3D Compression

INTEGRATED MEDIA SYSTEMS CENTER
A National Science Foundation
Engineering Research Center at the
UNIVERSITY OF SOUTHERN CALIFORNIA

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Progressive transmission of a 3D triangle mesh

Quadrilateral meshes for art history
Examples of progressive and single-rate 3D Compressions.

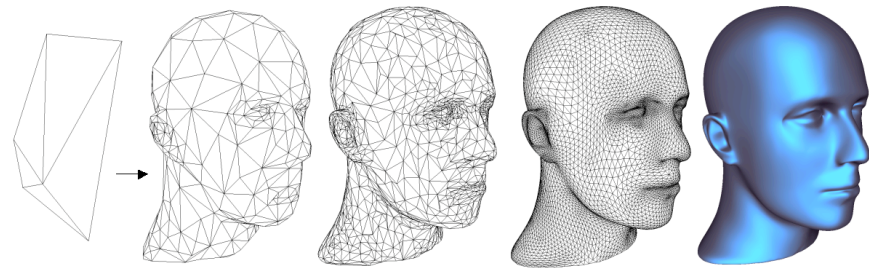| USC STUDENTS, DEGREES	OTHER RESEARCHERS, AFFILIATIONS
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BRIEF DESCRIPTION OF DEMONSTRATION

Complete set of tools for progressive or single-rate compression of meshes. This includes decimation, traversal, subdivision, conversion between triangle/quad/polygonal on irregular meshes. A set of data compression tools are also included such as Huffman encoding, order-n adaptive arithmetic encoding, run-length encoding, quantization, prediction.
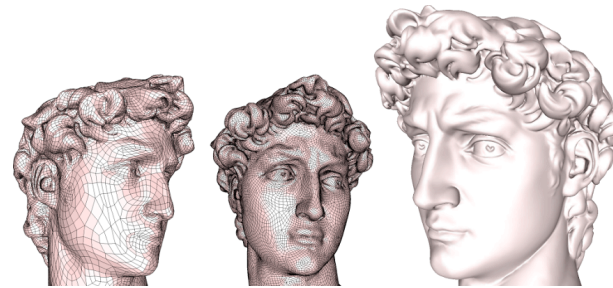
UNIQUE OR DISTINGUISHING CHARACTERISTICS RELATIVE TO STATE-OF-THE-ART

Best published rates for lossless compression. Fits theoretical bounds for triangle and polygonal meshes.

APPLICATIONS	RECENT HIGHLIGHTS, LEVEL OF DEVELOPMENT, UPCOMING MILESTONES
Progressive transmission/storage of geometry (medical, art history, virtual malls, games, virtual reality).	We are exploring ultra-fast compression/decompression techniques with only near optimal bit-rates, for multi-connected components for objects of any topology. We also work on optimal remeshing for lossy compression.

UNDERLYING TECHNOLOGIES

Mesh traversal and simplification for encoding,
Progressive refinement for decoding,
Metric-related and valence-based decimation algorithms,
Geometric prediction,
Statistical modeling and adaptive arithmetic encoding.

LIST OF PUBLICATIONS, REFERENCES, URLs

Pierre Alliez, Mathieu Desbrun, *Progressive Compression for Lossless Transmission of Triangle Meshes*, SIGGRAPH'01.
Pierre Alliez, Mathieu Desbrun, *Valence-Driven Connectivity Encoding for 3D Meshes,* EUROGRAPHICS'01.
Technology disclosures available: *Valence-Driven Connectivity Encoding for 3D Meshes* and *Progressive Compression for Lossless Transmission of Triangle Meshes.*

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