Karlsruhe Institute of Technology

Paper Out of Core Processes

Proseminar Paper by

Jonathan Beller

At the Faculty for Computer Science
Institute for Visualization and Data Analysis,
Computer Graphics Chair

29. April 2018

Inhaltsverzeichnis

1. Abstract

With the ever increasing amount of data to be rendered for a single given scene, experimenting with new approaches for handling and structuring that data becomes more and more important. This paper covers the approach to enhance response times and quality using out-of-core techniques.

With the help of out-of-core techniques, it is possible to achieve real-time rendering performance on current-generation graphics cards by overcoming limits posed by the graphics cards' internal memory [CNLE09]. Thus, this topic is essential for everyone hoping to achieve such performance for scenes that cannot be efficiently rendered using conventional methods.

I will discuss different strategies used to load necessary data chunks into working memory taking into account its finiteness using intelligent data streaming. These include visibility culling and virtual texturing. Also, this paper will give an overview of the possibility to use volumetric texture units called "Voxels" instead of regular texels and the advantages and challenges that come with it. Lastly, the topic will be further explored using the examples [CNLE09] and [VW09].

2. Motivation

3. Basics

4. Main Content

4.1 Memory Management

4.2 Voxels

4.3 Example 1: GigaVoxels

4.4 Example 2: ID Tech 5 Challenges

5. Epilogue

Literaturverzeichnis

[BKR09] Steffen Becker, Heiko Koziolek und Ralf Reussner: *The Palladio component model for model-driven performance prediction.* 82:3–22, 2009. `http://dx.doi.org/10.1016/j.jss.2008.03.066`.

[CNLE09] Cyril Crassin, Fabrice Neyret, Sylvain Lefebvre und Elmar Eisemann: *GigaVoxels: Ray-guided Streaming for Efficient and Detailed Voxel Rendering.* In: *Proceedings of the 2009 Symposium on Interactive 3D Graphics and Games*, I3D '09, Seiten 15–22, New York, NY, USA, 2009. ACM, ISBN 978-1-60558-429-4. `http://doi.acm.org/10.1145/1507149.1507152`.

[VW09] JMP Van Waveren: *id tech 5 challenges-from texture virtualization to massive parallelization.* Talk in Beyond Programmable Shading course, SIGGRAPH, 9:5, 2009.

Erklärung

Ich versichere, dass ich die Arbeit selbstständig verfasst habe und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt habe, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet habe. Die Arbeit wurde in gleicher oder ähnlicher Form noch keiner anderen Prüfungsbehörde vorgelegt und von dieser als Teil einer Prüfungsleistung angenommen.

Karlsruhe, den 29. April 2018

(Jonathan Beller)