

Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

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Název práce Efficient Sampling of Re-radiation Matrices in Fluorescence-capable Rendering Systems

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Text posudku:

In this thesis, the author solves an important remaining technical issue which prevented using fluorescent materials in modern rendering systems. Being able to efficiently importance sample the wavelength shifting activity of such materials was a key obstacle to include the effect in a modern path tracer. It was known how to do this kind of importance sampling inefficiently: with the inefficiency mainly lying in undue memory consumption of pre-computed tables for needlessly high-resolution re-radiation matrices. The author is the first to explore efficient approaches to this, using Gaussian Mixture Models that are fitted to the re-radiation data of a given material. Crucially, the much reduced memory footprint of this approach allows the inclusion of fluorescent textures in renderings, although the increased efficiency and reduced memory footprint are desirable even for scenes with just a few such materials.

The thesis is well written: the background of the problem is properly described, and extensive test cases and results are presented. An abridged version of the thesis was published as a conference paper at EGSR 2021, which is a top venue for rendering technology. This underlines the importance of the conducted research for the rendering industry, and that it is technically sound.

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

V Praze dne 1. 9. 2021

Podpis: