

Escape the Camera Cafe VR

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Corso di Laurea Magistrale in Intelligenza Artificiale

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The Project

What's the goal?

- Make a Camera Cafe themed VR Escape Room

What do we need?

- A game Engine
- Office Assets



Figure: Unity 2021.3.4f1 LTS



Figure: Synty Assets repository

Choice of Artificial VR Locomotion

Common Types of AVR locomotion:

- Teleportation
- Scripted Movement
- **Avatar Movement**
 - Snap Turn Provider: that rotates the rig by fixed angles
 - **Continuous Turn Provider**: that smoothly rotates the rig over time

Choice of Artificial VR Locomotion

Figure: Teleportation

Figure: Continuous Turn Provider

Introduction
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Player Movement
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Game Design
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Physics MGMT
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Object Movement
oooo

Event MGMT
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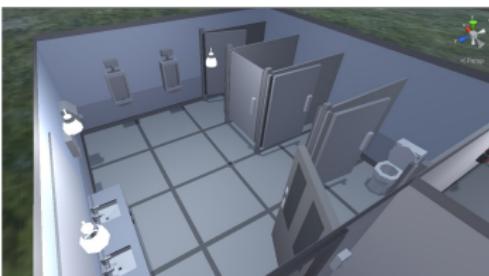
SFX & VFX
oooo

Conclusions
oo

Office Scene



Office Scene



Tutorial Scene



Tutorial Scene



Layer

Builtin Layer 0	Default
Builtin Layer 1	TransparentFX
Builtin Layer 2	Ignore Raycast
User Layer 3	
Builtin Layer 4	Water
Builtin Layer 5	UI
User Layer 6	Teleport
User Layer 7	Interactable
User Layer 8	Interactable Ignore Ray
User Layer 9	Body
User Layer 10	Key
User Layer 11	Door
User Layer 12	MuroInvisible
User Layer 13	Numbers
User Layer 14	NumPad
User Layer 15	Dito

Figure: Project Layers

	Default	TransparentFX	Ignore Raycast	Water	UI	Teleport	Interactable	Interactable Ignore Ray	Body	Key	Door	MuroInvisible	Numbers	NumPad	Dito
Default	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TransparentFX	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ignore Raycast	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
UI	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Teleport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Interactable	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Interactable Ignore Ray	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Body	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Key	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Door	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MuroInvisible	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Numbers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NumPad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dito	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure: Physic Interaction Matrix

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oo

Game Design
oooo

Physics MGMT
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Object Movement
oooo

Event MGMT
oo

SFX & VFX
oooo

Conclusions
oo

Discrete VS Continous Dynamic Collision

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oo

Game Design
oooo

Physics MGMT
ooo●

Object Movement
oooo

Event MGMT
oo

SFX & VFX
oooo

Conclusions
oo

Socket Interactors

Interpolation

Spherical Linear Interpolation

```
while (timeElapsed < duration)
{
    transform.eulerAngles = Vector3.Slerp(transform.rotation.eulerAngles, to, Time.deltaTime);
    timeElapsed += Time.deltaTime;
    yield return null;
}
```

Animate objects

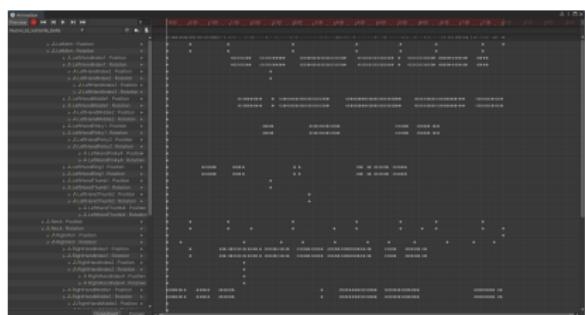


Figure: Matthew's animation

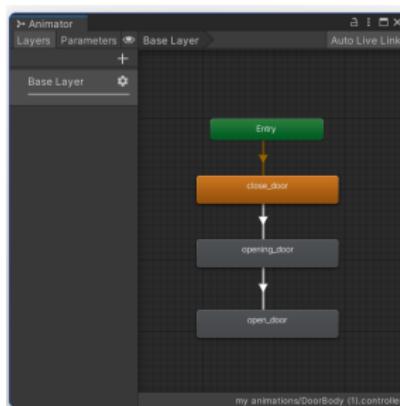


Figure: Exit Door Animator

Introduction
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Player Movement
oo

Game Design
oooo

Physics MGMT
ooo

Object Movement
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Event MGMT
oo

SFX & VFX
oooo

Conclusions
oo

Animate objects

Animation VS Interaction

Figure: Interactable Door

Figure: Animated Door

Triggering Events

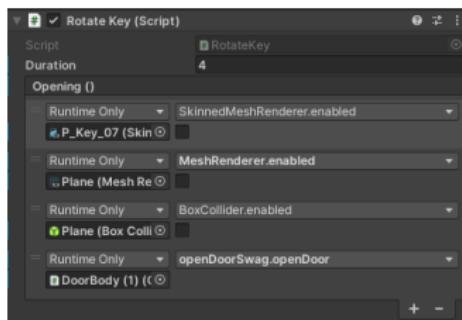
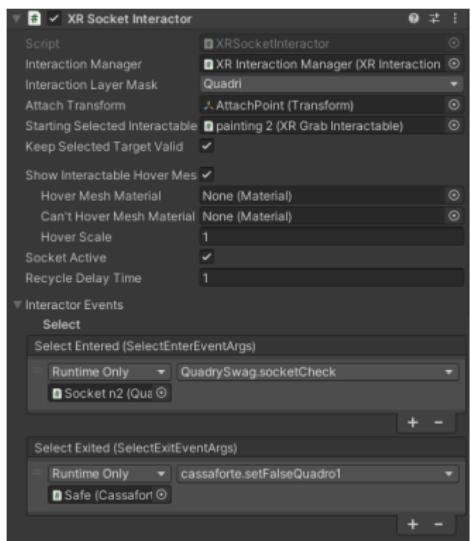


Figure: Creating New Events

Figure: Using Default Interactor Events

Example: Numpad Script

```
public UnityEvent OpenDoor;

private void OnTriggerEnter(Collider other)
{
    if (!pressed && !opened)
    {
        pressed = true;
        currentEntry += thisKey;
        if (currentEntry.Length > 2)
        {
            if (currentEntry == correctCode)
            {
                audioSource.PlayOneShot(successSound);
                updateVisual("OPEN");
                disableKeypad();
                opened = true;
                OpenDoor.Invoke();
            }
            else
            {
                currentEntry = "";
                audioSource.PlayOneShot(errorSound);
                updateVisual("ERROR");
                Invoke("resetVisual", 0.5f);
            }
        }
        else
        {
            updateVisual(currentEntry == "" ? "****" : currentEntry);
            audioSource.PlayOneShot(kethHit);
        }
    }
}
```

Sound Effects

```
void OnTriggerEnter(Collider other)
{
    if (other.tag == "Player")
    {
        pressed = true;
        audioSource.PlayOneShot(cafeSound);
    }
}
```

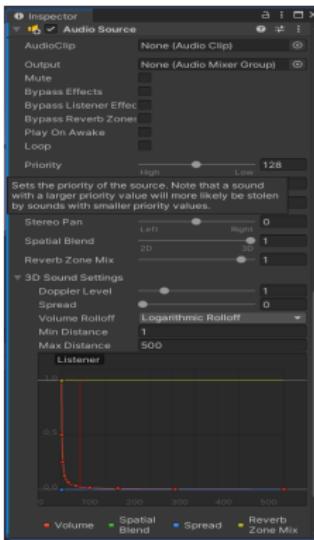


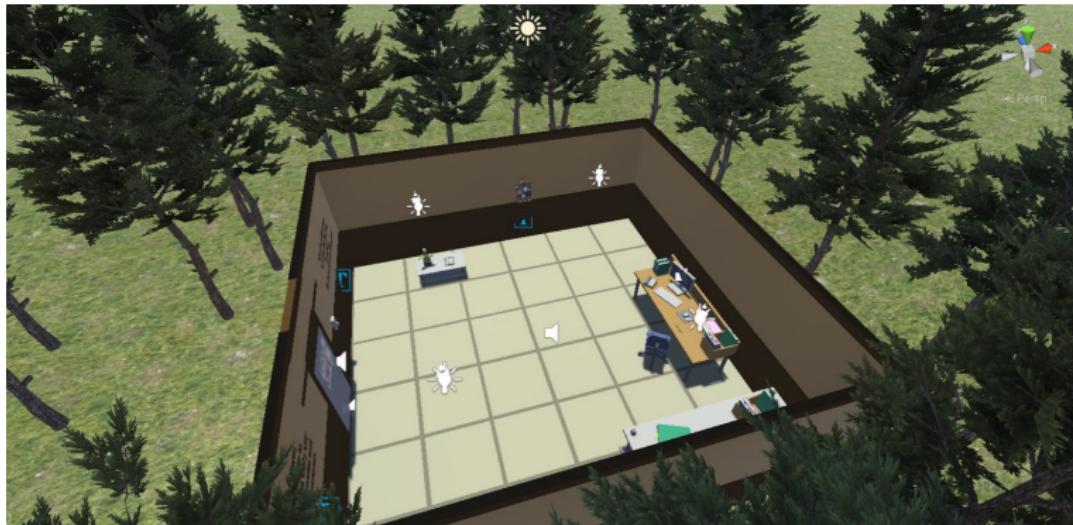
Figure: C# script audio trigger

Figure: Audio Source Inspector

Office Lightning



Tutorial Lightning



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oo

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oo

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oooo

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oooo

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oo

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oooo●

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oo

UV Flashlight

Youtube Channel



Conclusive Observations

Developing a video game was harder than we believed. Simple tasks such as triggering events and interact with objects can be cumbersome but Unity Documentation and online tutorials helps so much. However this project taught us some 3D and VR game developing skills.

Future Work

- Create new levels with some trickier puzzles
- Add Game Menu with an option to change the locomotion type
- Add achievements for speed runners

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