

COMS 4167 - Final Creative Project

Project Proposal

Quadcopter Simulator in 3-D in JavaScript Using Three.js

Goal:

The goal of this project is to develop a 3-dimensional simulator of a quadcopter that can be controlled using your keyboard. The simulation is written in JavaScript with the help of the Three.js library because of its portability, which makes it possible to play on any modern browser.

Deliverables:

The project will consist of the following deliverables:

- A 3-D rendering of a quadcopter using a perspective camera in a blank space;
- The user can control the rotor's pitch, yaw and roll by typing different keys;
- The simulation will model the different forces acting on the vehicle, as well as the quadcopter's internal forces from the four propellers;
- The space will contain obstacles later on to make the simulation more interesting;
- The environment will simulate real-world scenarios by simulating wind and rain with fluids and particles;

Creative:

- This project is creative because it models a real quadcopter in three dimensions, which I see as an extension of the fun 2-D helicopter game I played as a child (see appendix). The project is also creative because the simulation is written in JavaScript, so it can run on any browser. This makes it easier to share and play.

Technical:

- The technical component of this project comes from the real-life modeling of the (a) three internal forces of the copter coming from the propellers (pitch, yaw and roll), as well as the external forces acting on the vehicle (gravity, wind, rain, and obstacles).

Externals:

Three.js, Physi.js

Timeline / Phases:

First week of December (1st - 7th)

- Get acquainted with Three.js & Physi.js: 5 hours
- Develop scene and quadcopter in 3 dimensions: 3 hours
- Implement control of the vehicle using keyboard: 2 hours

Second week of December (8nd - 16th)

- Apply physical forces to the quadcopter: 15 hours
- Model external environment (wind, rain): 5 hours

December 16 - 18th:

- Testing, debugging

Appendix:

