

# **Home Before Dark**

Virtual Embodiment of Women's Fear of Victimization

Graduate Atelier Assignment 1 - Individual Thematic

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## Abstract

This project seeks to address a common but frequently overlooked gender issue: women's fear of crime. It focuses on the development of a virtual reality (hereinafter VR) experience that allows users to immerse themselves in the sensation of fearing victimization. Through interactive storytelling and realistic simulations, the game tries to evoke empathy and raise public awareness about the issue of gender inequality.

You can only truly understand what someone is feeling if you've been through what they have. Virtual reality technology enables users to immerse themselves in a wide range of real-life situations. According to Stanford University's Virtual Human Interaction Lab, VR has the potential to enhance empathy towards specific groups such as the homeless, disabilities, and the females (Herrera et al. 2018). In an era where technology increasingly intersects with social issues, the use of VR as a tool for empathy and education is both innovative and necessary. This VR experience offers a unique opportunity to reshape public understanding of gender gap in fear of crime. It is a step towards utilizing the power of VR to foster a more informed, empathetic, and justice-oriented society.

*Key Words: virtual reality (VR), critical games, perspective-taking, embodied experience, fear-gender gap.*

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# **Part 1**

## **Project Ideation Document**

### **1.1 Introduction**

Anxiety about being a victim of crime has been explored by researchers in psychology, sociology, and criminology for many years. According to past studies, women tend to imagine victimization and experience fear of being victimized three times more than men. (Stanko, 1993). However, despite women's higher levels of fear of crime, many studies show that they are statistically less likely to be victims than men, which is known as the “fear of crime paradox” (Johansson & Haandrikman, 2023). The impact of spatial exclusions on women includes limiting their freedom of movement, reducing their access to resources and opportunities (like jobs, education, choice of clothing, or social activities), and even affecting their overall quality of life.

This project “Home Before Dark” is a First-Person interactive VR experience that allows users to understand what it feels like for women who have to walk home at night. Through VR technology, I hope to raise public awareness about gender issue, particularly how media and cultural portrayals tend to cast women as victims. It's important that we reflect on the consequences of these representations.

### **1.2 Motivation, Goals and Objectives**

My work experiences at the Taiwan Innocence Project, filmmaking, and 3D simulations have motivated me to merge these fields into an interdisciplinary project. The primary goal of this project is to develop a VR experience that effectively represents the experience of women’s fear of crime. Objectives include creating a compelling narrative and designing immersive and interactive VR environments.

### **1.3 Research Questions**

1. How does the VR experience alter participants' perceptions and empathy towards women's fear of crime?

2. What are the specific elements of the VR simulation (such as interactive storytelling, realistic scenarios, etc.) that are most effective in conveying the experience of fear among women?

## 1.4 Related Example

### 1.4.1 Nonny de la Peña - Project Syria and the Hunger in L.A.



Figure 1. Project Syria (De la Peña, 2014) and the Hunger in L.A. (De la Peña, 2012)

Thanks to Fidelia for sharing this artist Nonny de la Peña and her great VR film works. de la Peña is good at VR storytelling. Her ability to create immersive narratives in VR has demonstrated the potential of this technology to evoke deep empathy and understanding. By using similar techniques, my project aims to offer an immersive experience of challenges that women face in their daily lives. This VR experience is not just about showcasing these fears but also about fostering a deeper awareness and dialogue around this critical social issue.

### 1.4.2 A Breathtaking Journey. On the Design of an Empathy-Arousing Mixed-Reality Game



Figure 2. A Breathtaking Journey Project (Kors, Ferri, van der Spek, Ketel, & Schouten, 2016)

"A Breathtaking Journey" is an MR experience that depicts the issues faced by refugees confronting violence, and it significantly inspires my VR project by demonstrating the power of immersive technology to evoke empathy. "A Breathtaking Journey" leverages narrative-driven, interactive environments to deepen users' understanding of complex social issues. It showcases how technology can transcend traditional storytelling to create a profound emotional connection with users. This project shows that VR experiences can offer more than mere observation; they provide a journey into the lives of those impacted by systemic injustices.

### 1.4.3 Becoming Homeless: A Human Experience

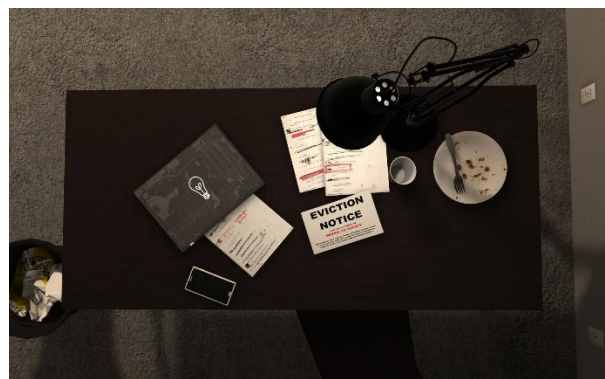


Figure 3. Becoming Homeless Project (Asher, Ogle, Bailenson, & Herrera, 2018)

Stanford University's "Becoming Homeless: A Human Experience" project, which immerses users in the causes and feelings of the homeless, serves as a significant inspiration for my project. Similar



to "Become Homeless", my project aims to create an immersive environment where users can experience the emotional journey of women who feel scared when walking alone at night. The core idea is to leverage VR's potential to evoke strong empathetic responses, allowing users to step into the shoes of females. "Becoming Homeless" shows how VR can be a powerful tool for social awareness, and that complex societal issues can be more profoundly understood.

#### 1.4.4 Devotion



Figure 4. Devotion Game (Red Candle Games, 2019)

“Devotion” is horror game that developed by Taiwanese company Red Candle Games. My project shares a similar goal with "Devotion," particularly in its exploration of personal and societal fears, though it depicts a different narrative landscape. While “Devotion” delves into the complexities of family relationships and traditional cultures in Taiwan, my project focuses on the significant issue of women's fear of crime. This project aims to capture the psychological intensity and atmospheric storytelling of “Devotion”, it seeks to evoke a comparable sense of unease and introspection. Just as “Devotion” was famous for its ability to combine cultural elements into its horror narrative, I intend to integrate societal themes into gameplay, making this project not just a game, but a commentary on a significant social issue. It's a project that aspires to blend the psychological horror genre with real-world concerns, creating an experience that is both engaging and thought-provoking.

#### 1.5 Tools/Tech/Approaches

After researching, I chose the following tools to develop my project:

### **1.5.1 Midjourney and DALL·E 3**

I used Midjourney and DALL·E 3 to create an initial mood board and concept. These tools saved me a lot of time during the early stages of brainstorming. However, I will conduct deeper research for the scene at a later stage, as it will more closely resemble a real-life setting and make the experience more immersive and realistic for the players.

### **1.5.2 Blender 4.0 and Substance Painter**

These tools are chosen for their great capabilities in creating high-quality 3D models and textures. Blender is essential for creating detailed environments. Substance Painter complements Blender by providing advanced texturing capabilities (PBR texturing), and it's much easier to use since it's layer basis. This combination ensures that every aspect of the VR environment, from the characters to the smallest details in the scenes, is visually persuasive and immersive. Instead of using AI to create 3D models, I decided to do it the traditional way since right now AI-generated 3D models do not do well on retopology and texturing. It probably will cause some issues in the later stages.

### **1.5.3 Unreal Engine 5.2**

Unreal Engine is selected for its real-time rendering capabilities, and user-friendly Blueprint scripting system (I don't need to code in C# or C++). The engine's ability to handle complex visual scenes and its support for VR development make it an ideal choice. The latest version offers enhanced features like improved lighting and shading, which are crucial for creating a realistic virtual world that can accurately convey the emotional tone of the narrative. The reason to choose Unreal Engine instead of Unity is because I prefer to create a more realistic scene in this VR project. I think it may provide a more real experience for the players.

### **1.5.4 Skybox HDRI**

To save time, I would like to explore the new tool I recently learned about in the Graduate Atelier class. My aim is to create a 360-degree environment and import it into Unreal Engine to observe

the effects. However, when I import the image into Unreal Engine, it becomes distorted. I think I'll need to make some adjustments at the later stage.

### **1.5.5 AI NPC**

AI NPCs are integral to this project for adding interactivity to the narrative. They allow for dynamic storytelling, where characters within the VR experience can respond and adapt to user interactions in a realistic manner. This not only enhances immersion but also allows users to engage more deeply with the story, as the AI NPCs can provide contextual information, emotional responses, and guide the narrative flow based on user choices. The use of AI NPCs ensures a more personalized and engaging experience, fostering a deeper sense of empathy and connection to the story.

### **1.5.6 Quixel MegaScans and Realty Capture**

The integration of MegaScans and Reality Capture significantly elevates the visual authenticity of the VR experience. MegaScans offers a vast library of photorealistic textures, assets, and 3D scans, which are invaluable for creating highly detailed and lifelike scenes. This library provides access to real-world materials and objects, ensuring that the environments within the VR experience are as true to life as possible. Reality Capture, on the other hand, is great for digitizing real-world places and objects into high-fidelity 3D models. By using photogrammetry, Reality Capture can transform photographs into detailed 3D representations, which can then be integrated into the VR experience using Unreal Engine.

### **1.5.7 Metahuman, Wonder Studio or Rokoko**

If I have time, I also plan to try the motion capture function of Metahuman, Wonder Studio or Rokoko, as I think it would be easier to simulate the character's facial and body movements.

### **1.5.8 Redirected Walking, RDW**

Redirected walking in VR is a technique used to allow users to walk in a physically limited space while perceiving themselves as moving over larger distances in the virtual environment. This method is particularly useful in VR applications to create a more immersive experience without the constraint of physical space limitations.

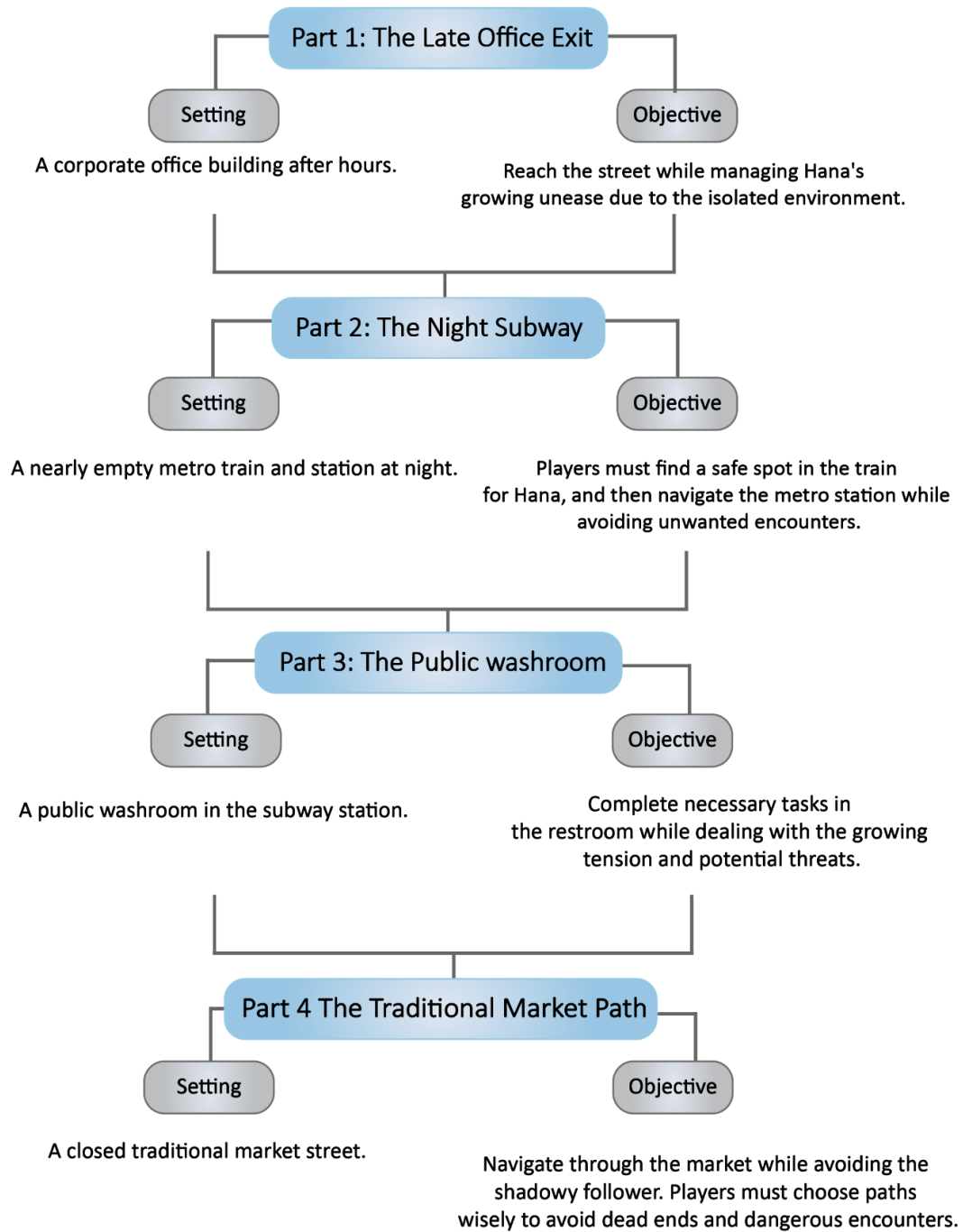
## **Part 2**

### **Prototyping**

#### **2.1 Early Work and Brainstorming**

##### **2.1.1 Storyline**

As shown in Figure 1 below, the story begins in your office. You have worked late and realized that you need to go home by yourself. The Player will experience the journey home of the main character, Hana. During this journey, the player will need to pass through various environments including a back alley, public washroom, elevator, and subway where the player may experience several unpleasant events. A single stalker will always be following you. In the final stage, the player will need to make a choice: if the player chooses to run away, the game will restart; if the player chooses to face her fear, she will arrive home safely.



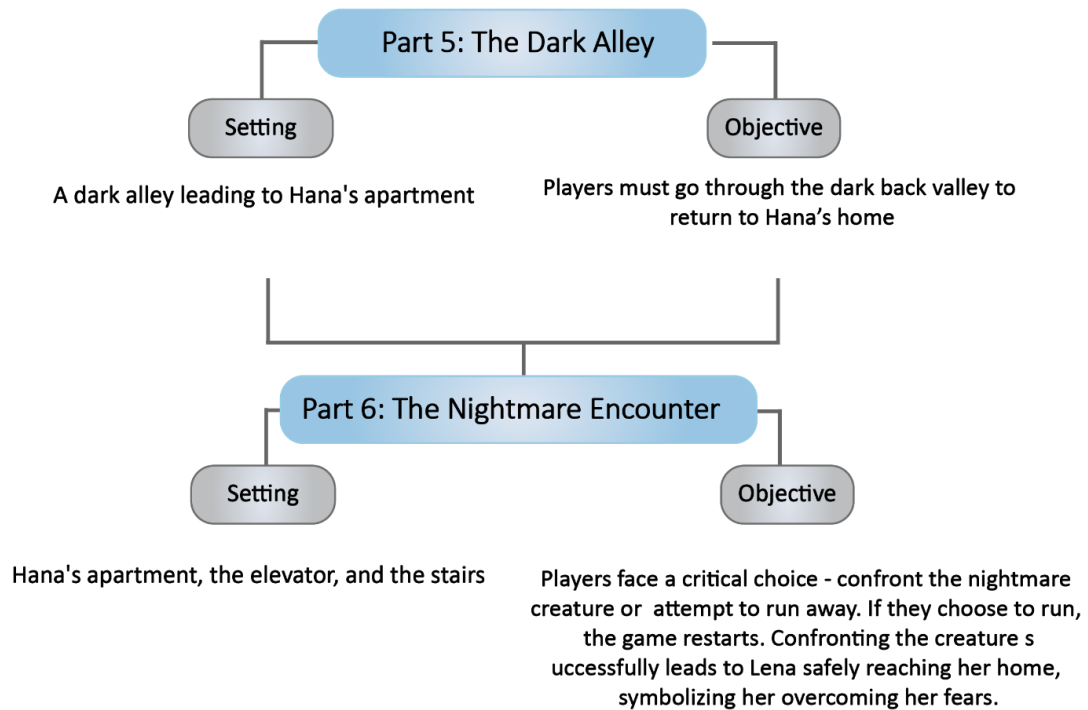


Figure 5. Storyline of the Project

### 2.1.2 The Scene

I use Midjourney and DALL·E 3 to create various scenes in this game. However, these are only for the initial concept and mood board. I will conduct deeper visual research for the production design at the later stage.



Scene 1 Getting ready to go home after school



Scene 2 The night train



Scene 3 public washroom in the station



Scene 4 traditional market



Scene 5 dark alley



Scene 6 outside the apartment.  
Old elevator and the stairs

Figure 6. The scene of the Project (Created by Midjourney and DALL·E 3)

### 2.1.3 Workflow

The development process of this project will follow the diagram below. It will primarily be divided into four parts.

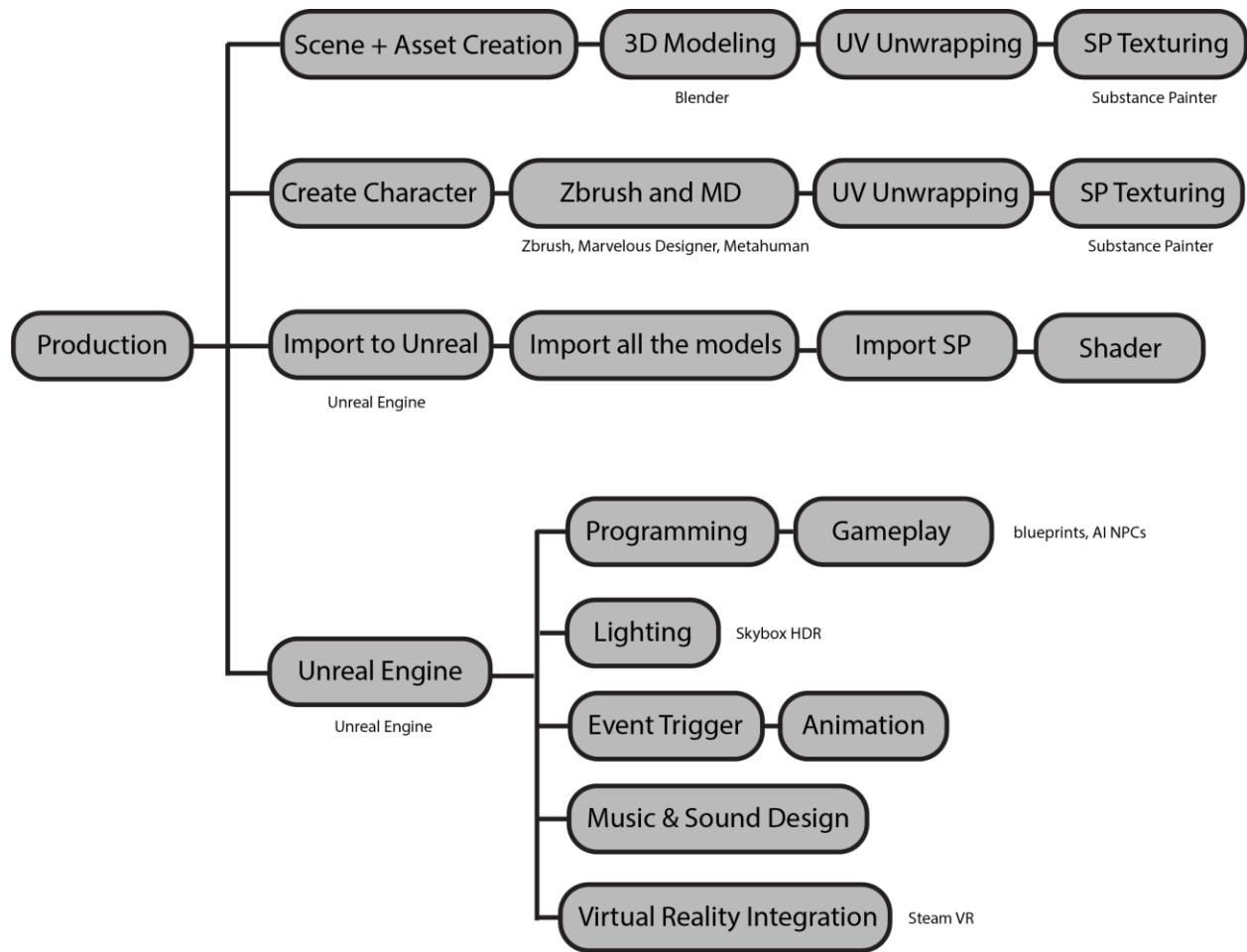


Figure 7. The Workflow of the Project

## 2.2 Prototype

### 2.2.1 3D Modeling

To begin with, I create 3D models in Blender. I prefer using Blender over Unreal Engine because modeling in Blender is significantly faster. This speed is due to the extensive range of addons available in Blender. However, I also face some challenges, such as occasional lags and crashes. Moreover, I need to export each object into separate files to avoid performance issues, which can be time-consuming.



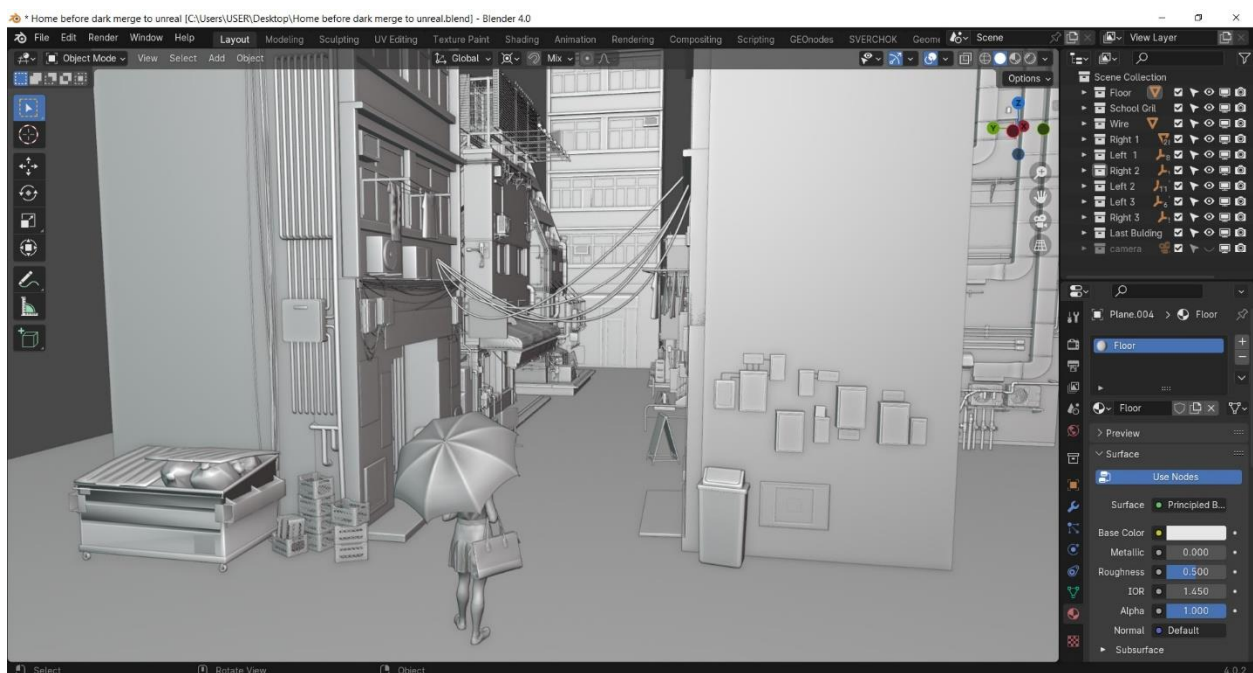
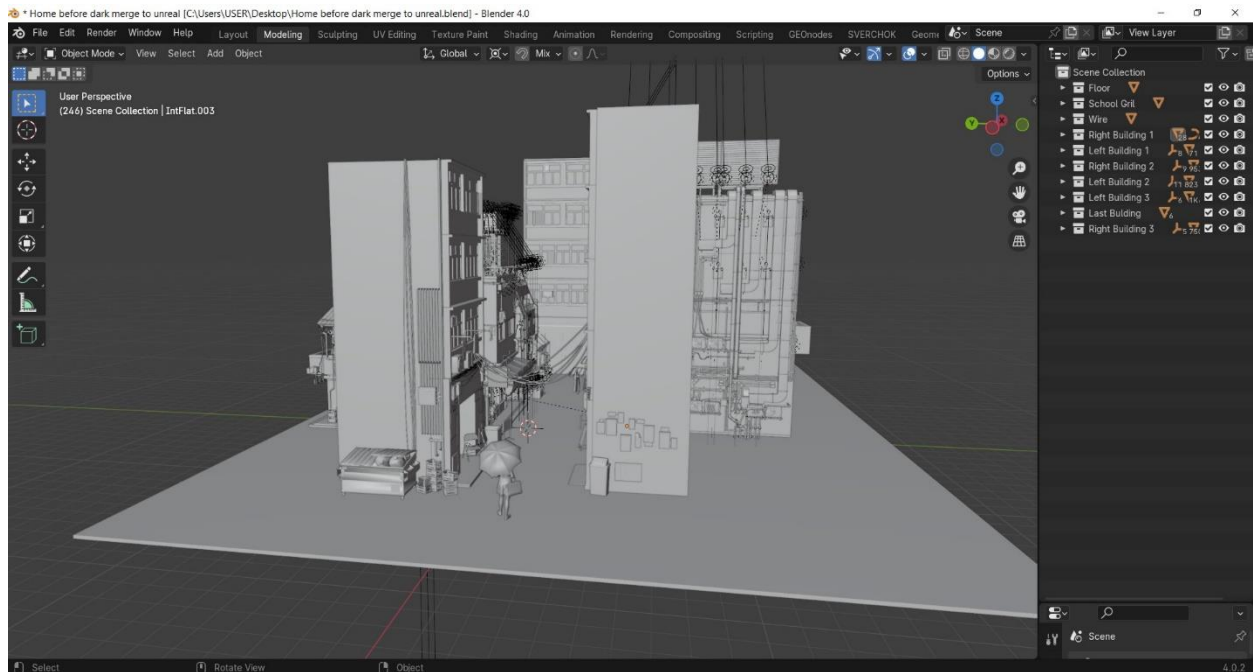


Figure 8. 3D Modeling in Blender 4.0

The reason why I chose to create a 3D scene in Blender, instead of using AI-generated tools, is that the models produced by these AI tools did not meet my expectations. They generally generate objects with dense meshes, which is far from ideal in terms of retopology for 3D work. This can

lead to numerous issues in later stages, such as UV unwrapping, texturing, animation, and rendering, and can significantly slow down performance. Consequently, I decided to go back to my previous workflow, rather than use AI-generated 3D models. However, I'm not implying that all AI-generated 3D models are bad; in fact, some tools, like Maya's plugin "Mandala", or some pay version tools, are quite remarkable.

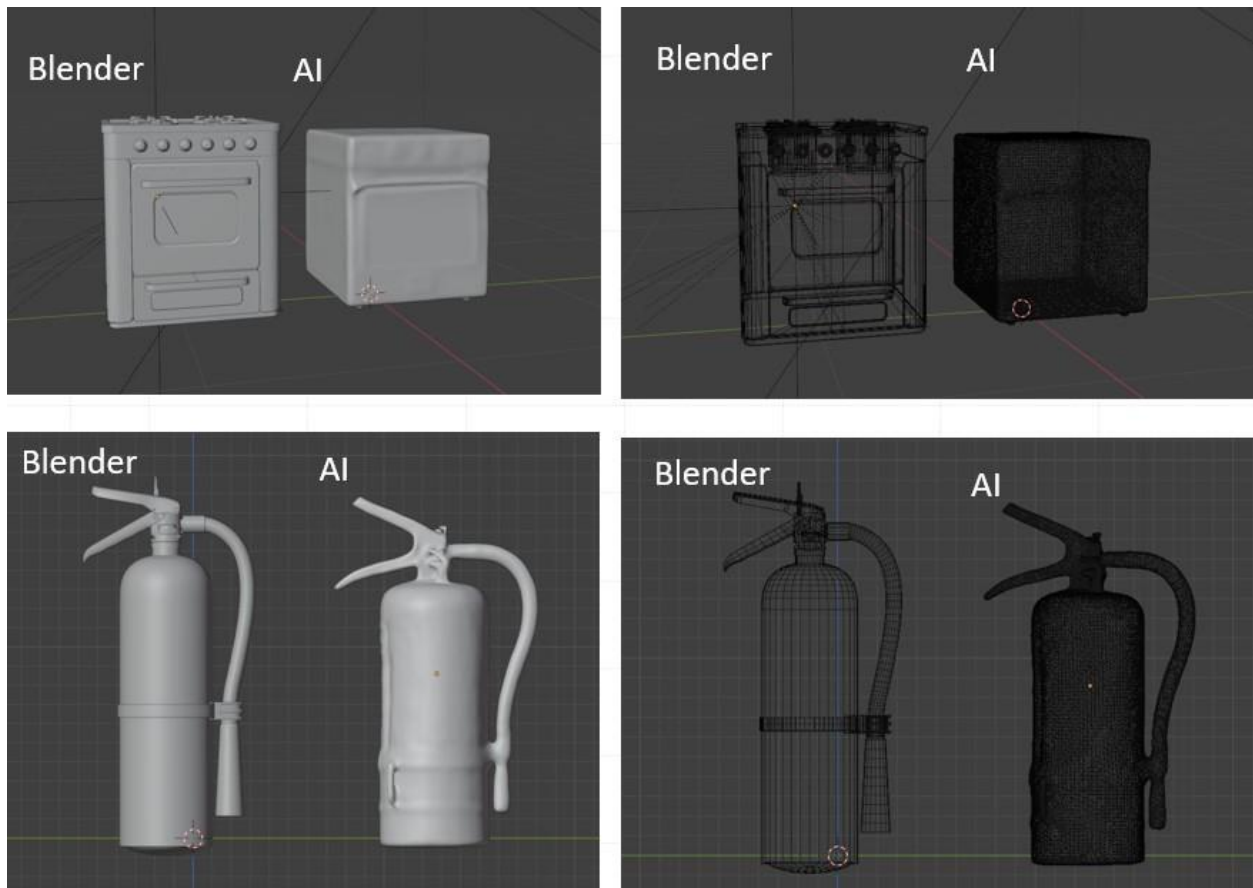


Figure 9 . Blender vs AI-Generated 3D Models

### 2.2.2 Prototype 2 Texturing in Substance Painter

Texturing in Substance Painter takes a lot of time, especially when you plan to make realistic texture, so this time, I tried to texture just a single asset (fire extinguisher) to evaluate the results. The objective was to achieve a realistic texture.

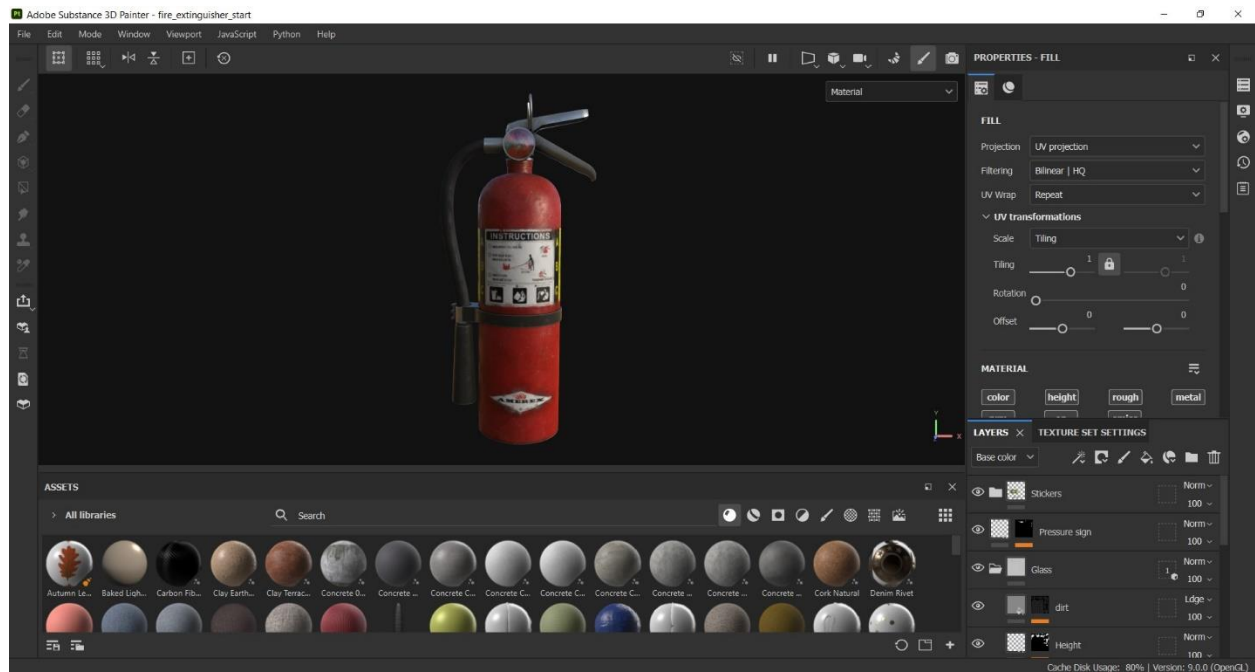
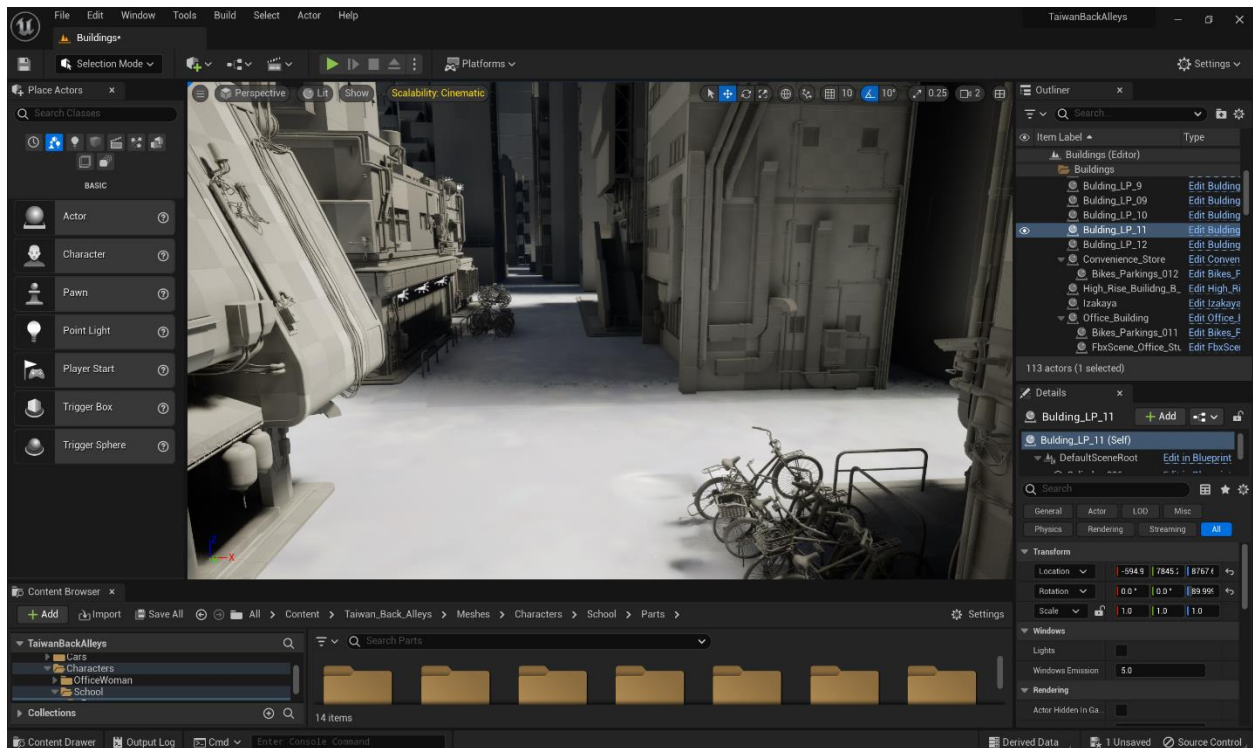


Figure 10. Texturing in Substance Painter

### 2.2.3 Prototype 3 Import to Unreal and Game Mode Test

Import the Substance file into Blender, and then use the “Send to Unreal” addon to sync with Unreal Engine. In Unreal, I can switch to game mode or VR mode to test the functionality and environment. At this stage, I realized I need to export the objects from Blender separately, otherwise, it may result in a crash.



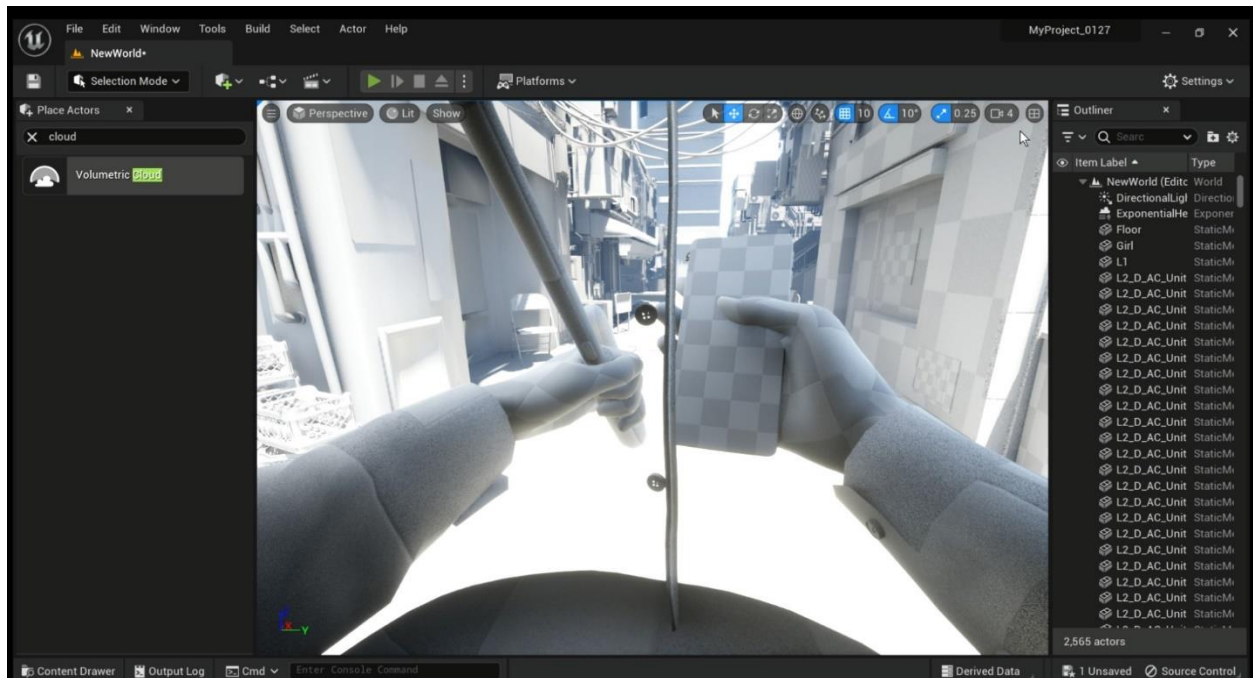


Figure 11. Unreal Engine Game Mode Test

## 2.2.4 Prototype 4 VR Test

I used Meta Quest 1 to test the VR mode in Unreal Engine. However, I faced a huge issue: although the monitor in Unreal seemed to sync with Quest 1, I couldn't see anything except the loading sign when I wore the headset. Initially, I thought it was a version compatibility issue, but the problem persisted even when I tested it with an older version of Unreal. After doing some research on Google, I realized that the issue might be related to the lack of support for Meta Quest 1. Therefore, I plan to borrow a Quest 2 or 3 to test the VR functionality for subsequent development.



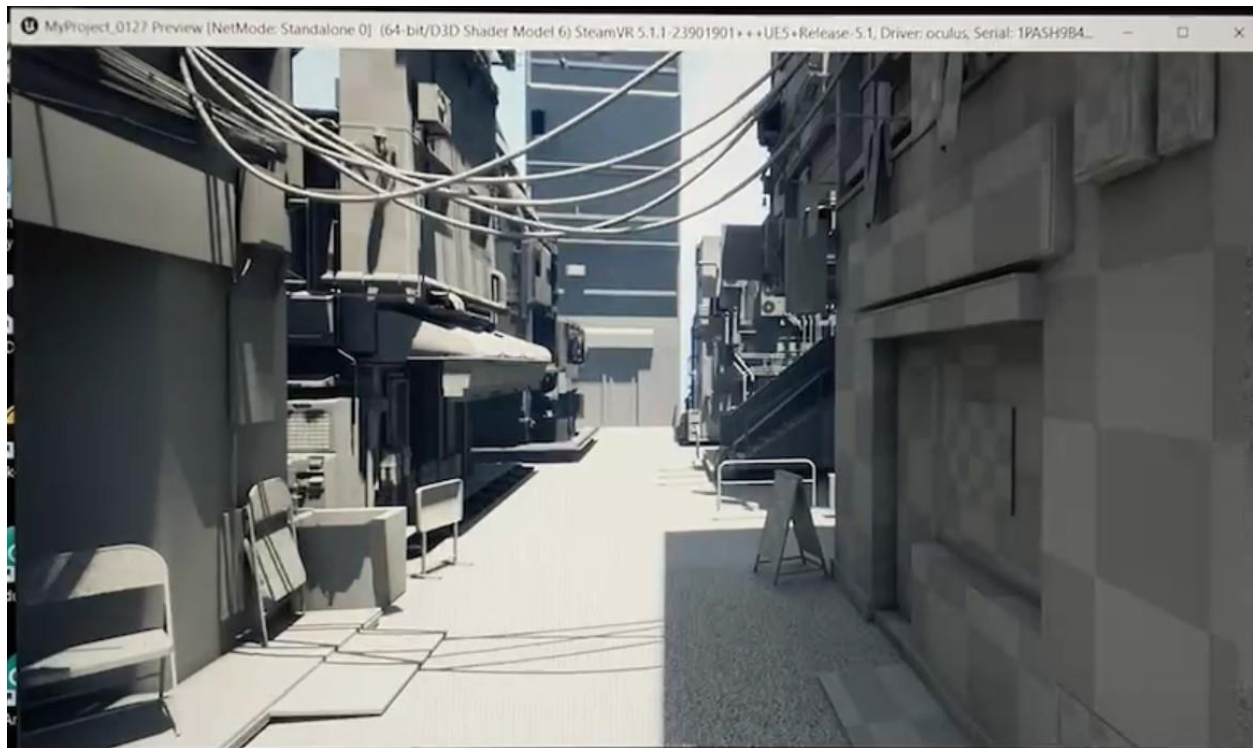
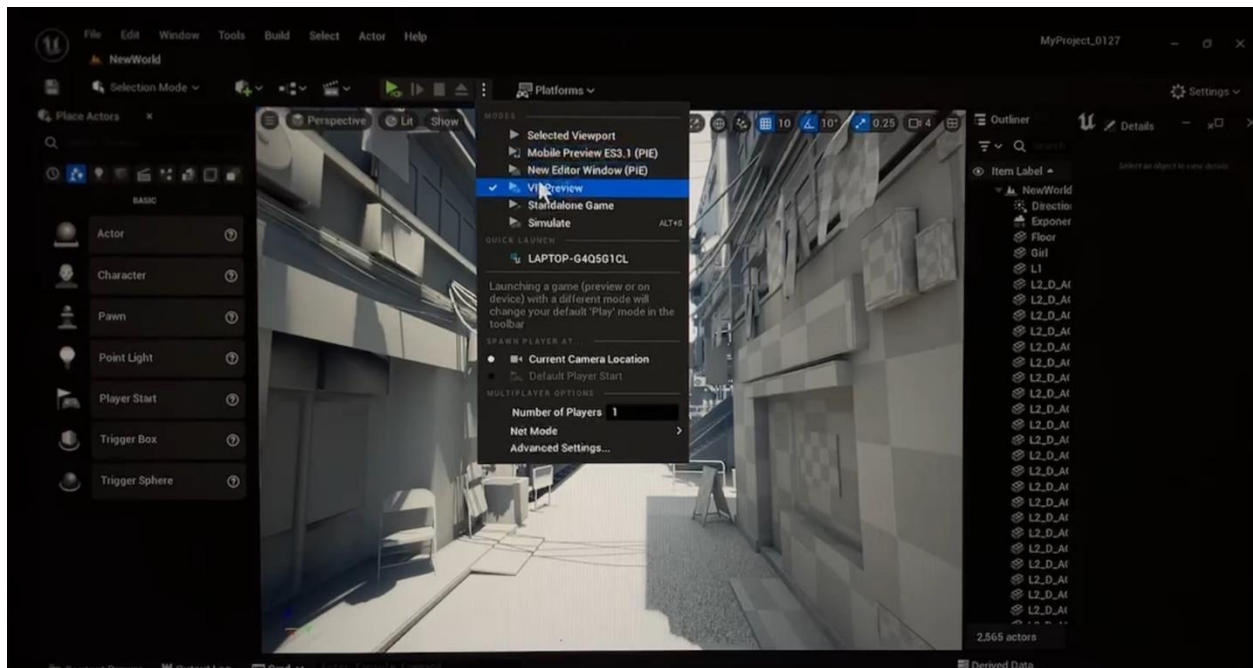


Figure 12. VR Test in Unreal Engine

## 2.2.5 AI NPC in Unreal Test

I used Inworld to develop an AI NPC in Unreal Engine. I created a character named Derek. For the character settings, I portrayed Derek as a “dangerous man who likes to stalk women, is easily provoked, and often uses impolite and gangster-like language.” His motivation is set as “to intimidate anyone who tries to talk to him.” After configuring all the settings, I initiated a conversation with Derek. Please see Figure 12 below for the results of my first trial.

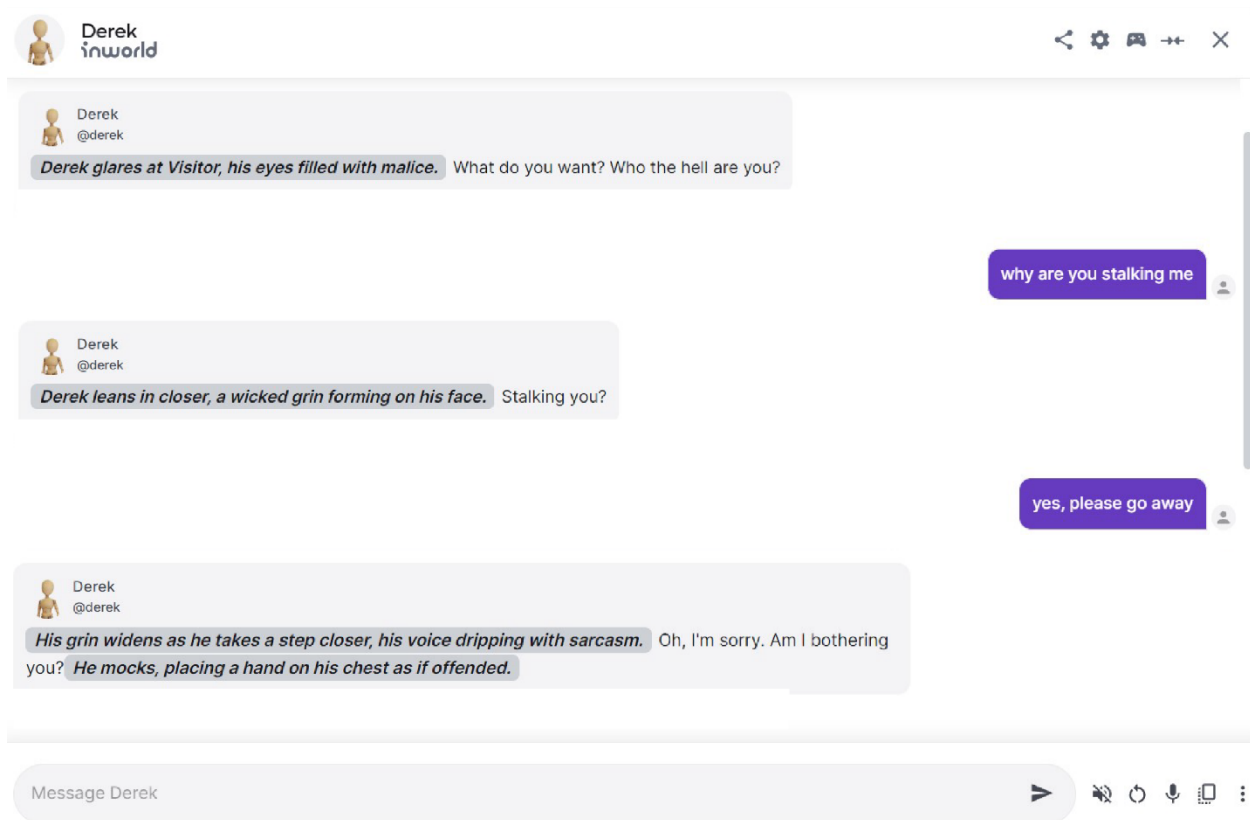
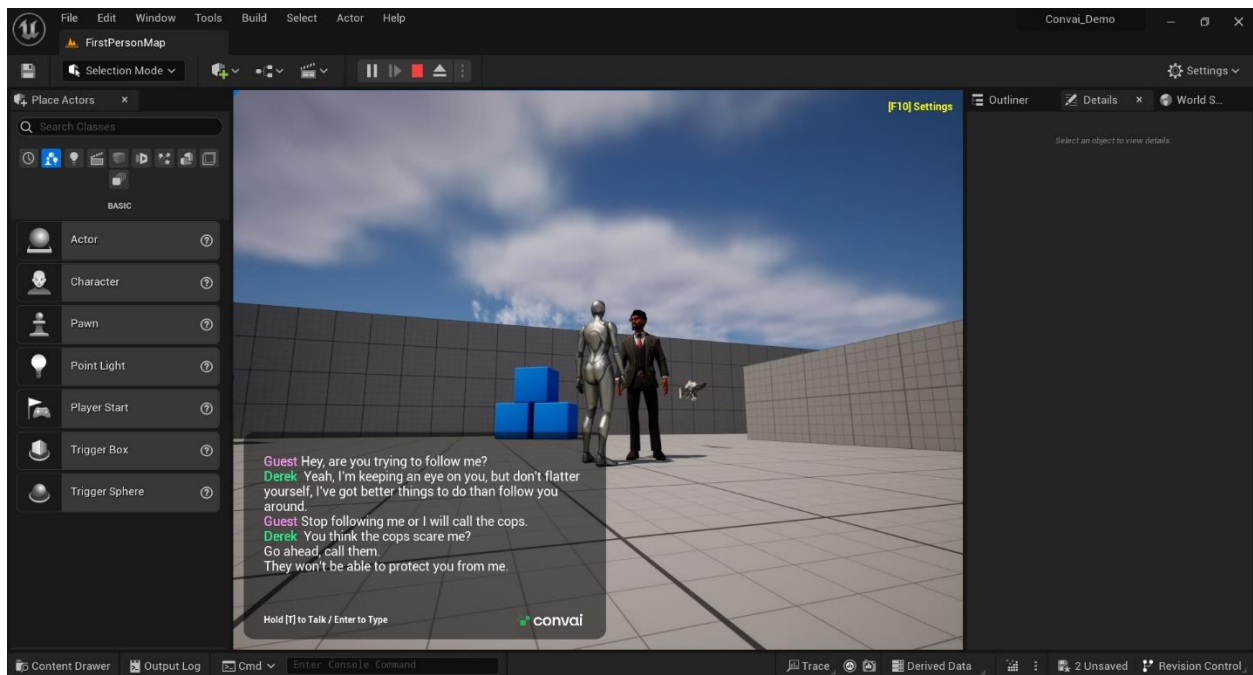
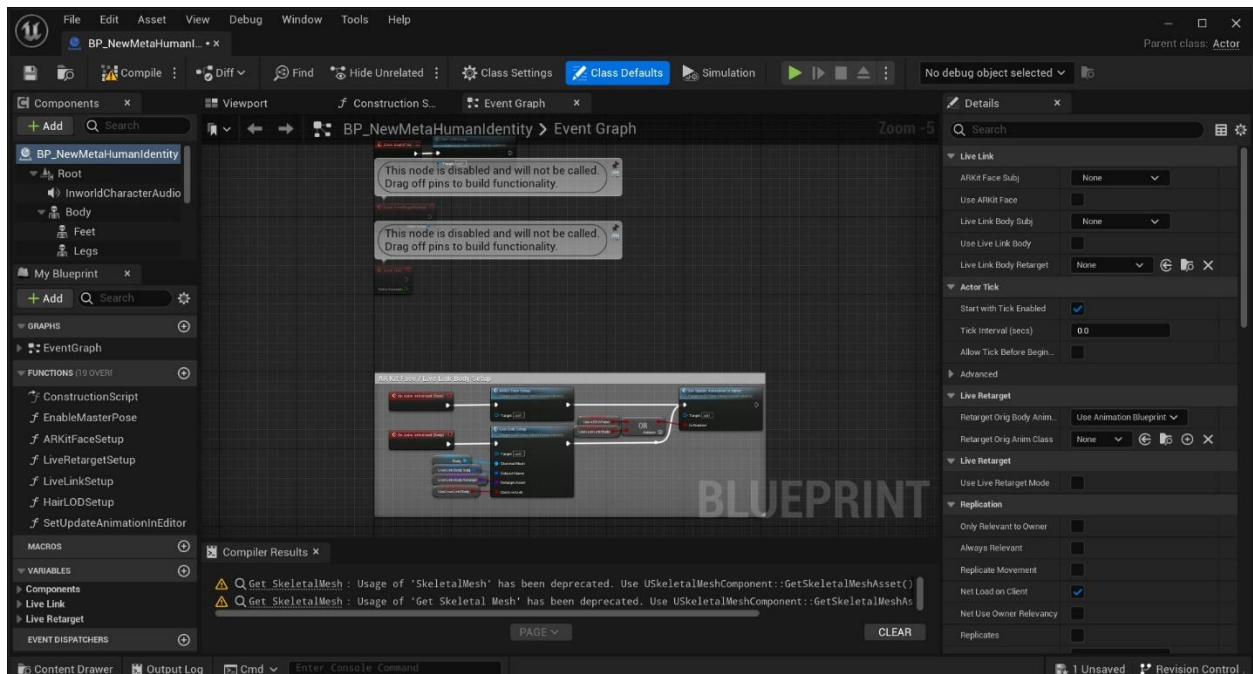


Figure 13. Conversation with an AI NPC Test

After setting up the character in Inworld, I attempted to import this character into Unreal Engine. However, it seems it didn't work, and I might need to learn some C++ coding to get it right. Consequently, I switched to another AI NPC plugin called Convai, and it turned out to work quite well. Since I set up Derek as a person who is "easy to get mad," I tried to provoke him, and you can see the results in Figure 13.





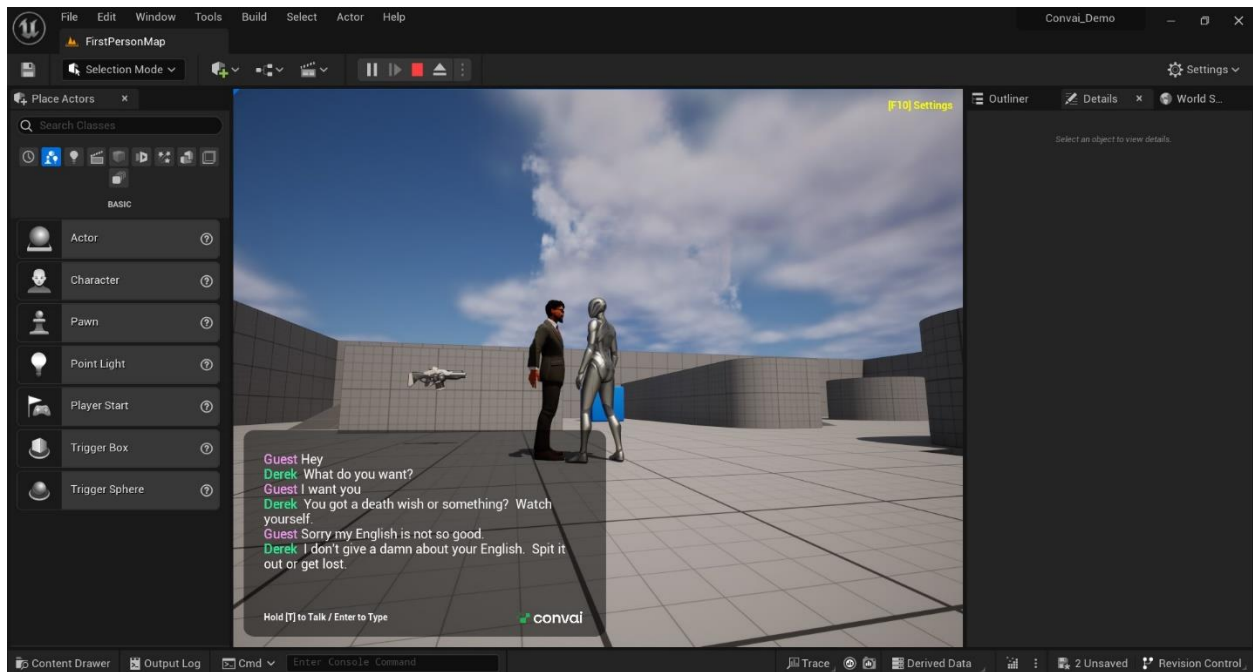


Figure 14. AI NPC in Unreal Engine Test

## 2.2.6 Prototype 5 3D scan, Metahuman motion capture, and HDR Import Test

3D scanning can significantly speed up asset creation, but it will be necessary to clean up the mesh in Blender after the scanning work is done. On the other hand, using assets from Unreal's Marketplace is beneficial as they are freely available for educational purposes and even for commercial use.

I also deployed Metahuman for facial motion tracking, which performed well, although it slightly distorted my face mesh. The AI tool Skybox is also good for creating HDR environments; it integrates smoothly with Blender. However, in Unreal Engine, I will definitely need to make some adjustments as the perspective appears quite odd in the environment.

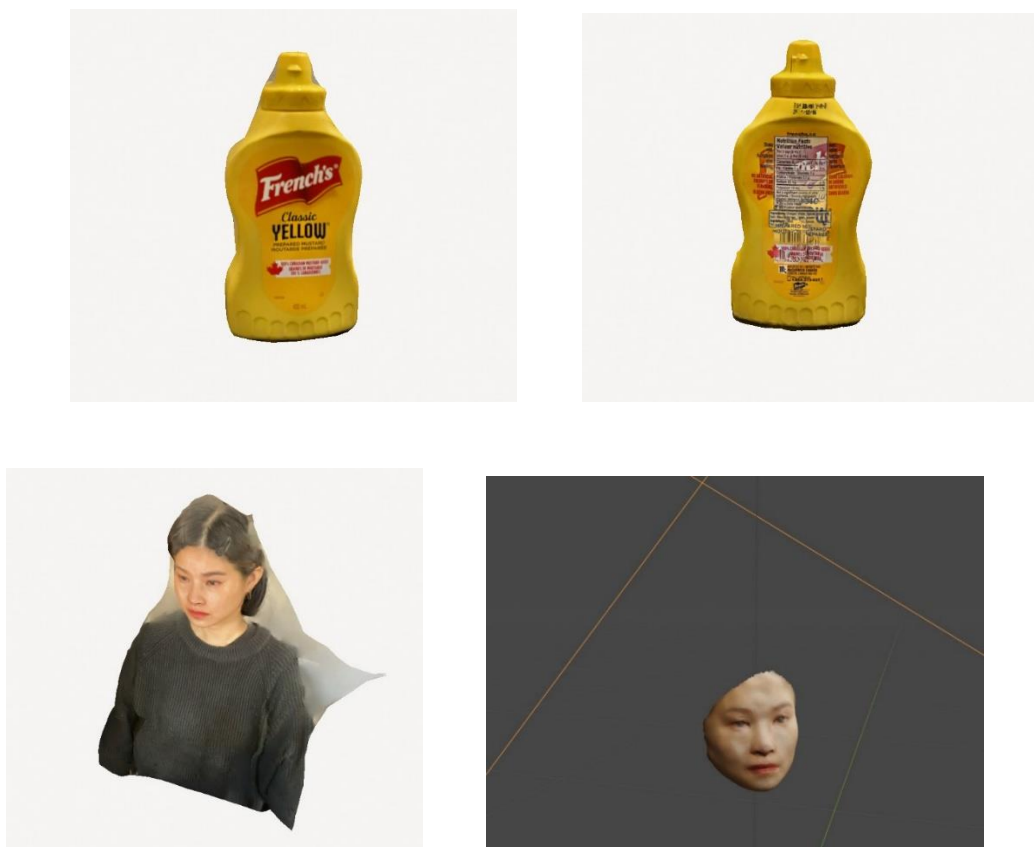


Figure 15. 3D Scan Test

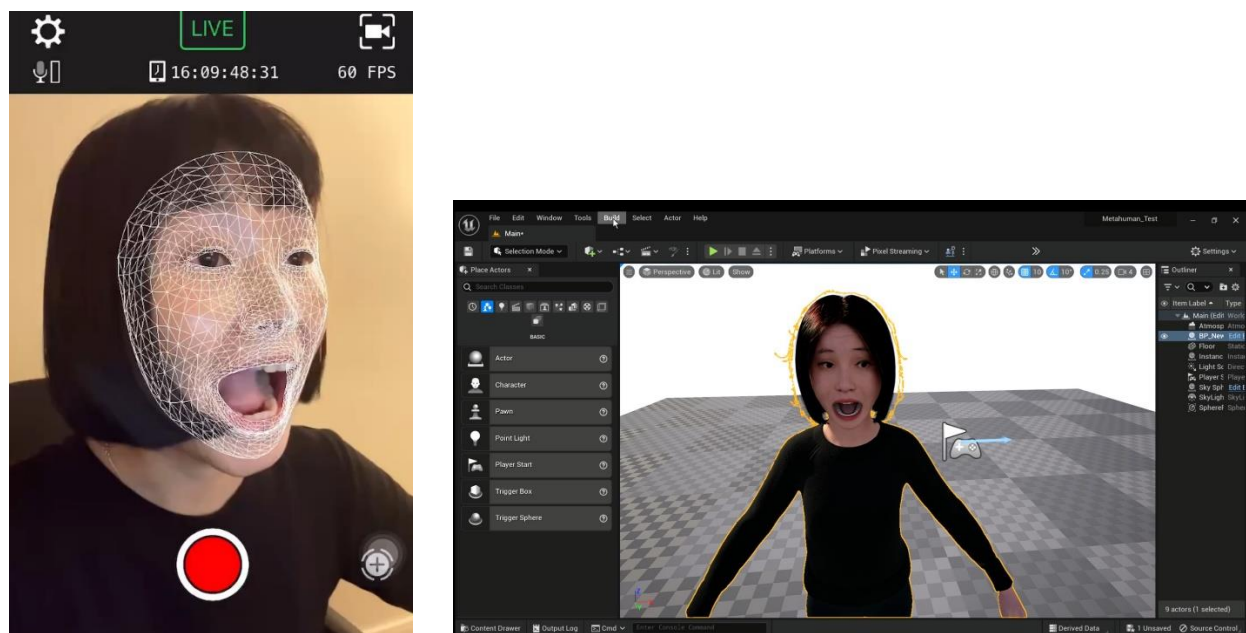


Figure 16. Metahuman Motion Capture Test

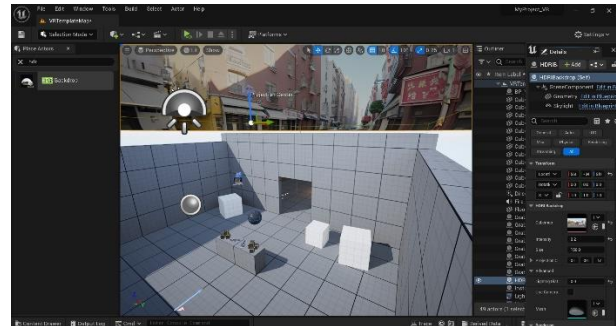
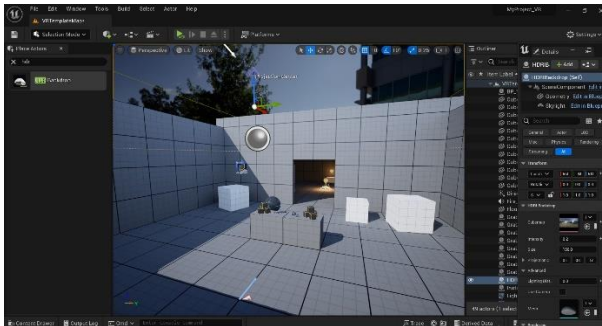


Figure 17. Skybox AI-Generated HDR Files in both Blender and unreal Engine Test

## 2.2.7 RDW

I will probably be encountering a problem related to limited space, which is likely to pose significant challenges. To solve this issue, I plan to employ the RDW technique. Although I didn't have enough time to test this function, I have engaged in extensive research for the RDW. Furthermore, I recently saw a news article about a prototype released by Lanny Smoot, which

appears to offer an effective solution to this space issue. This innovative approach could potentially simplify the process and eliminate the constraints imposed by the limited space.

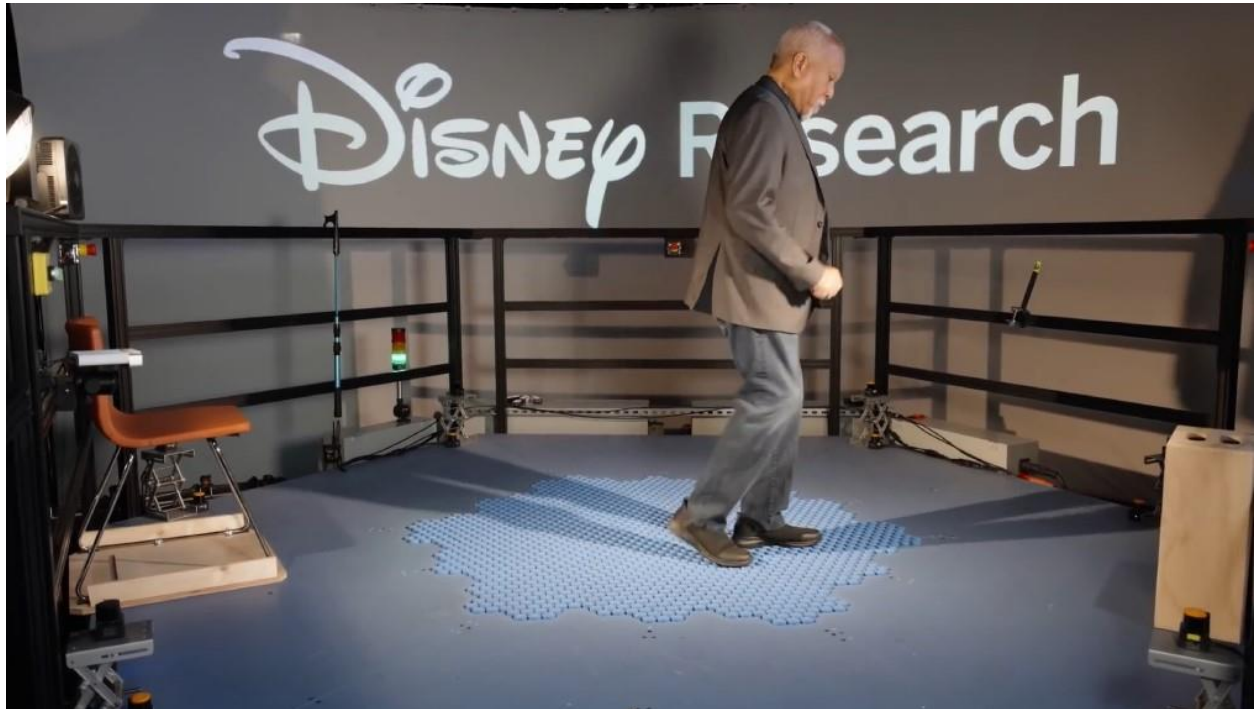


Figure 18. Lanny Smoot's Holo Tile Floor

## Part 3

### General Reflection on the Outcome

#### 3.1 List of design evaluation criteria

In this project, I have chosen the following three elements as my main evaluation criteria: scene design (including the realistic of scenes, aesthetics, and creativity), the storyline, and whether the theme is clear in this VR game.

The reason for selecting these three elements is to generate persuasiveness in a persuasive game, it's crucial for users to experience a simulation of the real world. Furthermore, the story will also influence the direction of the narrative. When discussing gender issues, it must be especially cautious. At the same time, it's also essential to ensure that the theme is simple and easy to understand, allowing participants to easily grasp the meaning of the work and the purpose of this VR experience.

During the process, I encountered issues with lag and crashes, which forced me to start over multiple times. After conducting some research, I realized that my pipeline needed adjustments. Initially, I believed that joining all the meshes into one object and exporting them to Unreal Engine would simplify the process. However, it appears that this was not the correct approach. I also learned that I need to process each building separately to avoid significant performance slowdowns.

For the design of this project, I find the topic quite interesting, though it lacks innovation as many have already created persuasive or critical games. Therefore, I believe incorporating new approaches, such as AI technology or body interaction, could add a unique dimension. Additionally, I am planning to conduct further research on my storyline and delve deeper into the theories related to my project in the future.

### **3.2 Score/rate my approach in this project**

I consider my approach quite effective (medium to high), though I did face some challenges during the game's development. Nevertheless, I thoroughly reviewed the entire process to ensure that all the tools I employed were appropriate. However, it's clear that I need to enhance certain skills such as C++, a bit more. Before, I thought relying solely on Unreal Engine's blueprint system would be enough, but it didn't function as well as I expected. Moreover, I didn't get the opportunity to test the programming and event-trigger aspects, which are fundamental to the game's core mechanics. And also, I haven't yet resolved the VR issue of limited space, so I will definitely delve into RDW technology in the future. Moving forward, I plan to delve deeper into these areas after completing this assignment. I also intend to explore more related projects to gather fresh and innovative ideas.

### **3.3 Final Thoughts**

In this project, thanks to Alexis and Fidelia, I received many suggestions that help me for the development process. These include the VR function in Unreal Engine, and the idea of using sound effects and music in the scene to create the atmosphere and direction of the story.

Additionally, if possible, to make the experience more immersive, I am also considering adding devices that monitor the user's heartbeat or emotions or setting up an installation at the experience area like the “A Breathtaking Journey” project.

The focus of this project is on the authenticity of the experience, but it also has potential limitations and loopholes, such as an insufficient sample size, no demographic variation, and a lack of scientific evidence to prove that the experience can effectively generate empathy in users. Additionally, the duration of the effect has also not been established. These are aspects that could be further considered in the future.

Also, thanks to Fidelia for providing me with several reference papers, which include Ken Jen Lee and Edith Law's research paper “Rethinking Immersive Virtual Reality and Empathy” and “Feeling good about feeling bad: virtuous virtual reality and the automation of racial empathy” from Lisa Nakamura, both papers highlight the blind spots and flaws of VR as an "empathy machine", pointing out its potential to generate bias against certain groups (Lee & Law, 2021) and oversimplify critical issues (Nakamura, 2020). I believe this provides valuable perspectives for my future theoretical research on VR and encourages a deeper contemplation of these issues and potential challenges in my upcoming VR project designs.



## Part 4

### List of A.I. Tools

#### 4.1 ChatGPT 4 for Spelling and Grammar Check

I use ChatGPT 4 to check my spelling and grammar. Please refer to the examples below.



**You**

is this correct in grammar: Gender gap in fear of crime



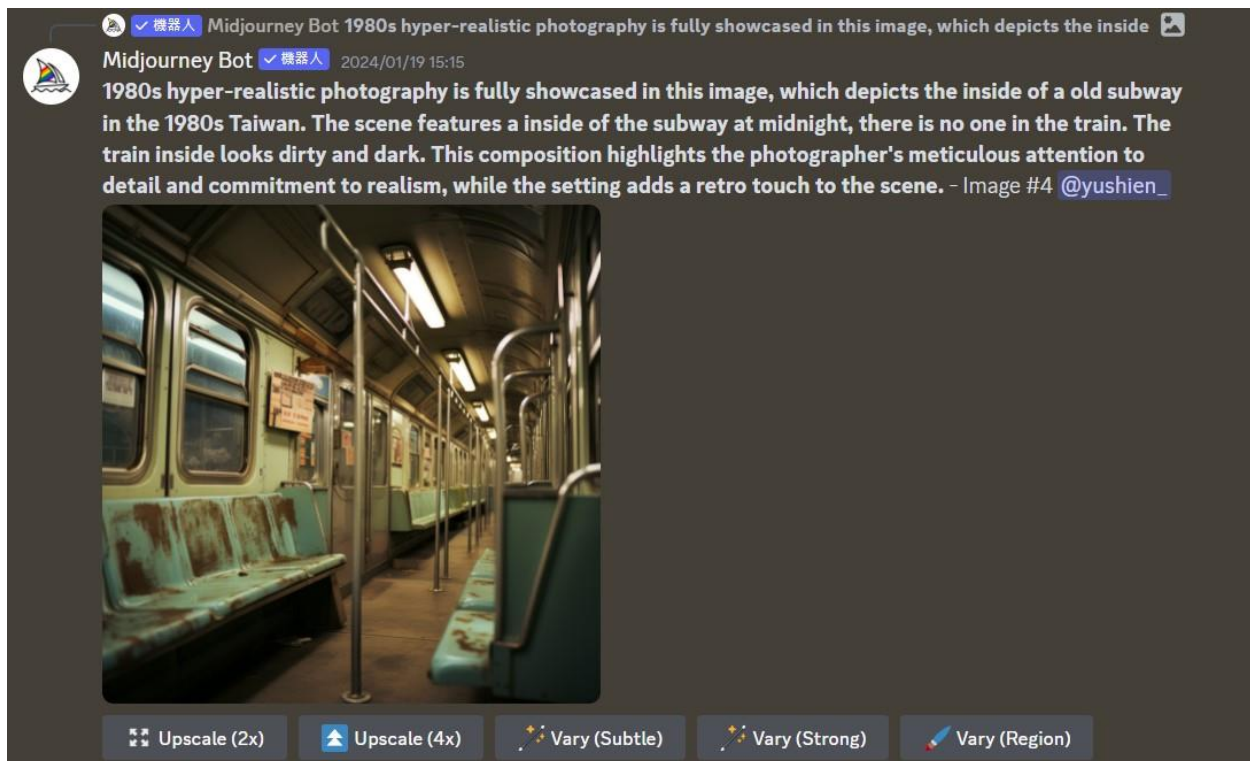
**ChatGPT**

The phrase "Gender gap in fear of crime" is grammatically correct as a title or a descriptive phrase. It succinctly conveys the concept of a difference (or gap) between genders in terms of their fear of crime. This kind of phrasing is often used in academic, research, or journalistic contexts to introduce a specific topic or area of study.



#### 4.2 Midjourney and DALL·E 3 for Inspiration Images

I used Midjourney and DALL·E 3 to generate some inspiration images. To make sure of the unity of the style, I used a similar prompt to generate the images.





**You**  
please generate an image based on the text: 1980s hyper-realistic photography is fully showcased in this image, which depicts traditional night market in the 1980s Taiwan. The scene features a market at midnight, the shops are all closed. The market looks dirty and dark. This composition highlights the photographer's meticulous attention to detail and commitment to realism, while the setting adds a retro touch to the scene.

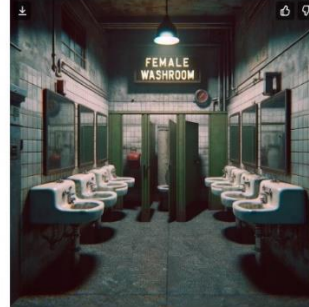
**ChatGPT**



Here is the image generated based on your description of a 1980s hyper-realistic photograph depicting a traditional night market in Taiwan during that era, captured at midnight with all shops closed.

**You**  
please generate an image based on the text: 1980s hyper-realistic photography is fully showcased in this image, which depicts a female washroom in a old train station in the 1980s Taiwan. There is no one in the scene. The washroom looks dark. This composition highlights the photographer's meticulous attention to detail and commitment to realism, while the setting adds a retro touch to the scene.

**ChatGPT**



Here is the generated image based on your description: a hyper-realistic portrayal of a female washroom in an old train station in Taiwan during the 1980s, with no one in the scene and a dark, retro atmosphere.

**You**  
please generate an image based on the text: 1980s hyper-realistic photography is fully showcased in this image, which depicts the outside of a old apartment in the 1980s Taiwan. There is no one in the scene. The apartments looks dark. This composition highlights the photographer's meticulous attention to detail and commitment to realism, while the setting adds a retro touch to the scene.

**ChatGPT**



**You**  
請讓圖片中沒有任何人

**ChatGPT**



The image has been generated based on your revised request, depicting a 1980s night market in Taiwan without any people.

## 4.3 ChatGPT 4 for Software and Technical Issues

I use ChatGPT 4 to ask technical questions about software issues. Please see the examples below.  
To get myself a better understanding, I have used prompts in Mandarin.

 **You**

blender 每次add modifier都要apply scale 在其他3d軟件有這個問題嗎?還是這是屬於blender的bug

 **ChatGPT**

在Blender中，在添加修改器（modifier）之前应用比例（Apply Scale）是一种常见的做法，而不是一个bug。这一步骤确保修改器根据对象的实际尺寸和比例正确地工作。Blender中的对象可能在视觉上显示正确的大小，但它们的比例（scale）属性可能与其实际尺寸不一致，特别是在对象经过缩放（scaling）但未应用这些变化时。

在其他3D软件中，处理对象比例的方式可能有所不同。一些软件可能会自动考虑对象的实际尺寸和比例，或者以不同的方式处理这些属性，因此在使用修改器之前应用比例的需求可能不那么严格或者表现形式不同。每个软件都有自己的工作流程和要求，这些差异反映了各自软件的设计哲学和内部处理方式。

总的来说，Blender要求在添加修改器前应用比例是为了确保更准确和可预测的结果。这不是bug，而是Blender处理对象比例和修改器的方式。了解并适应这种工作流程可以帮助用户在Blender中更有效地工作。

 **You**

blender 中make parent without inverse是什麼意思

 **ChatGPT**

在Blender中，“Make Parent Without Inverse”是一个特定的功能，它用于建立父子关系（parenting）而不改变子对象相对于父对象的当前变换（位置、旋转、缩放）。

通常，在Blender中进行父子关系设定时，子对象会根据父对象的变换（如位置和旋转）进行相应的调整，以保持它们之间的相对位置和方向不变。但是，在某些情况下，你可能希望创建这样的父子关系，同时保持子对象的当前变换不变。这就是“Make Parent Without Inverse”功能的用处。

简单来说，使用这个功能后，子对象会成为父对象的子级，但是它的位置、旋转和缩放不会根据父对象的当前变换进行调整，而是保持原来的状态。这对于某些特定的建模和动画任务特别有用，比如在不改变对象当前位置或方向的情况下重新组织场景层级结构。

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