preferences. This feature is of High priority, as it forms the core functionality of the Eco way finder, enabling personalized itineraries..

4.1.2 Stimulus/Response Sequences

Stimulus: User inputs destination, travel dates, and preferences.
Response: System generates a personalized itinerary with suggested activities and Actions..

4.1.3 Functional Requirements

REQ-1 Users should be able to input the starting location, specifying the city or region.
REQ-2: Users should provide travel details, including the destination and preferred travel time.
REQ-3Users can customize preferences, such as acceptable air quality thresholds, health considerations, and specific constraints related to travel.
REQ-4: The system should dynamically generate route recommendations based on user inputs, real-time air quality data, and preferences.
REQ-5: Route recommendations should include a variety of paths, highlighting differences in air quality conditions along each route.
REQ-6: The system should prioritize routes based on air quality conditions, user preferences, and provide real-time adjustments in response to changes in air quality.
REQ-7: In case of invalid inputs or missing information, the system should prompt the user for correction and provide clear error messages.
REQ-8: The system should provide an option for users to save or export the generated route recommendations for future reference..

5. Other Nonfunctional Requirements

5.1 Performance Requirements

To ensure a responsive user experience, the Planner sets a standard for quick system responses, scalability to accommodate a large user base, and efficient data loading times. Real-time updates and push notifications must be delivered promptly to enhance user engagement..

5.2 Safety Requirements

User safety is paramount, with a focus on secure financial transactions during bookings and robust user authentication mechanisms to prevent unauthorized access. These measures aim to create a secure environment for users to interact with the application..

5.3 Security Requirements

Security measures include data encryption for sensitive user information, compliance with privacy regulations, and the implementation of multi-factor authentication to enhance user account security. These measures collectively safeguard user data and privacy.

5.4 Software Quality Attributes

Usability is a priority, with a target satisfaction score of 90% in usability testing. Reliability is emphasized through a high system uptime, and maintainability ensures that the codebase adheres to best practices for ease of future updates and maintenance.

5.5 Business Rules

User roles are clearly defined, allowing registered users to create and save itineraries, while admin privileges are required for certain administrative functions. Content moderation ensures that user-generated content aligns with community guidelines, fostering a safe and positive user environment. These business rules guide user interactions within the system.

6. Other Requirements

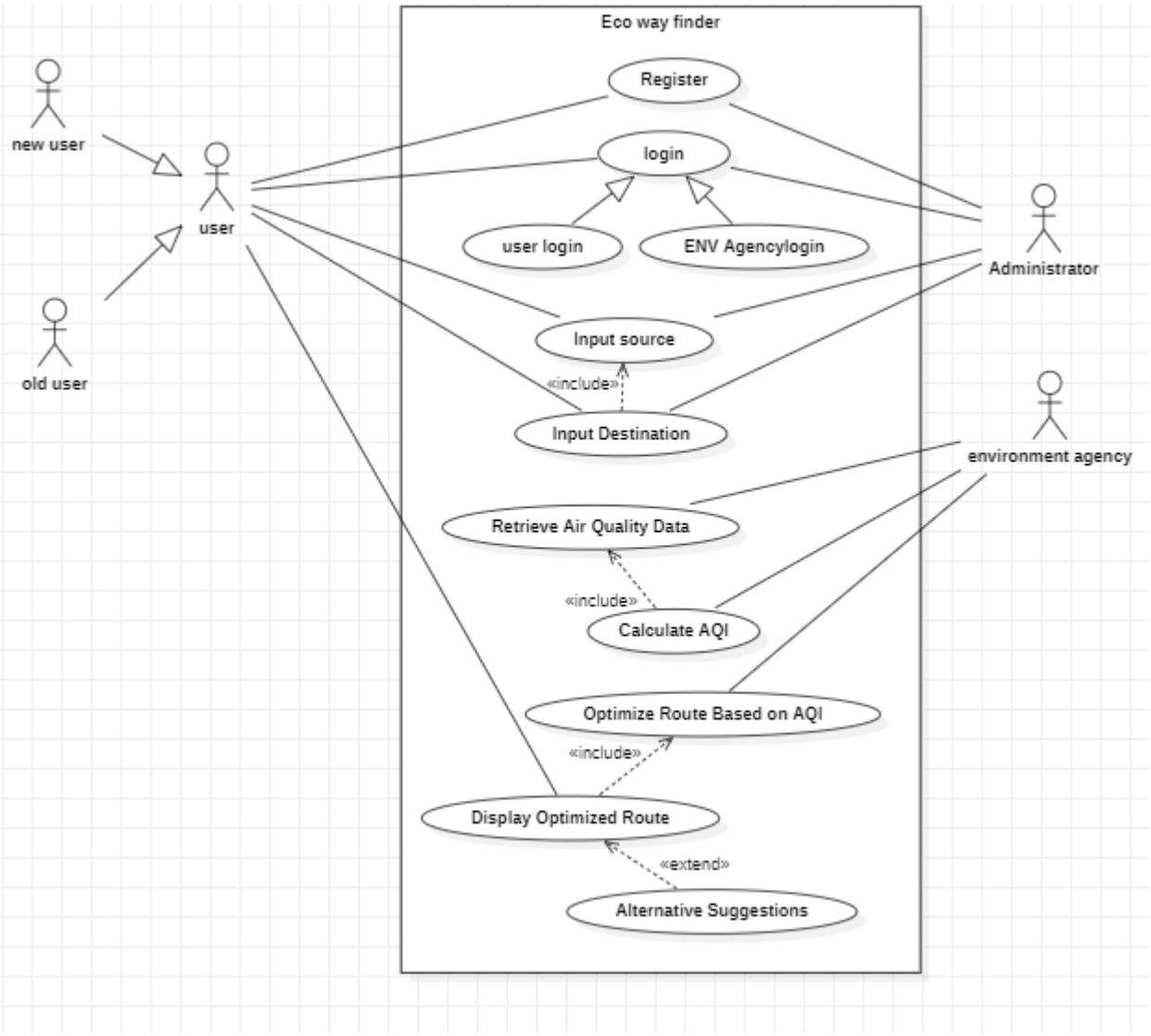
Appendix A: Glossary

Term	***Description***
Route Finder	*The core functionality allowing users to input destination, travel dates, and preferences to generate personalized itineraries.*
User	*Real-time calculation of estimated budgets based on user preferences, including accommodation, transportation, and activity costs.*
Accommodation Booking	*The feature enabling users to explore, select, and book accommodations seamlessly*
Activity Recommendations	*Dynamic suggestions for activities and attractions at the chosen destination,*

	customizable based on user interests.
Collaborative Planning	*Users can share itineraries with others and engage in collaborative trip planning. Community features include reviews, ratings, and shared experiences.*
Real-Time Updates	*The feature delivering push notifications and instant updates to users, ensuring timely information on itinerary changes, weather updates, and local events.*
User Management	*Involves user registration, profile creation, and secure authentication. Users can manage preferences and view their travel history.*
Accessibility and Localization	*Ensures support for multiple languages and localized content. Mobile accessibility allows users to plan trips on-the-go.*
Security and Privacy	*The implementation of robust security measures, including encryption and secure authentication, to protect user data and privacy.*
External Service Integrations	*Seamless integration with third-party services, providing users with real-time information on weather, transportation options, and additional travel-related data.*
User Notifications	*Automated notifications for upcoming activities, booking confirmations, and reminders, customizable based on user preferences.*
Search and Explore	*Features allowing users to explore destinations, search for specific locations or activities, and access comprehensive information on attractions.*
Feedback and Support	*Mechanisms for users to provide feedback, and customer support features for issue resolution and assistance.*
Performance Requirements	*Specifications outlining the expected performance levels, including response times, scalability, and data loading times.*
Safety Requirements	*Measures ensuring secure financial transactions and robust user authentication for the protection of user accounts and personal information.*
Security Requirements	*Specifications regarding data encryption, privacy compliance, and user authentication mechanisms to maintain the security of user data.*
Software Quality Attributes	*Characteristics such as usability, reliability, and maintainability that contribute to the overall quality of the software.*
Business Rules	*Operating principles dictating user roles, content moderation, and other rules that guide user interactions within the system.*

Appendix B: Analysis Models

Use case Model:



1. Usecase name: *Register*

Topics	Details
Use Case Name	*Register*
Scope	*User Account Creation*
Level	*System*
Primary Actor	*User*
Stakeholders and Interest List	*- User: Interested in creating an account.*
	- System: Interested in securely registering users.
Preconditions	*User has not registered with the system before.*
Success Guarantee/Post Condition	*User successfully creates an account.*
Main Success Scenario	*1. User provides valid registration details.*
	2. System validates the information.
	3. System creates a new user account.
Extensions	*1. If the user provides invalid or incomplete details, the system prompts for*
	correct information.
Special Requirements	*- Secure handling of user registration data.*
	- Email verification for account activation.
Technology and Data Variations List	*- Secure data transmission for registration details.*
	- Database for storing user registration information.
Frequency of Occurrence	*Moderate*
Miscellaneous	*None*

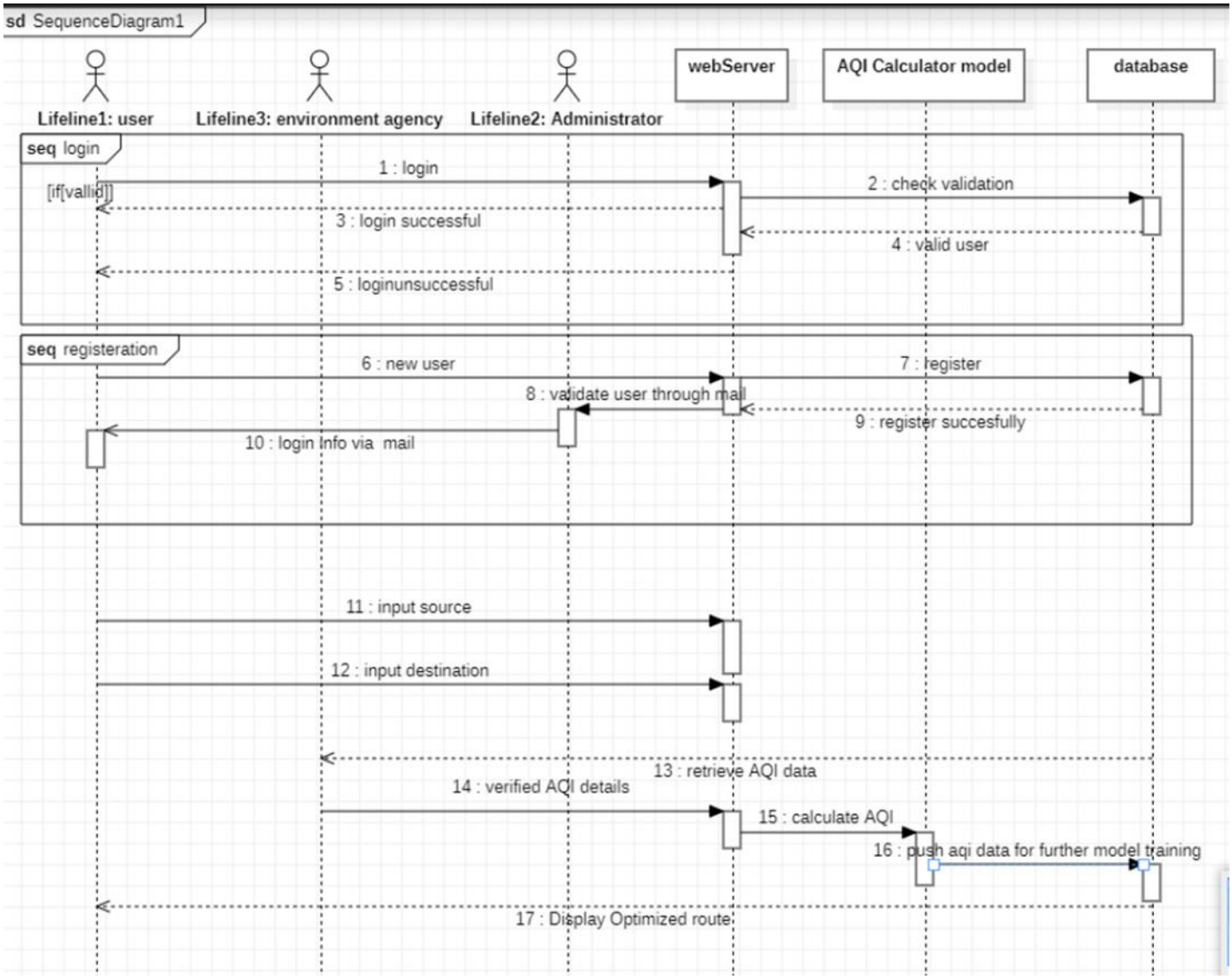
2. Usecase name: *Login*

Topics	Details
Use Case Name	*Login*
Scope	*Authentication Process*
Level	*System*
Primary Actor	*User*
Stakeholders and Interest List	*- User: Interested in accessing the application.*
	- System: Interested in authenticating the user securely.
Preconditions	*User has a valid account.*
Success Guarantee/Post Condition	*User gains access to the application.*
Main Success Scenario	*1. User inputs valid credentials.*
	2. System authenticates the user.
	3. System grants access to the application.
Extensions	*1. If the user enters invalid credentials, the system prompts for correct information.*
Special Requirements	*- Secure authentication protocols.*
	- User account database.
Technology and Data Variations List	*- Secure authentication protocols.*
	- User account database.
Frequency of Occurrence	*High*
Miscellaneous	*None*

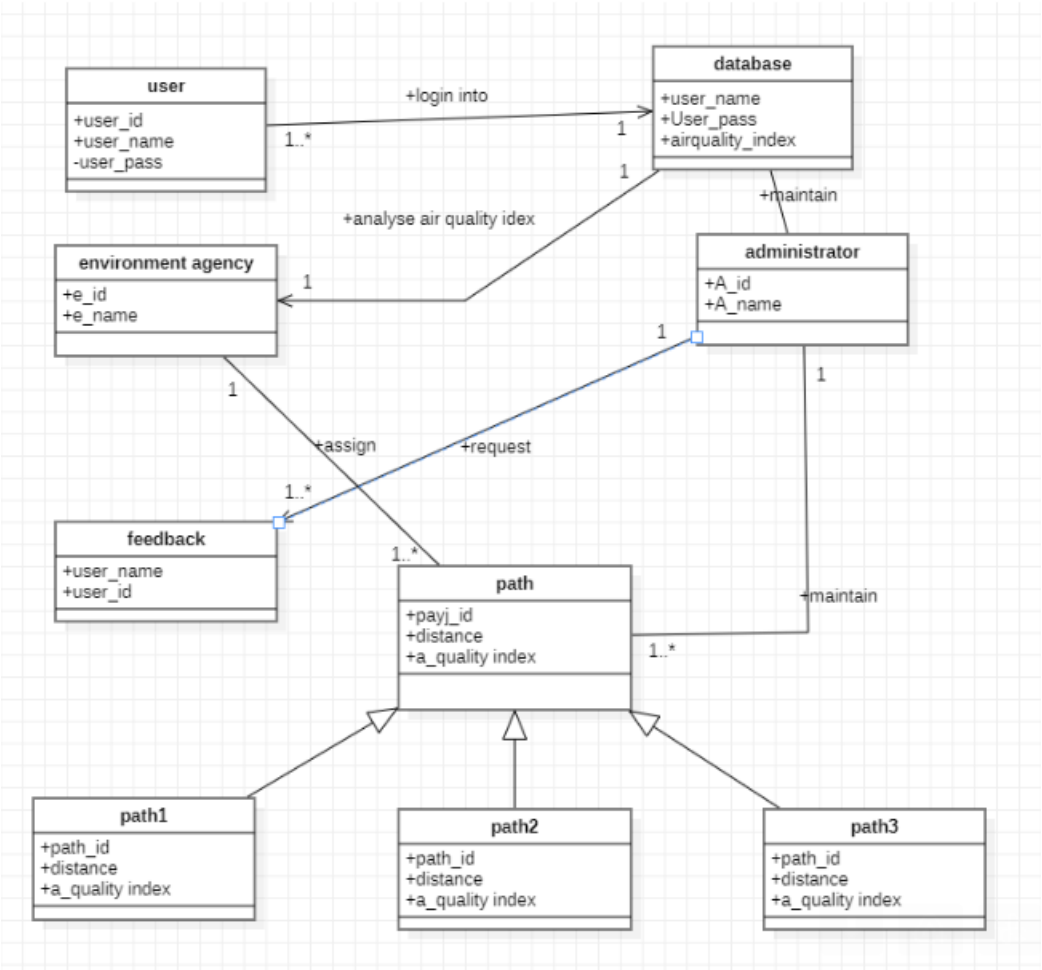
3.Usecase name: *Route recommendation*

Topics	***Details***
Use Case Name	*See Destination*
Scope	*Destination Exploration*
Level	*User*
Primary Actor	*user*
Stakeholders and Interest List	*- Traveler: Interested in exploring destinations within a budget.*
	- System: Responsible for retrieving and displaying matching destinations.
Preconditions	*User is on the "See Destination" screen.*
Success Guarantee/Post Condition	*System displays matching destinations based on the entered budget.*
Main Success Scenario	*1. User enters the budget for destination search.*
	2. System proceeds to "Retrieve Matching Destinations."
Extensions	*If the user struggles with budget input, the system suggests a budget range based on their travel details.*
Special Requirements	*None*
Technology and Data Variations List	*None*
Frequency of Occurrence	*Moderate*
Miscellaneous	*None*

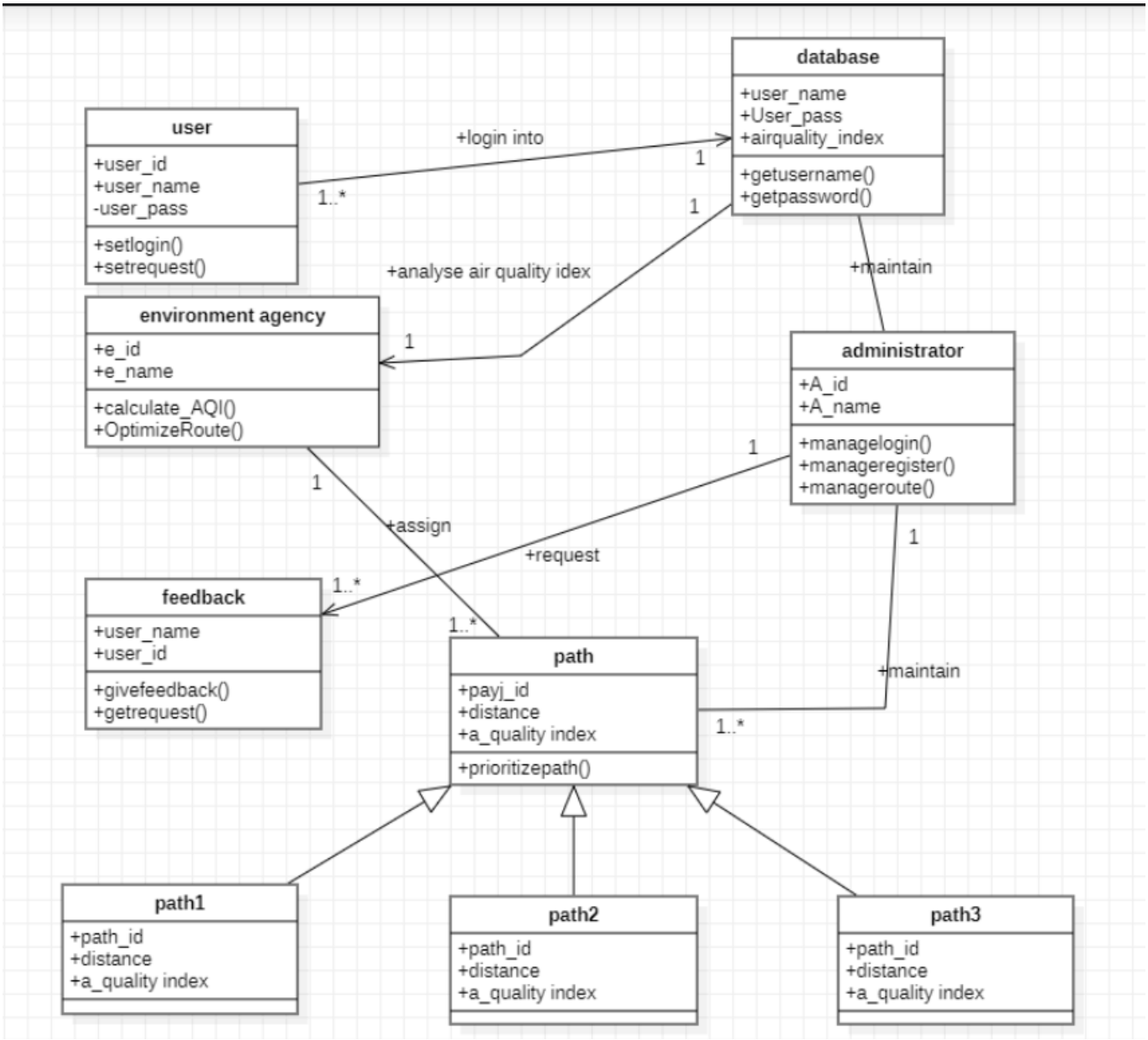
Sequence Diagram



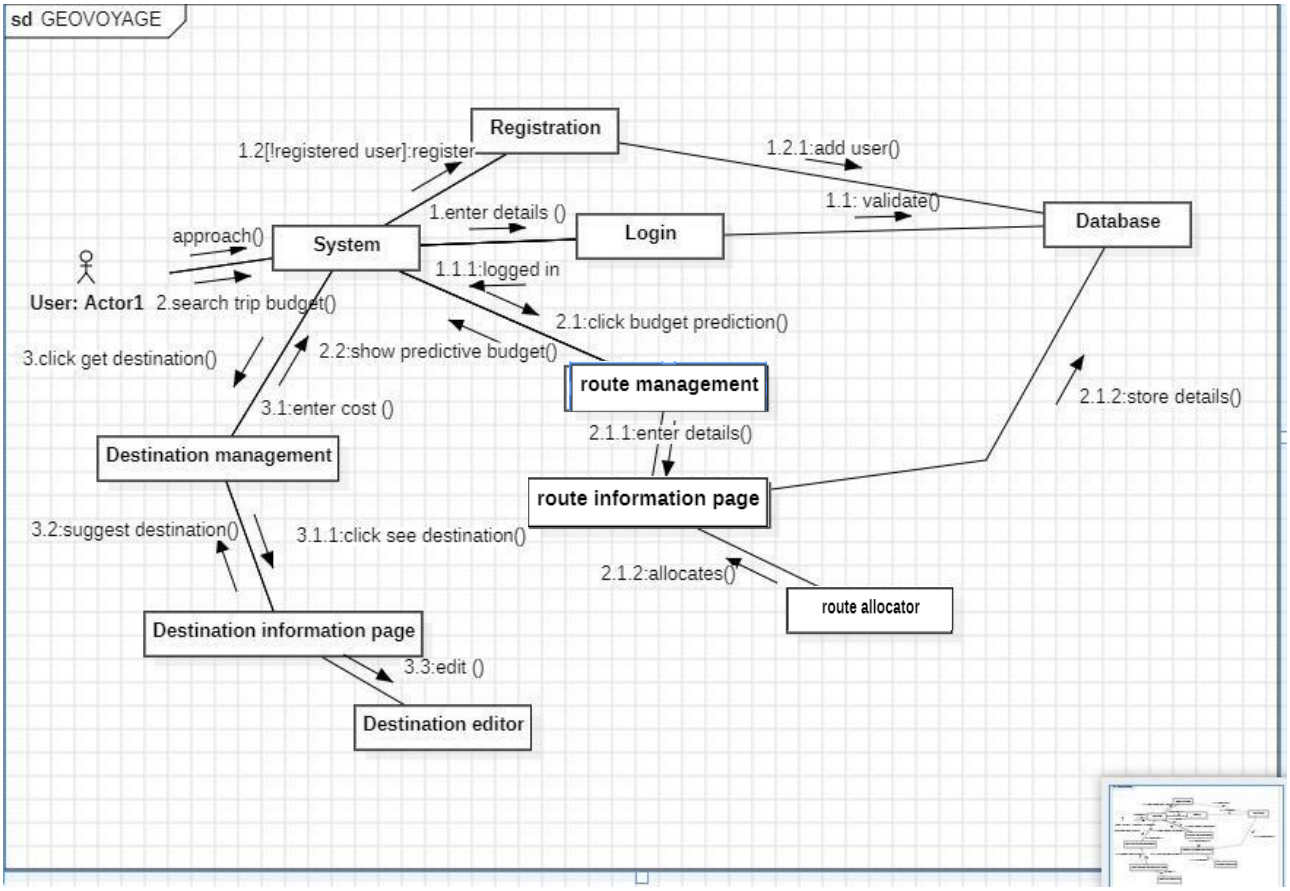
Domain model



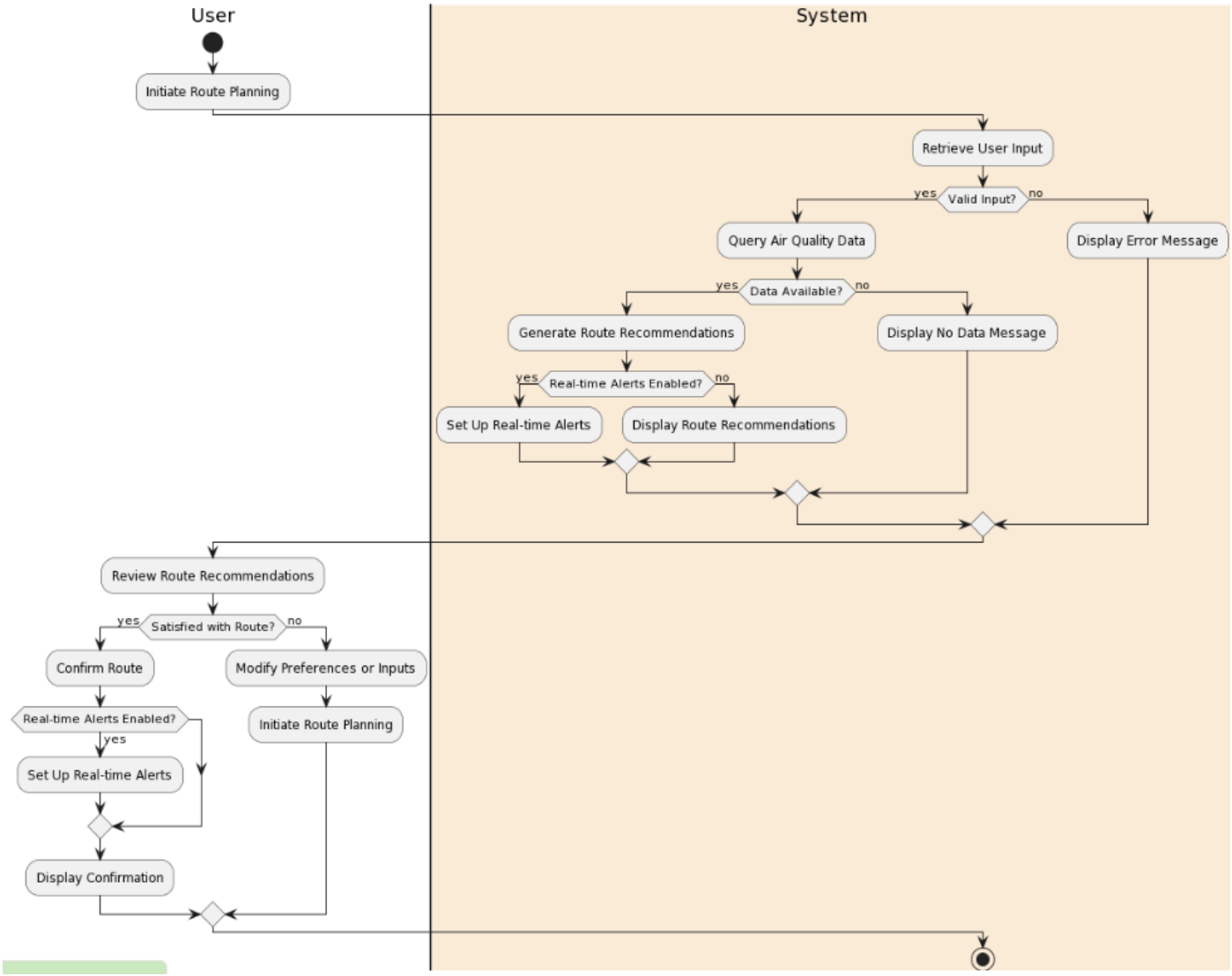
Class Diagram



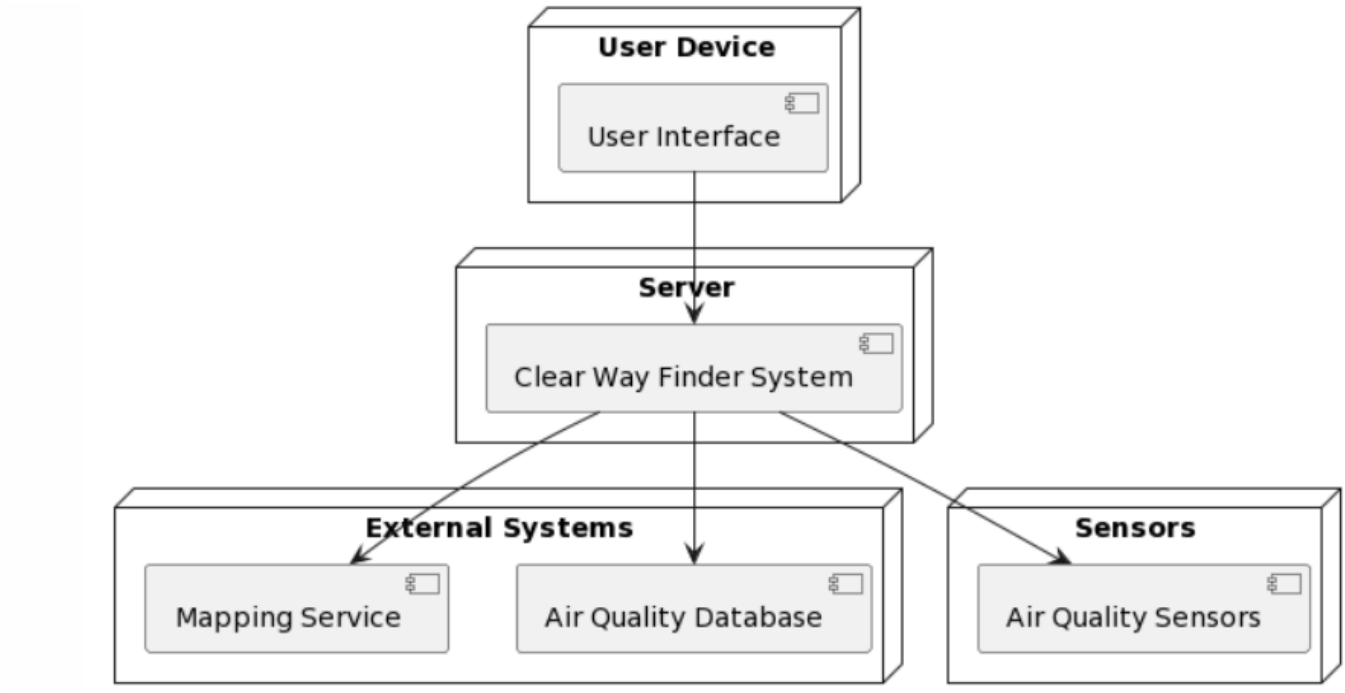
Communication Diagram



Activity diagram:



Deployment diagram:



Non-Functional requirements:

Category	Description
Performance:	Response Time: The system should respond to user requests for eco-friendly route information within X seconds to ensure a seamless user experience.
Usability:	User Interface: The user interface should be intuitive and user-friendly, allowing users to easily input destination information and receive eco-friendly route details.
Security:	Data Encryption: User data and transaction information should be encrypted to ensure the security and privacy of sensitive information.
Maintainability:	(Add relevant information about how the system will be maintained and updated for the EcoWayfinder application.)

Functional Requirements:

Category	Description
User Authentication	Secure user account creation and login.
User Profile Management	Intuitive interfaces for profile creation, update, and deletion.
Input Form for Budget Prediction	Validation of user inputs for accuracy.
Budget Prediction Algorithm	Utilization of relevant features for accurate predictions of eco-friendly routes.
Destination Suggestion	Personalized travel destination suggestions based on eco-friendly criteria.
User Feedback Submission	Efficient processing and recording of user feedback related to eco-friendly routes.
Database Management	Secure storage and management of user data, including preferences and feedback.