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Interactive Walk-Through of Complex Environments

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Organized by
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Abstract

This course focuses on interactive systems and algorithms for displaying complex geometric databases which require sophisticated scene management techniques to achieve frame rate. Beginning with a discussion of basic techniques and leading to state-of-the-art algorithms, the speakers will address key issues in walkthrough, including visibility computations, automatic object simplification, and memory management through database subset prefetching. Speakers will show real applications of these algorithms to a variety of areas, including game development, visual simulation, virtual reality, architecture, and digital mockup.

Interactive Walkthrough of Complex Environments

An Introduction to Systems Issues for Walkthrough Applications

Brian Cabral, Silicon Graphics
Michael Hopcroft, Silicon Graphics

Level-of-Detail Using Progressive Mesh Representations

Hugues Hoppe, Microsoft Corporation

HOPPE, H., DEROSE, T., DUCHAMP, T., MCDONALD, J., AND STUETZLE, W. Mesh Optimization. In *SIGGRAPH 93 Conference Proceedings (Computer Graphics, Annual Conference Series 1993)* (Aug. 1993), pp. 19–26.

HOPPE, H. Progressive Meshes. In *SIGGRAPH 96 Conference Proceedings (Computer Graphics, Annual Conference Series 1996)* (Aug. 1996), pp. 99–108.

HOPPE, H. View-Dependent Refinement of Progressive Meshes. In *SIGGRAPH 97 Conference Proceedings (Computer Graphics, Annual Conference Series 1997)* (Aug. 1997)

High Performance on Low-End Systems

Turner Whitted, Numerical Design Limited

Hierarchical Visibility and Tiling

Ned Greene

GREENE, N., KASS, M., AND MILLER, G. Hierarchical z-buffer visibility. In *SIGGRAPH 93 Conference Proceedings (Computer Graphics, Annual Conference Series 1993)* (July 1993), pp. 231–238.

GREENE, N. Hierarchical polygon tiling with coverage masks. In *SIGGRAPH 96 Conference Proceedings (Computer Graphics, Annual Conference Series 1996)* (Aug. 1996), pp. 65–75.

Direct Rendering of Higher Order Models and Texture-based Simplification

Dinesh Manocha, University of North Carolina

KUMAR, S., MANOCHA, D., ZHANGH, H., AND HOFF, K. Accelerated walkthrough of large spline models. In *Proceedings of the 1997 Symposium on Interactive 3D Graphics* (1997).

KUMAR, S., MANOCHA, D., AND LASTRA, A. Interactive display of large NURBS models. *IEEE Transactions on Visualization and Computer Graphics* 2, 4 (December 1996), pp. 323–336.

ALIAGA, D. Visualization of Complex Models using Dynamic Texture-based Simplification, In *Proceedings of IEEE Visualization 1996*, (1996), pp. 101-106.

Collision Detection

Ming C. Lin

COHEN, J. D., LIN, M. C., MANOCHA, D., AND PONAMGI, M. I-COLLIDE: An interactive and exact collision detection system for large-scale environments. In *Proceedings of the 1995 Symposium on Interactive 3D Graphics* (June 1995), pp. 189–196.

GOTTSCHALK, S., LIN, M. C., AND MANOCHA, D. OBB-tree: A hierarchical structure for rapid interference detection. In *SIGGRAPH 96 Conference Proceedings (Computer Graphics, Annual Conference Series 1996)* (Aug. 1996), pp. 171–180.

HUDSON, T., LIN, M. C., COHEN, J., GOTTSCHALK, S. AND MANOCHA, D. V-COLLIDE: Accelerated Collision Detection for VRML. In *Proceedings of VRML '97* (1997)