



VR Design: The Royal Coronation

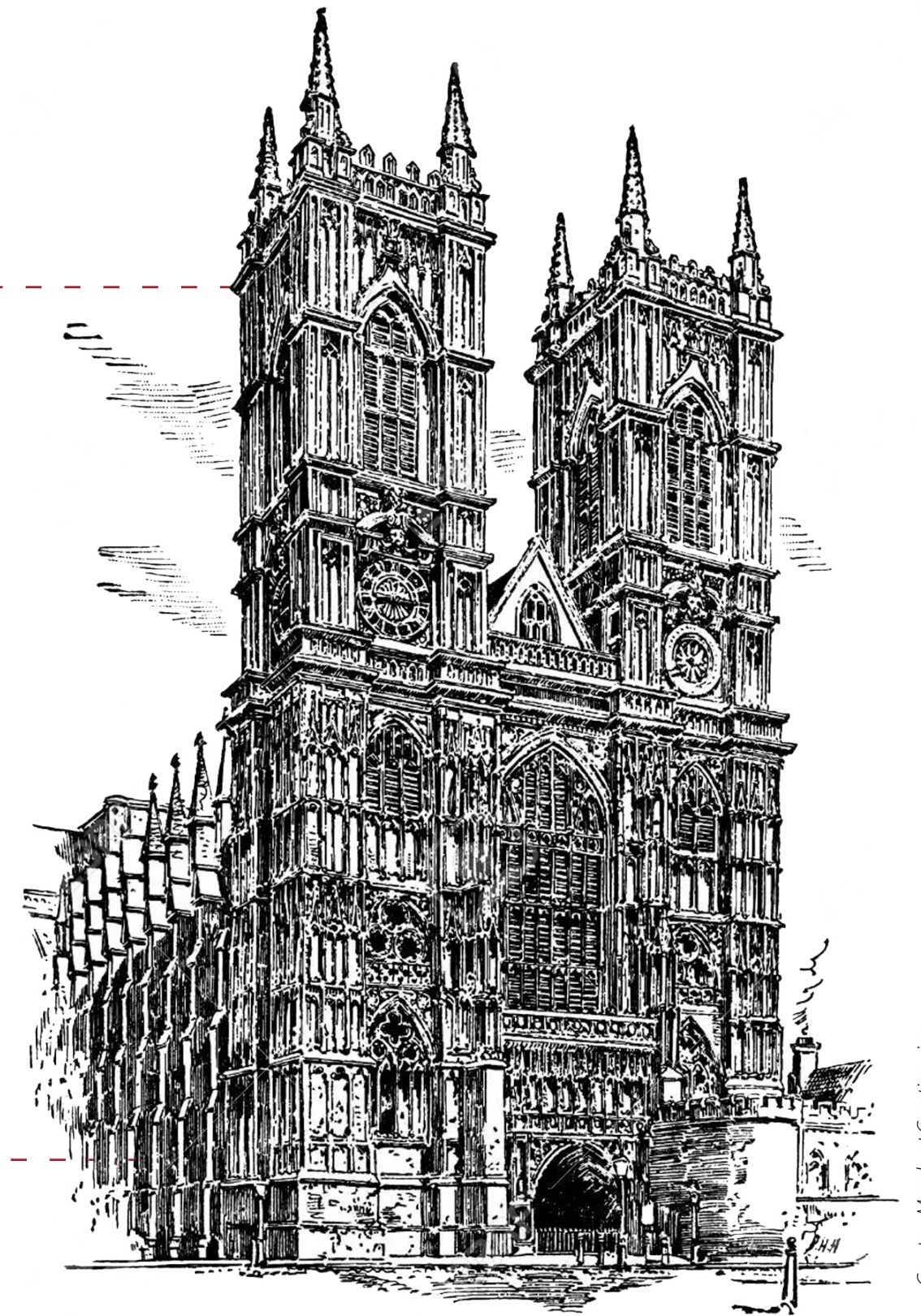
Name: Mallika Thaur
Student ID: 201676423
Module: Experiential Practice (38907)
Module No. DESN5182M



Introduction

The coronation ceremony has its origin in European tradition that was initiated to further the involvement of the church in the state and to establish control over volatile societies that often found themselves having several individuals claim to the throne (Torrance, 2022). Presently, UK is the only European monarchy that retains this tradition representing religious and constitutional aspects of the country exhibited in a grand ceremonial event. The coronation ceremony begins with a state procession from the Buckingham Palace to the Westminster Abbey followed by the recognition, oath taking, anointing, crowning, homage and a closing procession.

This work aims to educate people on the historical essence and symbolism of the royal coronation ceremony through experiential learning using Virtual Reality (VR) technology. VR enables the users to immerse and interact within a digitally created artificial environment projecting real-world scenarios (Asad et al., 2021). The design solution offered in this work facilitates experiential learning via role play in an immersive VR storytelling experience (Alrehaili and Osman, 2022). The users adopt the role of the sovereign to experience and learn about the royal coronation tradition with a first-person perspective.

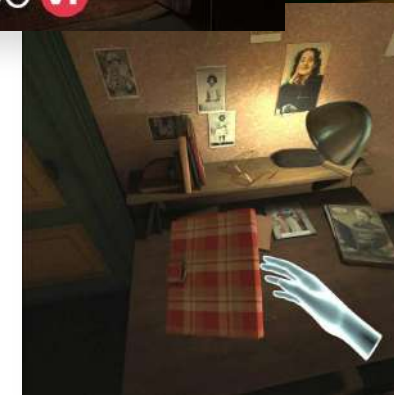


Idea Generation

The ideation process for this work was carried out in multiple phases over several weeks between the team members. This included extensive research, multiple brainstorming sessions, generating an exhaustive mood board using a collaborative tool named Miro, making design decisions via discussions and voting and iterative storyboarding.

Case Study

The idea generation began with the study of Ann Frank's VR House on the Oculus making key observations about the experience in terms of visual cues, interactions, input modes, level of immersion, environment, space and perspectives, sound, information and objects (Jerald, 2016). This helped us in building a direction for our VR experience of the royal coronation.



Research

As a next step, focus of research was discussed and allocated between the two team members. Mallika to collect information on the coronation process, steps, symbolism and meaning. Alexis to gather information on the environment, location, artefacts and the people. This helped in reducing the time and cognitive load of researching and understanding a vast subject as this. Once the relevant research work was completed, the team members collaborated to educate each other on their findings and plan the way forward. We decided to focus on creating the VR experience only for most significant parts of the coronation experience which included the anointing, the investing, the crowning, the enthronement and the flypast ceremony.

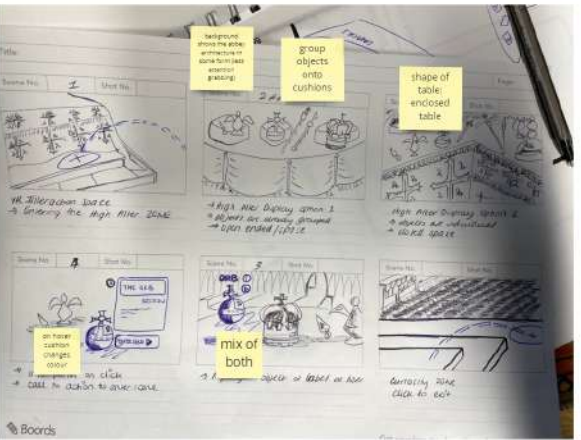
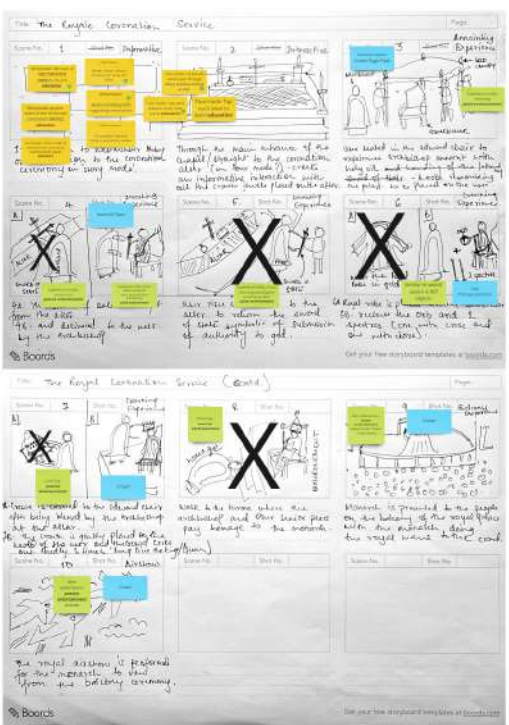


Idea Generation

Storyboard

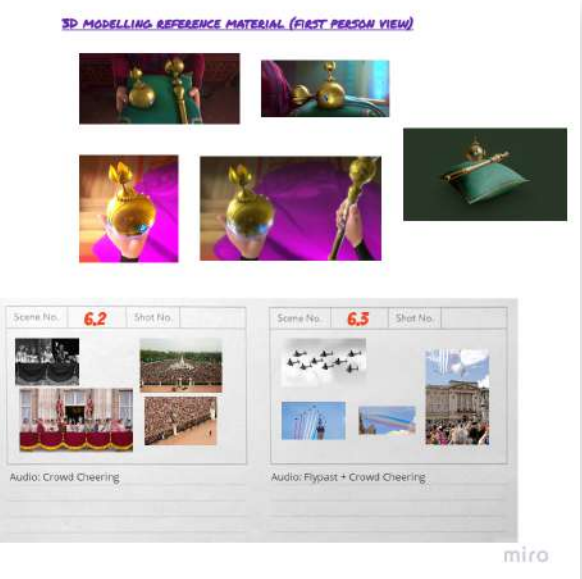
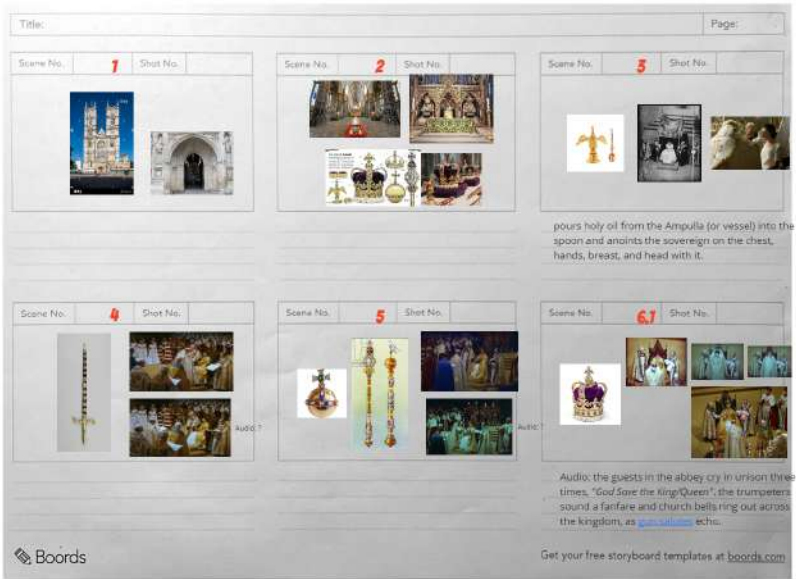
The next course of action involved evaluating diegetic and non-diegetic elements (Jerald, 2016) of user experience (UX) and user interface (UI) that were relevant to our VR experience. Subsequently, each team member proposed a scene wise storyboard of the entire experience. The proposed storyboards were created drawing on frameworks of UX and UI in VR. These included principles such as Jerald's 4 'illusions of presence', that is, spatial place, self-embodiment, physical interaction and social communication (Jerald, 2016); Object Categories such as background, contextual geometry, fundamental geometry and interactive objects (Jerald, 2016) and; Locomotion in VR (Boletsis and Chasanidou, 2022).

Both the team members collaborated to present their respective versions of the storyboards and collectively agreed on scene wise iterations finalizing the user journey and interactions of the VR coronation experience. The storyboard proposed by Alexis was uniquely inspiring in terms of interactions with the crown jewels to learn about them allowing the users to engage in the coronation experience with the crown jewel of their interest at will. While the storyboard proposed by Mallika was more focussed on the experiential learning of the coronation process from a first person's perspective, initially learning about the crown jewels via tour mode simulation and then learning about the coronation process via story mode simulation. We took a vote on each scene to bring together the best aspects from each storyboard to conclude on a final storyboard for the VR experience that would be used to build a prototype on Unity. Following to which, scene to object mapping to the final storyboard was created by Mallika along with exploring blender for creating models of the crown jewels, while Alexis continued to examine the visual elements, interactions and space of the environment to begin the development of the prototype.



INDIVIDUAL STORYBOARDS
MALLIKA (LEFT)
ALEXIS (RIGHT)

FINAL STORYBOARD



Development

A prototype was designed in Unity, combining screen captures from the original Westminster Abbey virtual tour and new 3D fbx models, designed in Blender aiming for consistency with the real crown jewels.

Tasks were divided as follows:

Experience design – Malika and Alexis

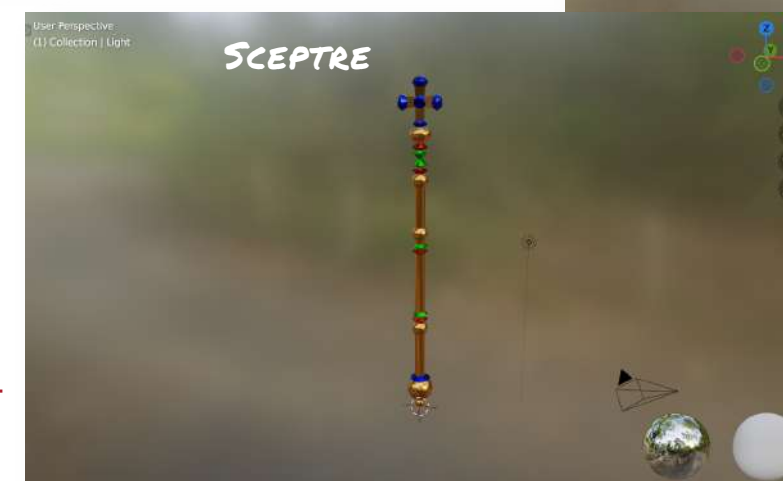
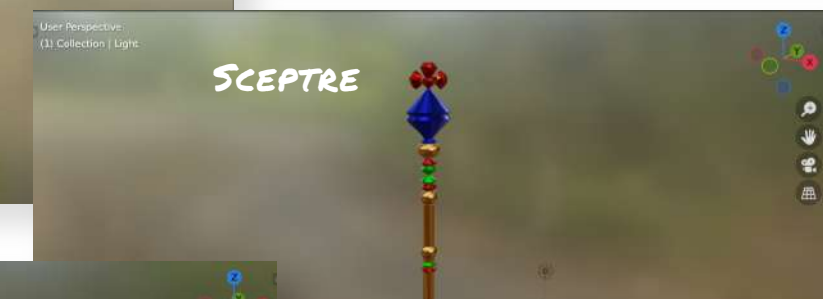
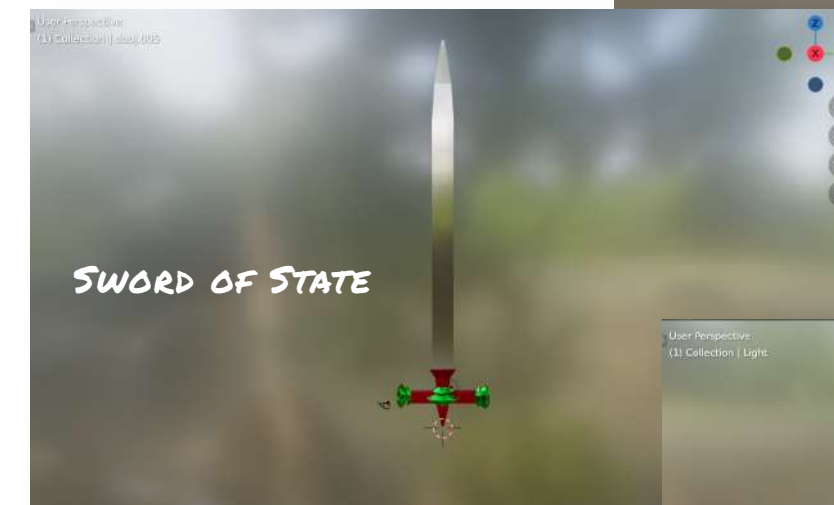
Modelling and Texturing – Malika

Prototype scene and interactivity – Alexis

Modelling and Texturing

Using images sourced from google as reference, 3D models of five out of a total of seven crown jewels were created using Blender. These included the crown, the orb, the sceptres and the sword of state and a cushion as a placeholder for the crown jewels. The materials and textures of the crown jewels and the cushion were also created and applied to the models in Blender. The final models were exported in fbx format which is compatible with Unity engine where the prototype of this experience was being generated.

This exercise was particularly useful in acquiring new skill set of learning to use Blender to produce complex 3D models such as the crown and also creating the right materials and textures for the models.



Development

Prototype Scene and Interactivity

New features were implemented in the prototype the included the foundational blocks of VR based immersive experiences: Presence, immersion and Reality and the developed prototype includes animations, locomotion, and user input.

1.Prescence

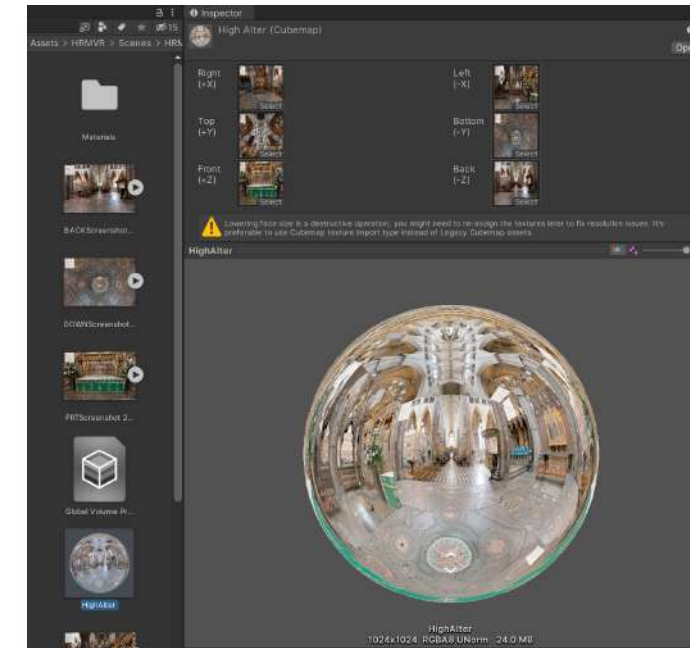
- a.By having a 360-degree environment presence is built
- b.Using Jerald's 4 'illusions of presence' (Jerald, 2016) three out of four illusions were able to be developed in our prototype.
 - i.There is illusion of being in a stable spatial place through gravity that has been applied to the first-person camera view
 - ii.There is an illusion self-embodiment being about to navigate the VR space through the mouse view or using WASD keys.
 - iii.There is the illusion of physical interaction through screen clicks and animations. The full connectivity using VR controllers would be a further improvement on the prototype made.

2.Immersion

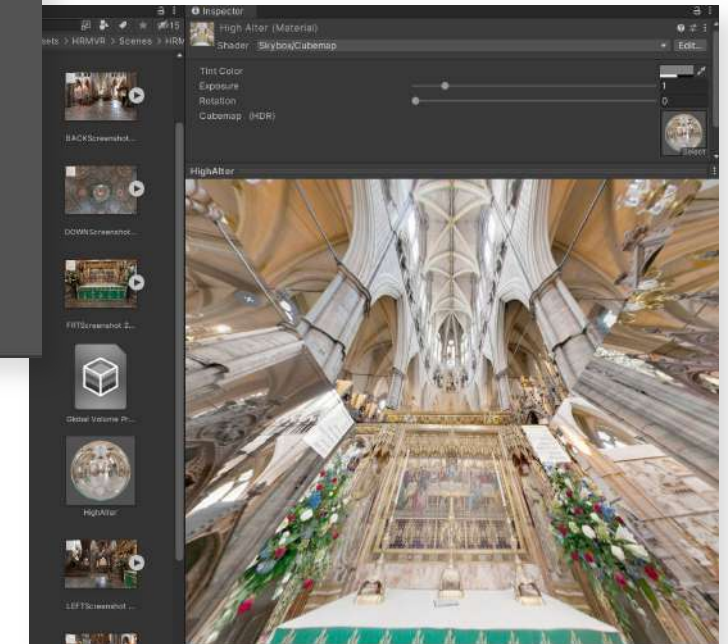
- a.Ambient sound such as the National anthem in the Intro scene add to the storytelling to create a scene of royalty.

3.Reality

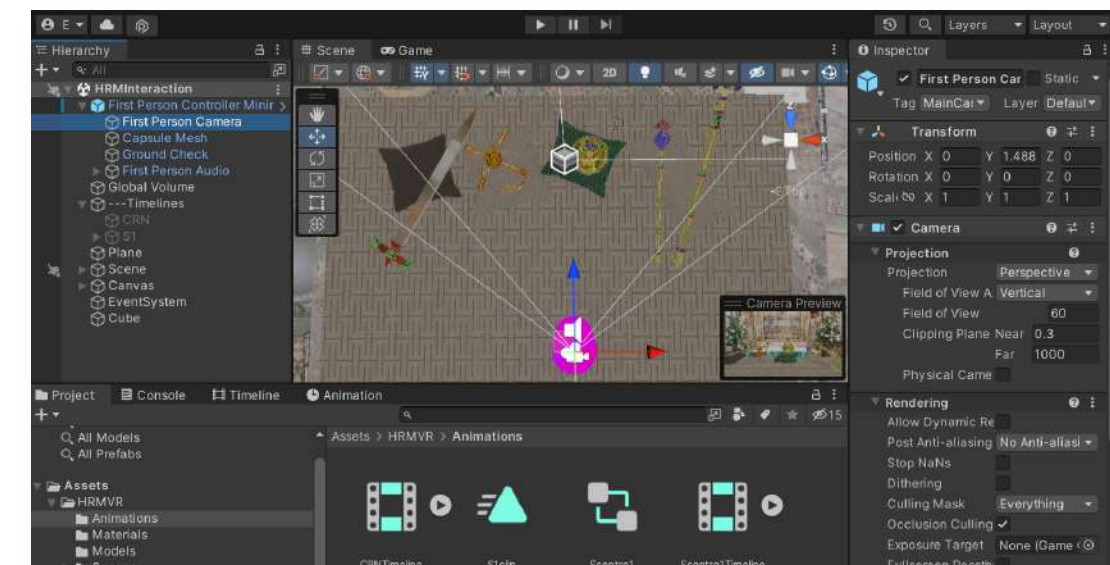
- a.First person footsteps enhance the realism of the environment. Audio item would also include general background noise of the streets, or the echoes and signing inside the abbey during scenes



360-DEGREE ENVIRONMENT IN UNITY



SCENE LAYOUT SHOWING ALTERNATE TIMELINES FIRST PERSON CAMERA AND AUDIO SOURCES



Final Outcome

The final VR Coronation experience includes functionalities to make the user feel immersed and engaged. The overall look of the real Westminster abbey was kept, making it easy for users to envision themselves as a monarch.

Layout

The environment is structured in terms of personal space, action space (2m-20m), and vista space (Jerald, 2016, pp.156) for a first-person view.

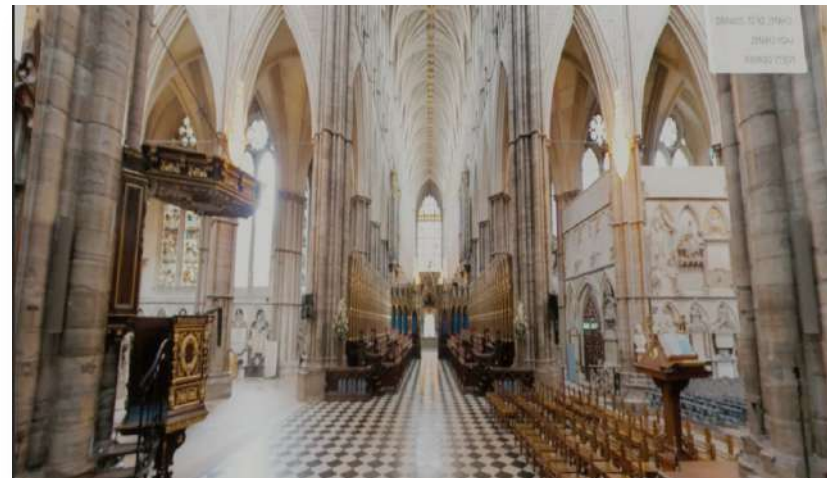
1. In the personal space there are clickable items
2. In the action space the first person can run/walk around to exits or other scenes. UI such as entry or exit icons are planted spatially in the VR scene.
3. The vista space is created using the skybox with Abbey imagery.

Input

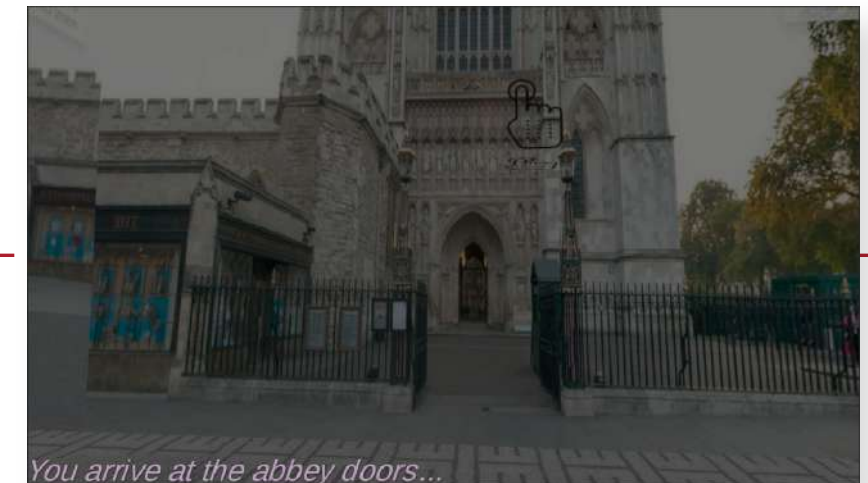
VR experiences typically have multiple input modes however for simplicity of the prototype other modes of input were explored. The prototype had touchscreen touch for mobile and iPad as well as WASD key and mouse clicks. A script was developed to show when a user has clicked on the game screen. It made use of a hand icon on the screen's canvas, and it tracked mouse input to update the image position. Using Raycasts, a method to interact with objects in Unity, was also explored however was not able to be fully developed and would be implemented in future improvements.



**FIRST PERSON PERSPECTIVE:
WESTMINISTER ABBEY INDOOR SIDE VIEW**



**FIRST PERSON PERSPECTIVE:
WESTMINISTER ABBEY INDOOR BACK VIEW**



**FIRST PERSON PERSPECTIVE:
WESTMINISTER ABBEY OUTDOOR MAIN
ENTRANCE VIEW**

Final Outcome

[CLICK HERE TO VIEW PROTOTYPE](#)

Locomotion

The locomotion is currently an artificial controller based one where WASD keys and mouse view cursor imitate a joystick or continuous movement. Locomotion such as this can cause motion sickness therefore is not our preference for the final application. Since the majority of the experience is pre-scripted and there is limited non-continuous motion-based teleportation would be exploration a further improved final application.

Objects

There are UI elements that a placed in 3D space. The elements are non-diegetic elements that have been added to create wayfinding for the user. The example shown is a small doorway. text overlay with the words “You arrive at the abbey doors”. Also, small door icons and planted around the plane to signify exits from the main scene to explore more of the abbey. Since the application is being viewed from a screen some of the they are shown as overlays for the sake of clarity.

*FIRST PERSON PERSPECTIVE:
WESTMINISTER ABBEY INDOOR FRONT VIEW
THE ALTER*



*FIRST PERSON PERSPECTIVE:
CROWN JEWEL INTERACTION AT THE ALTAR
THE CROWN*



*FIRST PERSON PERSPECTIVE:
CROWN JEWEL INTERACTION AT THE ALTAR
THE SCEPTRES*

References

- Alrehaili, E.A. and Al Osman, H. 2022. A virtual reality role-playing serious game for experiential learning. *Interactive Learning Environments*, **30**(5), pp.922-935.
- Asad, M.M., Naz, A., Churi, P. and Tahanzadeh, M.M. 2021. Virtual reality as pedagogical tool to enhance experiential learning: a systematic literature review. *Education Research International*, **2021**, pp.1-17
- Boletsis, C. and Chasanidou, D. 2022. A Typology of Virtual Reality Locomotion Techniques. *Multimodal Technologies and Interaction*, **6**(9), p.72.
- David, T. 2021. *The coronation: history and ceremonial*. [Online]. United Kingdom: The House of Commons Library. [Accessed 3 January 2023]. Available from: <https://researchbriefings.files.parliament.uk/documents/CBP-9412/CBP-9412.pdf>
- Jerald, J., 2016. *The VR book: Human-centered design for virtual reality*. First Edition. New York: Association for Computing Machinery and Morgan & Claypool.