Black Hole Audio Visualizer

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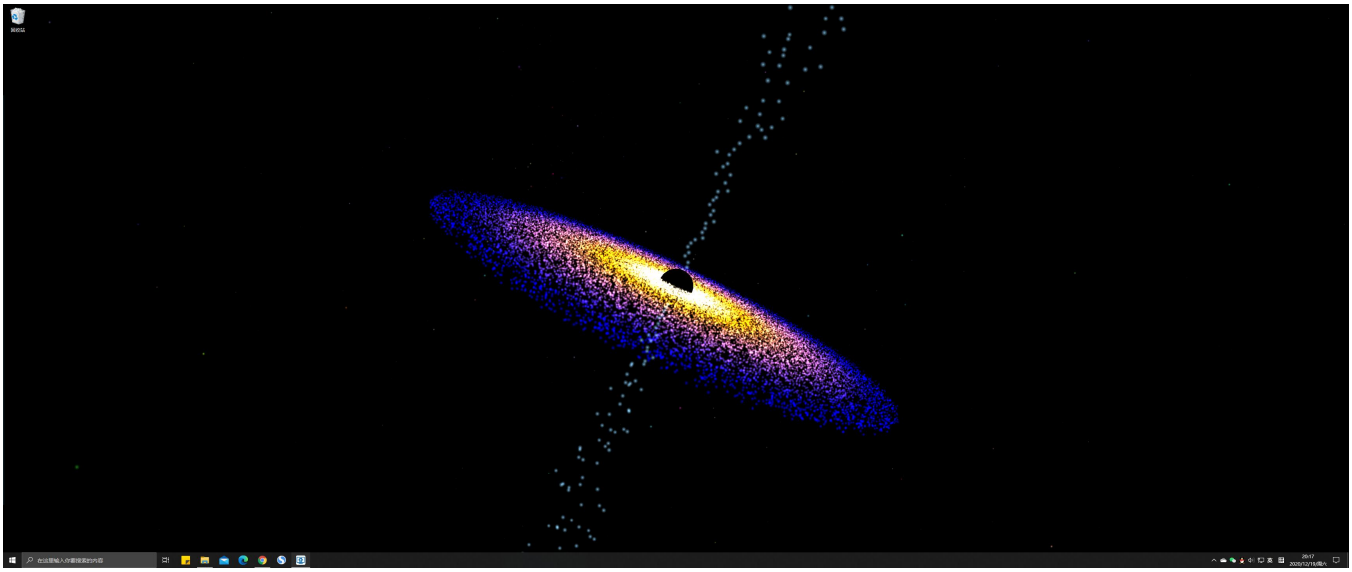

ABSTRACT

We are making an animated wallpaper for the Wallpaper Engine app from Steam. This app can record system audio for audio visualizers and allow us to upload a web application as a wall paper, so we will utilize its functionalities to make our own. We will use Three.js particles to make a black hole, and its particles should move with the audio.

KEYWORDS

WebGL, Visualization, Wallpaper Engine, audio visualizer, particles

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1 INTRODUCTION

We want to make something cool but also can be used. We like the Wallpaper Engine app and its creative Steam Workshop community. This project is an opportunity for experimenting with what we have learned throughout this course and our way to contribute to the Wallpaper Engine community.

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2 RELATED WORK

Three.js [1], Creating Particles with Three.js[link], Web audio visualizer Guide[link]

3 METHOD

Use three.js to make a particle system that looks like a black hole with the acceleration disk and the astrophysical jet, then hook up with an audio visualizer using Wallpaper Engine to control the movements of particles. Particles of the disk should move up and down according to the audio. Particles farther away from the center respond to the higher audio frequency and vice versa. The jet should respond to how heavy the bass is.

3.1 Implementation

Please tell the reader how you implemented the project. You can include code snippets that you want to highlight. Don't include the whole code.

```
window.onload = function() {
  ...
  black_hole = new BlackHole();
  black_hole.show(scene);
  animate();
}
function animate() {
  black_hole.onAnimate();
  ...
}
```

3.2 Milestones

How did you structure the development?

3.2.1 Milestone 1. Brainstormed the project idea, then formed a team of two. Breakdown the work into two. One does the particle system, another does the audio visualizer.

3.2.2 Milestone 2. Figure out how to make a particle system, then make a black hole with the acceleration disk and the jet.

3.2.3 Milestone 3. Figure out how to make an audio visualizer in Wallpaper Engine, then modify the black hole particle system to react with the audio.

3.2.4 Milestone 4. Upload to Wallpaper Engine Steam Workshop and make sure everything works as expected.

3.3 Challenges

Describe the challenges you faced.

- Challenge 1: Particle texture wasn't rendered as expected, but fixed using depthWrite.
- Challenge 2: Imitate the behavior of the acceleration disk and the jet without actually simulate the physics.
- Challenge 3: Figure out how to parse the audio.

4 RESULTS

It's better to see our project in action then explaining it in words. Here is a video demo: https://youtu.be/OmoLgRy_NMs, and this is where we uploaded our work to: https://steamcommunity.com/sharedfiles/filedetails/?id=2326920718

5 CONCLUSIONS

The final result is not exactly what we had in mind, but turns out that it looks pretty good. There is space for improvement and we will continue to extend it in the future.

REFERENCES

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