

Narrative/Game Context

The experience I have created inside “StartSceneadvanced3dcopy” is a walking simulator of a modern art deco living room. The scene is supposed to be photorealistic and most of the objects inside the scene have been inspired by real furniture. When the user first enters the scene, the living room is slightly illuminated by candles and a lamp to allow them to visualise where they are and to create a mysterious atmosphere. The text boxes play a significant role in the game because they guide the player to where they must go. The interactions between the player and the objects fulfil the expectations of the player regarding a walking simulator.

Description of the Experience

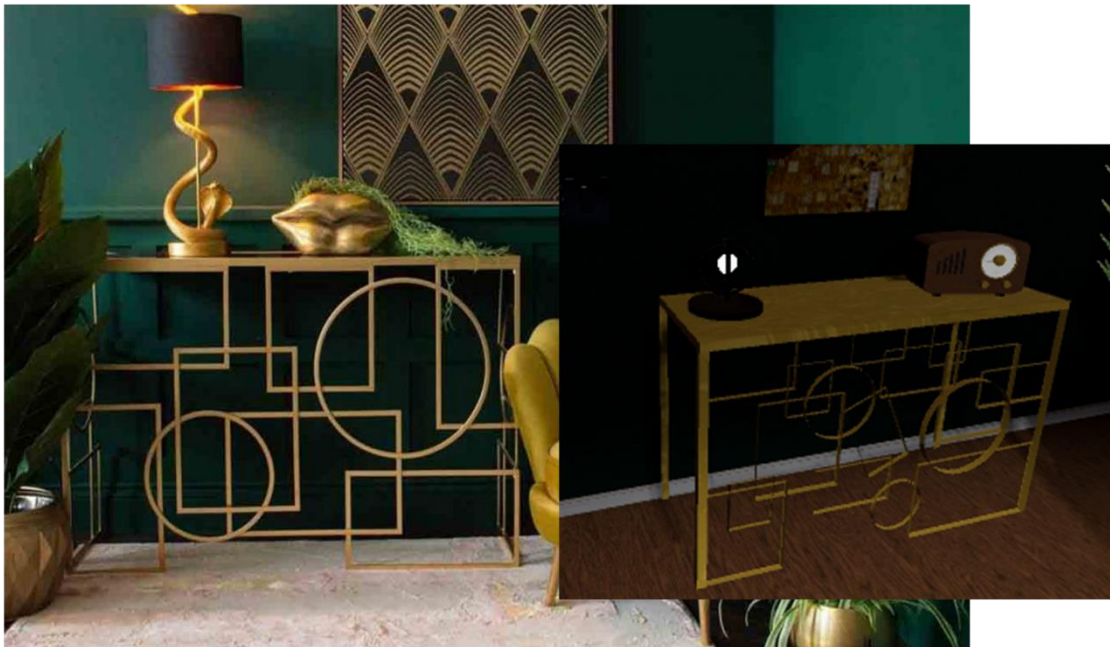
Each interaction has the purpose of creating an immersive experience for the player. The fireplace produces warm lights that make the viewer feel welcomed and create an intimate atmosphere. The player must then interact with the light switch. The radio introduces the viewer in the art deco age, both visually and auditory. This experience is supposed to show how house viewings can be experienced online, as well as interior design renders. By digitalizing these types of experiences, the viewer can have a more immersive experience, such as turning the fireplace on, which would not be possible at a house viewing in real life. The elegance of the room can feel intimidating, however the warm lights coming from the candles and the fireplace are supposed to make the viewer feel welcomed and comfortable.

Aesthetic Rationale

The design of the room is modern art deco. Given the similarity of the art deco style with Art Nouveau, the paintings are part of the Art Nouveau era. Given the principles of the art deco style I have used bold colours: bright yellow, dark green and navy blue. The two main fabrics are leather and velvet. Geometry is incorporated in various pieces of the furniture present in the scene. Metallic accents are combined with marble and concrete. The dark green accompanied by the yellow gold creates a contrast of colours and show elegance throughout the entire scene. Regarding textures, I have decided for the sofa to be made of leather and to be contrasted by the armchairs that are made of velvet. These details were chosen due to their prevalence in my research about Art Deco. The metal, along with the rough painted walls offer the room the style usually found inside art galleries. To amplify the atmosphere of an art gallery, the accent wall, consists of multiple empty picture frames. The light contrasts the rigidity of the concrete and metal. The candles and the fireplace emit a warm light which invites the player to be comfortable in this environment. The scene visible through the windows display a cold winter, which comes in opposition with the warmth emitted by the fireplace and the candles. The lights of the candles and the fireplace change their intensity and range at different times from each other and to create a sense of realism. The plants and the wood add natural accents to the scene.

Description of Technical Implementation

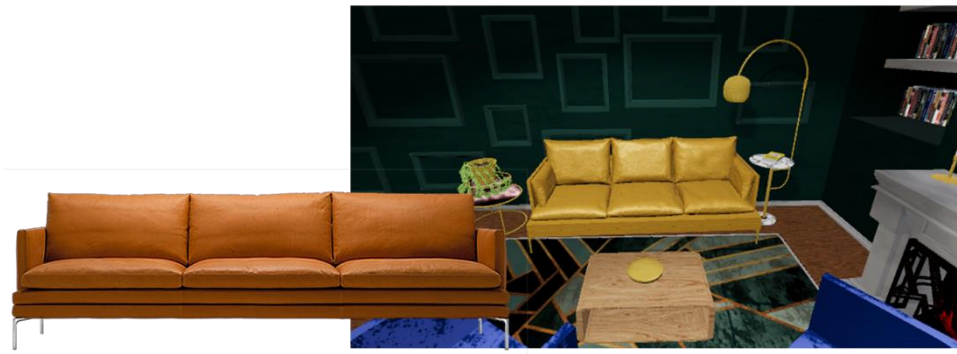
Modelling



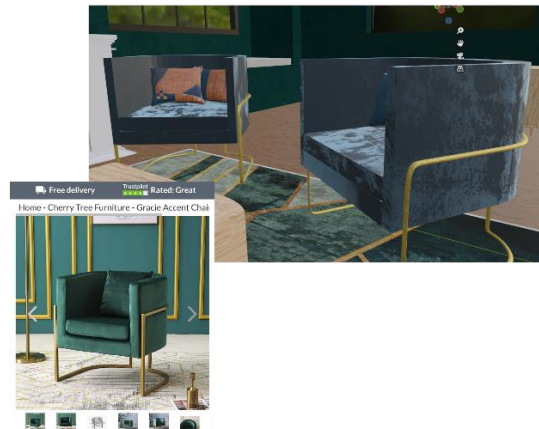
The table was created from a plane, I have extruded the top face and then I deleted it to have equal margins and have a thin surface. For the legs of the table, I have used the loop cut tool in each corner and extruded the cut edges. The rectangles are also created from planes, I have extruded the top face and when it reached the right height, I have deleted both faces to be left only with the margins. For the circles I have extruded its top edges.



The shape of the fireplace screen started from a cube and the different details were created using the loop cut and extrude tools. The curves were created by inserting circles and converting them to curves to increase the depth and then they were converted to meshes to be cut.



To model the sofa, I have used the blueprints of the real couch. For the pillows I have used the loop cut tool to add uniform details and then I have used the subdivision surface. To add realism, I have used the cloth simulator, enabled the pressure, and disabled the gravity. This method was used for all the pillows in the scene. After I have applied the modifiers, I have sculpted more details using the cloth tool. To stimulate collision with the support of the sofa I have used the draw sharp tool. The legs of the sofa were modelled using the bevel tool.



The legs of the chair were made using curves. I have modelled half of the shape and the other half was created using the mirror modifier. I have used this method because working with curves creates restrictions, given it is difficult to model it accurately. The other leg was created using the mirror modifier. The back of the chair started from a plane. With the bevel tool I have curved two of its corners. With the top face selected, I have extruded the face. This method was used for the seat too. When the height was right, I have deleted three of its faces and applied the solidify tool.



This cupboard was created from a plane. I have used the loop cut tool and then extruded the cut faces to divide the spaces. The doors were created using the extrude tool on the x axis. The door handles were created by inserting different faces of a cylinder and then using the Boolean modifier to leave just the shapes of them.



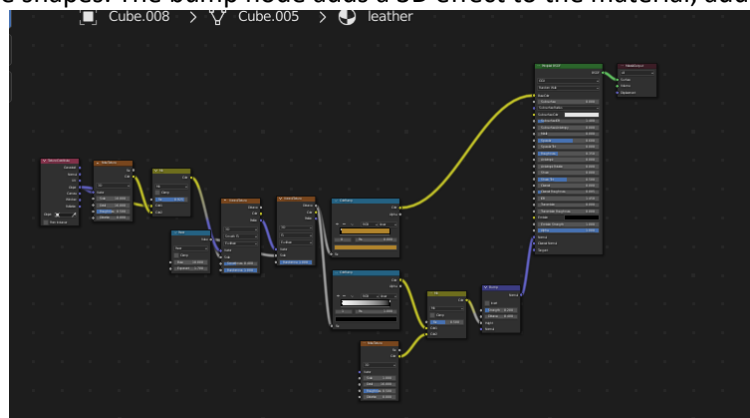
The radio started from a cube and for the rounded corners I have used the bevel modifier. For the speakers, I have inserted a flattened circle that had a texture applied to it and then I have used the Boolean modifier to leave its shape and texture inside. The display for the radio frequencies was created in Photoshop.

Textures

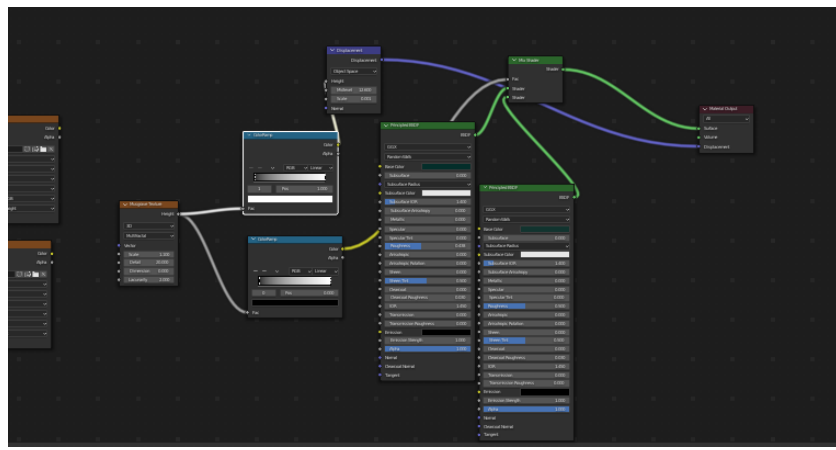
The methods used for the textures are inspired by tutorials that are referenced in the appendix. For the wood material I have used the wave texture which has the role of adding the wood lines, and by scaling up the details on the x axis inside the mapping node the texture looks real. The Voronoi texture along with the color ramp create the wood knots.



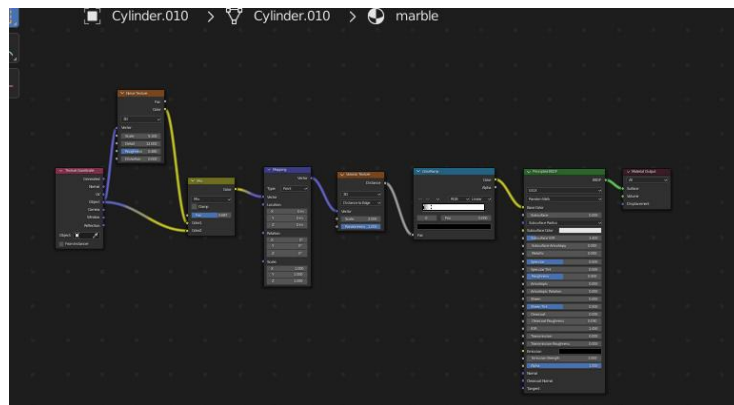
The Voronoi textures used for the leather are creating the geometrical shapes of leather. The noise texture distorts the shapes. The bump node adds a 3D effect to the material, adding realism.



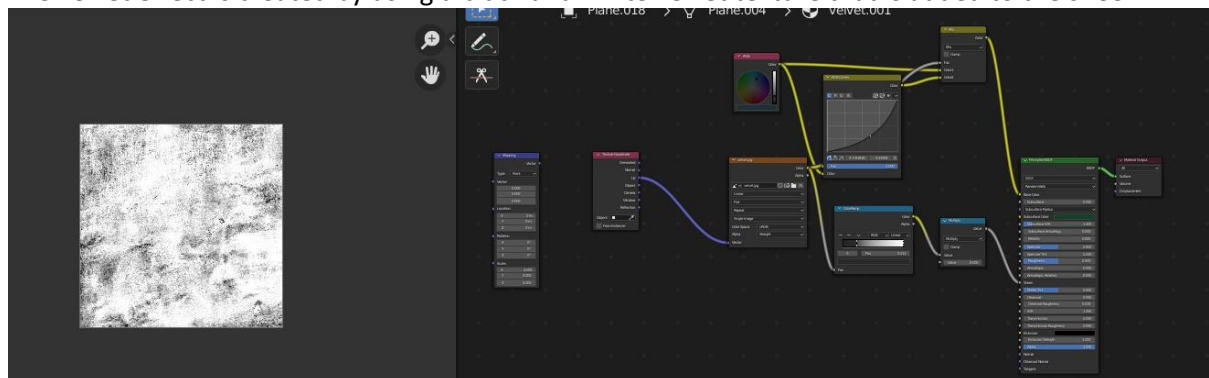
For the texture of the wall, I have used two "Principled BSDF" to create two layers to give it the feeling of rough painting. The pattern is determined by the Musgrave Texture which is controlled by a color ramp.



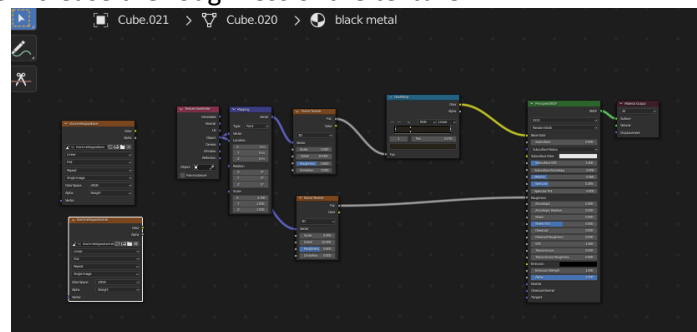
For the marble texture I have used the Voronoi texture to create the lines and added the color ramp to have better control over it. The noise texture is used to distort the lines and create the marble effect.



The velvet effect is created by using a black and white velvet texture that is added to the sheen.



The metallic texture is created by using the noise texture node and scaling it up on the x axes. The second noise texture increase the roughness of the texture.



Scripts

I have created two systems for the text display. The "GuideText" script contains the list of options that can be displayed on the screen when the user collides with the interactive objects that are in the scene.


```

@ Unity Message | 0 references
private void OnTriggerEnter(Collider other)
{
    if (other.gameObject.name == "First Person Player")
    {
        playerTrigger = true;
        //the guide text can be displayed just in case the player has not turned the fireplace on
        if (count == 0) {
            changeText.option = 1;
        }
        else
        {
            changeText.option = 0;
        }
    }
}

```

Inside “FireplaceOn” and “SwitchLights”, the text is displaced just if the player has not pressed “f” yet, because the action can be done once. The radio can be turned on and off therefore the script is different in that case.

```

@ Unity Message | 0 references
private void OnTriggerEnter(Collider other)
{
    if (other.gameObject.name == "First Person Player")
    {
        playerTrigger = true;
        if (radioActive) {
            changeText.option = 3;
        }
        else
        {
            changeText.option = 4;
        }
        if (count == 0)
        {
            changeOption.option = 0;
            count = 1;
        }
    }
}

```

If the radio is on the text displayed will inform the user they can turn the radio off, but if the radio is off the text will let them know they can turn it on.

The script “TextController” has the role of displaying the right text inside the text boxes, which guides the player through the game. When the game starts, the option is set to 1. The text displayed on the screen is changed through the scripts attached to the interactive objects. For example, inside “FireplaceOn”, the option is set to 0 for a few seconds after the player has pressed “f”, and then is changed to 2 so the player can be guided to the next step.

```

private bool playerTrigger;
public GameObject lightFireplace;
public TextController changeOption;
public GuideText changeText;
public bool fireOn = false;
int count = 0;
// Start is called before the first frame update
@ Unity Message | 0 references
void Start()
{
    playerTrigger = false;
}

// Update is called once per frame
@ Unity Message | 0 references
void Update()
{
    if (playerTrigger && Input.GetKeyDown(KeyCode.F) && count == 0)
    {
        lightFireplace.SetActive(!fireOn);
        AudioSource fireSound = GetComponent();
        fireSound.Play();
        StartCoroutine(MyCoroutine());
        count = 1;
    }
}

@ Unity Message | 0 references
private void OnTriggerEnter(Collider other)
{
    if (other.gameObject.name == "First Person Player")
    {
        playerTrigger = true;
        //the guide text can be displayed just in case the player has not turned the fireplace on
        if (count == 0) {
            changeText.option = 1;
        }
        else
        {
            changeText.option = 0;
        }
    }
}

@ Unity Message | 0 references
private void OnTriggerExit(Collider other)
{
    if (other.gameObject.name == "First Person Player")
    {
        playerTrigger = false;
        changeText.option = 0;
    }
}

1 reference
private IEnumerator MyCoroutine()
{
    changeOption.option = 0;
    yield return new WaitForSeconds(5f);
    changeOption.option = 2;
}
}

```

The candles have the same script attached to them, “CandleFlickering”, but their maximum intensity differs to simulate realism.

```

@ Unity Script (4 asset references) | 0 references
public class CandleFlickering : MonoBehaviour
{
    //this is the light that is emitted by the candle
    public Light pointLight;
    //by setting maxIntensity to 1.5, the intensity of the light will go from 0 to 4 in order to replicate the light of a real candle
    public float maxIntensity = 1.5f;
    //by setting maxRange to 2, the range of the light will go from 0 to 4 in order to replicate the light of a real candle
    public int maxRange = 2;
    // Start is called before the first frame update
    @ Unity Message | 0 references
    void Start()
    {
        pointLight = GetComponent<Light>();
    }

    // Update is called once per frame
    @ Unity Message | 0 references
    void Update()
    {
        //the variable for intensity will go from 0 to the value set as maxIntensity
        pointLight.intensity = Mathf.PingPong(Time.time * 1, maxIntensity);
        //the variable for range will go from 0 to the value set as maxRange
        pointLight.range = Mathf.PingPong(Time.time * 1, maxRange);
    }
}

```

Mathf.PingPong was used to change the intensity and the range of the candles, to simulate the flickering effect. The same method was used for the fireplace too.

Post-processing

The post-processing layers increase the photorealism of the scene. I have used ambient occlusion to add shadows and colour grading to increase the contrast in the scene.

Particle System

The shape of the fireplace is set to a cone and the size over lifetime uses a customized curve. For the material added to the particle system I have used the additive render mode to create the fire effect.

A similar method was used for the candle's flame.








Reflection

The main strength of the game are the models that respect the real dimensions, along with their textures. The code responsible for the text works well too. The script controlling the fire, arguably simple, creates an extremely realistic flame effect.


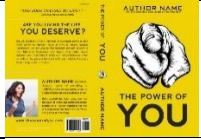

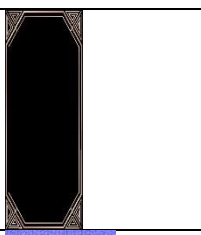




The lights represent a weakness because they are the default lights inside Unity. This issue can be fixed by using IES files. Additionally, the player can see through the wall if close enough, although I have added a box collider to the walls. The particle systems from the side look unrealistic. These issues should be solved to improve the game.






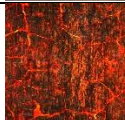
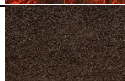
A further improvement is adding a character with whom the player can interact.

Word count: 1643

Description	Image (if applicable)	Source	License/ permission
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Picture used for the text box		https://www.freepik.com/free-vector/golden-art-deco-ornaments-arabic-antique-decorative-gold-border-retro-geometric-ornamental-frame-ornate-golden-corners_10722688.htm#query=frame%20template&position=11&from_view=keyword	Used under Illustration for Instruction
Picture used for the fabric material		https://www.dreamstime.com/stock-photo-fabric-texture-normal-seamless-map-d-programms-woolen-image92739592	Used under Illustration for Instruction
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Picture used for the money plant		https://youtu.be/3-Z5uK7yREM	Used under Illustration for Instruction
Picture used for fireplace fire		https://unsplash.com/photos/wnF27F85ZKw	Used under Illustration for Instruction

Tutorial used for the leather texture		https://youtu.be/gFIE9LmpzZ0	Used under Illustration for Instruction
Tutorial used for the metallic texture		https://youtu.be/bCgPjfSSN50	Used under Illustration for Instruction
Tutorial used for the velvet texture		https://youtu.be/ZSSkxiqenRQ	Used under Illustration for Instruction
Tutorial used for the wood texture		https://youtu.be/NPiK25I07TE	Used under Illustration for Instruction
Tutorial used for the wall		https://youtu.be/UXEekyFeGmc	Used under Illustration for Instruction
Tutorial used for the marble texture		https://youtu.be/vV9zZ3Tu7SI	Used under Illustration for Instruction
Picture used for the skybox		https://polyhaven.com/a/blaubeuren_church_square	Used under Illustration for Instruction
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