

Observing Space in Your Own Space

Studying the solar system can be very boring for Astronomy and Astrophysics students. The only representations we have of our Solar System are images in our textbooks, images found online, or 3D models that are scalable yet small. It presents a problem for students because they don't have a good way to view the planets and their scale, making learning boring. There has been some previous work using Augmented Reality (AR) where you can scan a planet and view it on your phone. However, the team hasn't seen an application where someone can view planets that are moving in AR. The project will be tasked in replicating the Solar System using AR in the real world. It will be scalable so students can see it across a small field or walk around campus looking for the planets. Creating this type of application will get students interested in learning and will give them a chance to interact with other students hunting down planets in our cosmic backyard.

The proposed system will take what students are learning on paper and move it into the real world around them. The students will be able to understand the Solar System in a whole new way. They will be immersed in the environment by their search for the different planets and other objects of our Solar System. We will use mobile devices to run the project, whereas the development will be done in Unreal using C++. The project will be using HD models, courtesy of NASA, that will be rendered in AR-space.

See Figures 1 & 2 below.

The project is aimed at students, specifically astronomy and astrophysics students, who are struggling to conceptualize the mechanics of the Solar System. The project will task these students to “hunt” down the planets, in a scaled-down Solar System model across real space such as the NMSU campus. The students will be able to use a digital map on the application to tag their geographical location on the map. The geotagging will allow students to share where they spotted the planets to help visualize the planets’ orbits to help in their calculations. Astrophysics faculty could be used as a resource to find out about student needs and requirements, such as the information they need to learn. The project’s evaluations can be done with faculty with regular feedback sessions. Once the project’s application becomes functional we can test with an in-house alpha by the project team with a beta test of the system involving a small group of live volunteer students, possibly organized by the faculty, later when the product is more stable and complete.

Currently when learning about our Solar System and planet placement, we look to two-dimensional diagrams that leave much to be desired. The team will try to develop a new and fun way for students to learn about the Solar System. The project will promote an engaging way to learn more about the Solar System. The project has the potential to expand to a wider audience than just astronomy and astrophysics students. With all the game elements involved, our projects will make it so that more students can be included. Hopefully, we can create a space where students can enjoy learning in a

more stress-free and fun environment. The goal is to facilitate students' academic success through the use of an engaging, immersive environment.

Our team will accomplish the proposed project by combining our skills and using an iterative, agile development approach. Our team is experienced in this area. In a previous semester, we worked together to create our game titled *Knock Blocks*. We were successful in assigning tasks, using version control, and bringing everything back together to form a cohesive and working product. Our group has experience in scripting and developing games in Unity, so the switch to Unreal should not present a problem. Phillip has worked in the VR lab at NMSU and has experience with creating VR environments and linking controls to peripherals. All five members have taken a Software Development course. Four of our team members have taken the Game Development course together, where we worked as a team to design, create, and complete a project. These skills would make our team a perfect fit to accomplish this project.

Resumes

https://drive.google.com/drive/folders/1tIGv-OPhw7_DJoG-9RX0Pu9dKr7gwSeZ?usp=s

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Sketches & Concepts

Figure 1: Scaling Concept across the horseshoe.

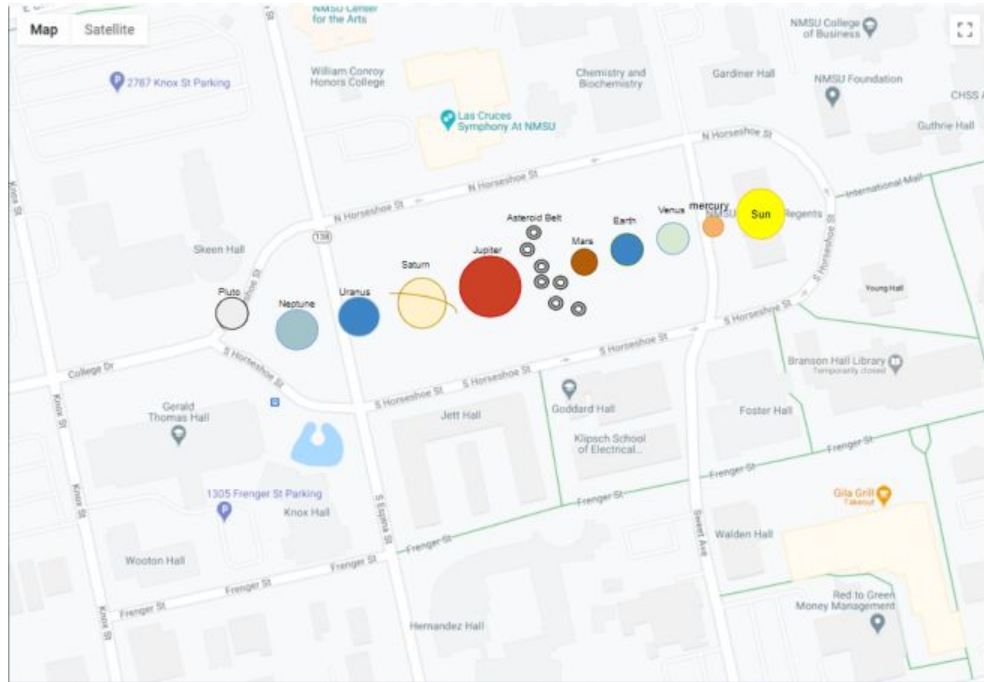


Figure 2: AR concept rendering:

