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GASTVORTRAG

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“Towards Real-time Path Tracing in Games”

Abstract:

Historically, graphics for games have been an important driving force in the advance of graphics hardware and rendering algorithms. Effort has evolved from striving for abstract, visually pleasing results, to more plausible realistic rendering. Recently, efforts are being made towards physically correct results.

Of the available rendering algorithms, rasterization is commonly associated with real-time graphics. Ray tracing and distributed ray tracing have been shown to run in real-time as well, or at least at interactive frame rates, on both CPUs and GPUs. Despite the availability of real-time ray tracing, games predominantly use rasterization for rendering virtual worlds. As a consequence, reaching a plausible level of realism requires meticulously crafted art, baked lighting, and approximating algorithms for the missing features such as shadows.

By contrast, the level of realism that can be achieved in path tracing depends mostly on compute power. In the light of ever increasing CPU and GPU performance, it seems reasonable to review the possibility of using ray tracing and path tracing to render virtual worlds, also considering that "algorithms that are simpler or more powerful are eventually favored over those designed for efficiency in special cases" (Veach, 1997). Successfully doing so allows game developers to focus on the actual content, rather than technological limitations. This ultimately leads to better games.

At the IGAD academy for Game Architecture and Design we research the use of ray tracing and path tracing in actual games. The ray tracer "Arauna" and the path tracer "Brigade" have been used in several student project as an alternative to rasterization-based renderers. This provides insight in this emerging technology for both visual artists and programmers. This talk presents our results and experiences, in the context of a high-quality, international game development curriculum.

Biography:

Jacco Bikker, NHTV University of Applied Sciences, Breda, The Netherlands. He is a games developer with 10 years of experience on PC and mobile devices. At NHTV, Jacco is associate professor and lecturer for the IGAD course on game architecture and design, teaching C/C++ optimization and graphics programming courses. He also coaches students that work on game projects using the Arauna real-time ray tracer, which he developed. Apart from lecturing, Jacco pursues a PhD in computer graphics at the Delft Technical University.

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