Smart Image Filter Preview

Motivation

Volume data as for example acquired from computed tomography typically requires extensive processing for useful analysis. In many analysis pipelines, some simple, existing filters like smoothing or denoising need to be applied. Finding the right parameters to use for them can be a tricky task. The way this is often done at the moment requires applying the filter once, checking the results, then going back, applying the filter again with different parameters, and repeating this until the results converge on the expectation.

Goal

Within this project, a method and tool should be developed to provide an intelligent preview over the possible outcome from some 3D image filter. This could for example be done by applying the filter multiple times with different parameters on a small part of the image, and showing these different versions in a matrix, as is for example available in 2D image processing software like Photoshop.
The method will be implemented in the open_iA tool [1], and will be applied for a simple, already existing filter, for example one from the Insight Segmentation and Registration Toolkit ITK [4]. Ideally the devised method should be extensible very easily to additional filters with different parameters.

Starting literature:

1. A. J. Pretorius, M.-A. Bray, A.E. Carpenter and R.A. Ruddle, “Visualization of parameter space for image analysis,” Visualization and Computer Graphics, IEEE Transactions on, Vol. 17 (12), December 2011, pp. 2402–2411, doi: 10.1109/TVCG.2011.253.
2. L. Bavoil et al., “VisTrails: enabling interactive multiple-view visualizations,” IEEE Visualization, 2005, Minneapolis, pp. 135-142, doi: 10.1109/VISUAL.2005.1532788.
3. Bernhard Fröhler, Torsten Möller and Christoph Heinzl, “GEMSe: Visualization-Guided Exploration of Multi-channel Segmentation Algorithms,” Computer Graphics Forum, Vol. 35 (3), June 2016, doi: 10.1111/cgf.12895.
4. The Insight Segmentation and Registration Toolkit - itk.org

Kontakt

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