**Introduction**

I have used Unity3D (version 2021.3.11f1) on a Windows system to create this project that represents an urban street simulation in virtual reality. While building this simulation I have used GitHub for version control where I backed up my files in case, I needed to restore previous versions. To test my build, I have used Quest HMD while attending the workshop however at home while lacking the hardware I had to use Unity HMD simulator.

I have included features in my application which include a C# script that adds road traffic simulation such as cars stopping for pedestrians, traffic lights and other vehicles on the road, I added more car models and sound effects for pedestrians, ambient and vehicles. Vehicles will also be able to use all the roads in the scene by using a waypoint system. To make the scene less empty I have integrated some other buildings and street decorations.

**Analysis**

**Fidelity and Coherence:**

Virtual reality provides users with a virtual environment that simulates a realistic environment (Zheng et al., 1998). This can be achieved with a level of fidelity. Features such as graphics, sound, user interface and interaction with the virtual world all provide users with levels of fidelity. Depending how these features are implemented it will influence how users perceive the world and feel present within.

I have implemented these features within my project which should impact the fidelity of the scene. For graphics, since my hardware doesn’t have a good processing power, I had to reduce the settings of my project to a minimum. I have included in my scene, buildings, vehicles, pedestrians, roads, pavements, street decorations such as vegetation, traffic lights, benches. To implement these objects, I used low poly assets to have a smaller impact on performance on my system. As described by (Mel Slater 1999), immersion is affected by the VR system provided. Such factors as Field of View (FoV), resolution, tracking, sound quality, etc., will affect the fidelity.

Graphically speaking, my project doesn’t resemble real life when it comes to textures which affects the fidelity as the scene doesn’t look that realistic, this can be seen when looking at, buildings or the floor where the texture resembles a plastic like texture. Some other issues that might affect users’ presence is how there’s not a lot of assets on the scene that could make the user more present for example, most of the buildings look similar and the pedestrians use the same model.

To increase fidelity, I have added sounds to the scene on pedestrians, vehicles, and ambient sounds, which adds coherence to my project. As well as making the cars more autonomous as if they are being driven by real people.

Issues I found that would affect the users experience would be how pedestrians will always walk their path regardless of cars, meaning they would walk straight through cars and not wait until its safe to move. This differs from reality as no real pedestrian would walk through a vehicle. This project also lacks on player interactions with the world other than moving and looking around. To fix these I would have to add colliders to the player object which would allow for the user’s model to interact with the world such as stopping cars or making pedestrians change path to avoid the user. Also improving the lighting by adding light sources and more realistic sound effects and making the world seem fuller.

**Sense of Embodiment:**

This is when the user takes control over their avatar and feels like they are controlling their own real body.

**User Locomotion:**

References

(Zheng et al., 1998) Zheng, J.M., Chan, K.W. and Gibson, I. (1998) ‘Virtual reality’, IEEE Potentials, Potentials, IEEE, 17(2), pp. 20–23. doi:10.1109/45.666641.

(Mel Slater 1999) Mel Slater. Measuring Presence: A Response to the Witmer and Singer Presence Questionnaire, Presence: Teleoperators and Virtual Environments 1999 8:5, 560-565.