2D Registration

The 2D Registration module determines geometric transformation parameters which can be used to align 2D images, section to section by matching common contours or by matching sections to a single base slice. This exercise will demonstrate how to do this using the 2D Registration module to align a series of misaligned 2D slices.

1. Load the Spinal_Cord data set from the $:/BIR/images/TutorialData folder.
2. Open the 2D Registration module (Register > 2D Registration).
3. Open the Cursor Link Tool (Tools > Cursor Link).
4. Choose a Blend from the right-click menu in the upper right pane.
5. To review the data slice by slice, use the Match Section slider bar.
6. If required, slice data can be manually adjusted using the manual adjust control operations.
7. The % Base Image allows the combined image display (upper right pane) to fade between the base and match image.
8. Open the Control window (Generate > Control).
9. Choose between a Sequential or Single reference registration mode (figure 2):
   - **Sequential**: each slice will register sequentially to its neighbor (i.e., slice 2 to slice 1, slice 3 to slice 2, etc.)
   - **Single Reference**: will register each slice to a single base slice (defined with the To Section slider).
10. The Register Section and Thru slider bars allow users to determine a range of slices to be registered (i.e., slices 10-20 only).
11. Set the registration mode to Sequential, then click Done.
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12. Open the **Voxel Match** window (**Generate > Voxel Match**), expand the **Threshold**, **Sample Region** and **Search Parameters** options (figure 3).

13. Check the **Show Thresholding** option the image, the cursor link tool will update converting the images to binary representations. Only voxels displayed as white will be considered for the registration.

14. Set the **Minimum threshold** value to 5 to eliminate background noise. Then uncheck the Show Thresholding option.

15. The Sample Region option will allow for defining a region to consider for registration. See the **X Minimum** to 69 and the **X Maximum** to 333. Then set the **Y Minimum** to 33 and the **Y Maximum** to 237. Reset the Min/Max X and Y values before proceeding. Note the region is defined on the blended and match image (figure 4).

16. The Search Parameters option allows users to adjust the X and Y Translation range, the Z Relation range and the X and Y Scaling range.

17. Click **Register**. Select **Generate > Transform Slices**, set the **Destination** to **Analyze Workspace**, then click **Go**. The data will be transformed and saved to the Analyze workspace.

18. Compare the input and output data sets to see the effect of the registration on the data.