

Exercise 8 : Multiplanar Sections

The Multiplanar Sections module allows the user to quickly and easily view image data in the plane of acquisition or in any naturally orthogonal plane. The module contains several tools for easy two-dimensional display, and has the capacity to load volumes, load object maps, select orthogonal orientations, and perform intensity windowing or thresholding.

1. Load the **MRI_Head.avw** data set from the **\$(\BIR)\images\TutorialData** directory. The data set may already be available in the Analyze workspace if you have completed exercise 4, Loading and Resizing Anisotropic Data.
2. Open the **Multiplanar Sections** module (**Display > Multiplanar Sections**).
3. Press the **Display Section(s)** PowerBar button or choose **Generate > Display Section(s)**. This will begin a sequential display of the data, the display may be stopped at any time by clicking anywhere in the main Multiplanar Sections window (figure 1).
4. Since MRI_Head.avw was acquired in the sagittal orientation, this is the default orientation for display purposes. The display orientation can be changed to display images in a transverse, coronal, or sagittal orientation. Use the **Orientation** PowerBar buttons to change the display orientation or open the Orientation window (**Generate > Orientation**).
5. To specify a particular slice to view or to begin the sequential display from, open the **Slice** window (**Generate > Slice**). Use the 'Slice' slider bar to set the specific slice.

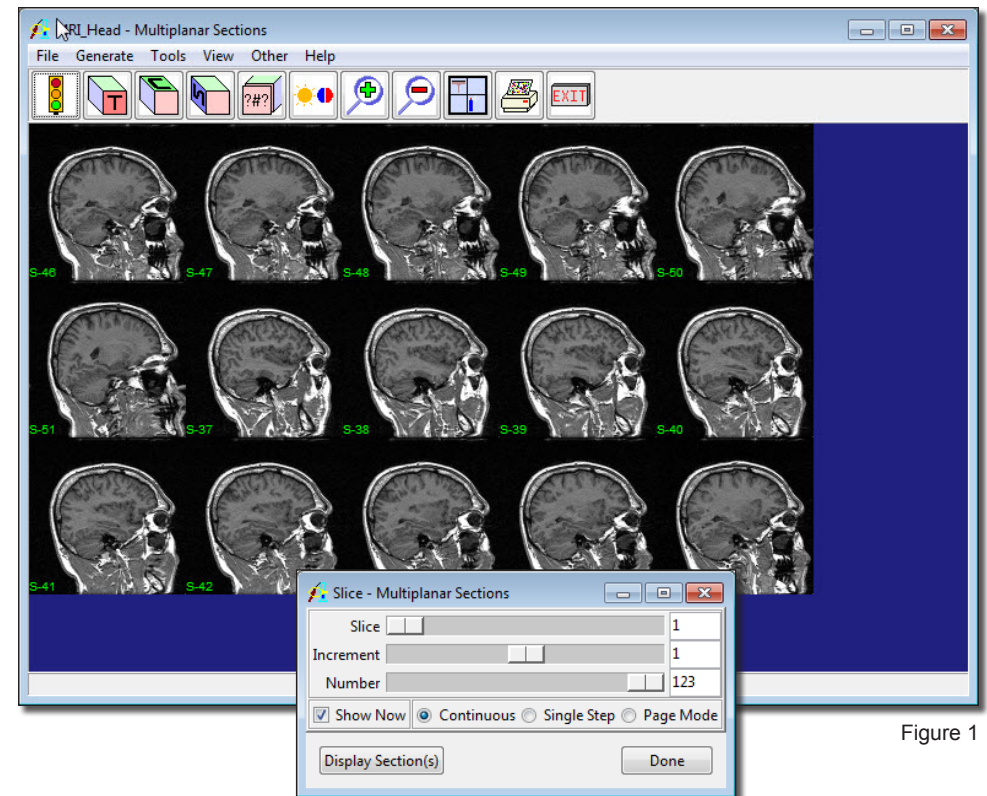


Figure 1

tip The Slice window also contains three display options: Continuous, Single Step, and Page Mode. 'Continuous' sets the display mode to display the slices in a continuous stream. 'Single Step' turns off the continuous display of slices, when Display Section(s) is selected only one slice is displayed. 'Page Mode' sets the display mode to display a page of slices at a time when Display Section(s) is selected.

note Since MRI_Head.avw is anisotropic, images will appear "squashed" in the coronal and transverse orientations. The resized data set MRI_Head0 created in exercise 4, Loading and Resizing Anisotropic data, will display normally in all three orientations.

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Scan Tool

6. The **Scan Tool** (**Tools > Scan**) provides an interface for slice-by-slice review. Click either of the green 'play' arrows to start a sequential display of slices, or use the + and - buttons to move one slice at a time. The slider bar can also be used to move through the slices.

Intersecting Sections Tool

7. Open the **Intersecting Sections** tool (**Tools > Intersecting Sections**). The Intersecting Sections tool provides an interactive display of intersecting orthogonal sections.
8. To change the angle at which the intersecting sections are viewed, use the **View Angle X, Y, and Z** slider bars [A]. The view angle can also be changed by clicking in the image display [B] and dragging the image to a new view.
9. Use the **Slice X, Y, and Z** slider bars [C] to manipulate the intersecting orthogonal sections. The 'X' slider bar controls the sagittal slice displayed, 'Y' the coronal, and 'Z' the transverse; the slider bar and intersecting sections are also color-coded. The image display will interactively update, allowing the user to navigate through the interior of the data set.
10. The scale of each plane can also be changed using the **Scale X, Y, and Z** slider bars. To increase the scale of all planes in proportion to each other, uncheck the Individual Axis option; one Scale slider bar [D] will replace the three slider bars, use this to increase and decrease the image size.
11. Right-click on the image display and choose **Auto Save**. Now, repeat some of the maneuvers described above; when you are finished, right-click again and uncheck the Auto Save option. The maneuvers performed have been recorded and saved to the Analyze workspace. The file can be reviewed with the **Movie** module (**Display > Movie**).

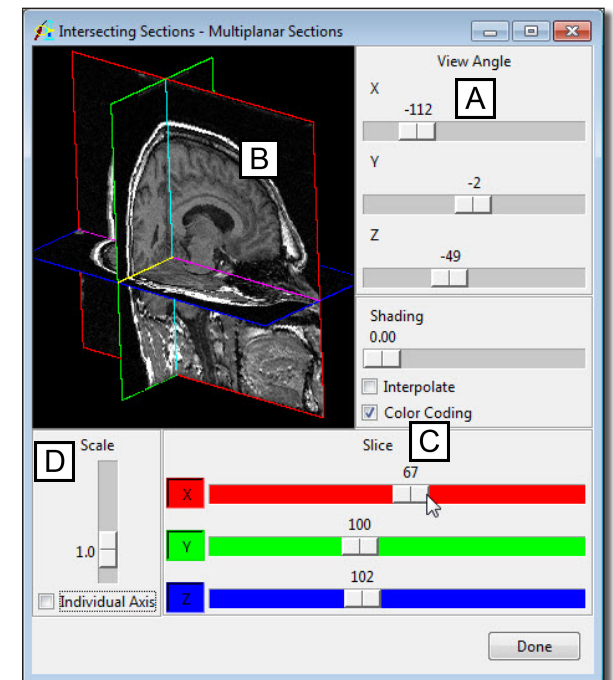


Figure 2

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Cube Sections Tool

12. Open the **Cube Sections Tool (Tools > Cube Sections)**. The Cube Sections tool provides an interactive display of orthogonal sections in a three-dimensional viewing cube.
13. The **View Angle [A]** and **Scale [B]** options for the Cube Sections tool may be changed as described for the Intersecting Sections tool.
14. Planes can be interactively sliced away in the three orthogonal orientations to reveal interior sections of the cube with the **Subregion X, Y, and Z** double-ended slider bars [C]. As with the Intersecting Sections tool, 'X' controls the sagittal orientation slices displayed, 'Y' the coronal, and 'Z' the transverse; the slider bars and cube sides are also color-coded.
15. After subregioning the data set, right-click on the image display and choose **Extract Sub-volume**. The subregioned data set will be saved to the Analyze workspace.
16. Click **Done** to close the Cube Sections tool.
17. Close the Multiplanar Sections module before proceeding to the Additional Task.

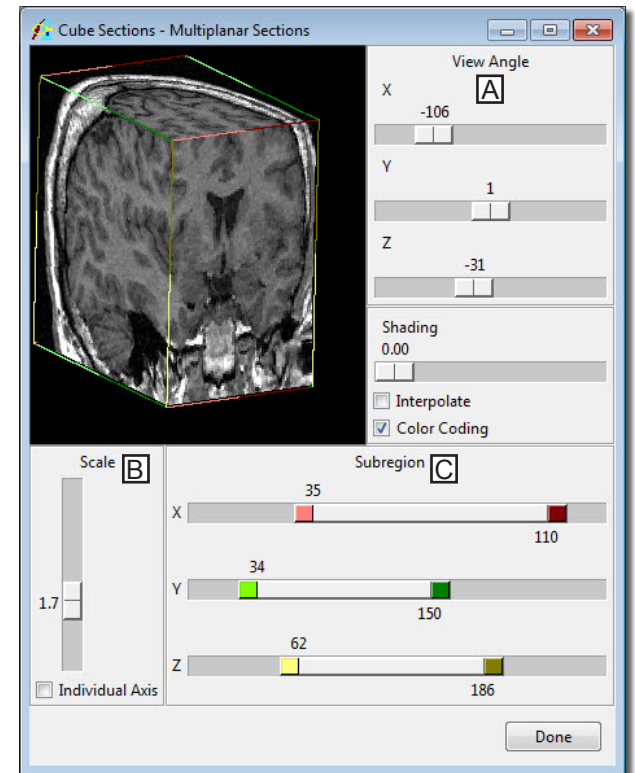


Figure 3

1. Creating a Grayscale Data Set with Color Overlaid Objects

The ability to create a grayscale image overlaid with colored objects, also known as an Intensified Volume, can be useful. This exercise will demonstrate how to achieve this using the Multiplanar Sections module.



1. Select the **MRI_3D_Head** data set in the Analyze workspace and then open the Multiplanar Sections module (**Display > Multiplanar Sections**).
2. Choose **File > Load Object Map** and load the **MRI_3D_Head.obj** object map from the **\$_\BIR\images\TutorialData** directory.
3. When the object map loads the Objects window will automatically open (figure 1). In the Objects window do the following:
 - Set '**Control by**' to '**Attribute**'
 - Set the **Display** of all objects to '**On**' with the exception of the Original and Skin objects.
4. Open the **Scan Tool (Tools > Scan)** and use the slice slider to review the display of the image date (figure 2).



5. Open the **Intensity** option (**View > Intensity**). In the Intensities window, review each of the Object Color modes by selecting each from the 'Mode' drop down menu.

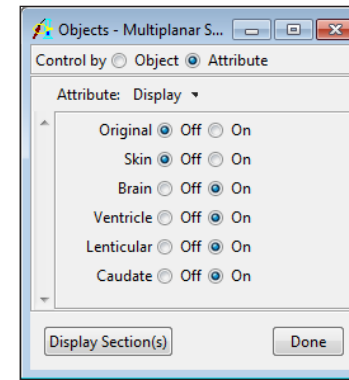


Figure 1

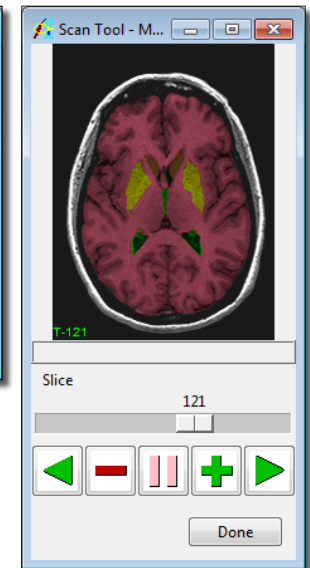


Figure 2

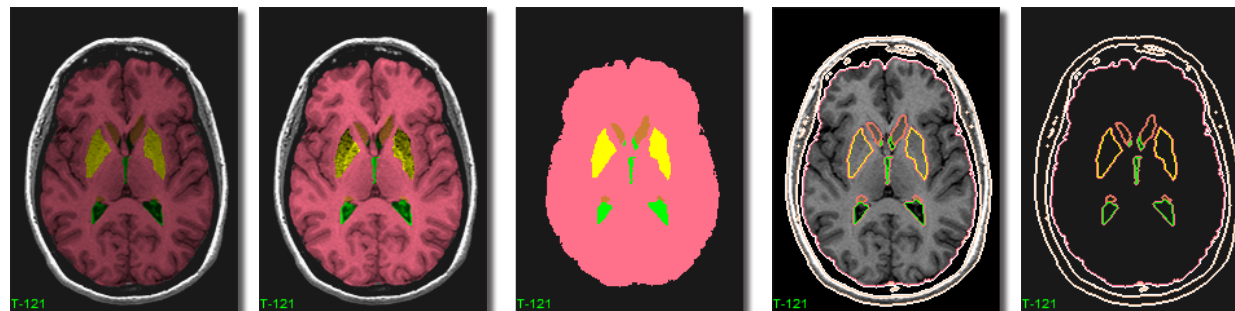


Figure 3

Windowed Object

Local Max/Min

Object Only

Color Edges

Edges Only

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6. Change the 'Mode' back to 'Windowed Object'.

note | If you have reviewed the data set using the Display Sections option, make sure you use the *Generate > Slice* option to set the slice number back to 1.

7. Next select **File > Output Intensified**. A message will be returned (figure 4), select '**Continue**'.
8. A new Intensified Volume will be saved to the Analyze Workspace.
9. Close the Multiplanar Sections module before proceeding to the next exercise.

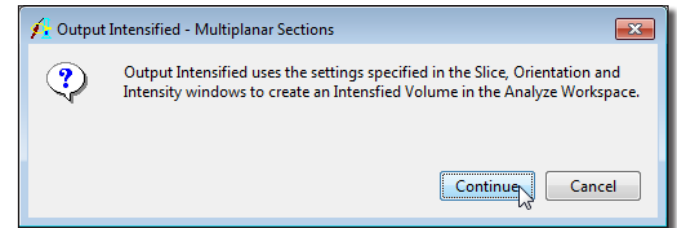


Figure 4