

InnerSpace: Explore your Inner World through Meditation

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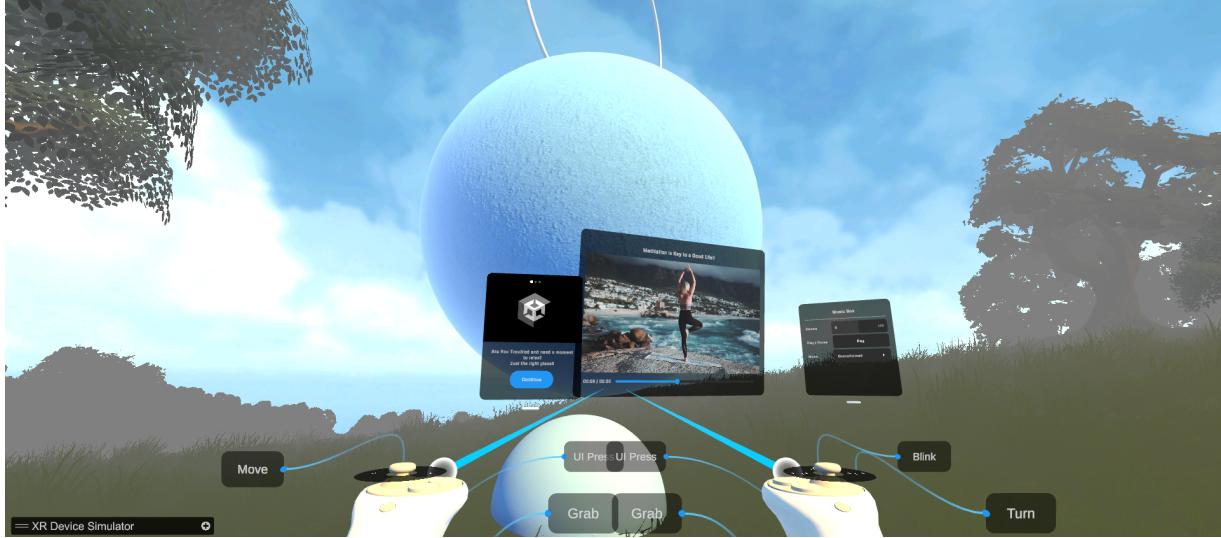


Figure 1: Immersive environment of InnerSpace

ABSTRACT

Meditation offers numerous benefits for physical, mental, and emotional well-being. However, the practice can be challenging, especially for beginners or those dealing with high stress and anxiety. Virtual reality (VR) has emerged as a promising tool to facilitate meditation by creating immersive and calming virtual environments that enhance focus and block distractions. This paper explores the use of VR for guided meditation, drawing upon historical and cultural perspectives, related research works, and a user-centered design approach.

Through surveys, expert reviews, and analysis of existing technologies, the paper investigates the cognitive aspects of natural visual and auditory cues in VR meditation environments. The findings highlight the potential of VR to improve attentional engagement, spatial perception, emotion recognition, memory encoding, and attentional restoration during meditation practice.

The paper presents a user flow diagram and design for a VR meditation application incorporating these principles. Additionally, it discusses future prospects, such as transitioning to mixed reality (MR) for enhanced immersion, integrating voice assistance through speech recognition and natural language processing, and providing personalized guided meditation experiences.

Overall, this research contributes to the understanding of how immersive technologies like VR and MR can be leveraged to create engaging and effective meditation experiences, promoting mindfulness and well-being in an increasingly digitized world.

Index Terms: VR, VR meditation, immersive environment

1 INTRODUCTION

Meditation, a profound practice with roots in ancient Vedic times, has been recognized for its potential to facilitate a return to one's true nature beyond the fluctuations of the mind, known as the Seer or Purusha (Vivekananda, 1907). This practice is integral to Vedic science, establishing a conscious connection with the deep inner Self, akin to a feedback loop that activates inner faculties and promotes holistic well-being. Modern scientific understanding also highlights the role of meditation in alleviating accumulated stresses, fostering inner peace and bliss, and positively impacting overall health.

The historical and cultural significance of meditation is deeply embedded in various traditions, evolving into multifaceted techniques, including mindfulness, loving-kindness, and transcendental meditation. Contemporary scientific research supports the numerous health benefits of meditation, including bolstering the immune system ([5]), regulating inflammation ([3]), and promoting healthy aging through telomerase regulation ([7]).

Virtual reality (VR) technology has emerged as a potential tool for learning meditation, particularly for beginners ([10]). VR offers immersive environments that create calming and focused virtual environments, helping block out distractions and focus on meditation techniques ([10]). It also provides a more engaging way to visualize abstract meditation concepts ([10]). However, the ultimate goal of meditation is to develop the ability to meditate without relying on external tools, and overdependence on VR could hinder this goal ([10]).

VR technology has also shown promise in addressing student mental health, particularly exam anxiety ([10]). Traditional meditation has benefits for students, but VR offers a more immersive and potentially more effective way to experience it ([10]). This is especially relevant given the increased need for mental health support



Figure 2: DBT mindfulness skills



Figure 3: SnowWorld

among students due to the COVID-19 pandemic [4].

Research has also explored the potential of VR in enhancing mindfulness training in Dialectical Behaviour Therapy (DBT) ([10]). VR's immersive environment might decrease distractions and negative emotions, making mindfulness practice easier ([10]). Additionally, studies suggest that VR with natural environments can reduce stress and improve relaxation, creating a suitable setting for meditation ([1]).

Meditating outdoors taps into the profound connection between humans and nature, as emphasized by traditions like Ayurveda. Ayurveda's principle of "Prakriti" highlights how nature influences our physical, mental, and emotional well-being. Outdoor meditation offers a calming effect on the mind, supported by research showing its ability to reduce stress and anxiety ([2]). Natural sights, sounds, and sensations create an environment conducive to relaxation and introspection, fostering a deeper connection to the present moment ([8]).

In summary, this paper explores the potential of VR technology in enhancing meditation practices, particularly for beginners and individuals with concentration issues. It also highlights the benefits of outdoor meditation in promoting holistic well-being and deepening spiritual practice. This research aims to contribute to the ongoing discourse on the integration of technology and meditation practices, as well as the importance of nature in promoting mental health and well-being.

2 RELATED WORKS

2.1 Research on Guided Meditation

The use of VR for Meditation is a digital technology with limitless possibilities that is becoming increasingly popular among re-

searchers for its use in social and psychological experiments ([14]). Some studies report that participants experienced an improvement in anxiety and depression-related effects, such as lesser fatigue and tension, as well as increased energy and pleasure as a result of exercising in VR ([7]). In view of the studies that have been mentioned, one may suppose that VR has the potential to be used for many purposes in different sectors. [11] conducted a study (Figure 2) for using virtual reality as a fresh perspective of mindful meditation which was tested by 44 non-clinical participants at a mindfulness conference. Participants eagerly tried virtual reality DBT® (Dialectical Behavioral Therapy) mindfulness skills, and in using VR to exercise DBT mindfulness skills, the intense feeling of an illusion of entering the computer-generated environment was reported as moderate to strong and revealed an increase in mindfulness and mental state. According to the observations, users' psychological response and experience of presence both play crucial roles in their acceptance of utilizing VR to practise mindfulness. [11] also supports that the accomplishment of presence has been considered a defining element of a successful VR experience for more than 40 years.

The outcomes of a randomized controlled experiment examining the usefulness of virtual reality (VR) as a distraction tactic to assist manage pain in children and young adults experiencing venipuncture are described by . Fifteen patients with cancer or haematological disorders were assigned to the virtual reality software "SnowWorld" at random (Figure 3) or a condition in which there is no VR influence (i.e., standard of care). The report discovered that virtual reality was much more effective in distracting patients during venipuncture and elicited more positivity. Patients in this study experienced a great feeling of connectedness and described the virtual objects as appearing "reasonably convincing". Overall, there seems to be some evidence to indicate that anxiety can be managed in a stressful situation as the one stated above but more studies are required to evaluate how much VR distraction reduces anxiety. Although meditation techniques were not used, this study demonstrated the importance of the illusion of someone being existent in a virtual reality setting. Since these papers have highlighted this illusion as a critical component for a compelling VR experience, this must be taken into account during the development of my project.

[9] experimented with a virtual reality meditation system named 'RelaWorld' (Figure 5) that makes use of neurofeedback. In live time, the technology monitors the subject's brainwave activity and displays special visual effects accordingly in a virtual world, which is presented via a head-mounted device. According to usability testing of 43 university students, the head-mounted screen promotes higher meditative states than the identical system exhibited on a regular screen. A study that took place during COVID-19 had similar results [13] found that Meditating in VR (3D format) was linked with an overall increased sense of excitement as VR meditation when compared to its 2-dimensional equivalent, is far less uncomfortable, more entertaining, and less tiresome (Figure 6). VR meditations were linked to increased experiences of peacefulness and less disturbance from the process of breathing., and less fatigue when compared to 2D meditations. The VR format was favored by about half of the participants, while the 2D format was favored by the other half. which suggests that people still prefer one of the two at an almost equal rate. Likewise, [8] hold the view that students who were subjected to Immersive meditation profited more than those that were subjected to video-based meditation. Even though, students' post-survey comments raised doubts about meditation and its benefits it was compelling enough to help them. Based on the evidence provided from these papers VR VR-based meditation can be more or just as beneficial for meditation as video-based which supports the choice of this project to use a VR headset to allow participants to meditate.

[12] investigated the effect in patients with Generalized Anxi-

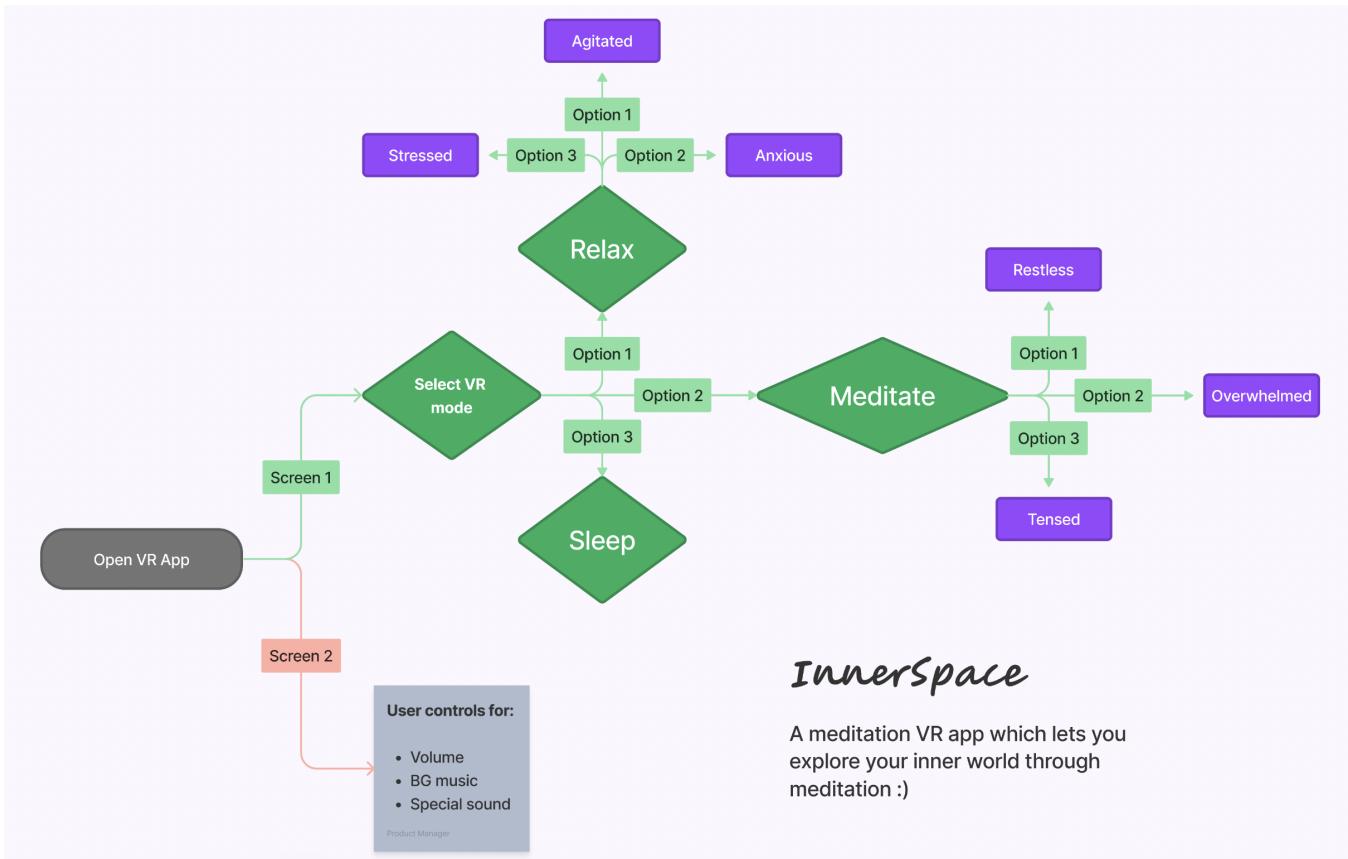


Figure 4: User flow of InnerSpace

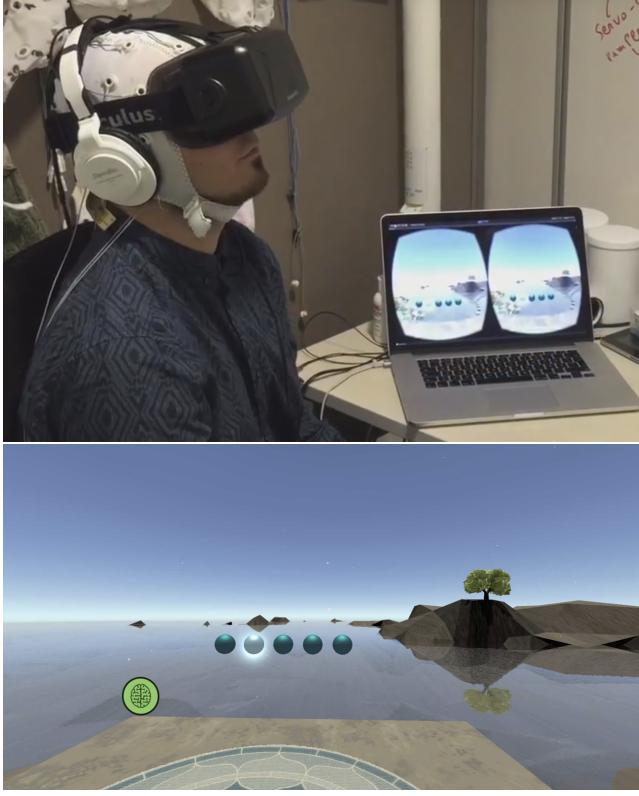


Figure 5: RelaWorld

ety Disorder (GAD) by assessing changes in neural patterns linked with the use of virtual reality for GAD. The study included 14 people who had GAD. According to the findings, VR meditation drastically decreased levels of perceived anxiety, the VR intervention was the only one that contributed to a physiological reduction of anxiety among other methods. This shows that the use of VR to alleviate anxiety can be promising.

[6] explored the feasibility and clinical promise of employing VR-enhanced DBT® mindfulness skills training (Figure 2) in individuals who had suffered severe injuries by diminishing their negative feelings and improving their optimism. They concluded that this method was impactful for severe burn patients with psychological issues and negative emotions. Although this study was performed on one subject only more research and controlled studies are needed as this could potentially be widely used as a treatment for patients with such traumas. [12] investigated the clinical proposal to use VR technology as a meditation practice to aid people with varying levels of post-traumatic stress disorder (PTSD). Ninety-six young adults participated in VR and non-VR meditations and indicated greater perceived contentment towards VR meditation than non-VR meditation, although to patients with high levels of PTSD was deemed to be ineffective. The two studies reviewed here support the hypothesis that this type of meditation which has been used for the treatment of patients with PTSD or people with negative emotions in general can have a positive effect on their well-being. This reinforces the purpose of my project to help people with unhappy emotions like stress, anxiety, and work dissatisfaction by offering them a stimulating way to meditate.

2.2 Cognitive Aspect Of Natural Visual and Auditory Cues

Natural Visual and Auditory Cues in Cognitive Processing

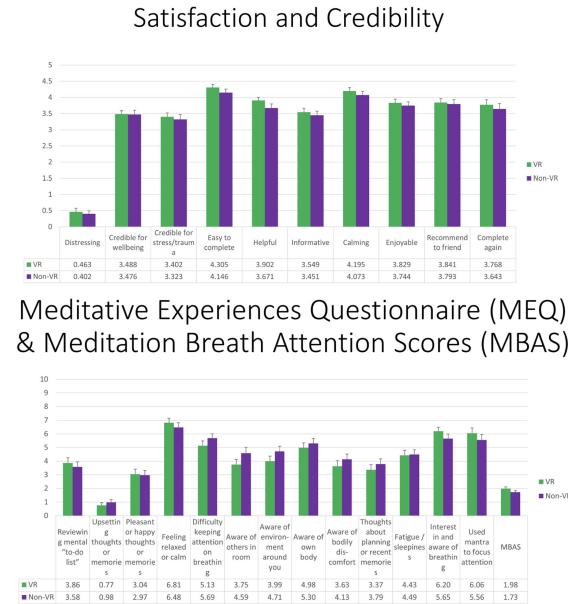


Figure 6: Results from VR meditation

1. Attentional Engagement: Natural visual cues, such as movement in the environment or changes in light, and auditory cues, like the rustling of leaves or distant sounds, can automatically capture attention. Understanding how these natural cues engage attention sheds light on attentional processes and cognitive prioritization mechanisms.

2. Spatial Perception: Visual cues in natural scenes provide information about spatial layout and depth perception, while auditory cues, such as echoes or spatialized sounds, contribute to spatial localization. Investigating how the brain processes these cues aids in understanding spatial cognition and navigation.

3. Emotion Recognition: Natural visual cues, such as facial expressions or body language, convey emotional information, while auditory cues, such as intonation or prosody, also carry emotional content. Studying how individuals perceive and interpret these natural cues provides insights into emotion recognition processes and social cognition.

4. Memory Encoding: Natural visual scenes and auditory environments are rich in contextual information that facilitates memory encoding. Research may explore how exposure to natural stimuli influences memory formation and consolidation, contributing to our understanding of environmental effects on cognitive processes.

5. Attentional Restoration: Exposure to natural visual and auditory stimuli has been associated with cognitive benefits, including attention restoration and stress reduction. Investigating the mechanisms underlying these effects can inform interventions for cognitive enhancement and mental well-being.

6. Cross-Modal Integration: The brain seamlessly integrates information from natural visual and auditory sources to form coherent percepts of the environment. Understanding how different sensory modalities interact and influence cognitive processing provides insights into multisensory integration and perceptual organization.

Incorporating natural visual and auditory cues into cognitive research enhances our understanding of attention, perception, memory, emotion, and multisensory integration within ecologically valid contexts.[14]

3 METHODOLOGY

3.1 Data Collection

3.1.1 VR app review & User Survey

We extracted reviews from multiple VR app websites and user survey to figure out the current challenges in the VR meditation apps currently in the market. We employed codebook generation method from Human Computer Interaction to gauge the problems in the existing technology. Our findings and reviews have been tabulated as follows:

APP	REVIEWS	CODES
TRIPP: Mood on Demand	I sat down to meditate tonight on Tripp only to be greeted by a guide exhorting me to gain wealth and money? The subject of money is the opposite of relaxing to me. Please be mindful that not all of your users want to be reminded of the never-ending struggle to make enough money to keep their household afloat.	Subscription
TRIPP: Mood on Demand	First of all it is too expensive. Secondly why there are animals photo at the end of meditation videos?? No need for this kind of videos I'm really disappointed with that. Don't get me wrong people I love animals but why? Who's idea was it?	Subscription, Frustrating Design
TRIPP: Mood on Demand	Every experience takes forever. Everyone even the one used before need an hour to load, and it can't be done without having the meta on your eyes watching it load. The app should have a minimum of dozen offline experience available.	Subscription, Bugs, Frustrating Design
TRIPP: Mood on Demand	It was very harmful to my psyche due to low lung volume. The breathing exercises were made for an average adult without health issues. When having low lung volume, they might be harmful. Also don't use if you are highly functional. It will slow you down and destroy your capabilities.	Frustrating Design
TRIPP: Mood on Demand	Nice graphics but the same guides, no personal options, only owned for a couple of days, used less than 2 hrs and no refund available. Disappointed after reading all the hype.	Subscription, Frustrating Design
Hoame	There is a mode to just sit and be peaceful while enjoying the view. Would be great if the landscape was a video. It's just a static picture. Very boring and not immersive. Then I tried 1 class where the purpose is to listen to some nice sounds, but it was very annoying, I stopped after 3 minutes. And then for the studio we need to wait for the right time to join the class... I don't care about having a live class, it doesn't have to be live...	Frustrating Design

APP	REVIEWS	CODES
TRIPP: Mood on Demand	It won't let me redo my sanctum after I moved so my sanctum is in a house I will never live again.	Frustrating Design
TRIPP: Mood on Demand	The experience you get initially with the app is pretty awesome. It's brief but it's just a sample so what would you expect. However, as soon as you subscribe, you realize it's not as cool. Very little variation, repetitive, boring. With Supernatural (a workout app for quest), when you pay the subscription you get brand new content every single day, loads of options and variety. Tripp is a total scam. Canceled my subscription.	Subscription, Repetitive, Frustrating Design
TRIPP: Mood on Demand	I see posts of content that are saved to VR that appear appealing, but I can NEVER locate those suggestions. They seem less psychedelic and emerge as content of authentic self-help and pedagogy. I'd love to know HOW to access those curriculums that are centered on human direction and not simply breathing in-out to a rhythmic, psychedelic design.	Frustrating Design
TRIPP: Mood on Demand	They could have done something interesting by using the microphone or headset gyro to detect breathing and add dynamism. But it's just static animations according to predetermined timing. There is also no subtitle accessibility for the deaf.	Frustrating Design, Accessibility
TRIPP: Mood on Demand	They need to take that breath in and out stuff out of there because it's like breathing in a whole bunch of dandelion fluffs or something and it makes me cough and it's disgusting every time. Certainly doesn't help me relax. The part with the tree at the end was really cool, but there isn't much to the demo.	Frustrating Design
Hoame	Took out the subscription and was looking forward to it with the real guides.... but static video is just so unsettling even though you have live/video people - just doesn't feel right. There was not enough on demand classes, just one of each (that I could find) and being in a different time zone was not able to join any life classes. So all in all, could be a great app, but needs more thought and work. When you are paying a subscription and can only get a couple of classes and poor environments - really is not worth the money.	Frustrating Design, Subscription, Bugs, Accessibility

3.2 Data Analysis

Based on a comprehensive analysis of user feedback on diverse meditation applications available on platforms, it becomes appar-

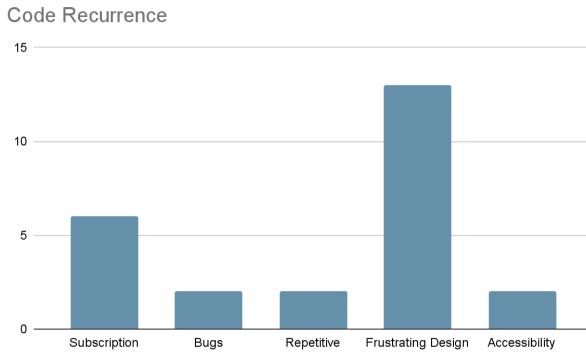


Figure 7: Review codebook histogram

ent that the predominant issues revolve around challenging design attributes and subscription-related impediments. To address these concerns, we have devised a solution centred on a cost-free user experience. Additionally, we have employed a methodical approach informed by robust research findings to construct a tranquil meditation setting characterized by soothing visuals and sounds. Furthermore, our solution prioritizes extensive customization options to accommodate the diverse requirements of a broad user base.

APP	REVIEWS	CODES
Maloka	The first time you try each of the different types of meditation (visual, sound and movement), the voice is just tolerable and helps you get started, but after that it's completely useless and unbelievably distracting and patronizing. It's the same recording every single time, sickly sweet, "You're doing great, etc" and repeating the breathing instructions over and over, even interrupting in the middle of the visual meditations to remind you how to breathe.	Frustrating Design, Repetitive
Maloka	The stupid thing is stuck on binding me to an Avatar, then will not proceed. 3 tries is enough. Totally worthless!	Frustrating Design

CODES	DESCRIPTION
Subscription	Problems related to frequent subscription reminders/ mandatory subscription/ over-priced subscription.
Frustrating Design	Any Design/environment issues that either make the use difficult or frustrate the experience
Repetitive	Repetitive content which may not be worth the cost
Bugs	Issues with functioning of the App [includes but not limited to lagging, bugs etc]
Accessibility	Lack of inclusive environment for all

3.3 Approach

3.3.1 Approach Overview

Our team followed a structured approach to create an immersive virtual meditation environment in line with Sahaja Yoga principles.

This approach encompasses the following key stages:

- **Design and Planning:** Conceptualizing an intuitive user journey for individual and collective meditation, feature mapping, and visualizing the experience through storyboarding and prototyping. Insights from user surveys and reviews informed the design process, allowing the team to tailor the meditation experience to user preferences and address potential challenges.
- **Development:** Utilizing Unity for VR/AR development, organizing a hierarchical structure for modular management, creating custom scripts for interactions and functionalities, and integrating VR technologies for seamless virtual interaction. User feedback played a key role in the development of custom scripts and functionalities, addressing common issues found in existing VR meditation apps and improving user interactions.
- **Testing and Iteration:** Conducting usability testing for gesture guidance and controls, optimizing the codebase for performance, and incorporating user feedback to refine functionality and interface. Data-driven insights from usability testing were used to refine the meditation experience, making adjustments to gestures, controls, and transitions based on user feedback.
- **Content and Experience Enrichment:** Curating tranquil visual and auditory elements for an immersive meditation experience, and emphasizing guided meditation sequences and collective sessions to foster community. Feedback from existing meditation apps guided the selection of visual and auditory elements, ensuring the virtual world aligns with user preferences and expectations.
- **Compliance with Sahaja Yoga Principles:** Aligning with core values of holistic well-being, inner peace, and deeper self-understanding, while adhering to best practices in VR development for serenity and thoughtless awareness.

By adopting this comprehensive approach, the project team successfully creates a virtual meditation environment that is engaging and transformative, offering users a unique opportunity to experience inner harmony and personal growth.

3.3.2 Basic User Interface (UI)

The basic user interface (UI) of the VR project is designed with simplicity and intuitiveness in mind, aiming to provide a seamless and non-intrusive experience for users. Key aspects of the UI approach include:

- **Minimalistic Design:** The UI follows a minimalist design philosophy, ensuring that it does not distract users from the meditation experience. Visual elements are kept clean and subtle, avoiding frustration as indicated by data analysis.
- **Intuitive Navigation:** The UI offers intuitive navigation through menus and options, allowing users to effortlessly switch between individual and collective meditation modes.
- **Interactive Controls:** The UI features interactive controls such as sliders, buttons, and toggles that users can easily manipulate using VR controllers or hand gestures.
- **Guided Feedback:** Clear and concise visual cues, such as affordance callouts and visual feedback to help the user interact with the meditative UI, guide users through meditation gestures and interactive elements.

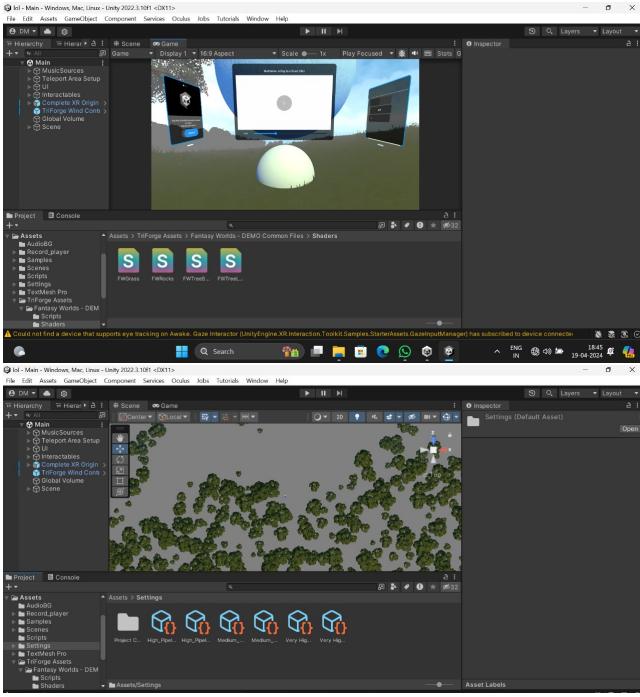


Figure 8: InnerSpace's Game Engine Screenshots

- **Responsive Layout:** The UI layout is responsive to the user's position and actions within the virtual space, ensuring that elements are easily accessible and appropriately scaled.
- **Audio and Visual Integration:** The UI seamlessly integrates with the project's audio and visual components, providing feedback through soothing sounds and visuals that enhance the meditation experience.

3.3.3 Peaceful Environment

Creating a peaceful environment is central to the VR project, as it directly impacts the quality of the meditation experience. The approach to developing a serene and tranquil environment includes:

- **Natural Landscapes:** The project features lush and immersive natural landscapes that transport users to serene settings such as tranquil forests, calming beaches, or peaceful mountaintops.
- **Ambient Sounds:** To complement the visuals, the environment includes ambient sounds such as gentle waves, rustling leaves, and soothing wind. These sounds are carefully curated to create a calming atmosphere.
- **Calming Colors and Lighting:** The color palette and lighting in the environment are chosen to evoke a sense of calm and relaxation. Soft hues and gentle lighting transitions enhance the user's sense of peace.
- **Dynamic Environment Adjustment:** The virtual terrain dynamically responds to user interactions, providing a realistic and engaging meditation environment. This includes smooth camera adjustments and immersive interactions with the terrain.
- **Meditation Guidance:** Users are guided through meditation gestures and sequences that promote mindfulness and inner

peace. This guidance is seamlessly integrated into the environment, creating a cohesive experience.

- **Customization Options:** Users have the option to customize certain aspects of the environment, such as background music or ambient sounds, allowing them to tailor the experience to their preferences. These options are inspired by user feedback and data analysis on preferred experiences.

By focusing on a basic UI that is intuitive and non-intrusive, as well as a peaceful environment that is immersive and calming, the VR project offers users a transformative meditation experience that promotes well-being, mindfulness, and a sense of connection with the self and the natural world.

3.3.4 Acknowledging Collected Data

We can clearly see the common themes on the problems faced by Meditation VRs currently in the market fall under the category of:

1. Too much bugs inherent in the VR design for the user to handle.
2. Highly cluttered UI and nothing to guide the user through.
3. Subscription costs which is very high for the value it provides.

Our team has kept these user issues in mind and made sure that our product solves all the above problems.

3.4 Design

We incorporated the inferences from our study of the existing VR meditation apps. For eg, we used a minimalist design to avoid distractions, we plan to add subscription reminders and keep the cost within feasibility. We also avoided repetitive content by outlining a mutually exclusive user flow. Adding GPT integration in future will open a new realm of content on the VR app. This VR project aims to create an immersive and tranquil meditation environment that supports both individual and collective practices. Key design elements include:

3.4.1 User Experience Design

- **Intuitive Navigation:** Users can seamlessly navigate through individual and collective meditation modes, with an emphasis on easy access to all features.
- **Gesture Guidance:** Users are guided through meditation gestures, promoting a smooth and immersive meditative state.

3.4.2 Visual Aesthetics

- **Realistic Shaders:** We have used URP shaders to provide a realistic look to the VR project which is necessary for user to feel the realism and calmness flowing into him to create sensations of calmness.
- **Natural Settings:** The virtual world mirrors serene natural environments, such as tranquil forests and calming beaches, offering a soothing backdrop for meditation.
- **Color Palette:** A carefully selected color palette with calming shades enhances the peaceful atmosphere of the VR environment.
- **Dynamic Lighting:** Soft and adaptive lighting adjusts to the environment, complementing the natural settings and creating a serene ambiance.

3.4.3 Audio Aesthetics

- Multiple Audio Sounds: As users interact with the Music Panel UI, they can choose from a variety of audio sounds and tracks that adapt to their mood and meditation style.
- Instruction Sounds: Upon interacting with the Meditate UI, users hear instructional sounds that guide them through the meditation practice and initiate the meditate timer.

3.4.4 User Interface (UI) Design

- Comprehensive UI Elements: The design incorporates a variety of UI elements, such as sliders, buttons, and toggles, which control different parts of the user experience, from volume and track selection to initiating meditation.
- TV Screen: A virtual TV screen is integrated into the environment, allowing users to watch meditation tutorials, calming videos, and other content to enhance their experience.

3.4.5 Chill Environment

- Serene Atmosphere: The VR environment is designed to offer a chill and serene atmosphere, providing users with a calming escape from everyday stress.
- Immersive Ambiance: The combination of visuals, sounds, and interactive elements creates an immersive ambiance that supports relaxation and mindfulness.

3.4.6 VR Interaction Design

- Responsive Interactions: The design supports smooth, responsive interactions with the virtual space, allowing users to navigate and manipulate objects effortlessly.
- Dynamic Environment Adjustment: The virtual environment adjusts dynamically to user movements, ensuring a consistent and immersive experience.

By prioritizing user-centric design principles, such as intuitive navigation, aesthetic choices, and responsive interactions, the VR project provides a holistic meditation experience that promotes well-being and inner harmony.

4 CONCLUSION

The project elucidates the potential of virtual reality (VR) technology to augment meditation practices, fostering mindfulness and well-being. Through an exploration of historical, cultural, and scientific contexts, coupled with a user-centered design approach, the project aims to highlight and implement the cognitive benefits of immersive VR environments for meditation. By addressing common challenges in existing VR meditation applications and proposing future avenues for research and development, this work contributes to the ongoing discourse on the integration of technology and holistic well-being practices. Ultimately, the synthesis of VR technology and meditation holds promise for promoting mental health and fostering inner peace in an increasingly digital landscape.

5 FUTURE WORKS

The future prospect of our project involves a transition from virtual reality (VR) to mixed reality (MR), aiming to enhance immersion and interaction in meditation experiences. Through the seamless integration of virtual elements with the user's physical environment, our meditation setup will enable real-time observation of the body, thus augmenting the effectiveness of meditation sessions. Leveraging cutting-edge MR technologies, our objective is to develop

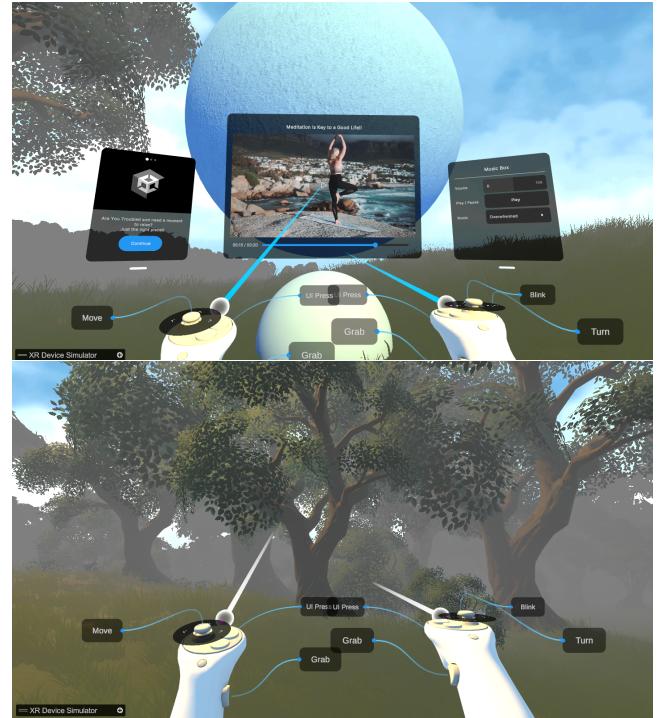


Figure 9: Immersive environment of InnerSpace

a serene digital environment conducive to guided meditation sessions, ultimately fostering relaxation and mindfulness. This transition holds promise for advancing the field of immersive technology in facilitating holistic well-being through meditation practices. We also aim to integrate voice-based assistance to the VR app. This can be achieved through Audio Speech Recognition (ASR) using the Whisper API and then matching the keywords to our existing database of guided meditation techniques. This method can be further improved by adding a GPT/LLM functionality which enables tailor-made guided instructions based on the input provided by the user. Prompt Engineering techniques like Mixture-of-Experts can be employed to achieve this task. An added functionality of changing the guide's voice can also be added to improve the usability and user experience of the application.

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REFERENCES

- [1] M. Annerstedt and P. Währborg. Nature-assisted therapy: systematic review of controlled and observational studies. *Scandinavian Journal of Public Health*, 39(4):371–388, 2011. doi: 10.1177/1403494810396400 2
- [2] M. G. Berman, J. Jonides, and S. Kaplan. The cognitive benefits of interacting with nature. *Psychological Science*, 19(12):1207–1212, 2008. doi: 10.1111/j.1467-9280.2008.02225.x 2
- [3] D. S. Black and G. M. Slavich. Mindfulness meditation and the immune system: a systematic review of randomized controlled trials. *Annals of the New York Academy of Sciences*, 1373(1):13–24, 2016. doi: 10.1111/nyas.12998 1
- [4] A. Charles, D. Thompson, R. Nixdorf, G. Ryan, D. Shamba, J. Kalha, G. Moran, R. Hiltensperger, C. Mahlke, B. Puschner, J. Repper, M. Slade, and R. Mpango. Typology of modifications to peer support work for adults with mental health problems: systematic review.

- British Journal of Psychiatry*, 216(6):301–307, Jun 2020. doi: 10.1192/bj.2019.264 [2](#)
- [5] R. J. Davidson, J. Kabat-Zinn, J. Schumacher, M. Rosenkranz, D. Muller, S. F. Santorelli, F. Urbanowski, A. Harrington, K. Bonus, and J. F. Sheridan. Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, 65(4):564–570, 2003. doi: 10.1097/01.PSY.0000077505.67574.E3 [1](#)
- [6] L. Gomez, B. Leupen, M. Theng, K. Fernandez, and M. Savage. Gomez et al 2017. 34:104–114, 10 2017. [4](#)
- [7] V. Jacobs, L. Lamb, and R. Philipp. Professional noticing of children’s mathematical thinking. *Journal for Research in Mathematics Education*, 41:169–202, 03 2010. doi: 10.5951/jresmatheduc.41.2.0169 [1](#), [2](#)
- [8] S. Kaplan. The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3):169–182, 1995. Green Psychology. doi: 10.1016/0272-4944(95)90001-2 [2](#)
- [9] I. Kosunen, M. Salminen, S. Järvelä, A. Ruonala, N. Ravaja, and G. Jacucci. Relaworld: Neuroadaptive and immersive virtual reality meditation system. In *Proceedings of the 21st International Conference on Intelligent User Interfaces*, pp. 208–217. ACM, Association for Computing Machinery, 2016. doi: 10.1145/2856767.2856796 [2](#)
- [10] A. Laplume and K. Sonpar. Stakeholder theory: Reviewing a theory that moves us. *Journal of Management*, 34:1152–1189, 12 2008. doi: 10.1177/0149206308324322 [1](#), [2](#)
- [11] M. V. Navarro-Haro, D. Campos, M. M. Linehan, H. G. Hoffman, A. García-Palacios, M. Modrego-Alarcón, L. Borao, and J. Garcíá-Campayo. Meditation experts try virtual reality mindfulness: A pilot study evaluation of the feasibility and acceptability of virtual reality to facilitate mindfulness practice in people attending a mindfulness conference. *PLOS ONE*, 12(11):e0187777, 2017. doi: 10.1371/journal.pone.0187777 [2](#)
- [12] N. Tarrant, M. Roy, S. Deb, S. Odedra, A. Retzer, and A. Roy. The effectiveness of methylphenidate in the management of attention deficit hyperactivity disorder (adhd) in people with intellectual disabilities: A systematic review. *Research in Developmental Disabilities*, 83:217–232, 2018. doi: 10.1016/j.ridd.2018.08.017 [2](#), [4](#)
- [13] D. A. Way, A. Cook, and A. Rogers. The effects of rising co₂ concentrations on terrestrial systems: Scaling it up. *New Phytologist*, 229(5):2383–2385, 2021. doi: 10.1111/nph.17096 [2](#)
- [14] B. M. Wilson, L. Mickes, S. Stolarz-Fantino, M. Evrard, and E. Fantino. Increased false-memory susceptibility after mindfulness meditation. *Psychological Science*, 26(10):1567–1573, 2015. doi: 10.1177/0956797615593705 [2](#), [4](#)