# **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.

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### **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

## **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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