



Smart Visibility Techniques in Volume Visualization

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In this presentation we discuss interactive visualization techniques that effectively convey information about most important structures in the volume dataset through smart change in the visual representation or through distortion of spatial arrangement of the data. These techniques have their origin in the modern technical illustration where they are known under terms such as cut-away views, ghosted views, exploded views or peel-aways. We discuss how these expressive illustration concepts, designed for static visual display, can be adapted for interactive visualization of volumetric data obtained from medical or seismic measurements.

One discussed approach is importance-driven feature enhancement, where the visibility of a particular feature is determined according to assigned importance information. The most appropriate level of visual abstraction is specified automatically to unveil the most important information. The importance-driven feature enhancement will represent one category of smart visibility techniques, i.e., where a local change of visual representation improves visibility of relevant structures.

The second category of smart visibility techniques is based on modification of the spatial arrangement of structures. Such techniques are closely related to exploded views illustrations, nowadays often used for assembly instructions. We discuss visualization techniques that separate context information to unveil the inner focus information by splitting the context into parts, moving them apart, or peeling context away.

We demonstrate the potential of smart visibility visualization techniques by specific examples of medical procedures where these techniques are already integrated part of visual analysis. Finally we give an outlook how visual analysis of seismic 3D data could profit of utilization of smart visibility techniques.