Color Tunneling : Interactive Exploration and Selection in Volumetric Datasets

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Résumé

Interactive data exploration and manipulation are often hindered by dataset sizes. For 3D data, this is aggravated by occlusion, important adjacencies, and entangled patterns. Such challenges make visual interaction via common filtering techniques hard. We describe a set of real-time multi-dimensional data deformation techniques that aim to help users to easily select, analyze, and eliminate spatial-and-data patterns. Our techniques allow animation between view configurations, semantic filtering and view deformation. Any data subset can be selected at any step along the animation. Data can be filtered and deformed to reduce occlusion and ease complex data selections. Our techniques are simple to learn and implement, flexible, and real-time interactive with datasets of tens of millions of data points. We demonstrate our techniques on three domain areas: 2D image segmentation and manipulation, 3D medical volume exploration, and astrophysical exploration.

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