Space Experience

Team: One Canvas
Team Members: 1
Member Name: Hassaan Qureshi (1906852)

Final Project for Interactive Graphics course taught by Prof. Marco Schaerf

Hassaan Qureshi - 1906852

Introduction:

Space Experience gives you the real-time experience of our Galaxy, The Milky Way. You can roam between the eight official planets of our galaxy in real time. These planets are revolving around the sun, centered in the solar system and 3 of them have moons i.e. Earth, Jupiter and Saturn.

Special Feature:

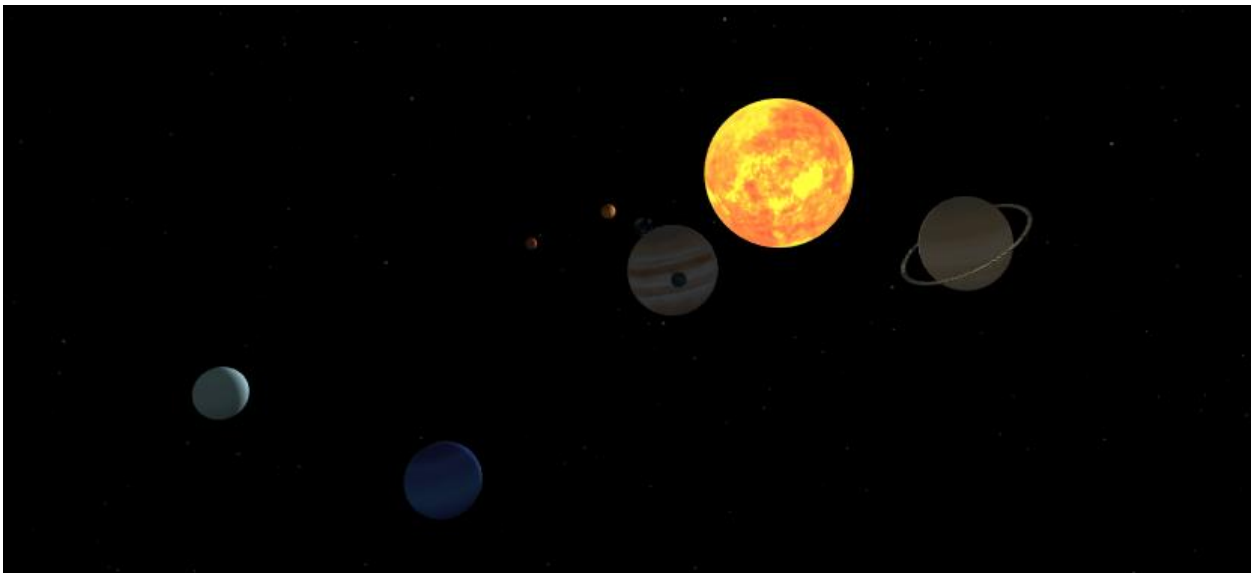
Original sounds captured by NASA over the years have been added to these planets i.e. while visiting a planet, you can hear how it actually sounds in space.

Environment Used:

The project is entirely developed using Three.js library along with JavaScript.

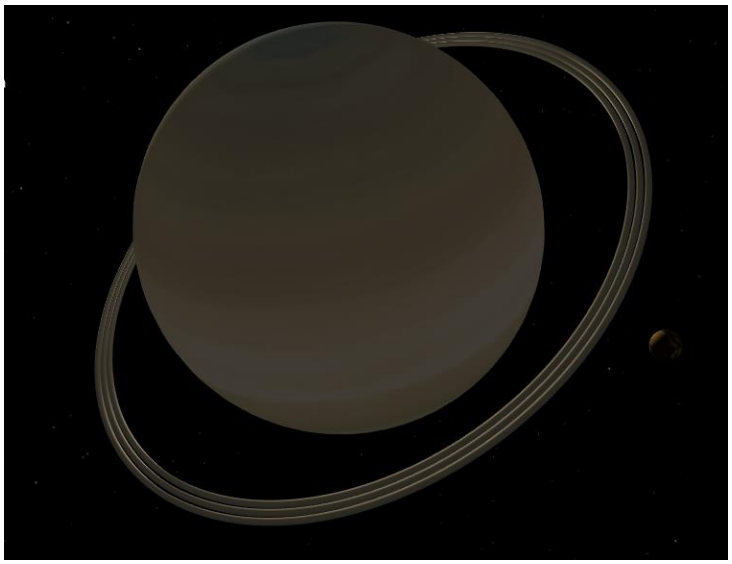
Technical Description:

The project consists of the 9 Planets, the Sun, and Moons of 3 planets and stars. All of these planets are created using the Threejs' SphereGeometry and MeshPhongMaterial.



The Hierarchy:

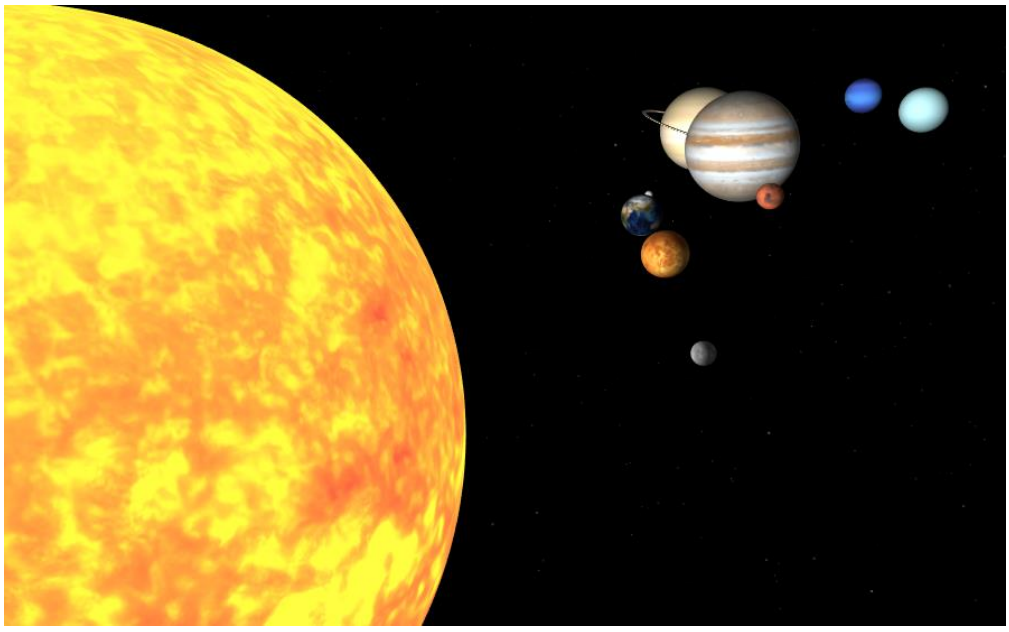
Threejs' Group hierarchy has been used to create hierarchy between the sphere models. The complex hierarchical model consists of a main group named SolarSystem which has 9 children nodes i.e. the sun and the 8 planets. Out of these, Earth, Jupiter and Saturn are also groups each having a children node with their associated moon. Saturn with an exception has 4 child nodes with the 'saturn rings' created using Threejs TorusGeometry method.



For the stars, a 2x2 matrix of Threejs Buffer geometry along with the PointsMaterial has been used to randomly place them around the galaxy.

Lights and Textures:

Sphere have been mapped with specific topographical textures taken from the NASA's official website. 2 Light sources have been added to the system, the main point light which is placed under the sun and throws light in all 360 degrees direction to all the planets making it look like the glowing sun is throwing sunlight. Another global ambient light has been added to the system to see the rear part of the planets not visible otherwise.



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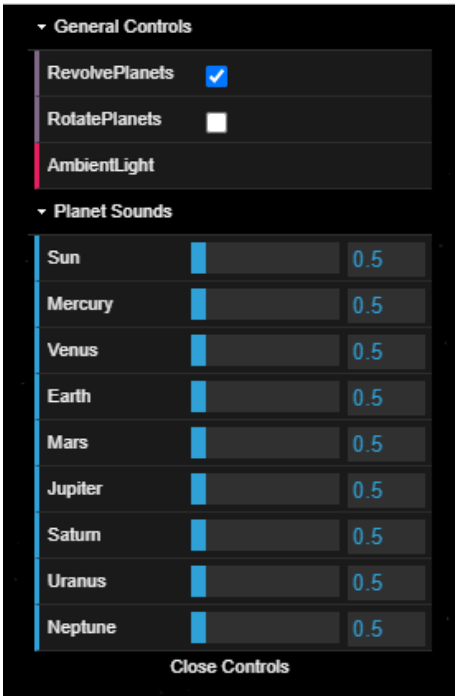
User Controls:

There are two types of controls added to the scene. One is to control the camera and the other one to control the planets and lights using a control panel. Threejs' Trackball control has been used to control the environment using which you can roam around the solar system and between the planets and through the control panel you can control the light, rotation of planets and the orbiting of planets around the sun. You can also control the sounds coming out of each of the planets as well as the sun.

The control panel uses a dat.gui library to provide a customized view of the controls.



Animations:

The planets have been animated entirely manually since not much animation was required therefore I did not use Tweenjs or any other library. The main animation is the planets orbiting around the sun whereas the planets revolving in itself. The revolvePlanets() function handles all the animations. This is done through changing the x and z position of the planets at specific speeds which have been initialized in an array. The position in x takes cos(radians) value multiplied by that specific sphere orbit speed and the z value takes sin(radians) value and therefore creating an orbit motion of the planets around the sun.

Mean Feature:

The main feature of the space experience is the sounds of planets that can be heard by visiting that planets when a user reaches near the planet. To hear the sound clearly of a specific planet it is advised to turn volume off of other planets from the control panel thus giving you a unique experience of a kind.

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This feature has been implemented using Threejs AudioListener and AudioLoader to load the sounds and then attach the sounds to their specific planets/spheres. All the sounds are taken from the NASA's sound repository and are the sole property of NASA.