Date: 5-5-98
Due Date: 5-14-98

CS 523: Scientific Visualization

Assignment 3

The purpose of this problem is to introduce you to volume rendering and to let you experiment with different transfer functions.

Once again, we will be using the brain.s.dat data file. The file brain.s.dat is on the CS 523 web page. This is a binary file of a magnetic resonance scan of a human head (of one of my graduate students - David Weinstein). It is sampled on a uniform grid. The data is of size $128 \times 128 \times 32$, with the spacing between samples in Z about 5 times the spacing in X and Y. Each sample is stored as an unsigned 8 bit value between 0 and 255 in a single byte in the data file. The samples are organized as a 3D array, with X varying fastest, followed by Y, followed by Z. In other words, you can think of the data set as a set of 32 slices, each slice is a 128×128 2D array of bytes. Each byte is one 8 bit sample value.

Your task in this assignment is to visualize this data set using either the volume rendering software package Volpack Volume Rendering Library or the VTK. The Volpack Volume Rendering Library can be found on: (`http://www-graphics.stanford.edu/software/volpack/`).

and is installed on: `/home/sci/data2/cs523/volume/vprender-2.0b`

the User's Guide can be found on:

`http://www-graphics.stanford.edu/software/volpack/vp_userguide.html`

Using VTK or Volpack, volume render the brain.s.dat data file. Then

- Experiment with different transfer functions - both different color maps and opacities. (In Volpack, this can be done by editing the script file that controls the transfer function.)
- Use the VTK to select parts of the data (volume of interest - VOI), or write a filter for Volpack which does this. For example, you can use a simple cutting plane, or use a histogram of the data to select values in a particular range. Re-render the filtered data and once again experiment with different color maps and opacities.

What to turn in

Please turn in the source code for all programs/scripts that you write. You can turn these in via electronic handin:

handin cs523 hw3 list of files

Also remember to turn in your HTML writeup for the project. Be sure to include some analysis of the different visualization techniques.