SOFTWARE ENGINEERING- I CS2223 ,fall 2023

Group Project

Presented By:

Wajahat Ali Raja (BCS203052).

Maira Alam (BCS221026).

Malaika Mehmood Abbasi (BCS221084).

Afaf Liaqat (BCS221091).

Submitted To:

Ma’am Asia Shahab

Topic:

AUGMENTED REALITY FOOD ADVENTURE GAME

Section no:

1

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Introduction:

The goal of the proposed software development project is to produce a thrilling augmented reality (AR) game that perfectly combines the virtual and physical worlds to provide users a lifelike experience. This project's main goal is to give users the impression that they are travelling around the world, experiencing other cultures, and enjoying a wide range of cuisines—all through the use of augmented reality. Our goal is to offer customers an engaging, educational, and enjoyable experience by replicating the feeling of consuming food from different parts of the world.

Functional Requirements:-

- **Realistic Virtual World:**
  Create a visually attractive and captivating virtual environment that replicates actual places and cultures.
- **Food Interaction:**
  Allow users to engage with and eat food products in a virtual environment, duplicating the experience of dining in the real world.
- **Multi-Cuisine Options:**
  Provide a variety of cuisines and dishes from around the world, along with background information on the respective cultures.
- **Realistic and Sensory Experience:**
  Make an effort to replicate the flavour, texture, and scent of food as well as other sensory components of eating.
- **Multiplayer and Social Features:**
  Enable users to take part in virtual dining journeys and share their experiences with others.
- **Virtual Commerce System:**
  Users can engage in virtual commercial activities within the augmented reality game, allowing them to buy and sell virtual products via a user-friendly marketplace.

Non-Functional Requirements:-

- **Smooth AR Integration:**
  Reduce delay and errors by making sure that virtual items blend in perfectly with the physical world.

- **Scalability:**

  The system must be able to handle an expanding user population and content collection.

- **Privacy and Security:**

  Preserve user information and confidentiality while ensuring safe online transactions.

- **Multi-Platform Compatibility:**

  Make sure it works with a variety of augmented reality gadgets, including tablets, smartphones, and AR glasses.

System Requirements:

- **A Vibrant and Realistic Virtual World:**

  Provide a visually appealing virtual environment that faithfully imitates real-world locations and cultures by implementing high-fidelity 3D graphics.

- **Food-Related Events:**

  Provide user-friendly interfaces that enable realistic food consumption and interaction, including selection, inspection, and eating.

- **Various Cuisines:**

  Create a user-friendly database with a variety of dishes from across the world and background data to facilitate exploration. This is a system need.

- **Incredibly lifelike and perceptual:**

  Make use of cutting-edge technology to create a multisensory experience that employs haptic, visual, and aural input to replicate the flavour, texture, and aroma of virtual food.

- **Smooth AR Integration:**

  Optimize AR integration for seamless blending of virtual items with the physical world, minimizing delays and inaccuracies.

- **Privacy Functionality:**

  Incorporate strong security mechanisms to safeguard user privacy, protect personal information, and enable safe online transactions within the virtual dining platform.

User Requirements:

- **Immersive Visual Experience:**

  Players anticipate a visually spectacular virtual environment that perfectly imitates locations and cultures from the real world, offering a fascinating and immersive experience.

- **Interactive Food Consumption:**

  By allowing users to interact with virtual food products, dining experiences should be replicated, particularly to the acts of selecting, examining, and eating food.

- **Diverse Culinary Options:**

  Users want access to a broad variety of culinary specialties and dishes from many nations, each complemented by educational materials that deepen their awareness and appreciation of these many culinary traditions.

- **Sensory Replication:**

  To provide a multi-sensory experience that closely resembles the feelings of eating in the real world, the system must realistically duplicate the flavour, texture, and aroma of virtual food.

- **Privacy-Aware User Interface:**

  Users require assurance that the virtual dining platform will protect their personal information and that online transactions will be safe. Data confidentiality and user privacy should be given top priority by the system.

- **Cross-Platform Harmoniousness:**

  To provide a consistent and pleasurable experience across platforms, users desire the freedom to access the virtual dining experience on a variety of augmented reality devices, such as tablets, smartphones, and AR glasses.

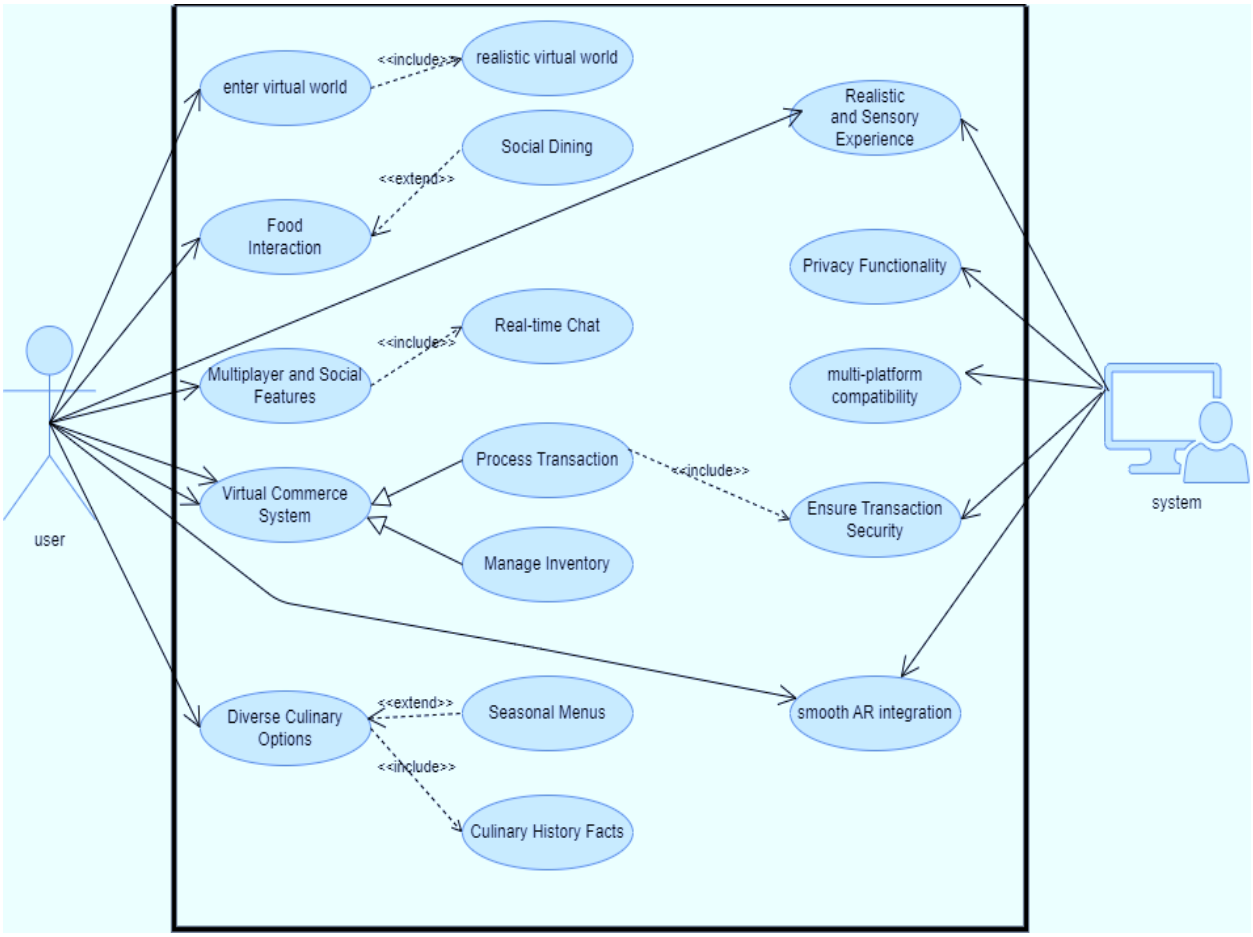
The user requirements were developed through group research and discussions. The team studied existing systems, imagined user situations, and considered preferences. This collaborative process ensured a thorough set of expectations that reflected the group's collective ideas and preferences for the virtual dining system.

Implementation Plan:

To ensure that our AR food adventure game works effectively on a variety of devices, we used C++ along with appropriate development tools. We divide the project into tasks, prioritize them, and track progress on a daily basis using the Scrum Agile approach. This strategy, combined with comprehensive testing and modern technology, enables us to detect and correct problems as

they arise. We utilize The Scrum methodology to adapt to user feedback and changing requirements, with the goal of delivering a high-quality, flexible game that constantly improves to match customer demands.

USECASE DIAGRAM:



FULLY DRESSED USECASE DIAGRAM:

1.

Name:	Privacy Functionality
Short Description:	This use case describes how to protect user privacy and provide secure online transactions on the virtual dining platform.
Precondition:	• The user has logged into the virtual dining platform with the intent of conducting online purchases or sharing personal information.
Post condition:	• Personal information is securely saved for users, and online transactions are done without threatening privacy.
Error Situations:	• User authentication fails. • Online transaction processing fails.
System Response:	• Display error messages for authentication failures. • Provide error notifications for unsuccessful online transactions.
Actors:	User , System
Trigger:	User initiates an action requiring the input of personal information or involves online transactions within the virtual dining platform.
Standard Process:	The system validates login credentials, encrypts user data securely with advanced algorithms, and processes online transactions while issuing error notifications for any issues encountered.
Alternative Processes:	Currency is earned by the user through in-game activities. For a just environment, the system provides reporting and moderation options for content concerns.

2.

Name:	Smooth AR Integration
Short Description:	The system ensures that virtual items mix seamlessly with the physical world, reducing delays and inaccuracies in augmented reality interactions.
Precondition:	• The user has an augmented reality device that is compatible. • The system is turned on and correctly configured.
Post condition:	• Virtual items are smoothly blended into the physical environment of the user. • The augmented reality interface responds quickly to human interactions.
Error Situations:	• If the user's AR device is not compatible or unavailable, the system notifies the user and recommends compatible devices.
System Response:	• When AR integration is successful, the system effortlessly displays virtual products.

Actors:	User , System
Trigger:	The user activates the AR feature within the virtual dining application.
Standard Process:	Upon user activation, the system initializes AR, accurately placing virtual items in real-time within the physical environment, facilitating seamless user interaction and a captivating augmented reality experience.
Alternative Processes:	The system ensures seamless AR integration, tracking the environment for accurate virtual item placement. It responds promptly to user interactions, presenting a captivating experience. Error handling guides issue resolution.

3.

Name:	Realistic and Sensory Experience
Short Description:	This use case involves providing users a multi-sensory experience within the virtual eating environment, with the goal of replicating the flavour, texture, and aroma of virtual food.
Precondition:	• The user is logged into the virtual dining system, and the AR device is properly connected and functional.
Post condition:	• The user experiences a realistic and immersive sensory encounter with virtual food.
Error Situations:	• If the AR device is not connected or malfunctions, the system prompts the user to reconnect the device. • If technological issues prevent realistic simulation of flavour, texture, or aroma, the system notifies the user and reports the incident for further research.
System Response:	• After the system runs successfully, it uses modern technology to mimic its desired sensory experiences, including sensation, visual, and audio feedback.
Actors:	User , System
Trigger:	The user selects a virtual food item and initiates the interaction to explore its sensory attributes.
Standard Process:	When a user selects a virtual food item, real-time flavour, texture, and aroma replication is enabled through sensory technologies. Feedback from the system verifies that the simulation was successful in creating an immersive experience.
Alternative Processes:	Users can adjust sensory experiences in real-time based on feedback. Customization options provide personalized dining encounters, enhancing user satisfaction and immersion within the virtual environment.

4.

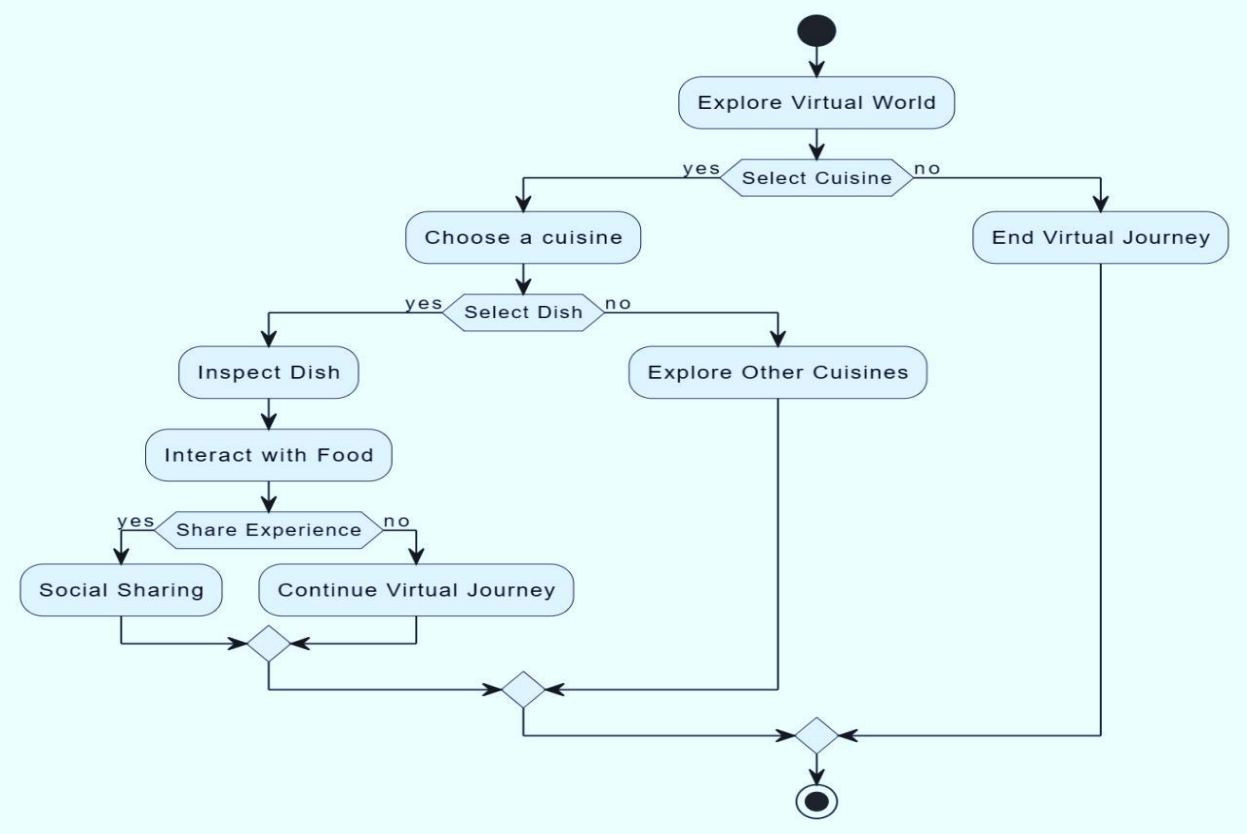
Name:	Diverse Culinary Options
Short Description:	Users explore diverse global cuisines, dishes, and background information within the virtual dining platform.
Precondition:	• User is logged into the virtual dining platform. • System is operational and connected to the internet.
Post condition:	• User successfully explores culinary options. • Selected culinary information is stored in the user's profile.
Error Situations:	• Loss of internet connection prompts a user to check their connection. • User must be logged in to access culinary options.
System Response:	• The selected cuisine's dishes, ingredients, and cultural history are all displayed in detail by the system. Exploration history and user preferences are updated.
Actors:	User
Trigger:	User selects "Explore Cuisines" from the main menu.
Standard Process:	User-friendly interface displays cuisines. User selects, system retrieves details. Navigation through cuisines or return to the main menu, ensuring a streamlined exploration experience.
Alternative Processes:	System returns to the main menu. System prompts reconnect, addressing internet issues and maintaining access to the virtual dining platform for uninterrupted exploration.

5.

Name:	Virtual Commerce System
Short Description:	This use case details the process of engaging in virtual commerce activities within the augmented reality game, allowing users to buy and sell virtual items through a user-friendly marketplace.
Precondition:	• The user has successfully logged into the augmented reality game. • The user has a stable internet connection.
Post condition:	• Transactions involving virtual commerce are carried out satisfactorily. • Purchases or sales are updated in the user's virtual inventory.
Error Situations:	• Unstable Internet Connection • Transaction Security Failure
System Response:	• Notify the user of the connectivity issue and suggest reconnecting. • Display an error message, ensuring that sensitive transaction

	information is not compromised, and prompt the user to try the transaction again.
Actors:	User
Trigger:	The user chooses to explore the virtual environment or take part in virtual trade.
Standard Process:	User accesses Virtual Commerce. Explores, buys, and sells items securely. System updates inventory and logs transactions for user reference.
Alternative Processes:	Currency is earned by the user through in-game activities. For a just environment, the system provides reporting and moderation options for content concerns.

ACTIVITY DIAGRAM:



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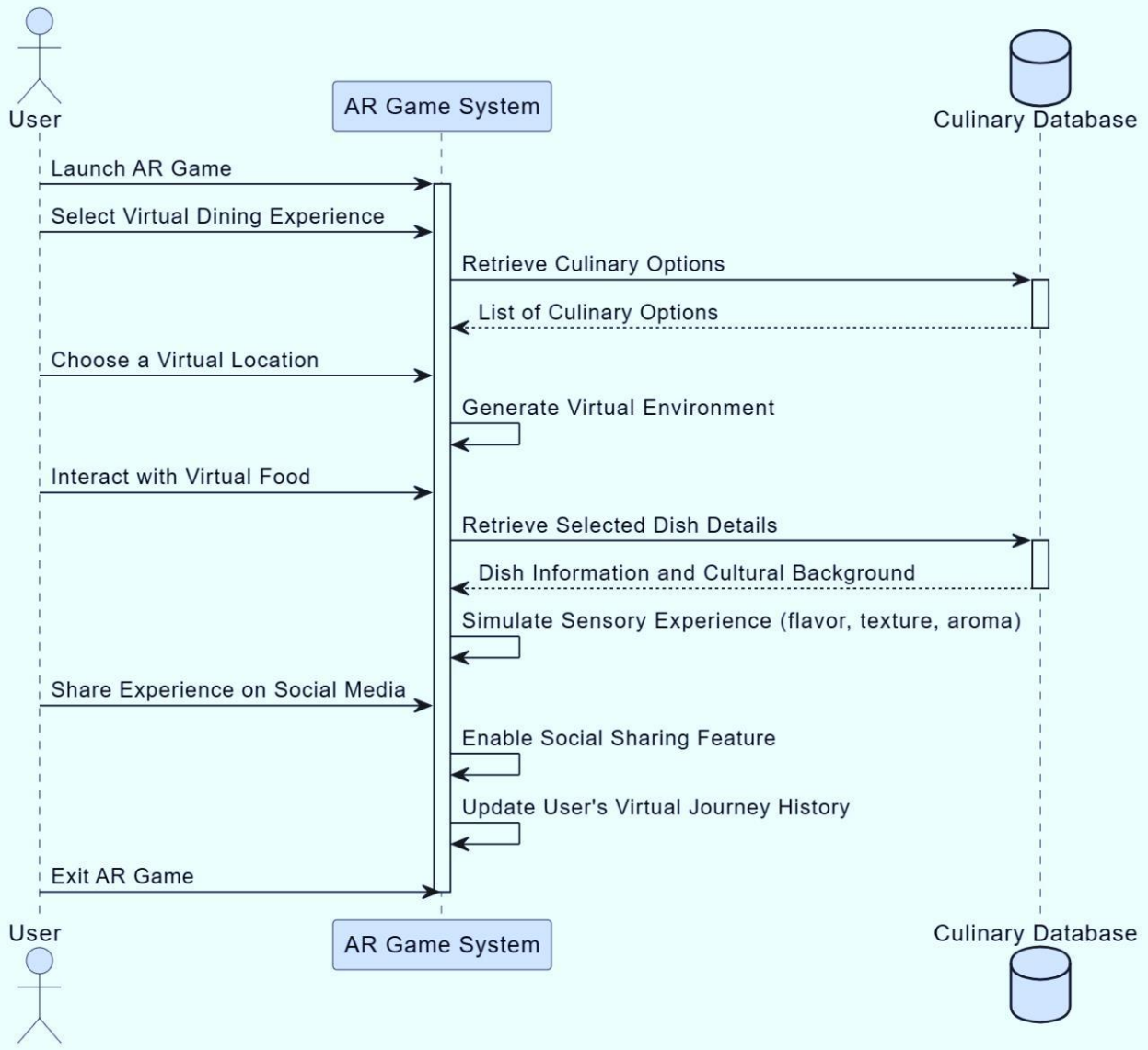
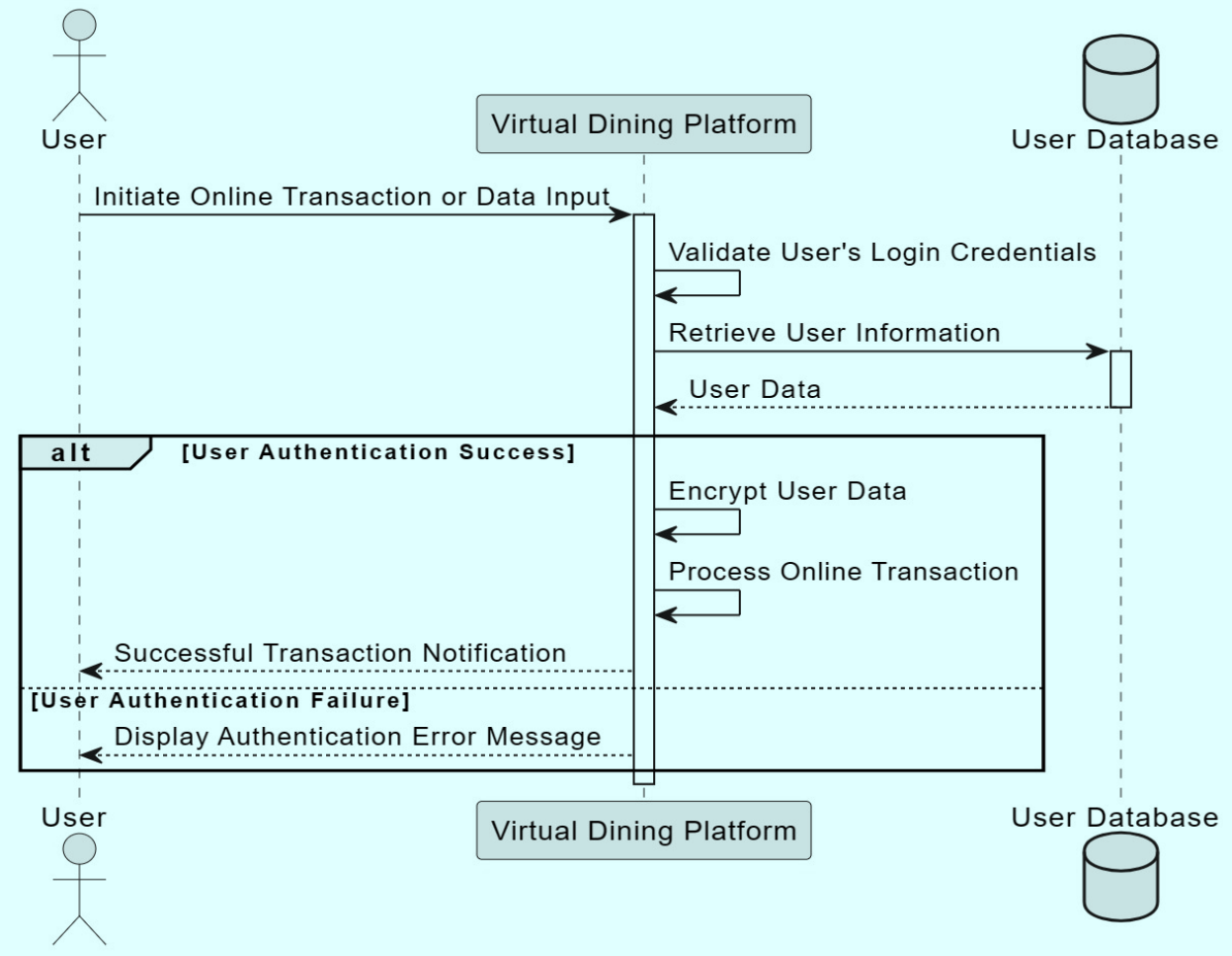
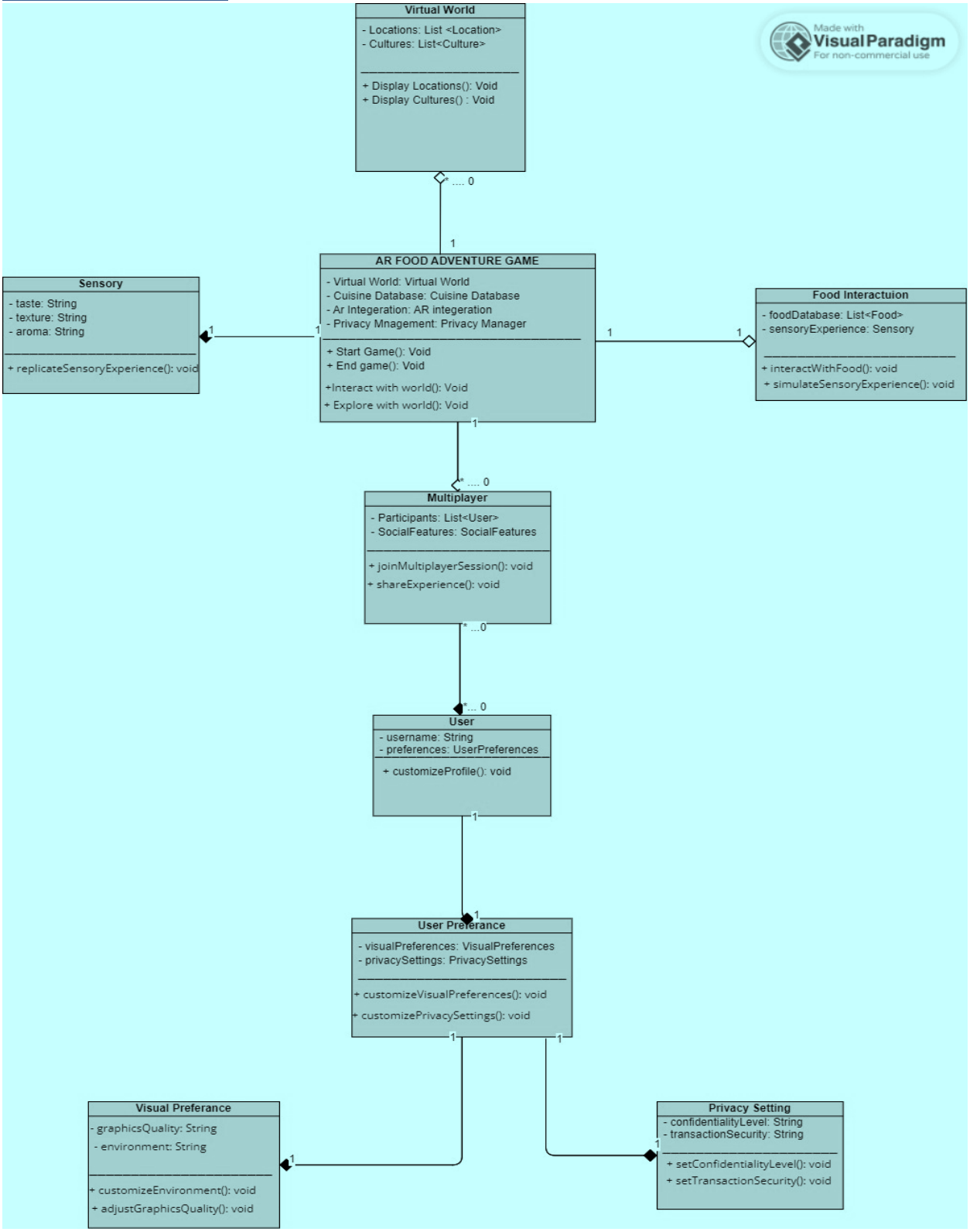


SYSTEM SEQUENCE DIAGRAM:



CLASS DIAGRAM:



DOMAIN MODEL: