Description of the prototype

The prototype is set in a beautifully rendered natural environment, including rivers, forests, and wetlands, showcasing the diverse habitats of the platypus. Users can look around freely, interact with objects using hand gestures, and feel a deeper connection to the virtual environment.

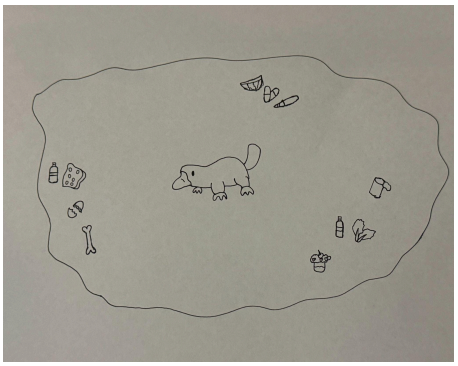
Design Concept Overview:

In the virtual reality experience prototype, users take on the role of a friendly and determined platypus tasked with cleaning up the environment and moving anywhere they want in the virtual space. This interactive virtual reality experience educates users about environmental conservation while engaging them in fun and meaningful gameplay.

Evaluation

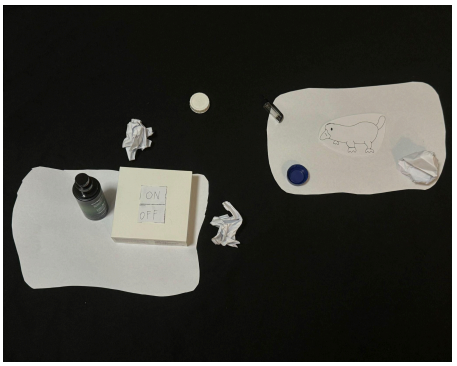
First Iteration:

First, our group chose the platypus as its design theme because it is one of Australia's endangered animals. Additionally, water pollution caused by garbage severely impacts its habitat. Thus, we designed an interactive method of picking up trash to raise awareness about its dangers while alerting people through interactive methods of collection. Finally, five users were interviewed about our initial plan; their feedback suggested our content needed to be more complex.



Second Iteration:

Therefore, we made changes. After group research and discussion, we discovered that sewage discharge contributed significantly to water pollution. Consequently, we included an interaction to control it as part of the physical prototype to encourage users to stop its discharge and actively pick up trash. We hope that will enable us to proceed with the final production in Unity. In addition, five previous users tested and interviewed our prototype, all agreeing it provided comprehensive functions. However, some mentioned needing to know precisely what they should be doing sometimes due to unclear guidance.



Therefore, after careful deliberation and consultations, we decided to add signboards to the prototype explaining potential threats from sewage and garbage to platypus survival and guiding users toward appropriate actions and interactions. After using the Unity prototype, we realized user movement speed was relatively slow compared with map size, thus adding teleportation points so users could more quickly reach their destinations, improving user experience.

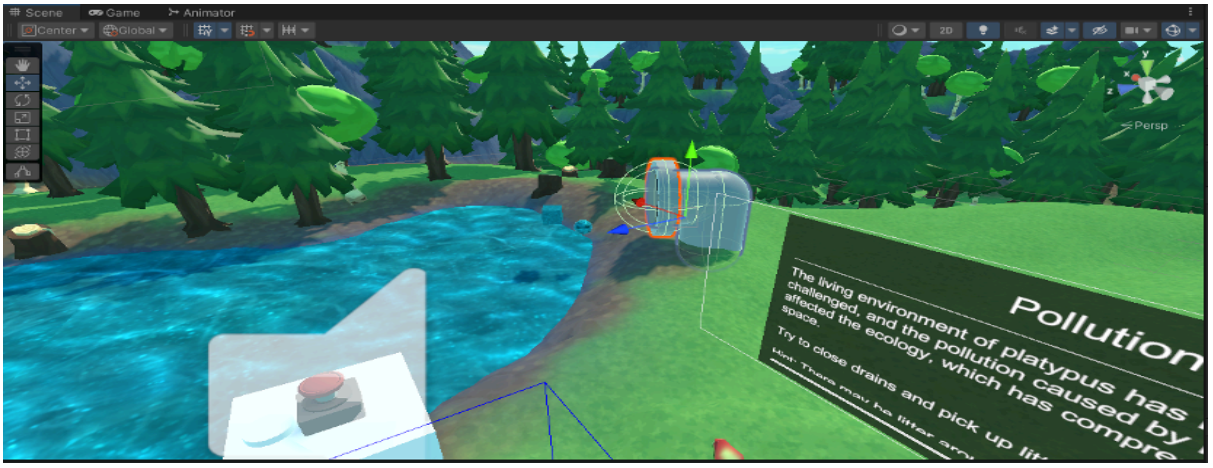
Design Process

Our prototype aims to make the player aware of the fact that the platypus' living environment is vulnerable to pollution and man-made factors, and we intend to convey this idea through two mini-games:

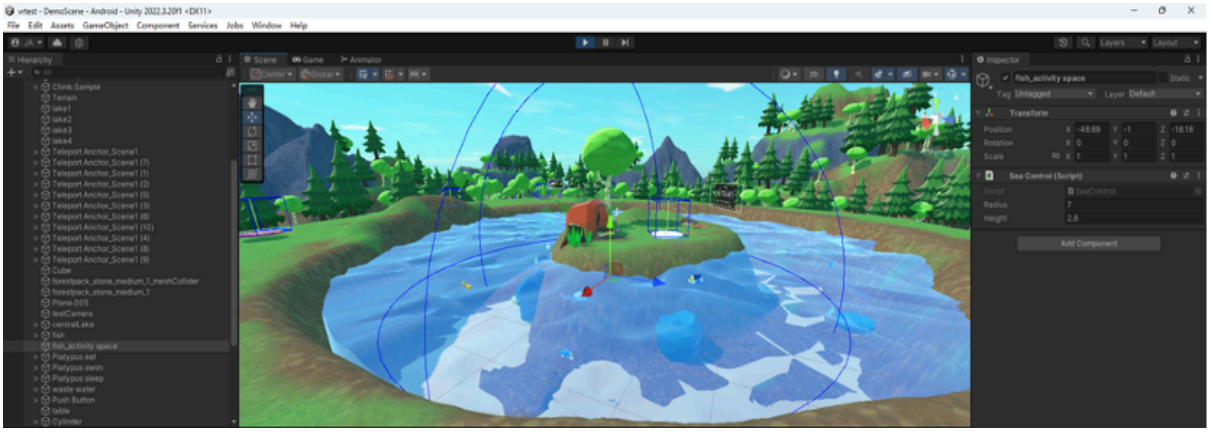
1. Have the user shut down the source of the sewage.
2. Have players pick up trash from the ground and throw it in the trash bin.

After importing the initial scenario from the XR interaction example that we were asked to download for the class (Environment Pack: Free Forest Sample), we modified the scenario considerably by adding two small lakes, one to show the environmental damage caused by sewage discharge. The other is to show the living environment of the platypus. It was a very difficult task to create the water effect, so we just made a simulation where the two types of water look different!

Next, we used the animation component to change the position, angle, and size of the object in the prototype, added appropriate materials to simulate the environmental damage caused by the discharge of sewage, and provided the user with a button to stop the sewage from being discharged when the button was pressed. The biggest problem here was the coding and animation, Initially, it didn't work as expected; for example, sometimes the pollutant would appear to be stagnant in the air. We then changed the codes to stop the loop to solve this problem.



We made extensive use of the 3D Fish Asset prefabs in setting up the Centre Lake in the environment, which included fish, some code to control the fish moves in a given space but not to move around, environment prefabs, etc.

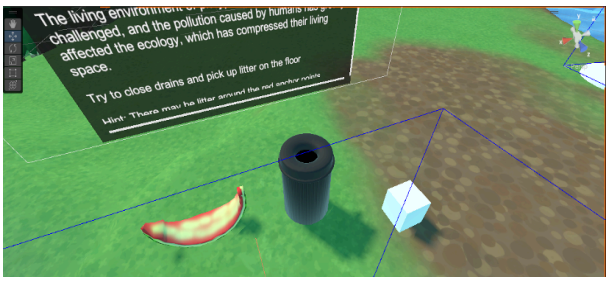


Known Issue

UI display anomaly, ui content can be displayed in game mode, but not in vr device after build and run.

When the sewage discharge button is touched, the ray of the vr controller will sometimes trigger an animation effect to stop the sewage discharge when the button is touched.

The platypus can't follow the desired path, this is related to the fact that the platypus prefab has it's own animation and can't run two animations at the same time, so trying to make the platypus swim in the water and then rest on the shore can't be done at the moment.



Future Work

1. Optimise code for performance, use low-latency input devices and ensure the game is running at a stable frame rate.
2. Implement a universal input mapping system using Unity's Input System package, regularly update SDKs, and test with a variety of controllers.
3. Optimise animations by reducing polygon count, using simpler animations where possible, and ensuring the game runs at a high and stable frame rate.
4. Improve user interface, including Platypus and its environment, by inspiring a more appropriate aesthetic style.

Reflection

Team Collaboration:

Our team collaboration was highly effective, and tasks were clearly divided among Alessio and Leonard, who created models and interactions in Unity, demonstrating their exceptional skills and creativity. Yuxiang and Ross oversaw all aspects of documentation for their project - iterations, design processes, and reflections - producing professional yet attractive presentations to clearly explain issues encountered and reflect upon its successes or shortcomings. We use WeChat for daily communication, task assignments, and progress tracking. Regular online meetings were held to coordinate tasks across members and ensure everyone was aligned with project goals. Our structured approach enabled efficient and seamless collaboration, seamlessly integrating all components. Our creative theme centered on Australia's endangered platypus population; interactive features highlighted the main threats facing it to make our project engaging and relevant to audiences around Australia. This innovative idea was conceptualized through collaborative brainstorming sessions.

Areas for improvement:

Although we have done this task excellently through the cooperation among team members, there is still room for improvement, unfortunately. In the final adjustment phase, we encountered some additional problems due to insufficient time allocation, which may affect the quality of the task. We should start this task earlier to allow extra time for adjustment and optimization. At the same time, we are facing some technical difficulties, such as in Unity, where platypus is consistently unable to move along the expected path, which may lead to issues such as threading. We need to enhance our technology further and conduct more testing and adjustments. In the future design, we plan to conduct more user tests, collect feedback, make changes in advance, and reserve time for final adjustments. Our team has demonstrated excellent teamwork skills and creative thinking through this project, but there is still room for further improvement.

References with external assets:

Environment Pack: Free Forest Sample
https://assetstore.unity.com/packages/3d/vegetation/environment-pack-free-forest-sample-168396#description
Fantasy Skybox FREE
https://assetstore.unity.com/packages/2d/textures-materials/sky/fantasy-skybox-free-18353
Simple Water Shader HDRP
https://assetstore.unity.com/packages/2d/textures-materials/water/simple-water-shader-hdrp-207454
Stylize Water Texture
https://assetstore.unity.com/packages/2d/textures-materials/water/stylize-water-texture-153577
3D Fish
https://assetstore.unity.com/packages/3d/characters/animals/fish/3d-fish-282104
9t5 Low Poly Australian Animals
https://assetstore.unity.com/packages/3d/characters/animals/9t5-low-poly-australian-animals-175977
Low poly Garbage Pack
https://assetstore.unity.com/packages/3d/props/food/low-poly-garbage-pack-156063