Posudek diplomové práce

Matematicko-fyzikální fakulta Univerzity Karlovy

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Text posudku:

Goal of this thesis was the development of a framework that allows a systematic and evaluation of the light transport capabilities of modern rendering software. Light transport computations are, in terms of algorithmic complexity and computation time needed to resolve them, the core of modern rendering techniques: the underlying problem is simple to state in mathematical form, but very hard to resolve in practice. Despite decades of research, no solution exists yet which can robustly evaluate light transport in truly arbitrary scenes, and all production software use varying degrees of heuristics and approximations to handle difficult scenarios. The price for this are more or less subtle deviations from the true, 100% correct solution.

Which makes a tool for systematic evaluation of the capabilities of any given rendering software a very desirable thing: and no such system exists yet. Typically, each rendering software package has test scenes that focus on the capabilities of the particular software in question: but platform-independent scenes are few and far between.

What made the creation of such an evaluation suite a research challenge is the fact that for obvious reasons of practicality, one wants a set of evaluation scenes that is as small as possible. At the same time, one wants all critical aspects of rendering software to be evaluated properly. Choosing the right mix of scenes requires in-depth knowledge of the rendering techniques that are being evaluated in the first place: and the thesis author does a good job of picking a representative set of evaluation scenarios, of increasing complexity. The thesis gives a good background introduction into the underlying problem, and uses this to motivate his specific choice of evaluation scenarios. He also wrote the evaluation software (which in its current form is fully functional, but only working with a comparatively small number of renderers) in such a way that it has a chance of being re-used in future iterations of this project. In particular, the software was designed so that working with additional renderers is as easy as possible.

General note: the work under review here is related to the thesis titled "A Methodical Approach to the Evaluation of Appearance Computations", which is also being defended on the same day. It is important to stress that the two theses both have similar overall goals: to systematically evaluate certain features of modern rendering software in a platform-independent fashion. However, appearance modelling features are so different from light transport computations that the two projects (which were started at the same time) eventually diverged considerably: both achieved their goals, and do have some similarities in the resulting software. But both stand as independent intellectual achievements.

Práci doporučuji k obhajobě.

Práci nenavrhuji na zvláštní ocenění.

V Praze dne 4. 9. 2020

Podpis: