Morphology

The Morphology module applies 1-D, 2-D, or 3-D mathematical morphological transformations and object topology operations to a data set. This exercise will demonstrate the morphological segmentation tools available in the module by showing how to segment the brain from an MRI data set.

1. Load the **MRI_3D_Head.avw** data set from the **$:\BIR\images\TutorialData** directory.
2. Open the **Morphology** module (**Segment > Morphology**).
3. From the **Generate** menu, open the Slice tool. Move the slice slider to slice 130.
4. Open the **Step Editor** window (**Generate > Step Editor**) (figure 1).
5. Click the **Threshold** button. In the Step 1: Threshold window returned, set the **Threshold Min** to **65**. Click **Threshold Volume**. In the window returned, select **Change a Copy of the Loaded Volume**.
6. Select **Generate > Display Section(s) > Current** to review that data.
7. Select **File > Save Volume**. Save the volume as **MRI_3D_Head_bin**.
8. Click the **Erode** button. In the Step 2: Erode window, change the **Element Depth** to **3** and change the value **Iterations** to **2**. Click Erode Volume (figure 2).
9. In the Step Editor window, click **Transform Volume**. A dialogue box will be returned, select **Yes**.
10. Click **Connect**. Change **Max. No. of Components** to **1**. Click **Connect Volume**.
11. In the Step Editor window, click **Conditional Dilate**. In the Conditional window, change **Element Depth** to **3** and change **Iteration** to **1**. Next load the conditional volume by clicking the Volume button. Use the window returned to select the MRI_3D_ Head_bin.avw data set saved in step 7. Press the **Cond. Dilate Volume** button.
12. To view your segmentation, select **Generate > Display Section(s) > Current** (figure 3).
13. The binary segmentation is available in the Analyze workspace. To obtain a suitable volume for further analysis multiply the binary volume by the input grayscale volume using the Image Calculator or Image Algebra modules.
14. When you are finished reviewing, close all windows related to the Morphology module before proceeding to the next module.

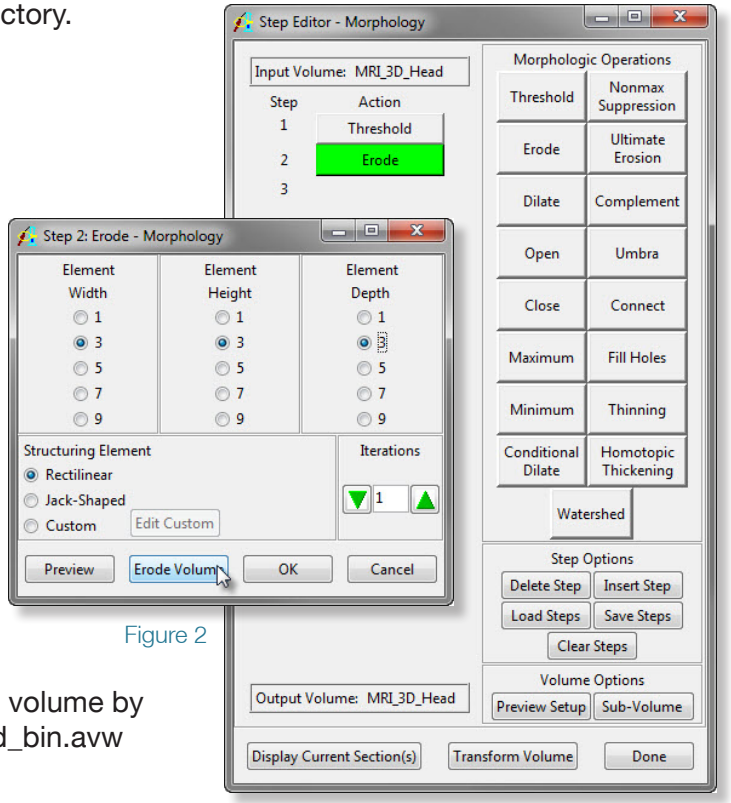

Figure 1

Figure 2

Figure 3

note Notice the left side of the Step Editor window; as operations are selected from below the Morph Operations, the sequence of steps is maintained on the left.