3D Modeling and Animation of Chinese Paper Lanterns

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1. Project Overview

This project aims to create a 3D model of traditional Chinese paper lanterns using OpenSCAD for parametric modeling and THREE.js for animation and rendering. The goal is to showcase the lantern's structure through procedural geometry, apply materials, and implement a turntable animation to demonstrate its design.

2. Technical Approach

2.1 OpenSCAD Modeling

The model is divided into two main modules:

1. **lantern()**: Constructs the lantern body with a red spherical base, golden top/bottom covers, support ribs, and hanging tassels.
2. **bbb()**: Creates the stand with a central pillar and decorative elements.

Key Code Snippet (OpenSCAD):

```
module lantern() {
color("red")
scale([1,1,0.8]) sphere(r=20);    // Lantern body
// Golden top/bottom covers (cylinders)
color("gold")
translate([0,0,16]) cylinder(h=1, r=11, center=true);
// Support ribs (6 golden cylinders)
for (r=[0,30,60,90,120,150]) {
color("gold")
rotate([90,0,r]) cylinder(h=0.8, r=20.5, center=true); }
// Hanging tassels
for (angle=[0:10:360]) {
rotate([0,0,angle]) translate([7,0,-24]) cylinder(h=8, r=0.4); }
}
```

2.2 THREE.js Animation & Shading

1. Model Loading: STL files exported from OpenSCAD are loaded via STLLoader.

2. Animation: The lantern rotates around the Y-axis using requestAnimationFrame.

3. Materials: MeshPhongMaterial with red and gold hues; ambient/point lights

enhance depth.

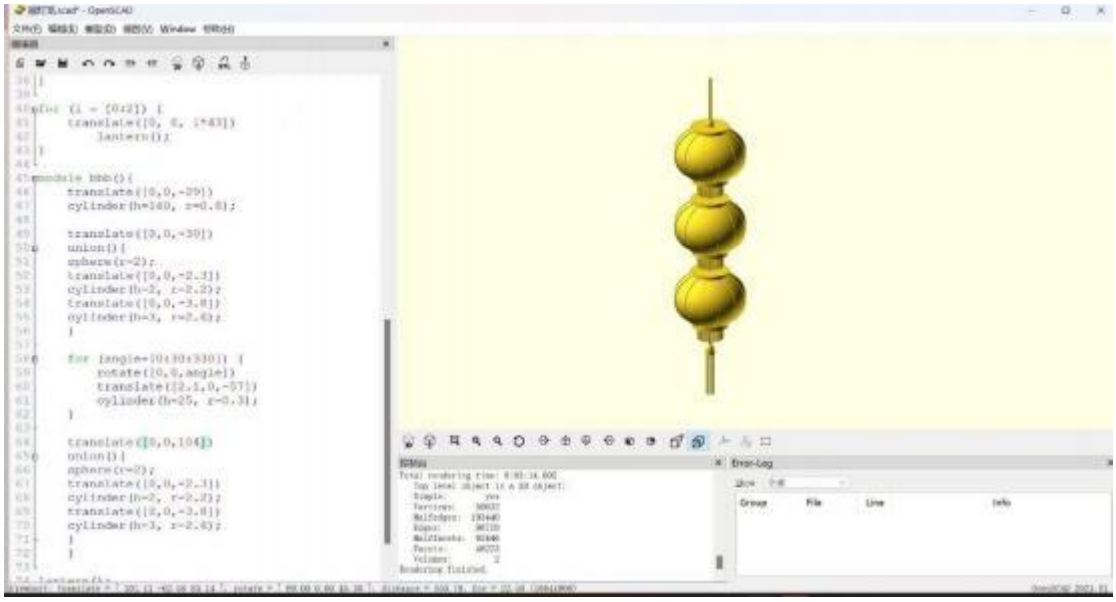
Core THREE.js Code:

javascript

```
loader.load('lantern.stl', (geometry) => {
const material = new THREE.MeshPhongMaterial({ color: 0xff2222 }); const
 lantern = new THREE.Mesh(geometry, material);
scene.add(lantern);
// Rotation animation
let rotation = 0;
function animate() {
rotation += 0.005;
lantern.rotation.y = rotation;
renderer.render(scene, camera);
requestAnimationFrame(animate); }
animate(); });
```

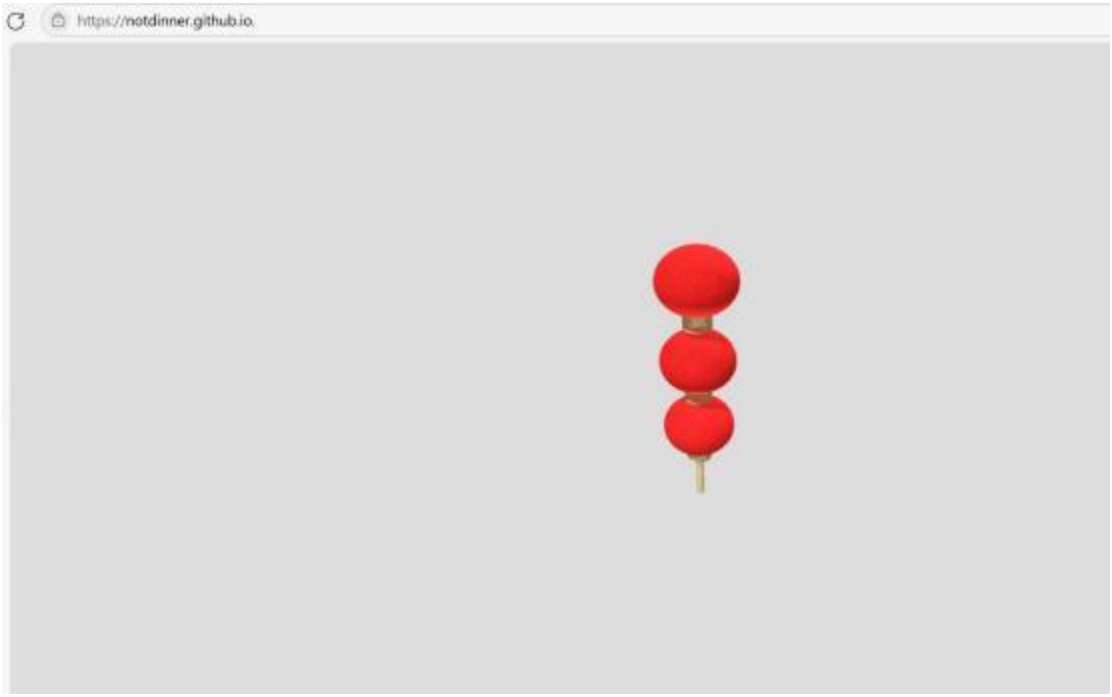
3. Results

3.1 Screenshots



3.2 Video & Web Page

assetsvideo.mp4



4. Conclusion

This project achieves procedural modeling of Chinese paper lanterns using OpenSCAD and dynamic rendering in THREE.js. The workflow highlights parametric design for symmetry and shader applications for visual enhancement. Future work may include texture mapping or AR integration.