

Earth On Top

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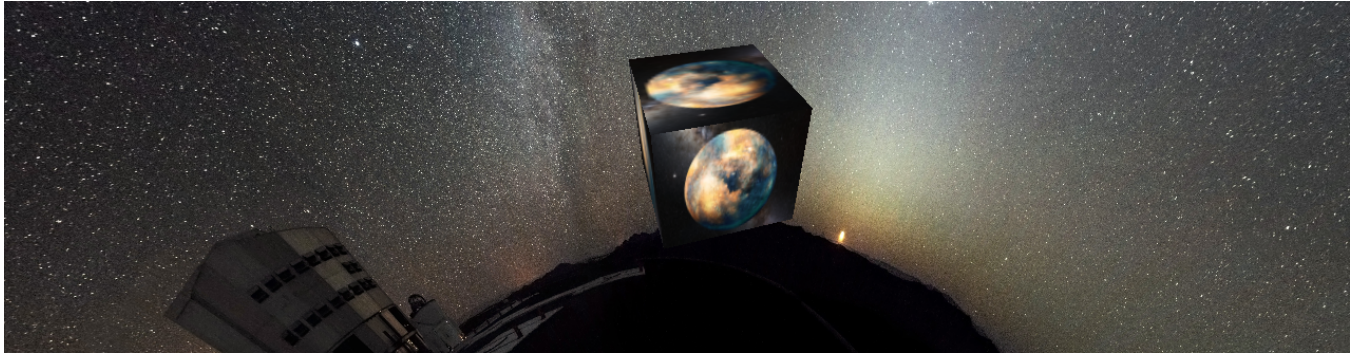


Figure 1: Earth On Top

ABSTRACT

I have created a pixel art image on the planet earth and the background image that I have used is a panoramic picture. Both the cube and the background can be rotated around.

KEYWORDS

WebGL, Visualization, Pixel-Art, 2.5D

ACM Reference Format:

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1 INTRODUCTION

I have chosen this project because during class, we did an assignment where we had to make either a fox or a Christmas tree using cubes or pixel-art. That was my most favorite assignment, and since I had an option to create pixel art for the final project, I have chosen to do it while making it more advanced. I have rendered image into cube which we did not do on the assignment as well as making a background that can be rotated around.

2 RELATED WORK

Three.js [1].

3 METHOD

First step was making a Cubemap from HTML. Set the perspective camera using, `THREE.PerspectiveCamera` while setting: `fov`, `aspect`,

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near, far. Made a scene where I added the color, intensity, light and the light position. Created a `boxGeometry` using `Standard Mesh Material`. Created a cube, added an image from online, and the cube was a `Basic Material`. At the end, I animated the frame using `requestAnimationFrame` and the background image was a panoramic image I found from online.

3.1 Implementation

```
material.uniforms.tEquirect.value = texture;
const plane = new THREE.BoxBufferGeometry(2, 2, 2);
bgMesh = new THREE.Mesh(plane, material);
bgScene.add(bgMesh);
}
function resizeRendererToDisplaySize(renderer) {
  const canvas = renderer.domElement;
  const width = canvas.clientWidth;
  const height = canvas.clientHeight;
  const needResize = canvas.width !== width || canvas.height !== height;
  if (needResize) {
    renderer.setSize(width, height, false);
  }
  return needResize;
}
```

3.2 Milestones

3.2.1 *Milestone 1.* Added an image into the cube.

3.2.2 *Milestone 2.* Added an panoramic image as the background.

3.2.3 *Milestone 3.* Implemented a skybox.

3.2.4 *Milestone 4.* Made a separate Scene, a `BoxBufferGeometry`, and a custom `ShaderMaterial`.

3.2.5 *Milestone 5.* Set side: `THREE.BackSide` to see the inside of the box. set `depthWrite: false` so that we neither test nor write to the depth buffer.

3.2.6 *Milestone 6.* Set `depthWrite: false` so that I neither test nor write to the depth buffer.

3.3 Challenges

- Challenge 1: figuring out an way to add picture to the cube.
- Challenge 2: Rendering camera position.
- Challenge 3: Rendering scene.
- Challenge 4: Fixing the ligh position.

4 RESULTS

Used an Equirectangular map to create a pixel-art scene of the planet earth on top of a city. As shown on image 2, the earth can be seen while there are buidlings under it, which is impossible in real life.

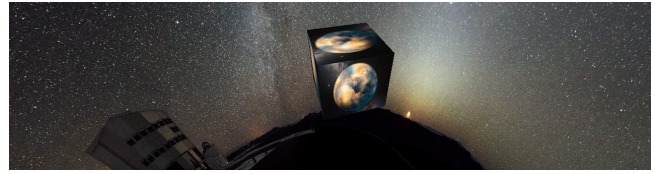


Figure 2: Earth on Top.

5 CONCLUSIONS

This was really fun for a final project. Even though working on it was not easy at all, I have managed to finish it and shot for the straight-A shortcut. With a slow computer which takes a long time to load a folder, with little knowledge of web-developing when we began this course, I think I have came a long way in this class to finish this final project.

REFERENCES

- [1] Ricardo Cabello et al. 2010. Three.js. URL: <https://github.com/mrdoob/three.js> (2010).