New Interaction Concepts and Real-Time Algorithms for the Exploration of Geological Data in Virtual Environments

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Abstract

This talk presents prototype virtual reality techniques and applications specific to oil and gas activities. One of these prototypes is a props-based interaction device that allows direct and intuitive interaction with seismic data cubes. Another development is a 3D-texture-based multi-resolution approach for handling massive volumetric data sets, using a two-level hierarchical paging technique to guarantee a prescribed frame rate. This technique displays adaptively lower resolutions of the data when a slice or volume rendering lens is moved through the data set, and fills in higher resolutions of the data, when the user slows down or stops. Further research has been performed in the areas of input devices, new interaction techniques, techniques for data sonification, mesh reduction techniques, high quality rendering techniques, PC cluster-based systems, and collaborative virtual environments.