VR Therapy Module for Stress Management Documentation –

Project Mindful Presence VR

Project Overview

The **VR Therapy Module for Stress Management** is designed to provide an immersive and calming experience aimed at reducing stress and anxiety. It incorporates a serene environment, interactive mindfulness exercises, and mechanisms for emotional feedback. This prototype demonstrates the use of VR for mental well-being with compatibility for mainstream VR hardware.

Key Features

1. Environment Design

- **Setting**: A tranquil forest canopy with gentle light filtering through the trees, creating a serene ambiance. A writing desk is positioned in the center of the forest to evoke an abstract, reflective feel.
- **Guided Breathing Exercises**: Visual cues guide users through mindful breathing techniques using an interactive glowing orb. The orb expands and contracts in sync with the breathing cycle, providing a tactile visual aid for deep breaths.
- **Interactive Elements**:
    - Breathing exercises visualized through dynamic animations.
    - Ambient soundscapes (forest sounds, light instrumental music).
    - Visual prompts for mindfulness activities.

2. Emotional Feedback Mechanism

- **Virtual Journal**:
    - A journal implemented using `TMP_InputField` and `TMP_Text` components.
    - Saves user inputs automatically when the journal is closed.
    - Loads saved content with the cursor positioned at the end for a seamless user experience.
    - Includes a "clear journal" option for resetting entries.

3. Animation Rigging

- A **rigged character** is attached to the XR Origin using Unity's animation rigging system, enabling:
    - Realistic gestures during interactions.
    - Smooth transitions and movements to enhance immersion.

4. Hand Canvas

- **Hand-Based UI**:
    - Displays contextual instructions for the user.
    - Allows stopping of interactions at any point, providing user control and flexibility.

Implementation Details

Technologies Used

- **Unity Engine**: Core platform for environment and interaction development.
- **C# Scripts**: Custom logic for interactivity, journaling, and feedback mechanisms.
- **XR Interaction Toolkit (XRITK)**: For implementing VR interactions and rigging.
- **Animation Rigging**: To integrate a responsive character model with the XR Origin.

Environment Creation

- **Assets Used**:
    - Unity Terrain System for generating the forest environment.
    - Custom shaders and post-processing for light effects.

    - 3D models for the writing desk and other environmental props.

Virtual Journal

- **Functionality**:
    - Journal content is stored using `PlayerPrefs`.
    - Cursor positioning is handled through coroutines to ensure readiness of the `TMP_InputField`.

Animation Rigging

- **Setup**:
    - Rigged character model integrated with XR Origin.
    - Unity's Animation Rigging package used for inverse kinematics (IK) and constraints.
    - Animations synchronized with user interactions.

Hand Canvas

- **Features**:
    - Canvas attached to the user's virtual hand.
    - Displays real-time instructions for guided activities.
    - Provides a "stop" button to end any ongoing interaction.

Challenges and Solutions

- **Challenge**: Achieving natural lighting through dense foliage.
    - **Solution**: Used baked and real-time lighting combinations.
- **Challenge**: Ensuring smooth transitions between interactions.
    - **Solution**: Implemented state management for seamless UI/UX flow.
- **Caret Positioning**: Ensuring the journal caret was placed at the end of the text required multiple iterations.

- **Synchronization**: Achieving smooth interaction between the XR Origin and the rigged character.
- **Performance Optimization**: Balancing graphical fidelity and performance for seamless VR experiences.

Hardware Compatibility

- Tested on:
    - Meta Quest 2
    - Meta Quest 3
- Compatible on:
    - Meta Quest 2
    - Meta Quest 3
    - HTC Vive

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5. User Testing and Feedback

Testing Methodology

- Conducted sessions with five participants (friends and colleagues).
- Participants explored the forest, completed breathing exercises, and used the virtual journal.

Feedback Highlights

- **Positive**:
    - The NYC canopy forest and abstract desk setting were highly praised for their uniqueness.
    - Interactive breathing exercises were intuitive and effective.
- **Suggestions for Improvement**:
    - Add dynamic weather elements like rain or mist.
    - Expand the journal to include customizable prompts.

Refinements

- Enhanced journal animations for smoother interaction.

Documentation

Design Choices

- Focused on creating a balance between visual appeal and usability.
- The writing desk in the forest adds an abstract touch, symbolizing introspection and creativity.

Technical Summary

- Developed using Unity 2022.
- Key packages: Unity XR Toolkit, Animation Rigging, TextMeshPro.
- Scripts written in C# for modularity and maintainability.

User Feedback Integration

- Implemented user-requested features like smooth journal saving and more intuitive hand canvas controls.

Planned Improvements

- Include a dynamic weather system in the environment (e.g., light rain, mist).
- Expand interactivity with more mindfulness prompts.
- Further refine character animations.
- Adding Hand Interaction to avoid use of Controllers and to give more Natural Feel.
- Adding Voice Input into the journal by using Azure Speech or Meta Voice SDK.

Submission Details

- GitHub Repository: https://github.com/Tribhuvan321/Mindful_Presence_VR.git
- YouTube Video: https://youtu.be/c24xb1pskpM

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