**About the Application**

A screenshot of a video game

Description automatically generated

*Figure 1: Interface of SolarSystem application*

It has 8 planets in serial wise. Imaging that the sun is on the left side of the image,**Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune (**[**source**](https://www.google.com/search?q=planets+in+solar+system&oq=planets+in+solar+system&gs_lcrp=EgZjaHJvbWUqBggAEEUYOzIGCAAQRRg7Mg0IARAAGIMBGLEDGIAEMg0IAhAAGIMBGLEDGIAEMg0IAxAAGIMBGLEDGIAEMg0IBBAAGIMBGLEDGIAEMhAIBRAuGMcBGLEDGNEDGIAEMhAIBhAAGIMBGLEDGIAEGIoFMhMIBxAuGIMBGMcBGLEDGNEDGIAEMhAICBAuGIMBGLEDGIAEGIoFMgoICRAAGLEDGIAE0gEIMTU4M2owajeoAgCwAgA&sourceid=chrome&ie=UTF-8)**).** It had developed by adding texture on a sphere gameObject. Then adding rotation in the script with multiplying the object with timeDeltaTime. Figure 1 is a visualization of how it looks like it the Unity screen.

**Source code:** <https://github.com/1604016-Meherun/SolarSystem.git>

**Tools:** Unity, Oculus Quest 2, Meta Quest Link

**Challenges:**

* **Technical Challenges with Hardware Setup:** I had to set up my desktop and PC multiple times because the Oculus Quest was not functioning correctly. This issue significantly disrupted my workflow, causing delays and additional troubleshooting efforts.
* **Initial Approach Misalignment:** I initially started the project with Augmented Reality (AR), which proved to be an unsuitable choice for my goals. The complexities and limitations of AR for this specific educational purpose led me to abandon this approach and shift to a more straightforward XR template offered by Meta. As a starter, I stick with the VR development process.
* **Adapting to New Tools and Frameworks:** Transitioning from an AR-based framework to an XR template required learning new tools and adjusting my development strategy. This shift involved overcoming a learning curve, which added to the project's overall complexity and development time.
* **Time and Resource Management:** The need to repeatedly configure hardware and pivot development approaches consumed a significant amount of time and resources. This prolonged the development process and required careful management to stay on track with the project timeline.

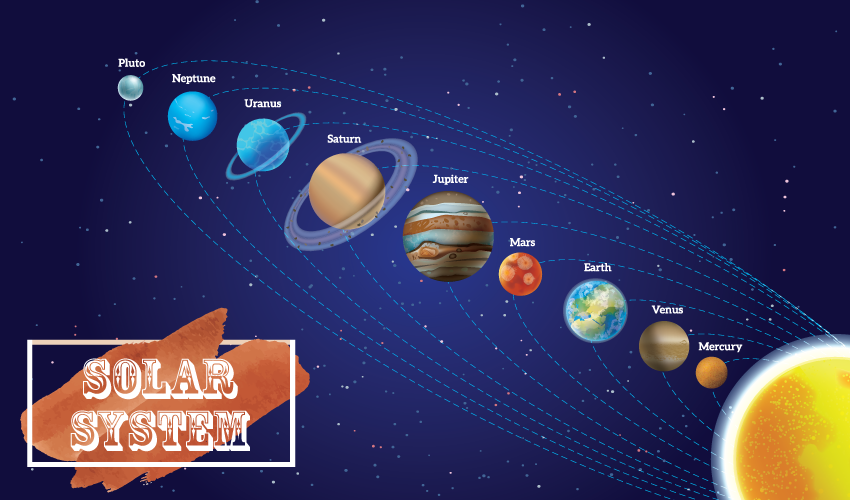
**Significance of the Application**

This VR project is a significant contribution to early childhood education. It has cutting-edge technology to create a captivating and interactive learning environment, making complex concepts like the solar system and renewable energy comprehensible for kindergarten students. By using VR, the project enhances engagement and retention, fostering an early interest in science, technology, engineering, and mathematics (STEM). The immersive experience allows students to explore and visualize the solar system in a way that is impossible with traditional teaching methods. This innovative approach not only supports cognitive development but also nurtures curiosity and critical thinking, laying a strong foundation for future learning.

**Criticizing the Application/Room to Improvement:**

While the project has numerous strengths, there are a few areas where improvements could be made:

* **Absence of the Sun:** The exclusion of the sun is a significant limitation, as it plays a central role in the solar system. The sun’s gravitational pull keeps the planets in orbit, and its light and heat are essential for life on Earth. Without it, students may miss the opportunity to understand its importance in the solar system’s structure and the concept of solar energy. Including the sun would provide a more accurate representation and enhance the educational value of the project.



* *Figure 2: Solar System UI design*
* **Missing Dwarf Planets:** The project currently includes only the eight main planets, omitting the four recognized dwarf planets: Pluto, Eris, Haumea, and Makemake. While the focus on the primary planets is understandable for simplification, including these dwarf planets could provide a more comprehensive view of the solar system. It would also allow for discussions about the classification of celestial bodies, helping students appreciate the diversity and complexity of our solar neighborhood.
* **Understandability:** While the project is aimed at young learners, balancing simplification with scientific understandability and accuracy is crucial. Providing basic information about each planet’s size, composition, and unique features would enhance the educational value without overwhelming the students.
* **User Experience and Engagement:** The VR environment should be designed to be intuitive and easy to navigate for young children. Consider adding guided interactions or prompts that encourage exploration and learning. Incorporating audio or visual cues could help maintain engagement and reinforce key concepts. For UI design it can be similar to the figure 2. To make it easy to use, there could be some instructions about what to do.
* **Potential for Further Expansion:** The project could be expanded to include more interactive elements, such as quizzes or mini-games that reinforce learning. Additionally, incorporating a storyline or narrative could make the experience more memorable and relatable for young learners.
* Saturn planet is unrecognizable without it's 7 rings. Saturn's rings make up an enormous, complex structure. From edge-to-edge, the ring system would not even fit in the distance between Earth and the Moon. The seven main rings are labeled in the order in which they were discovered. From the planet outward, they are D, C, B, A, F, G and E. ([**source**](https://science.nasa.gov/resource/saturns-rings-2/))
* The sphere/ shape of the planet doesn't match with the actual ratio, the rotation also doesn't match at all.