

Temporally Coherent Interactive Ray Tracing

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UUCS-01-005

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May 15, 2001

Abstract

Although ray tracing has been successfully applied to interactively render large datasets, supersampling pixels will not be practical in interactive applications for some time. Because large datasets tend to have subpixel detail, one-sample-per-pixel ray tracing can produce visually distracting popping and scintillation. We present an algorithm that directs primary rays toward locations rendered in previous frames, thereby increasing temporal coherence. Our method tracks intersection points over time, and these tracked points are used as an oracle to aim rays for the next frame. This is in contrast to traditional image-based rendering techniques which advocate color reuse. We so acquire coherence between frames which reduces temporal artifacts without introducing significant processing overhead or causing unnecessary blur.