Image Processing
Direct Volume Rendering
Image Processing in SCIRun

Four primary options:

• Native SCIRun
  – Interpolation
  – Gradient
  – TransformFieldData

• Teem (Nrrd, Gage, Tend, …)
  – N-dim raster data “Swiss Army Knife”
  – Crop, slice, permute
  – Local measures (via Gage and Tend)

• ITK
  – Similar filtering operations to Teem
  – Segmentation filters (threshold, confidence-connected, level sets, …)
  – Registration

• MATLAB
Learn “unu” and “tend” (Verbs of Raster Processing)
Decompose Complex Tasks Into Simple Steps
Accurate Kernels

• Derivatives between sample points
Direct Volume Rendering

Multi-dimensional Transfer Functions
  • Boundaries
  • Biolmage

More Examples

SCIRun Volume Rendering Modules
Gordon Kindlmann’s MS Thesis

Semi-Automatic Generation of Transfer Functions for Direct Volume Rendering

Gordon Kindlmann

A Thesis Presented to the Faculty of the Graduate School of Cornell University
in Partial Fulfillment of the Requirements for the Degree of Master of Science
Boundaries
Boundaries

IP / DVR

SCI INSTITUTE

CIBC
Boundaries
Boundaries
Tumor Vessel Imaging and Visualization

Immobilize. Dose Contrast
Optimize Signal : Noise vs Time
Discern Contrast Detect Boundaries

Volume Rendering: SIMIAN (Joe Kniss)

QuickTime™ and a YUV420 codec decompressor are needed to see this picture.
Mouse MRI – Al Johnson - Duke
Volume Rendering in SCIRun

Texture Objects

Gradients

Slice Rendering
  • Axis aligned
  • Tangent to view direction

Volume Rendering
  • Slice based
  • MIP (max operator)
  • “Direct volume rendering” (over operator)
Volume Rendering in SCIRun
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