Remote Collaboration Environment on the Grid

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In the visualization group of the VizGrid project, we plan to develop a tele-immersive environment using volume communication technologies, which mean a suite of technologies for communicating using volume datasets. The volume communication make the best of volume graphics technologies, where a volume data is represented as a three-dimensional array of voxels. The term voxel is used to characterize a volume element. It is a generalization of the notion of pixel that stands for a picture element. Today, widely used 3D computer graphics first extracts geometry data from volume data, and then uses polygonal meshes to represent an object by its surface. Volume rendering-based graphics, that is, volume graphics uses voxels - 3D or volumetric pixels - as basic element to represent not only the surface but also the entire inner part of an object. The volume graphics visualization is superior to polygon based 3D graphics in means of image quality and performance when we visualize highly complex objects that our project has to handle with finest details. In this project, we will develop a volume communication suite, that is an infrastructure that makes a remote collaborative environment, and it is composed of a series of techniques that are applied on a volume dataset generated from real scenes and computer simulations. These techniques include volume creation, volume compression/decompression, volume transmission, volume display, and volume search., We will describe three accomplishments, which were completed in 2002, a streaming-based and a CPG-based visualization techniques, and an ongoing development of a portable tele-immersive system which uses multi-viewpoint display system and a 3D pointing device with a perspective of the finalized system.

Reference

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