AR First Experience

Semester 4 HMI

HMI Challenge

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Acronyms

Acronym	Meaning
HMI	→ Human-machine Interaction and Control
ESP32	→ Expressif32

Table 1 – List of acronyms used throughout the report

Introduction

The assignment on which this document presents a small challenge of HMI subject. HMI also known as Human-machine Interaction and Control is a subject for semester 4 where we learn how to develop modules which humans are using to either interact, monitor and/or control a machine, process, data, etc. These are then displayed in a dashboard to create an insight of what is happening in a smart industry. In the following sections will provide the procedure and conclusion of the assignment.

Procedure

In this assignment, we will learn how to use AR and show data using 3D models. AR also known as Augment Reality is a technology that makes web content visible in the real world. Up until now AR has been widely used in devices such as smart phones, desktops, handheld devices etc. For handheld devices, you can interact with the 3D object and use its features to do all kinds of things.

To start off the assignment we firstly need to create a 3D model from scratch to gather experience for future use of AR. I used A-frame which is one of the provided 3D modeling websites. With A-frame you can create your own models using one of its suggested websites. A-frame provides several websites to create 3D models however, with the lack of knowledge and time for the learning 3D modeling, I used Glitch which is a web editor to create the model. Glitch provides an online web editor with instant refresh of the visual model and the language used in the web editor is HTML, CSS and JavaScript.
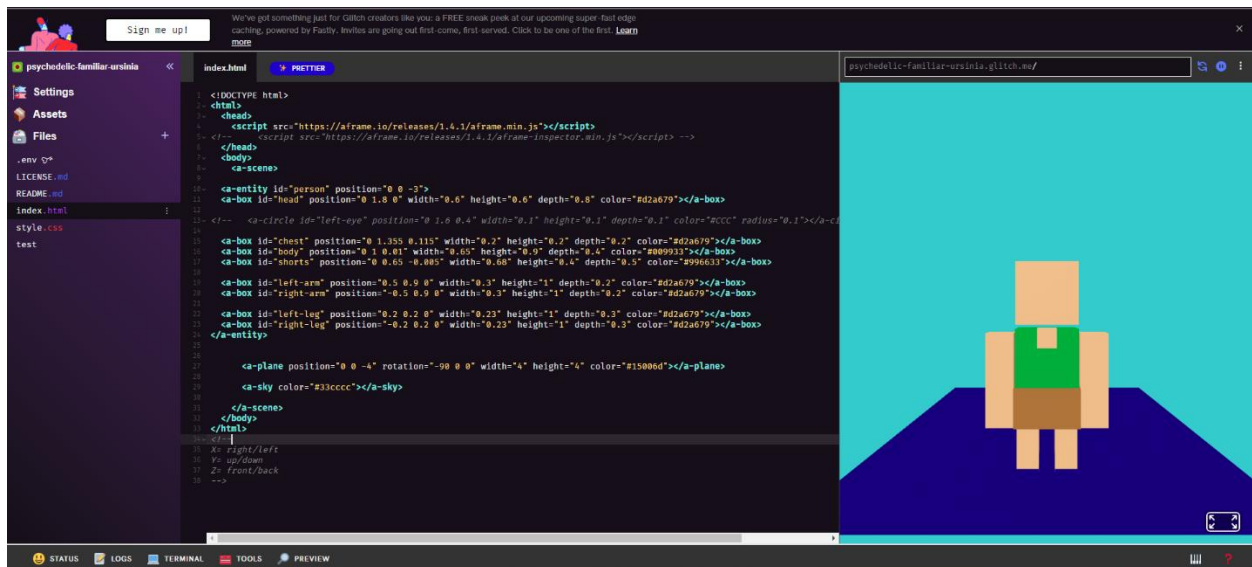

Figure 1 3D model prototype

As you can see in the figure above, I was experimenting with the attribute values to create the model prototype. A-frame provides information and examples for the attributes and the value type in takes. Due to lack of knowledge with other attributes, I only know how to use primitive attributes such as basic shapes that require beginner knowledge in 3D modeling.
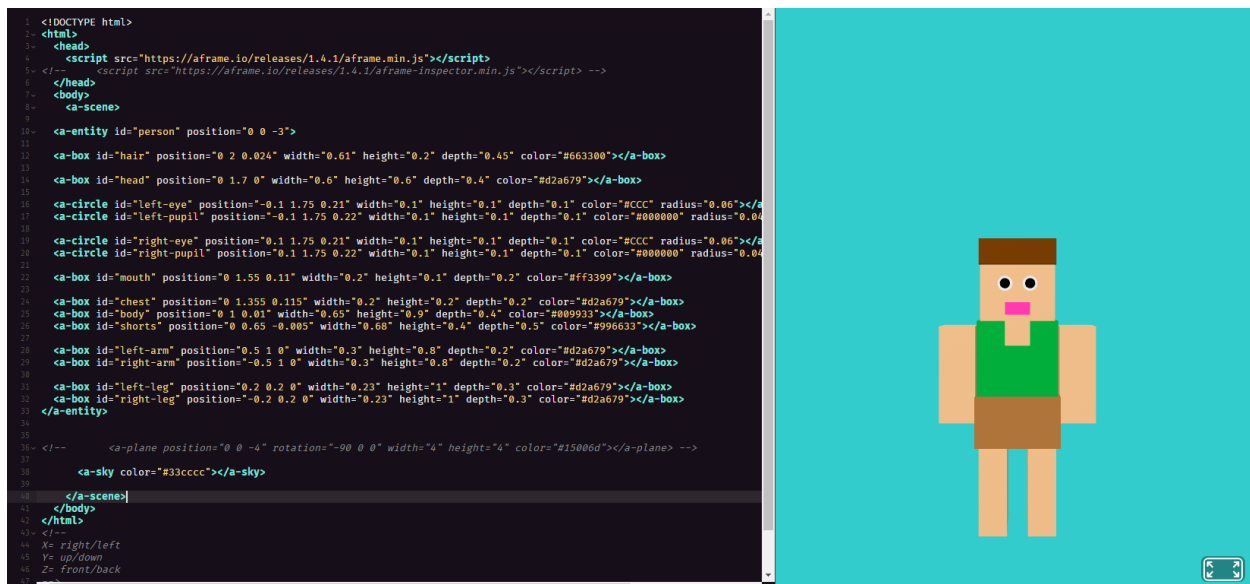
Figure 2 Character Model

In figure 2, I have finished creating a person model using box and circle attributes to make it simpler. I wanted to use other advance attributes however, it was hard to get the correct values to display the desired model.
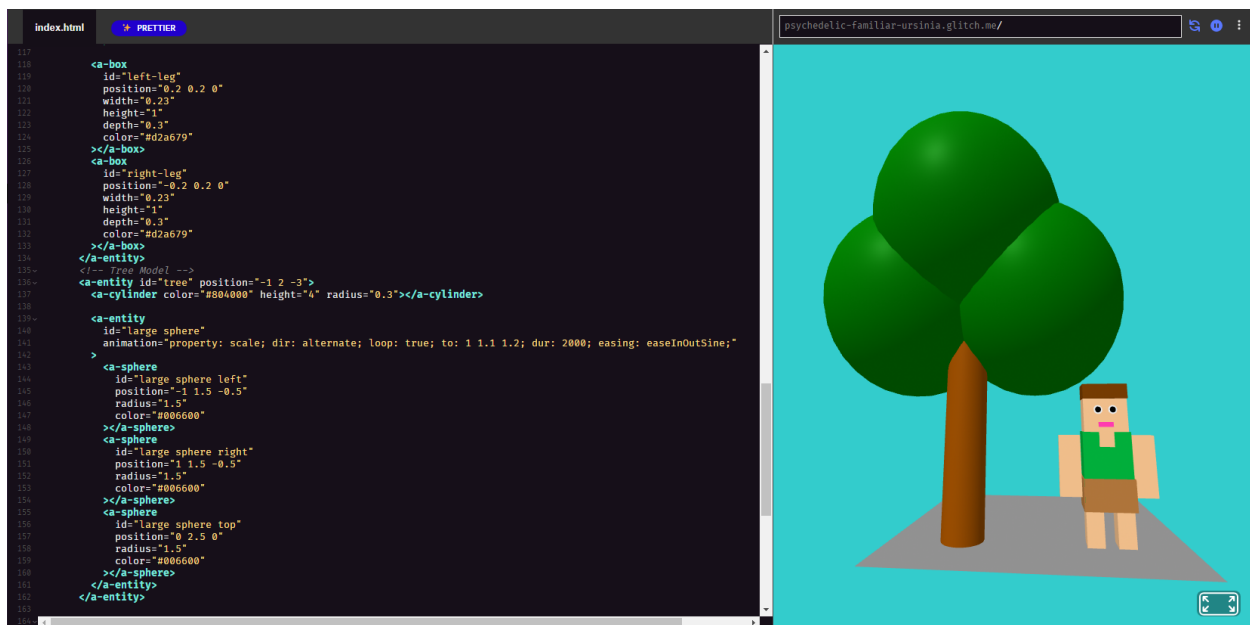

Figure 3 Final model

In figure 3, I added a tree and a platform terrain for the person model for the final touches. After cleaning up the code, I added it with provided AR code and was able to visualize the content using image tracking. I had more ideas however, it had problems when displaying the 3D model in the real world.

Conclusion

To conclude the assignment, I had fun creating the 3D model even though it was hard to understand at first. I attempted to create a model using Blender since it is widely used by 3D artist and followed a tutorial to just fail because it was hard to understand. Glitch was better for people who has experience in web development and was perfect for me to use in the assignment. With all things considered, it was a good learning experience making 3D model and hopefully we learn how to make it interactive using handheld devices.

Reference

Aframe (no date) *Glitch*. Available at: https://glitch.com/~aframe (Accessed: April 14, 2023).

Ar.js - augmented reality on the web (no date) *AR.js Documentation*. Available at: https://ar-js-org.github.io/AR.js-Docs/#:~:text=AR.js%20is%20a%20lightweight,based%20AR%20and%20Marker%20tracking. (Accessed: April 14, 2023).

Frame – make WebVR (no date) *A*. Available at: https://aframe.io/ (Accessed: April 14, 2023).