3D Interactive Visualization of DICOM images

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Overview

Part 1: Introduction to the 3D Slicer platform

Part 2: 3D Visualization of Dicom images and 3D models

Part 3: 3D exploration of liver segments using 3D Slicer
- Part 1 -

The 3D Slicer Platform

Sonia Pujol, Ph.D.
3D Slicer

- Open-source application available for Windows, Linux and Mac
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• More than 2.8 million lines of code
3D Slicer

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- More than 2.8 million lines of code
- Neuroscience and Image-Guided Therapy

Sonia Pujol, Ph.D. – Kitt Shaffer, M.D., Ph.D.
National Alliance for Medical Image Computing
3D Slicer History

- Started in 1997 between the Surgical Planning Lab (Harvard) and the CSAIL (MIT)

Image Courtesy of the CSAIL, MIT
3D Slicer History

- Started in 1997 between the Surgical Planning Lab (Harvard) and the (CSAIL) MIT
- 2009: Multi-institution effort to share the latest advances in image analysis with clinicians and scientists
3D Slicer

• Open-source platform supported by the National Institutes of Health consortia which include
  – National Alliance for Medical Image Computing (NA-MIC)
  – Neuroimage Analysis Center (NAC)
P.I. Prof. Ron Kikinis, MD,
Director of the Surgical Planning Lab,
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3DSlicer from three user perspectives

- Clinical researchers
- Biomedical engineers
- Algorithm developers
Clinical researchers

Interact in 3D to enhance data interpretation
Visualize

• User-driven views of anatomical structures

• Overlay between 2D grey-levels images and 3D anatomical structures

• Intuitive interaction with the 3D models
Biomedical Engineers

Extract relevant information from complex data
Analyze

• Advanced analysis of complex data
• Multimodal data fusion
• Clinical parameters extraction

Courtesy of W. Plesniak, BWH
Analyze

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RSNA 2009 Course:
‘Quantitative Medical Imaging for Clinical Research and Practice’
Tuesday, December 01
10:30-12:00 PM S401CD

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National Alliance for Medical Image Computing
\[
\ln p(X \mid \pi, \mu, \Sigma) = \sum_{n=1}^{N} \ln \left\{ \sum_{k=1}^{K} \pi_k N(x_n \mid \mu_k, \Sigma_k) \right\}
\]

Develop plug-ins to extend image analysis capabilities
Create

• Integrate external executables with the Slicer3 platform

• Develop plug-ins in C++, Tcl or Python

• Build upon the NA-MIC kit to meet your scientific goals
Clinical researchers
Biomedical engineers
Algorithm developers

Translate techniques into skills
Translate Techniques into Skills

3DSlicer hands-on workshops
- Clinical researchers
- Biomedical engineers
- Algorithm developers