

Map3D Lab Walkthrough

SCIRun 4.5 Documentation

Center for Integrative Biomedical Computing
Scientific Computing & Imaging Institute
University of Utah

SCIRun software download:

<http://software.sci.utah.edu>

Center for Integrative Biomedical Computing:

<http://www.sci.utah.edu/cibc>

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Getting Started

This walkthrough was written for use in the CIBC workshop as a guide for the allotted lab time. This document is meant to provide the information needed for the first time users to begin using Map3D. It provides instructions to run Map3D with basic functionality. For more detailed usage instructions, please see the documentation at: <http://www.sci.utah.edu/cibc/software/107-map3d.html>

Installation

Binaries and source code for Map3D can be found on the USB drives provided for the workshop under the “map3d” subdirectory of the “software” directory (“software/map3d/”). Binary executables of Map3D are available for Windows and Mac OS X. Windows users may simply run the appropriate executable (.exe). Mac users must execute the Map3D application after opening the appropriate disk image (.dmg). Linux users must compile Map3D executables themselves from the provided source code package (.tar.gz – compilation instructions included within).

Lab Steps

In this lab, we will be visualizing two related surfaces and corresponding data: the heart and torso surfaces and their corresponding electric potential distributions.

1. Execute the appropriate version of map3d for your operating system. A window titled Map3D Files should appear on your screen.
2. To the right of the text box labeled as “Geom File:” we will enter the path to a file specifying the surface geometry on which we will be visualizing data. One can use a file browser to navigate to the file as well by pressing the “...” button to the right of the text box.
3. Press the “...” button to the right of the “Geom File:” text box. Navigate to the “software/map3d/geom/” directory and select the file “sock.mat”. Once this is done, the path to the “sock.mat” file should appear in the “Geom File:” text box.
4. Press the “Apply” button at the bottom of the “Map3D Files” window to visualize this surface.
5. The “Map3D Files” window should disappear and a new window labeled “Surface #1” should appear showing a red wire mesh of a round shape on a black background. The current visualization of the surface is a collection of nodes (i.e. points) connected by triangles (i.e. red lines).

6. Click in the window and drag your cursor around to rotate the surface. Click on the bottom right corner of the window and drag to re-size the window.
7. Now we will visualize data on this surface. Right click within the window and select the “Files...” option from the pop-up menu to return to the “Map3D Files” window.
8. Press the “...” button to the right of the “Data File:” text box. Navigate to the “software/map3d/data/” directory and select the file “sockdata.mat”. The data we are loading is effectively a two dimensional array of scalar values where one dimension corresponds to sample times (a.k.a. frames) and the other corresponds to node indices of the geometry.
9. Press the “Apply” button in the bottom of the “Map3D Files” window to visualize this surface with the selected data.
10. In addition to the previous window for “Surface #1” an additional window displaying a colormap for “Surface #1” should appear.
11. To change the scaling of the colors and the colormap, right click within the main “Surface #1” window again to access the popup menu for that window and select “Scaling...” from the “Scaling” submenu (i.e. “Scaling” → “Scaling...”).
12. A new window for “Scaling Properties” should appear. Under the “Range” tab, select “Global over all frames in one surface” and click the “Close” button at the bottom of the properties window.
13. From the popup menu for “Surface #1”, select “Surface Data” → “Render Style (s)” and choose “Banded”. Note that the keyboard shortcut to toggle through the other render styles (the “s” key) is indicated by the “(s)” in the menu.
14. To display a plot of the data as a function of time for a single node, hold the control (or command) button and click the desired node to select it. This is the default action for selecting a node but this can be customized from the popup menu under “Picking”.
15. Clicking on the plot of the data (a.k.a. time signal) can be used to jump to a different time instant of the data in the main visualization.
16. From the popup menu for “Surface #1”, select “Mesh” → “Render as (m)” and choose “None”. Again, note that the keyboard shortcut to toggle through the other mesh rendering options (the “m” key) is indicated by the “(m)” in the menu.
17. Once the most commonly used keyboard shortcuts are learned for your own needs, they can be a more convenient way to use map3d for rapid visualization. To try this, press the “l” key a number of times to toggle lighting. Furthermore, use the left and right arrow keys on your keyboard to step through frames of the data in the main visualization window.
18. To load a new surface in addition to the existing one, go to the pop up menu and choose “Files...” again. Press the “New Surface” button in the lower left of the window to add a new surface to the list.

19. Notice that the option to add the visualization of the second surface to the same window as “Surface #1” is available. We will use the default option instead: each surface is visualized in a new window.
20. For the “Geom File:” choose “tank.mat” and for the “Data File:” choose “tank-data.mat” from the appropriate directories. Click the “Apply” button to visualize.
21. Use the “m”, “l”, “s”, and left/right arrow keys to toggle and navigate the visualization. Rotate the new surface using your cursor. Notice that these actions affect both surfaces (and hence windows).