Software Requirements Specification

for

Assist U: Recommendation Service for students

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**Date :15-04-24**

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# Introduction

## Document Purpose

The purpose of this Software Requirement Specification (SRS) document is to provide a comprehensive overview of the functional and non-functional requirements for the development of the Assist U platform. It serves as a blueprint for the software development team, guiding them in the implementation of the desired features and functionalities. Additionally, this document serves as a communication tool between stakeholders, ensuring a common understanding of the project scope and objectives. By detailing the software requirements, this document aims to facilitate the development process, streamline communication, and ensure the successful delivery of a high-quality product that meets the needs and expectations of its users.

## Product Scope

## Assist U is a recommendation service designed to assist students in finding reliable and suitable services such as mess facilities, hospitals, PG accommodations, and laundry centers. The platform utilizes user ratings and feedback to dynamically recommend the top-rated options in a given area, providing students with convenient access to essential services tailored to their preferences and needs. By aggregating information from various sources and incorporating user feedback, Assist U aims to simplify the process of service selection for students, saving them time and effort while enhancing their overall experience.

## Intended Audience and Document Overview

The Software Requirements Specification (SRS) document is intended for various stakeholders involved in the development and management of the Assist U project. These stakeholders include developers, project managers, marketing staff, users, testers, documentation writers, the client, and the professor.

The document is organized into several sections:

* ***Introduction :*** Provides an overview of the document's purpose and scope.
* ***Overall Description :*** Describes the product overview, functionality, design constraints, assumptions, and dependencies.
* ***Specific Requirements :*** Details external interface requirements, functional requirements, and includes a use case model.
* ***Other Non-functional Requirements :*** Covers performance, safety, security, and software quality attributes.
* ***Other Requirements :*** Includes any additional requirements not covered elsewhere.
* ***Appendices :*** Contains a data dictionary and group log.

***For an effective reading sequence :***

1. Begin with the overview sections for a high-level understanding.
2. Developers and project managers should focus on Specific Requirements and Design sections.
3. Testers should pay attention to Functional Requirements and Use Case Model.
4. Marketing staff may find value in understanding the Product Overview and Functional Requirements.
5. Users and the client might be interested in the Product Overview, Specific Requirements, and any safety/security considerations.
6. The professor may review the entire document for completeness and accuracy.

## Definitions, Acronyms and Abbreviations

**Definitions :**

1. **Streamline Service Selection :** Efficiently optimizing the process of choosing services.
2. **Location Proximity :** Selecting services based on their proximity to a specific location.
3. **Document :** A structured requirements specification capturing textual requirements for a given product or service.

**Acronyms and Abbreviations :**

1. **PG :** Paying Guest
2. **API :** Application Programming Interface
3. **ID :** Identifier
4. **GUI :** Graphical User Interface
5. **HTML :** Hypertext Markup Language
6. **SRS :** Software Requirements Specification

## Document Conventions

Document Templates: Establish standardized templates for different types of project documentation, such as project plans, requirements documents, design documents, test plans, and user manuals.

Naming Conventions: Define consistent naming conventions for files and documents to ensure easy identification and organization. For example, prefixing document names with the project acronym or type of document (e.g., TT\_ProjectPlan\_v1.0.docx).

Formatting Guidelines: Specify formatting guidelines for fonts, colors, headings, subheadings, bullet points, numbering, margins, and page layouts to maintain uniformity across all documents.

Version Control: Implement version control practices to track document revisions and updates. Clearly indicate the version number, date of creation, and authorship on each document.

Document Structure: Define a standard structure for each type of document, including sections, subsections, and their order. For instance, a project plan might include sections for introduction, project objectives, scope, schedule, budget, risks, and stakeholders.

Language and Terminology: Establish rules for language usage and terminology to ensure clarity and consistency in communication. Provide definitions for industry-specific terms and acronyms.

Review and Approval Process: Outline the process for document review, revision, and approval, including roles and responsibilities of team members involved in each stage. Specify how feedback should be addressed and incorporated.

Document Storage and Access: Determine a centralized location for storing project documents, such as a shared drive or a project management tool. Define access permissions and folder structures to facilitate easy retrieval and collaboration.

References and Citations: Specify guidelines for referencing external sources, such as industry standards, regulations, or best practices. Ensure that proper citations are included where necessary.

Accessibility and Usability: Consider accessibility requirements to ensure that documents are usable by individuals with disabilities. This may involve providing alternative formats or assistive technologies

## References and Acknowledgments

1. Smartlaundry: A real-time system for public laundry allocation in smart cities 2024.
2. Development of a web application to track the food quality and service in the hostel mess. IEEE, 2023.
3. Development of a mobile-based hostel location and recommendation chat bot system. Int. J. Inf. Technol. Comput. Sci.
4. Fredrick Simpeh and Winston Shakantu. On-campus university student housing facility services prioritisation framework.
5. Singh Shipra, Paul Virginia, and Srivastava Pratistha. Nutritional adequacy and dietary diversity of food serve in hostel mess-around of university campus.
6. Tabitha L Bailey and Abbie Brown. Online student services: Current practices and recommendations for implementation.

# Overall Description

## Product Overview

In the context of this SRS, Assist U: Recommendation Service for students is a new, self-contained product designed to address the challenge of students finding reliable and suitable services such as mess facilities, hospitals, PG accommodations, and laundry centers. It is not a replacement for existing systems but rather an innovative solution to streamline service selection for students. Assist U aggregates user ratings and feedback to dynamically recommend top-rated options in a given area, enhancing user experience and convenience.

Below is a simple diagram illustrating the major components of the Assist U system and its interaction with the environment:







1. User Interface: This component represents the interface through which users interact with the Assist U platform, providing inputs such as location, preferences, and feedback.
2. Assist U Platform: The core of the system, where data processing and recommendation algorithms are implemented. It receives user inputs, retrieves relevant data from the database, and generates personalized recommendations.
3. Database: Stores information about service providers, user ratings, feedback, and other relevant data necessary for the functioning of the Assist U platform.

## Product Functionality

* Recommend mess facilities, hospitals, PG accommodations, and laundry centers based on user preferences and location.
* Aggregate user ratings and feedback to dynamically adjust recommendations.
* Provide a user-friendly interface for users to input their preferences and view recommendations.
* Store and manage data about service providers, user ratings, feedback, and user preferences.
* Update recommendations in real-time based on changes in user feedback and service quality.
* Ensure the security and privacy of user data.
* Allow users to provide feedback on recommended services to improve future recommendations.
* Support scalability to accommodate a growing user base and expanding service database.

## Design and Implementation Constraints

* **User Interface Development**:

Design Constraint: Ensure the interface is intuitive and user-friendly, catering to a diverse user base including those with disabilities.

Implementation Constraint: Use responsive design principles to ensure the interface works well across various screen sizes and devices.

* **Backend Infrastructure Setup:**

Design Constraint: Plan for scalability to handle potential increases in user traffic and data volume over time.

Implementation Constraint: Choose reliable and scalable technologies for data storage and processing, such as cloud-based solutions like AWS or Google Cloud.

* **Database Management:**

Design Constraint: Implement data encryption and access control mechanisms to ensure the security and privacy of user data.

Implementation Constraint: Use efficient indexing and query optimization techniques to improve database performance, especially when dealing with large datasets.

* **Machine Learning Integration:**

Design Constraint: Select machine learning algorithms that are suitable for the type of data available and the recommendation task.

Implementation Constraint: Train and deploy machine learning models using frameworks like TensorFlow or PyTorch, considering resource constraints such as memory and processing power.

* **User Feedback Mechanism:**

Design Constraint: Design the feedback mechanisms to be unobtrusive yet easily accessible to users.

Implementation Constraint: Develop algorithms to analyze and incorporate user feedback effectively without compromising system performance.

## Assumptions and Dependencies

***Assumptions :***

1. Availability of User Ratings : It is assumed that sufficient user ratings and feedback will be available for the recommended services to generate accurate recommendations. If user engagement is low or feedback is unreliable, the effectiveness of the recommendation algorithm may be compromised.
2. Internet Connectivity: The platform assumes that users will have access to stable internet connectivity to interact with the system. Lack of internet connectivity may hinder users' ability to access recommendations and provide feedback.
3. Service Provider Data Accuracy: The platform relies on accurate and up-to-date information about service providers, such as mess facilities, hospitals, PG accommodations, and laundry centers. Assumption is made that the data obtained from external sources or user submissions is reliable and trustworthy.

***Dependencies :***

1. External APIs: The platform may depend on third-party APIs to fetch data such as location information, user reviews, and service provider details. Any changes or disruptions to these APIs could impact the functionality of the platform.
2. Database Management System: The platform depends on a reliable and scalable database management system (DBMS) to store and manage user data, service provider information, and user feedback. Any issues with the DBMS could affect data retrieval, storage, and processing capabilities.

# Specific Requirements

## External Interface Requirements

### User Interfaces

Since the Assist U project focuses on web-based recommendations for students, the main user interface will be a web application accessible via browsers on various devices. Here's a basic description of the user interface:

Web Interface : The user interface consists of a web page accessible through standard web browsers on desktops, laptops, tablets, and smartphones. Users interact with the platform by accessing the website and navigating through its features using a graphical user interface (GUI).

Homepage : Upon accessing the website, users are greeted with a homepage that provides an overview of the services offered by Assist U and prompts them to input their location and preferences to receive personalized recommendations.

Search and Filter Options : Users can input their location and preferences through a search bar and filter options provided on the homepage. They can specify criteria such as service type (mess, hospital, PG, laundry), location proximity, ratings, and other preferences.

Recommendation Display : After submitting their preferences, users are presented with a list of recommended service providers based on their input and user ratings. Each recommendation includes essential information such as service name, location, ratings, and contact details.

Navigation Menu : A navigation menu is available throughout the interface, allowing users to easily access different sections of the website, such as About Us, Contact, and Feedback.

Feedback Mechanism : Users have the option to provide feedback on recommended services, either through a rating system, reviews, or comments. This feedback mechanism helps improve future recommendations and enhances user engagement.

### Hardware Interfaces

Since the Assist U project is primarily a web-based recommendation service, it does not have direct hardware interfaces in the traditional sense. However, it relies on hardware components indirectly through the devices that users utilize to access the platform.

Supported Device Types: The platform is accessible through various device types, including desktop computers, laptops, tablets, and smartphones.

Web Browser Compatibility: The platform is compatible with popular web browsers such as Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge.

Screen Resolution: The user interface is designed to adapt to different screen sizes and resolutions, ensuring optimal viewing and usability across devices.

Input Methods: Users interact with the platform using standard input methods such as keyboards, mice, touchscreens, and touchpads.

### Software Interfaces

Since the Assist U platform primarily operates as a web-based service, its main software interface involves communication with a companion mobile application that enables users to send commands and interact with the platform remotely. Here's a description of the software interface between the Assist U platform and the mobile app:

Software Interface :

1. Mobile Application: The mobile application serves as a client interface for users to access the Assist U platform on their smartphones or tablets.
2. Communication Protocol: The mobile app communicates with the platform's backend servers using standard internet protocols such as HTTP or HTTPS.
3. User Authentication: The mobile app provides user authentication functionality, allowing users to securely log in to their accounts and access personalized features and recommendations.
4. Command Transmission: Users can send commands and input preferences through the mobile app, which are then transmitted to the platform's servers for processing.
5. Data Synchronization: The mobile app synchronizes user data, preferences, and feedback with the platform's servers to ensure consistency across devices and platforms.
6. Push Notifications: The mobile app may receive push notifications from the platform to alert users of new recommendations, updates, or important notifications.
7. Compatibility: The mobile app is compatible with major mobile operating systems such as iOS and Android, ensuring broad accessibility for users.

## Functional Requirements

**3.2.1 F1: User Registration and Authentication**

The system shall allow users to register for an account by providing necessary information such as name, email address, and password.

The system shall authenticate users during the login process to ensure secure access to their accounts.

**3.2.2 F2: Location-based Service Recommendations**

The system shall use the user's location information to recommend nearby service providers such as mess facilities, hospitals, PG accommodations, and laundry centers.

The system shall employ algorithms to prioritize and recommend service providers based on proximity to the user's location.

**3.2.3 F3: User Preferences and Customization**

The system shall allow users to specify their preferences and customize their recommendations based on factors such as service type, ratings, price range, and amenities.

The system shall provide options for users to save their preferences for future reference and personalized recommendations.

**3.2.4 F4: Dynamic Recommendation Updates**

The system shall dynamically update recommendations based on user feedback and changes in service provider ratings and availability.

The system shall employ machine learning algorithms to analyze user feedback and adjust recommendations to improve accuracy and relevance over time.

**3.2.5 F5: Service Provider Information Display**

The system shall display detailed information about recommended service providers, including name, address, contact details, services offered, operating hours, ratings, and reviews.

The system shall provide users with the option to view photos, menus, and other relevant information to aid in their decision-making process.

**3.2.6 F6: User Feedback Mechanism**

The system shall allow users to provide feedback on recommended service providers through ratings, reviews, comments, and suggestions.

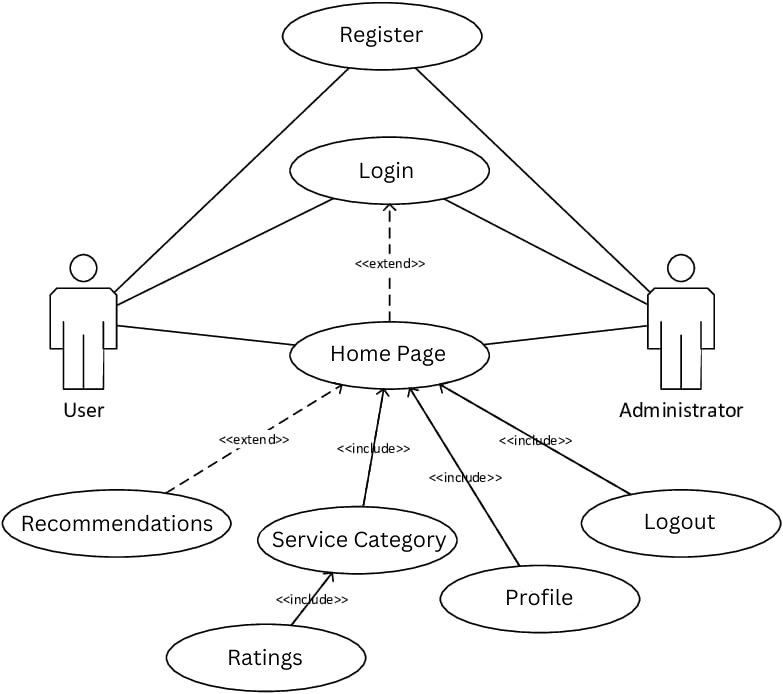
The system shall aggregate and analyze user feedback to improve recommendations and enhance the overall user experience.

**3.2.7 F7: Search and Filter Functionality**

The system shall provide users with search and filter options to refine their service provider recommendations based on specific criteria such as service type, location, ratings, and price range.

The system shall enable users to sort and prioritize search results according to their preferences.

## Use Case Model



### Use Case #1 (Use Case name and Unique Identifier – e.g. U1)

Identifier: U1

Author: Mayuri Nikade

Purpose: This use case allows a new user to register an account on the Assist U platform, enabling them to access personalized recommendations and services.

Requirements Traceability: Traced to the functional requirement F1: The system shall allow users to create accounts.

Priority: High

Preconditions: The user must have access to a device with an internet connection.

Postconditions: After successful registration, the user's account is created, and they can log in to access the platform.

Actors: User

Flow of Events:

Basic Flow:

User accesses the registration page.

User enters personal details.

System validates the information.

Account is created upon successful validation.

Alternative Flow:

If the email address is already registered, user is prompted to log in.

Exceptions:

Invalid information prompts error messages.

Notes/Issues: CAPTCHA should be implemented for security.

### Use Case #2

Identifier: U2

Author: Sujal Gosavi

Purpose: The system recommends services to a user based on their preferences, location, and feedback.

Requirements Traceability: Traced to F2: The system shall provide personalized recommendations to users.

Priority: High

Preconditions: User must be logged in to the platform.

Postconditions: User receives recommendations and can select a service.

Actors: User, Recommendation System

Flow of Events:

Basic Flow:

System retrieves user data.

Recommendation system analyzes data.

Personalized recommendations are generated.

Recommendations are presented to user.

User selects a service.

Alternative Flow:

If location data is unavailable, user is prompted to enter manually.

Exceptions:

If no recommendations are available, user is notified.

Notes/Issues: Recommendation algorithm should be periodically updated.

# Other Non-functional Requirements

## Performance Requirements

Performance requirements ensure that the system operates efficiently and effectively under various conditions. These requirements specify the speed, responsiveness, and resource utilization expectations of the software. Here are some performance requirements for the Assist U platform:

***P1 :*** The platform shall respond to user actions (e.g., search queries, feedback submission) within 2 seconds under normal load conditions to ensure a seamless user experience.

***P2 :*** The platform shall support concurrent user sessions without performance degradation. It should handle at least 100 simultaneous user interactions without exceeding a CPU utilization rate of 70%.

***P3 :*** The database query response time shall not exceed 500 milliseconds for retrieving service provider information based on user search criteria, such as location and service type.

***P4 :*** The platform's login/authentication process shall complete within 1 second, ensuring quick access for users while maintaining security standards.

***P5 :*** The system shall be capable of handling a sudden increase in user activity, such as during peak hours, without experiencing significant slowdowns or downtime. It should scale dynamically to accommodate up to 500 concurrent users.

## Safety and Security Requirements

Safety and security requirements are crucial for ensuring the protection of users' data and preventing potential harm or misuse of the product.

***S1:*** *Data Privacy* - The platform shall comply with data protection regulations such as GDPR (General Data Protection Regulation) to ensure the privacy and security of users' personal information. This includes implementing measures such as encryption, access controls, and data anonymization.

***S2 :*** *Secure Authentication* - The platform shall use secure authentication mechanisms, such as password hashing and salting, to protect user accounts from unauthorized access. Additionally, it should support multi-factor authentication for added security.

***S3 :*** *Secure Communication* - All communication between the platform and users' devices, including the mobile app, shall be encrypted using industry-standard protocols (e.g., HTTPS) to prevent interception and unauthorized access to sensitive information.

***S4 :*** *User Identity Verification* - The platform shall implement user identity verification measures, such as email or phone number verification, to ensure the authenticity of user accounts and prevent fraudulent activities.

***S5 :*** *Secure Payment Processing* - If the platform supports payment transactions, it shall adhere to PCI DSS (Payment Card Industry Data Security Standard) requirements to securely process and store payment card information, minimizing the risk of data breaches.

## Software Quality Attributes

***4.3.1 Reliability :***

**R1 :** The platform shall have a system uptime of at least 99.9% to ensure continuous availability of services to users.

**R2 :** The system shall be resilient to server failures or network outages, with automatic failover mechanisms in place to minimize service disruptions.

***4.3.2 Usability :***

***U1 :*** The platform's user interface shall be intuitive and easy to navigate, with clear labeling and minimal cognitive load for users.

***U2 :*** The system shall provide contextual help and guidance to users when performing complex tasks or encountering errors.

***4.3.3 Maintainability :***

**M1 :** The platform shall adhere to coding best practices and design patterns to facilitate code readability, maintainability, and scalability.

**M2 :** The system architecture shall be modular, allowing for easy updates and enhancements to individual components without affecting the entire system.

***4.3.4 Testability :***

**T1 :** The platform shall have comprehensive automated test suites covering unit tests, integration tests, and end-to-end tests to ensure code quality and prevent regressions.

**T2 :** The system shall support continuous integration and deployment pipelines, enabling frequent testing and validation of new features and updates.

# Other Requirements

***5.1 Database Requirements :***

**D1 :** The platform shall utilize a relational database management system (RDBMS) to store user data, service information, and ratings.

**D2 :** The database schema shall be designed to efficiently handle large volumes of data and support fast retrieval of information for recommendations.

**D3 :** The system shall implement appropriate data encryption techniques to ensure the security and privacy of user data stored in the database.

**5.2 Legal Requirements :**

**L1 :** The platform shall comply with relevant data protection regulations, such as GDPR (General Data Protection Regulation) and CCPA (California Consumer Privacy Act), ensuring the lawful processing and handling of user data.

**L2 :** The system shall incorporate mechanisms for users to consent to the collection and processing of their personal information, with clear privacy policies and terms of service agreements presented during account registration.

**L3 :** The platform shall maintain audit logs and records of user consent to demonstrate compliance with legal requirements and facilitate regulatory audits if necessary.

**Appendix A – Data Dictionary**

Data Dictionary:

| **Variable/**  **State** | **Description** | **Possible**  **States** | **Operations** | **Requirements** |
| --- | --- | --- | --- | --- |
| User | Represents a user of the Assist U platform | - | Create, Read,  Update, Delete | F1, F2, F3, F4 |
| Service Provider | Represents a provider of services such as mess facilities, hospitals, PG accommodations, and laundry centers. | - | Create, Read,  Update, Delete | F1, F2, F3, F4 |
| Rating | Represents the rating given by users to service providers | Star rating | Rate | F6, F7 |
| Review | Represents the feedback provided by users on their experience with service providers. | Text | Add, Edit,  Delete | F6 |
| Location | Represents the geographical location of service providers | Text | Search , Filter | F7 |
| Price  Range | Represents the price range of services offered by service providers. | Numeric Value | Search , Filter | F7 |
| User  Preferances | Represents the preferences specified by users for service selection. | Various  (location, etc) | Set , Update | F7 |
| Search  Result | Represents the list of service providers matching user criteria. | List of Providers | Display | F7 |
| Feedback  History | Represents the history of feedback provided by users on service providers. | List of Reviews | View | F6 |
| Service Availibility | Represents the availability of services offered by service providers. | Boolean (True/False) | Check | F7 |
| User Authentication | Represents the process of authenticating users accessing the platform. | - | Authenticate | F5 |
| Database | Represents the storage system for user data, service provider information, and feedback. | - | Store , Review | F1, F2, F3, F4, F5, F6, F7 |

**Appendix B - Group Log**

Meeting Date: April 1, 2024

Attendees: Sujal, Kajal, Mayuri, Asim

Agenda: Project kickoff and initial brainstorming

Minutes:

Discussed project ideas and settled on Assist U: Recommendation Service for Students.

Brainstormed potential features and functionalities.

Assigned roles and responsibilities to team members.

Meeting Date: April 3, 2024

Agenda: Problem identification and requirement gathering

Minutes:

Identified key problems faced by students regarding finding essential services.

Conducted research to gather requirements for the platform.

Generated three problem statements and evaluated their feasibility.

Meeting Date: April 5, 2024

Agenda: Technology selection and prototype design

Minutes:

Researched existing solutions and patents related to recommendation services.

Selected a technology stack for the platform development.

Designed a prototype user interface for the Assist U platform.

Meeting Date: April 8, 2024

Agenda: Implementation planning and testing strategy

Minutes:

Planned the implementation phase, dividing tasks among team members.

Discussed testing methodologies and strategies for quality assurance.

Reviewed the project timeline and set milestones for completion.

Meeting Date: April 12, 2024

Agenda: Final documentation and project completion

Minutes:

Completed the Software Requirement Specification (SRS) document.

Conducted a final review of the document for accuracy and completeness.

Submitted the SRS document along with relevant appendices.