Raytracer Full Feature List

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Abstract

A list that includes most of the features that an advanced raytracer should be capable of.

1 Introduction

Bla bla ray goes boom. Lets go straight to the List.

2 Basic Features

2.1 Basic Functionality

- **Primary Rays:** Ray generation from the camera
- **Intersection Tests:** Method for testing ray-intersection with primitives like triangles and spheres
- **Basic Math:** Handling vector calculations
- **Basic GPU structs:** E.g. struct HitPoint, ...

2.2 Basic Shading

Look at https://github.com/Glavin001/RayTracer-1#lighting for a better understanding.

- Support **Point Lights:** Defined through a vector3
- **Phong Shading:** phong light model, consisting of specular, diffuse and ambient intensity
- **Distance Based Light Intensity**: only for Point Lights
- **Shadow Rays**
- **Reflection**
- **Refraction**
- **Configurable through Material-File**

2.3 Quality Features

Look at https://github.com/sn4k3/UVtools/wiki/Anti-aliasing.

- **Antialising**
- **Supersampling** (alternatively)

3 Advanced Features

3.1 Textures/ Maps

- **UV-Mapping**
- **Textures**

3.2 Path-Tracing

For better understanding: https://github.com/bcrusco/CUDA-Path-Tracer#features

- **Emissive Objects**
- **Biased Diffuse Spread**
- **Perfect Specular Reflective Surfaces**
- **Non Perfect Specular Surfaces**
- **Refractions**

3.3 Quality Features

- **Normalinterpolation**: Objects seem "cleaner"
- **Motion-Blur**
- **Depth of Field**

3.4 Acceleration Structures

- **Octrees**
- **BVH**

4 Pro Features

4.1 Light Effects

- **Subsurface Scattering**
- **Spectra Raytracing**

4.2 Textures/ Maps

Have a look at: https://www.pluralsight.com/blog/film-games/bump-normal-and-displacement-maps

- **Bumpmaps**
- **Normalmaps**
- **Displacement-Maps**

4.3 Volumetrics

- **Smoke**
- **Fog**

4.4 Animator

(Editor feature... just a reminder)

References