Motivation

Application development is guided by the usage of software libraries and toolkits. For medical applications, the available toolkits focus on image analysis and volume rendering. User interface and exploration issues are not adequately supported. Hence, the METK provides a large variety of facilities for application development. The METK is based on the rapid prototyping platform MeVisLab. Therefore, no extended programming skills are needed for application building using a graphical programming approach. The METK is freely available and can be downloaded at www.metk.net.

The METK includes:
- Advanced medical visualizations and exploration techniques
- Standardized documentation
- Interface widgets for common tasks
- Script-based animation facilities
- Automatic viewpoint selection
- Several illustrative rendering techniques
- Object selection in complex and transparent 3D scenes

Exploration Layer

- Key States and Undo Facilities
- Object Selection and Fast Object Manipulation
- Measurement Tools
- Viewpoint Selection

Visualization Layer

- Viewer
- Colored 2D Overlays using Multi Coded Segmentation Masks
- Lift Chart
- Volume Rendering
- Illustrative Visualizations
- Colored Isosurfaces

Data Management and Communication Layer

- MRI and CT Images
- Segmentation Masks
- Multi Coded Segmentation Masks
- Smooth Isosurfaces and Vessel Visualizations

Multi Coded Segmentation Mask

- Usually, each segmentation mask is stored in a single file
- Memory and performance inefficient
- Not more than 64 structures
- Overlapping not possible
- An MCSM contains all segmentation masks
- Mapping of voxel values to structure lists is stored in the case data
- Upper bound of 2^n masks

Key States

- Several views on the explored data need to be saved
- Key state stores necessary information
- Additional screenshot, title and comment
- Automatic video generation between a set of key states

Object Selection

- Problem: desired object is hidden by transparent objects
- Mouse is pointed consciously
- Less perception of very transparent objects
- Impact of transparency and the bounding box size
- Limitations: structure is underlined by opaque

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