Building bridges between complementary medical image analysis platforms

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Medical Image Analysis Platforms

- FreeSurfer
- BRAINS
- HAMMER
- SPECTRE
- IA-FE Mesh
- OpenIGTLink
FreeSurfer

Description: FreeSurfer is research software for cortical surface parcellation and automated brain morphometry

Integration: 3D visualization of volumes, surfaces and statistics overlays.

Advantages: Interactive visualization, integration with other data (e.g. DTI)
FreeSurfer integration

Scanner \[\text{data} \rightarrow \text{FreeSurfer} \rightarrow \text{Slicer}\]

FreeSurfer processed data
BRAINS

Description: Comprehensive neuroanalysis research tool with optimized ITK-based registration

Integration: Command line module

Advantages: Interactive front end integration (e.g. prostate, IGT)

Image Courtesy of Vincent Magnotta, Ph.D. and Hans Johnson, Ph.D.
BRAINS integration

calls

Slicer

results

BRAINS

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HAMMER

Description: Specialized research tool for segmentation, lesion detection and registration of neuroimages

Integration: Command line module

Advantages: Open-source infrastructure, distribution and visualization

Image Courtesy of Dinggang Shen, Ph.D.
HAMMER integration

calls

Slicer

HAMMER

results
**SPECTRE**

**Description:** Skull Stripping component of the CRUISE (Cortical Reconstruction Using Implicit Surface Evolution) platform

**Integration:** Command Line module in Java

**Advantages:** Visualization platform for output data and access to batch make capabilities

Image Courtesy of Jerry Prince, Ph.D.
SPECTRE integration

Slicer  →  SPECTRE  ←  Brain Atlas
IA-FE Mesh

**Description:** open-source software for Finite Element Meshing of biological structures

**Integration:** Loadable module in C++

**Advantages:** End-to-end analysis context, open source infrastructure, distribution and unified visualization of original data and segmented mesh

Image Courtesy of Nicole Grosland, Ph.D. and Vincent Magnotta, Ph.D.
IA-FE Mesh integration
OpenIGTLink

**Description:** OpenIGTLink is an open-source protocol and library for IGT

**Integration:** Client-Server

**Advantages:** Integration with commercial FDA approved devices

Image Courtesy of Nobuhiko Hata, Ph.D.
OpenIGTLink

Slicer

OpenIGTLink

Network communication
Summary

- Multiple implementation options: C++ (ITK, VTK), Java, Python …
- Multiple levels of customization: interactive loadable modules, command line modules, data interoperability, network communication
- Diverse application areas
Acknowledgements

National Alliance for Medical Image Computing
NIH U54EB005149

Neuroimage Analysis Center
NIH P41RR013218