M7.450 - Design of user experience and interfaces

Proposal for a diegetic interface for a virtual reality video game

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1. Game presentation

This document outlines the design and implementation process of the main menu interface for the hypothetical virtual reality game "Mystic Express." The project encompasses the conceptualization of the game, analysis of usability and accessibility requirements, detailed design of the diegetic menu interface, and its practical implementation using Unity XR. The goal is to create an immersive and user-friendly interface that enhances the overall gaming experience.

Mystic Express

The game I want to propose would consist of an investigation across various locations, using a train to travel between them. Instead of solving a murder, the player must decipher different hieroglyphs and arcane statuettes (with small Lovecraftian undertones).

The menu will take the form of a luxury cabin in one of the train cars, which would be able to be accessed with a quick-access button in the pause menu. There, the player can check the investigation's progress, exit the game, continue from where you left off, adjust settings, and more.
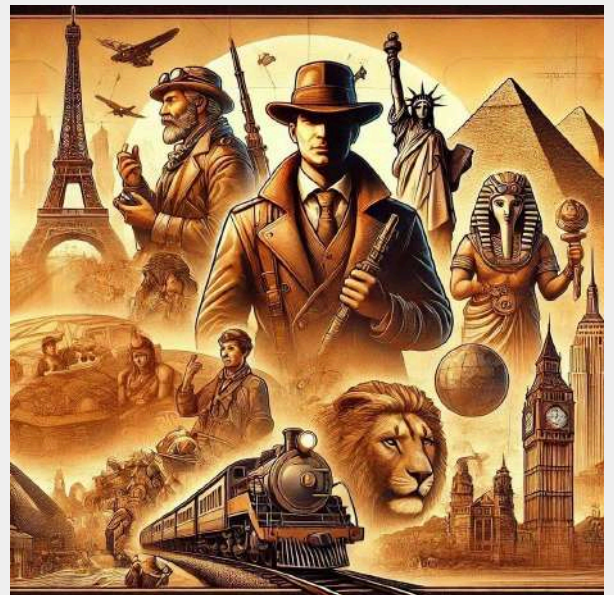
1. AI generated image with DALL-E 3 describing the cover of the game

The main inspirations for the conceptualization of this game are:

1. **Sherlock Holmes: The Awakened** (April 11, 2023), developer: Frogwares.

2. **Indiana Jones and the Great Circle** (December 9, 2024), developer: MachineGames.

3. **Call of Cthulhu: The Official Video Game** (October 30, 2018), developer: Cyanide.

4. **RailGods of Hysterra** (TBA), developer: Troglobytes Games.

5. **The Sinking City** (June 27, 2019), developer: Frogwares.

1.1. Pitch

Overview:

"Mystic Express" is a virtual reality adventure game where players embark on a journey aboard a luxurious train traveling through various enigmatic locations. Unlike traditional murder mysteries, players engage in deciphering ancient hieroglyphics and interacting with arcane statuettes reminiscent of Lovecraftian lore to uncover hidden secrets and solve intricate puzzles.

Gameplay Mechanics:

- **Exploration:** Players will go around the world with the Mystic Train visiting different locations with runes, cities, woods, etc.
- **Puzzle Solving:** Engage with hieroglyphics and arcane artifacts to unlock clues and progress in the investigation, progressively sinking into madness.
- **Interactivity:** Utilize VR controls to manipulate objects, interact with the environment, and access the main menu seamlessly.
- **Storytelling:** Unravel a deep narrative intertwined with supernatural elements, mysterious occurrences, deep characters and dangerous creatures.

Setting and Atmosphere:

The game is set in the early 20th century, aboard the "Mystic Express," a train that can traverse through mystical landscapes and hidden realms switching between realities to reach its destination. The ambiance combines elegant luxury with eerie, otherworldly aesthetics to create an immersive experience.

Visual and Audio Elements:

- **Visuals:** High-fidelity textures, detailed models of train interiors, and atmospheric lighting to enhance immersion.
- **Audio:** A haunting soundtrack complemented by ambient sounds and subtle audio cues that guide the player and amplify the mysterious atmosphere.

Player Objectives:

Players aim to uncover the truth behind the arcane phenomena occurring on the train by solving puzzles, collecting artifacts, and piecing together the overarching mystery. The journey requires both intellectual engagement and keen observational skills.

2. Main Menu design

In the next section, an analysis of usability and accessibility in VR environments has been done to address the development of the Unity XR experience. It should be noted that this is an ideal reference, but the development of the exercise will not be able to contain all the features due to time constraints.

2.1. Analysis of Usability and Accessibility Requirements in diegetic VR menus

Learnability:
- The menu should be easily accessible and navigable without requiring extensive tutorials.

- Clear labeling and straightforward layout to facilitate quick understanding.

- Make use of diegetic elements, such as a physical control panel, mimics real-world interactions, making it easier for players to understand functionality at a glance.

- Subtle visual cues (e.g., glowing buttons) and auditory feedback guide the player through available options, ensuring they quickly grasp how to navigate the menu.

- A first-use tutorial could be integrated to familiarize players with the interface, highlighting key features.

Simplicity:
- Highlighting selected options and providing subtle animations to enhance interactivity.

- Uniform design language across all menu elements to maintain coherence.

- Consistent placement of interactive elements to reduce the learning curve.

Efficiency:
- Immediate visual and auditory feedback upon user interactions to confirm actions.

- Related settings (e.g., audio, graphics) will be grouped logically to facilitate straightforward navigation.

Aesthetics:

- The menu design aligns with the luxurious yet eerie theme of Mystic Express, using a rich color palette, ambient lighting, and detailed textures that immerse players in the game's world.

- The aesthetic choices evoke a sense of mystery and intrigue, keeping players emotionally connected to the game's narrative and atmosphere even within the menu.

Accessibility:

- Ensure seamless interface functionality on devices like Meta Quest 2, Pico 4, and others supported by Unity XR with OpenXR.

- Avoid reliance on specific hardware functionalities (e.g., eye tracking) to ensure compatibility across devices.

- Enable adjustable text sizes, color contrasts, and interface scaling for players with visual impairments.

- Implement remappable controls to support different user preferences and physical abilities.

- Use legible fonts and appropriate sizes to improve readability.

- Maintain sufficient contrast between text and background elements.

- Design with diverse user needs and preferences in mind to promote inclusivity.

- Avoid color-only indicators to accommodate colorblind users.

2.2. List of diegetic and interface elements

The main menu of "Mystic Express" is integrated diegetically within the game's environment, specifically within a luxurious cabin located in one of the train's opulent carriages. This design choice ensures that the interface feels like a natural part of the game world, enhancing immersion and maintaining narrative consistency.

1. **Luxury Cabin Environment**

   a. When starting the game, the **scene** of the main menu will be loaded placing the character in the center of a luxury cabin environment.

   b. All the elements will be displayed on a table, offering easy access to the players.

   c. Players will find an **ethereal dark space** with an arcane altar, where the player will be urged to place the element of the environment they want to execute.

   d. An **exit door** will serve as the exit action for leaving the game.

2. **Interactable elements**

   a. **Old Camera:** Used to load a save game. In the hypothetical game would spawn different elements in the dark space of the altar that the players could select to load a save game or concrete checkpoint.

   b. **Binoculars:** Used to start a new game. Before starting the game, when placing it on the altar, a diegetic way of confirming the action would be displayed. For example, two energy spheres (red: cancel / green: confirm).

   c. **Clock Watch:** Will display the options menu in the dark zone. These configurations usually "breaks the fourth wall" because system requirements are asked to the player (e.g. resolution, graphics quality, etc). So it would not be a problem to display it as an extradiegetic menu. However, it could be translated to the world game as well.

   d. **Map:** Allows players to select a destination and move the train to a new location.

   e. **Diary:** Tracks story progression and summarizes the investigation's developments. This journal would contain the narrative key points and would be an object that the player carries when playing the game as well. This object could be interactable without need of putting it on the altar though, so doing this action could leave to a kind of "mental palace" that players would need to activate in order to advance the investigation and complete the story.

   f. **Luggage:** Displays a collection of mystical artifacts, which players can interact with directly.

2.2.1. User Flow and Interaction

1. **Accessing the Menu**
    a. Players start the game inside the luxury cabin, immediately immersing them in the environment that doubles as the main menu.
    b. To access different menu options, players interact with the diegetic elements (e.g., camera, clock, map) using their VR controllers.

2. **Executing Menu Commands**
    a. Interaction with the arcane altar triggers specific commands, such as confirming a menu selection or initiating a train journey.

3. **Returning options**
    a. After viewing stats or making adjustments, players can seamlessly return to their investigation by stepping back into the cabin space.

2.2.2. Justification of Diegetic Elements:

1. **Immersion Enhancement:** By embedding the menu within the game's environment, players remain fully immersed in the narrative without experiencing disruptive transitions or abstract interface screens.

2. **Narrative Consistency:** The luxury cabin setting aligns with the game's overall theme of mystery and sophistication, reinforcing the player's role as an investigator in an enigmatic world.

3. **Intuitive Interaction:** Physical representations of menu options (buttons, switches) leverage familiar real-world interactions, making the interface more intuitive and reducing the learning curve for players.

4. **Visual Cohesion:** The design elements (holographic displays, ambient lighting) are cohesive with the game's aesthetic, ensuring that the interface complements rather than detracts from the visual experience.

5. **Accessibility Integration:** The quick-access button ensures that essential functions are always within reach, catering to users who may need to manage settings or save progress without interrupting their investigative flow.

3. Implementation in Unity XR

The result of the implementation is a Unity v6 scene that would serve as a hypothetical diegetic menu for a VR adventure game.

In my case, I used Oculus Quest 2 for development, but the project includes an XR Device simulator for testing without the need for VR equipment (although it is highly recommended). The full development log is available in the **repository of the game** in GitLab: https://gitlab.com/jongompal/unity-xr-ui_ux

"Trailer" on YouTube: https://www.youtube.com/watch?v=yZirmYWWgeo
More pictures available in the appendix.

5.1. Features of the Diegetic Menu in Mystic Express

1. **Environment and Visual Design:**

   ○ A **luxurious train cabin** serves as the main menu, fully integrated into the game environment to enhance immersion.

   ○ An **ethereal dark space** with an arcane altar allows players to confirm menu selections by placing objects from the environment. Custom **unlit materials** create the illusion of a void in the dark space, avoiding light interactions for a mystical effect.

   ○ The **Skybox and background** add depth and atmosphere to the scene.

2. **Interactable Elements:** all the already mentioned in the point 2.2. The luggage case does not have the same interaction behavior because it has been decided that displaying all the objects inside it is much more immersive. This way, the collected arcane items could generate interesting narrative clues when placed in the altar.

3. **The Exit door** is an interesting element in the scene. Initially it was though for it to be an interactable element more, but using it as a physical (and diegetic) way to confirm if the player wants to leave the game was much more appealing. This way, players are not shown an extragietic confirming message because opening and crossing the door is a task that requires sufficient awareness that no extra confirmation is needed.

   My first idea was to add a UI message of confirmation when holding the knob, but this idea came to my mind and I think it was the right choice. Moreover, a mysterious narrative message is displayed to inform the player about the action, which is much more engaging and involving.

4. **Object Interaction:**

   ○ **XR Grab Interactable** functionality enables players to interact with objects using hand controllers.

   ○ **Interactor Sockets:** Allow objects to return to predefined positions after interaction. This way the crucial interactable elements can not get lost around the scene and always have a reference point where they can be found.

   ○ Custom **highlight and hover effects** on objects provide visual feedback, configured manually via scripts.

   ○ **Hinge Joints** were added to the luggage and the door for realistic opening and closing animations.

   ○ **Tooltips** dynamically appear next to objects, always oriented toward the player for better readability.

5. **Player Navigation and Accessibility:**

   ○ A **Camera Height Changer** script allows players to adjust their height using the right controller joystick (up/down). Also, standard locomotion VR controls have been implemented (continous moving with right joystick and TP rotation with the left one).

   ○ A **Return to Game** action simulates a quick return to the gameplay world by holding the secondary button on the left controller.

   ○ Visual **tutorial messages** guide players through the interactions and environment.

6. **Audio and Haptic Feedback:**

   ○ Integrated **audio feedback** enhances the user experience when interacting with objects.

   ○ Haptic feedback on controllers reinforces physical interactions, increasing immersion.

7. **Feedback and Affordance:** After a lot of trouble, a custom **highlight feedback** has been applied to all the interactable objects to display to the players what elements are grabbable.

8. **Extradiegetic UI:**

   ○ A **prefab TooltipText** displays textual descriptions of objects, assisting players in understanding their functions.

   ○ Descriptive **messages and hints** provide players with guidance, acting as in-menu tutorials.

9. **Scene Optimization:**

   ○ Updated and replaced all **textures** to fix artifacts from ambient occlusion (AO) marks caused by missing objects.

   ○ A light baking optimization would be pending for better performance and visual consistency. Also adding interactable lights would have offered more immersion, but my knowledge on the engine was not ready for such a task.

10. **Development Tools and Support:**

    ○ Custom models were created in Blender and imported into Unity, including modifications to fit the scene, such as the dark zone and the case interior.

    ○ OpenXR offers compatibility with a wide range of VR headsets because the basic controls of the game follow industry standards.

4. Appendix

Screenshots of the game:
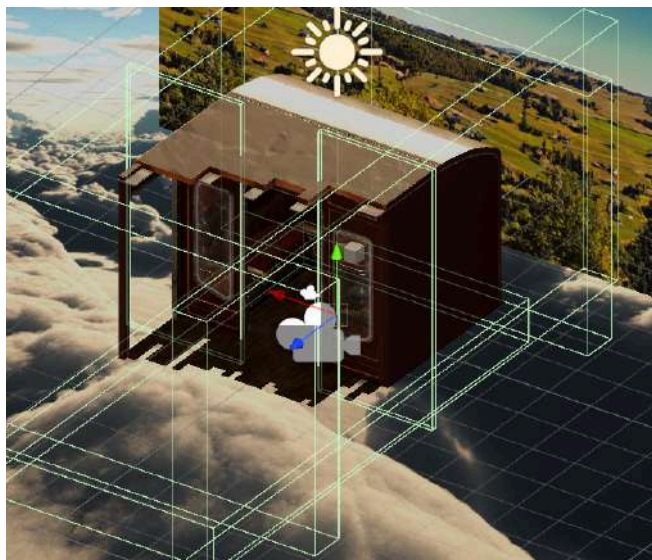
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