

Image Generation Pipeline Optimization

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ABSTRACT

Modern GPUs are easily capable of rendering millions of polygons at extremely high resolutions and frame rates. With this ability, much higher scene fidelity is theoretically possible. However, the fundamental design of both the traditional database generation process and rendering APIs such as OpenGL impose significant bottlenecks which greatly limit the throughput of an image generator. In this context, waiting for the next generation of GPU no longer brings the performance advantages it should. In order to fully leverage the abilities of modern GPUs, new approaches in database processing and rendering must be employed. This paper discusses the application and results of optimizing the image generation pipeline, from source to scene. This includes the effective use of multiple CPU cores and the application of Zero Driver Overhead (ZDO) OpenGL techniques.

BIO

Tim Woodard

Mr. Tim Woodard is the Chief Technology Officer at Diamond Visionics, with over 18 years of experience specializing in the design and development of software architectures for real-time PC-based image generation using Agile development processes, advanced C++, and modern OpenGL techniques. Mr. Woodard has received patents for the real-time simulator database generation technology which forms the basis of Diamond Visionics' GenesisRTX™ worldwide database generation system. GenesisRTX™ provides high-fidelity generation, visualization, and manipulation of visual databases at run-time directly from source data on low-cost PC-based platforms, eliminating the need for traditionally labor-intensive off-line database production processes. Tim has served as the Director of Engineering, Director of Research and Development, and principal investigator for a number of Phase I, II, and III US Government Small Business Innovative Research Grants. Tim has also published and presented papers at I/ITSEC, IMAGE, NVIDIA's GPU Technology Conference, ASQ, and ITEC.