COMP 5411 Rendering Final Project Proposal

1. Group Composition

Group ID: 8

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Background: None of us has a background in computer graphics and either OpenGL (WebGL).

2. Description

Title: Rendering Fur on Bunny

Brief Description about the project:

Fur is a natural phenomenon and rendering photorealism fur is a long-time study topic. An efficient and realistic animal fur can make games and animations attractive. The illumination model for fur is hard. A perfect illumination model should contain the shadows, texture maps, environmental lightings. What's more, rendering fur is more difficult because of the complex light-scattering properties. An animal often has tons of fur fibers, making the real-time rendering process computation resource intensive.

Our goal is to render the fur on the surface of a bunny. In the beginning, we need to select a physical-based model to generate the fur. Some of the properties are thickness, length, texture, color, radius, curvatures. We should also determine the hair 3D shape model like cylinders or some other shapes. As for the illumination, the ambient lighting, diffuse lighting, and specular reflection should be considered. What's more, there are lots of shading strategies. We should consider our topics and the truth to design a proper lighting method.

We will generate several furred bunny pictures in a specific lighting environment. If the rendering process is efficient enough, we will generate a video. A tentative result is shown in Fig.1. In the class so far, we have already learned a lot about geometry modeling and rendering. In this project, we will try to apply the knowledge we learned in class into practice.

Figure1. A furry rabbit in an animation video.

3. Challenges:

- Get familiar with the programming languages.
- Determine the light model. Simulating and modeling light traveling through the fur. Need to model the light illumination on the fur which considers light shading and reflection as well as occlusion.
- Determine the fur model. Rendering each hair is complex and computation consuming. Need to render the function on a large scale.

4. TimeLine:

11.2-11.7 Familiarize the background knowledge about fur or hair properties, do the literature review of related works, learning the base knowledge of the rendering engine and the programming language.

11.8-11-21 Find proper models and functions for fur and light. Program to render fur on a bunny and test the rendering result.

11.22-11.25 Summarize our results and analyze the strength as well as the drawbacks of our method. Write the report and make the presentation.