Project Design Phase-I
Solution Architecture

Date	19 November 2023
Team ID	Team-592784
Project Name	Project - RESTAURANT RECOMMENDATION SYSTEM
Maximum Marks	4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

1. Business Problem and Tech Solution:

Problem:

- Users want efficient and personalized restaurant recommendations beyond their immediate social circles.

Solution:

- A Restaurant Recommendation System utilizing machine learning algorithms for personalized suggestions.

2. Structure, Characteristics, and Behavior:

Structure:

1. **User Interface (UI):**
    - Responsive and intuitive design for user interaction.

2. **Application Layer:**
    - Implements business logic and core functionalities.
    - Manages user requests, communication with the database, and external services.

3. **Database:**
    - Stores user profiles, restaurant data, and preferences.
    - Provides efficient data retrieval for recommendation generation.

4. **Recommendation Engine:**

   - Utilizes machine learning algorithms for personalized restaurant suggestions.

5. **APIs:**

   - Facilitates communication between components.

6. **Authentication and Authorization:**

   - Ensures secure user access.

7. **External Services Integration:**

   - Integrates with external services for additional data (reviews, ratings).

8. **Caching Mechanism:**

   - Improves performance by caching frequently accessed data.

9. **Logging and Monitoring:**

   - Monitors system health, logs events for debugging.

Characteristics:

- Scalable, secure, and efficient in processing and retrieving data.
- Adaptable to changing user preferences and business requirements.

Behavior:

- Responsive UI for user interaction.
- Real-time recommendation generation based on user input.
- Continuous learning from user feedback to enhance future recommendations.

3. Features, Development Phases, and Solution Requirements:

Features:

1. **User Registration and Authentication:**

   - Secure user registration and login functionality.

2. **User Profile Management:**

   - Allows users to manage their preferences and provide feedback.

3. **Restaurant Recommendation Generation:**

   - Utilizes machine learning algorithms for personalized suggestions.

4. **External Services Integration:**

   - Retrieves and integrates data from external review platforms.

5. **User Feedback Loop:**

   - Allows users to provide feedback on recommended restaurants.

Development Phases:

1. **Phase 1 - MVP (Minimum Viable Product):**

- User registration, login, and basic recommendation functionality.

2. **Phase 2 - Enhanced Features:**

   - User profile management, external services integration, and improved recommendation algorithms.

3. **Phase 3 - Optimization and Scaling:**

   - Database optimization, caching mechanisms, and scalability improvements.

Solution Requirements:

- Mobile responsiveness for widespread accessibility.

- Integration with popular external review platforms.

- Continuous improvement of recommendation algorithms based on user feedback.

4. Specifications for Solution Management and Delivery:

1. **Agile Development:**

   - Adopt an agile development methodology for iterative releases and quick adaptation to changing requirements.

2. **Continuous Integration/Continuous Deployment (CI/CD):**

   - Implement CI/CD pipelines for automated testing, deployment, and rapid delivery.

3. **User Training and Support:**

   - Provide user training resources and support for efficient onboarding.

4. **Security Measures:**

   - Regularly update security protocols to address emerging threats.

5. **Scalability Plan:**

   - Outline a scalability plan for future growth and increased user demand.

6. **Documentation:**

   - Maintain comprehensive documentation for stakeholders and future development teams.

Solution Architecture Diagram: