

3D Geometry Compression

Recent Advances and Challenges

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Abstract

Polyhedral models, which are used in most graphics applications, require considerable amounts of storage, even when they only approximate precise shapes with limited accuracy. To support internet access to 3D models of complex virtual environments or assemblies for electronic shopping, collaborative CAD, multi-player video games, scientific visualization, representations of 3D shapes must be compressed by several orders of magnitude. In this talk I will describe the state of the art in schemes for lossy and loss-less compression of triangle and polygonal meshes, including progressive approaches.

In additions to single-resolution compression schemes for triangle and polygonal meshes, which result in compressed formats of less than a byte per triangle, multiresolution progressive refinement approaches have advanced to the point of challenging the best single resolution schemes in compression efficiency. Along with surface simplification or decimation methods, these approaches, which change the surface topology while approximating the geometry, can be regarded as lossy compression schemes. Finally, I will describe the status of standardization efforts and open problems.