Efficient Ray Tracing Techniques

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Abstract

Ray Tracing is next to rasterization the most widely used technique to generate discrete 2D images from continuous 3D scenes. Until recently ray tracing was too resource intensive to produce images in real-time, but advances in hardware capabilities, most notably the introduction of GPGPU (General Purpose Graphics Processing Units), and algorithms made near-realtime ray tracing feasible. In this paper we will present some of the techniques which are used to achieve this.

Keywords *Ray Tracing, Path Tracing, Acceleration Structures, Realtime Rendering*

Contents

1 Introduction

Introduction to your exciting topic including some citation [PH10]. Define citations in `references.bib` that you find in the latex source folder.

2 A brief history of ray tracing

Talk about ray tracing from Whitted to Hyperion.

3 Overview over the path tracing algorithm

A short overview of the base algorithm we are going to use for the rest of the paper.

4 Spacial Partitioning and Acceleration Structures

Going logarithmic baby!

4.1 BSP and KD-Trees

4.2 Volume Hierachies

5 Adapting the described algorithms to the GPU

5.1 Accessing the GPU outside of the rasterization pipeline

5.2 Sparse datastructures

6 Results

7 Timings

Figure 1: A simple dummy picture to demonstrate how to include graphics into your report.

References

[PH10] Matt Pharr and Greg Humphreys. *Physically Based Rendering, Second Edition: From Theory To Implementation*. 2nd. San Francisco, CA, USA: Morgan Kaufmann Publishers Inc., 2010. ISBN: 0123750792, 9780123750792.