



Level of Detail for 3D Graphics (The Morgan Kaufmann Series in Computer Graphics)

By David Luebke, Martin Reddy, Jonathan D. Cohen, Amitabh Varshney, Benjamin Watson, Robert Huebner

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Level of detail (LOD) techniques are increasingly used by professional real-time developers to strike the balance between breathtaking virtual worlds and smooth, flowing animation. *Level of Detail for 3D Graphics* brings together, for the first time, the mechanisms, principles, practices, and theory needed by every graphics developer seeking to apply LOD methods.

Continuing advances in level of detail management have brought this powerful technology to the forefront of 3D graphics optimization research. This book, written by the very researchers and developers who have built LOD technology, is both a state-of-the-art chronicle of LOD advances and a practical sourcebook, which will enable graphics developers from all disciplines to apply these formidable techniques to their own work.

- * Is a complete, practical resource for programmers wishing to incorporate LOD technology into their own systems.
- * Is an important reference for professionals in game development, computer animation, information visualization, real-time graphics and simulation, data capture and preview, CAD display, and virtual worlds.
- * Is accessible to anyone familiar with the essentials of computer science and interactive computer graphics.
- * Covers the full range of LOD methods from mesh simplification to error metrics, as well as advanced issues of human perception, temporal detail, and visual fidelity measurement.
- * Includes an accompanying Web site rich in supplementary material including source code, tools, 3D models, public domain software, documentation, LOD updates, and more. Visit <http://LODBook.com>.

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Bibliography

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Editorial Review

Review

"A textbook treatment of the concepts, theories, algorithms and data structures essential for modeling detailed three-dimensional graphic worlds. The authors provide a conceptual framework for striking the tricky balance between increasing levels of detail (LOD) and the need for smooth, flowing animation. This technical reference will be of use to professionals in game development, computer animation, information visualization, and virtual reality fields." - Design Issues

From the Back Cover

"I'm really happy with what Luebke et al. have created. It's exactly what I would want to find on the shelf if I needed to implement some LOD techniques in a game."

?Mark DeLoura, Sony Computer Entertainment America

"This is the first and only book that provides a comprehensive coverage about level of detail. When you are finished reading it, all you will be able to say is "Wow!""

?Dave Eberly, Magic Software, Inc.

"This book will find a choice spot on my bookshelf."

?Will Schroeder, Kitware, Inc.

"This fine book...provides both a treatment of the underlying theory and a valuable practical reference for the graphics practitioner."

?Dr. Frederick P. Brooks, Jr., UNC Chapel Hill

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About the Author

David Luebke David is an Assistant Professor in the Department of Computer Science at the University of Virginia. His principal research interest is the problem of rendering very complex scenes at interactive rates. His research focuses on software techniques such as polygonal simplification and occlusion culling to reduce the complexity of such scenes to manageable levels. Luebke's dissertation research, summarized in a SIGGRAPH '97 paper, introduced a dynamic, view-dependent approach to polygonal simplification for interactive rendering of extremely complex CAD models. He earned his Ph.D. at the University of North Carolina, and his Bachelors degree at the Colorado College.

Dr. Martin Reddy is the founder and CEO of the software consultancy firm Code Reddy Inc. He holds a Ph.D. in Computer Science and has over 15 years of experience in the software industry. During this time, he has written 3 software patents and has published over 40 professional articles and a book on 3D computer graphics.

Dr. Reddy worked for 6 years at Pixar Animation Studios where he was lead engineer for the studio's in-house animation system. This work involved the design and implementation of various APIs to support several Academy Award-winning and nominated films, such as "Finding Nemo", "The Incredibles", "Cars", "Ratatouille", and "Wall-E."

Dr. Reddy currently works for Linden Lab on the Second Life Viewer, an online 3D virtual world that has been used by over 16 million users around the world. His work is currently focused on a radical redesign of the Second Life Viewer, putting in place a suite of robust APIs to enable extensibility and scriptability.

Jonathan D. Cohen is an Assistant Professor in the Department of Computer Science at The Johns Hopkins University. He earned his Doctoral and Masters degrees from The University of North Carolina at Chapel Hill and earned his Bachelors degree from Duke University. His interests include polygonal simplification and other software acceleration techniques, parallel rendering architectures, collision detection, and high-quality interactive computer graphics. Jon's e-mail address is cohen@cs.jhu.edu.

Amitabh Varshney Amitabh is an Associate Professor in the Department of Computer Science at the University of Maryland. His research interests lie in interactive computer graphics, scientific visualization, molecular graphics, and CAD. Varshney has worked on several aspects of level-of-detail simplifications including topology-preserving and topology-reducing simplifications, view-dependent simplifications, parallelization of simplification computation, as well as using triangle strips in multiresolution rendering. Varshney received his PhD and MS from the University of North Carolina at Chapel Hill in 1994 and 1991 respectively. He received his B. Tech. in Computer Science from the Indian Institute of Technology at Delhi in 1989.

Benjamin Watson Ben is an Assistant Professor in Computer Science at Northwestern University. He earned his doctoral and Masters degrees at Georgia Tech's GVU Center, and his Bachelors degree at the University of California, Irvine. His dissertation focused on user performance effects of dynamic level of detail management. His other research interests include object simplification, medical applications of virtual

reality, and 3D user interfaces.

Robert Huebner Robert is the Director of Technology at Nihilistic Software, an independent development studio located in Marin County, California. Prior to co-founding Nihilistic, Robert has worked on a number of successful game titles including "Jedi Knight: Dark Forces 2" for LucasArts Entertainment, "Descent" for Parallax Software, and "Starcraft" for Blizzard Entertainment. Nihilistic's first title, "Vampire The Masquerade: Redemption" was released for the PC in 2000 and sold over 500,000 copies worldwide. Nihilistic's second project will be released in the Winter of 2002 on next-generation game consoles. Robert has spoken on game technology topics at SIGGRAPH, the Game Developer's Conference (GDC), and Electronic Entertainment Expo (E3). He also serves on the advisory board for the Game Developer's Conference and the International Game Developer's Association (IGDA).

Users Review

From reader reviews:

Concepcion Maldonado:

A lot of people always spent their own free time to vacation or go to the outside with them household or their friend. Are you aware? Many a lot of people spent they will free time just watching TV, or maybe playing video games all day long. If you wish to try to find a new activity that is look different you can read any book. It is really fun in your case. If you enjoy the book which you read you can spent the entire day to reading a guide. The book Level of Detail for 3D Graphics (The Morgan Kaufmann Series in Computer Graphics) it is extremely good to read. There are a lot of people that recommended this book. They were enjoying reading this book. If you did not have enough space bringing this book you can buy the actual e-book. You can m0ore simply to read this book through your smart phone. The price is not very costly but this book has high quality.

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Richard Broderick:

Level of Detail for 3D Graphics (The Morgan Kaufmann Series in Computer Graphics) can be one of your starter books that are good idea. Many of us recommend that straight away because this e-book has good vocabulary that may increase your knowledge in vocab, easy to understand, bit entertaining however delivering the information. The writer giving his/her effort to put every word into satisfaction arrangement in writing Level of Detail for 3D Graphics (The Morgan Kaufmann Series in Computer Graphics) although doesn't forget the main point, giving the reader the hottest and also based confirm resource facts that maybe you can be one among it. This great information may drawn you into completely new stage of crucial contemplating.

Jeff Jones:

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