

A Pipeline for Image Processing and Visualization in Medicine

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Abstract

Medical visualization can be more than a collection of separate, clinically-driven applications of data visualization. We can identify a set of generic operations that will support various stages of the (pre-)clinical process. As a step towards a more generic approach, we will present a simple generic pipeline model for medical image processing and visualization. The first stages of the pipeline strongly rely on image processing techniques for image acquisition, image enhancement, segmentation, and registration. The resulting enhanced, segmented, registered data are then used for modelling, visualization, and interaction. We will argue about the interdependence of Image Processing and Visualization as separate disciplines, and how they can better help each other.

As a second part of the talk, we will illustrate this pipeline model by showing recent results of a number of our research projects in medical visualization: virtual colonoscopy, shoulder replacement surgery, and multi-field data visualization for brain tumor resection planning. Finally, we will propose some high-priority issues for future research.

Biography

FRITS POST is an associate professor of computer science (visualization) at Delft University of Technology, the Netherlands, where he leads a research group in data visualization since 1990. His current research interests include vector field and flow visualization, medical imaging and visualization, virtual reality, and interactive exploration of large time-varying data sets. He is currently the chairman of the Eurographics Working Group on Data Visualisation and a co-founder of the annual joint Eurographics-IEEE VGTC Eurovis Symposium. He is a member of Eurographics and ACM Siggraph, and an Associate Editor of ACM Transactions on Graphics.