

13 Image Fusion (Interactive Colorwash)

13.1 Description

A useful function in the analysis of medical images is the overlaying of two images for various types of comparisons. The **Interactive Colorwash** is a MEDx tool that performs this function. The image fusion is accomplished by scaling the gray levels of one of the images to a range of hues (hue image) while retaining the gray level intensities of the other (intensity image) and then superimposing one image on the other to yield a visual comparison.

An instance where this module can be used to visually judge the accuracy of the coregistration of a functional image to a high resolution image. MEDx provides the user with the option of using various colormaps for the fusion.

The following is an example of an **Image Fusion** carried out on two previously coregistered images. (one PET and one MRI)

References: *MEDx User's Guide*, Section 13.7

13.2 Data Setup

- Step 1:** Select **New Folder** under the **File** menu.
- Step 2:** In this example MEDx is assumed to be in **/usr/medx**. Select **Open Image** from the **Image** menu, type the following path into the **Filter** field and hit Enter: **/usr/medx/images/fMRI**. Enter the correct path for MEDx on your system if it is not in **/usr/medx**. (“Apply” will open the file and leave the “Open Image” window open to facilitate more file openings. “Open” will open the file and close the “Open Image” window)
- Step 3:** Select the file named **roi_mri.img**.
- Step 4:** Select **Apply** in the **Open Image** dialog box. These volumes will be loaded into the MEDx folder.
- Step 5:** Go up one directory by double clicking on “..” in the **List of Directories**.
- Step 6:** Double click on the Directory called **PET**. In this directory you will find files called **roi_pet.hdr** and **roi_pet.img**. Select **roi_pet.img** and click on **Open**.

13.3 Feature Instructions

- Step 7:** The two images that you have opened are a PET and a structural MRI that have been already coregistered. We will now fuse them together to observe the accuracy of the coregistration.
- Step 8:** Go to the image called **roi_mri.img**. Under **Display -> Display Range** select **Group/Volume** and type in **0** for **min** and **80** for **max**.

Step 9: Choose **Toolbox** -> **Fusion** -> **Colorwash**.

Step 10: Set the various fields/parameters to the following

- ➔ **Hue Image -- roi_pet.img**
- ➔ **Intensity Image -- roi_mri.img**
- ➔ **Hue: Intensity Levels -- 8:16**
- ➔ **Hue range -- min 10 max 80**
- ➔ **Intensity Range – min 0 max 100**
- ➔ **Colormap -- Mirage Hot Body**

Step 11: Choose **Update Colorwash Image**.

Step 12: View the fused images in both the **Lightbox** and **Orthoviewer**.

Step 13: In the **Orthoviewer** using the right mouse button, select different areas of the volume and determine if the registration is accurate. The result of the Fusion is shown below. You can try out the various colormap options available. (figs. 13.1-13.2)

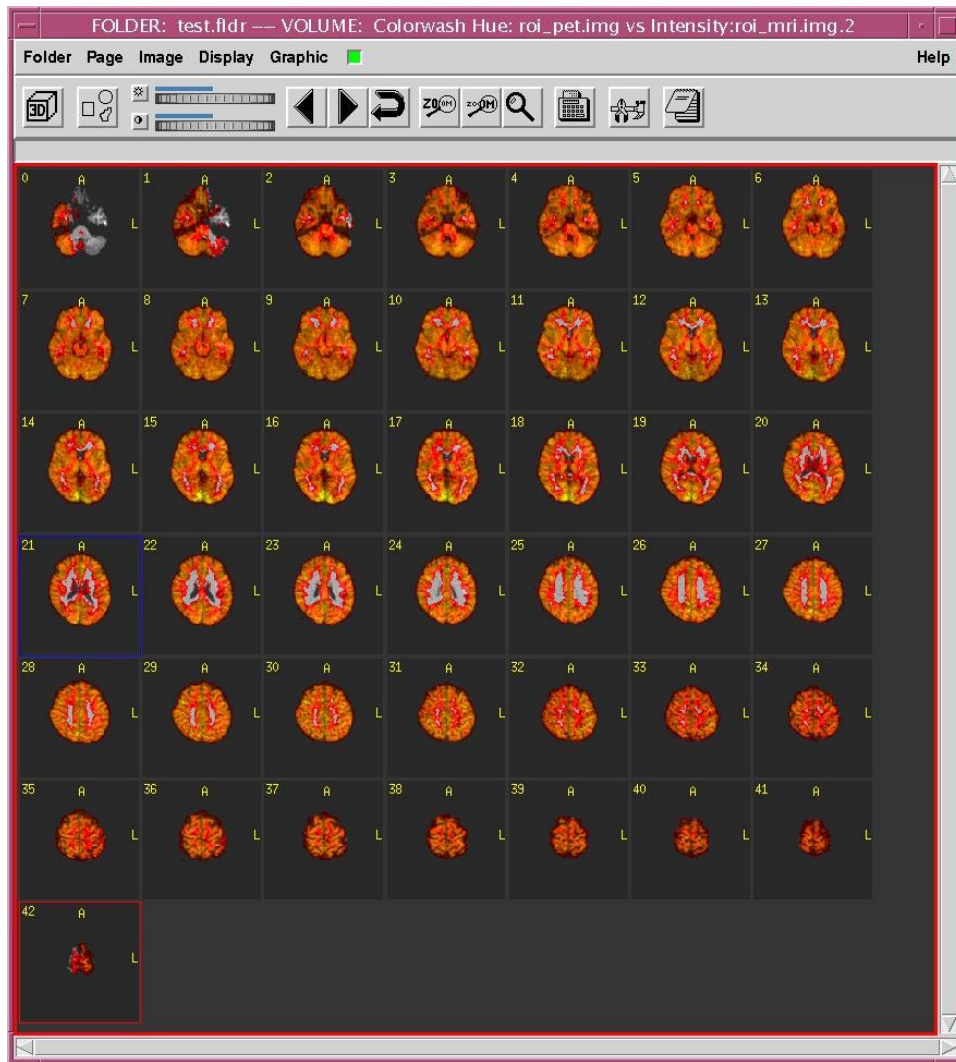


Figure 13.1 Fused Image in the Lightbox View

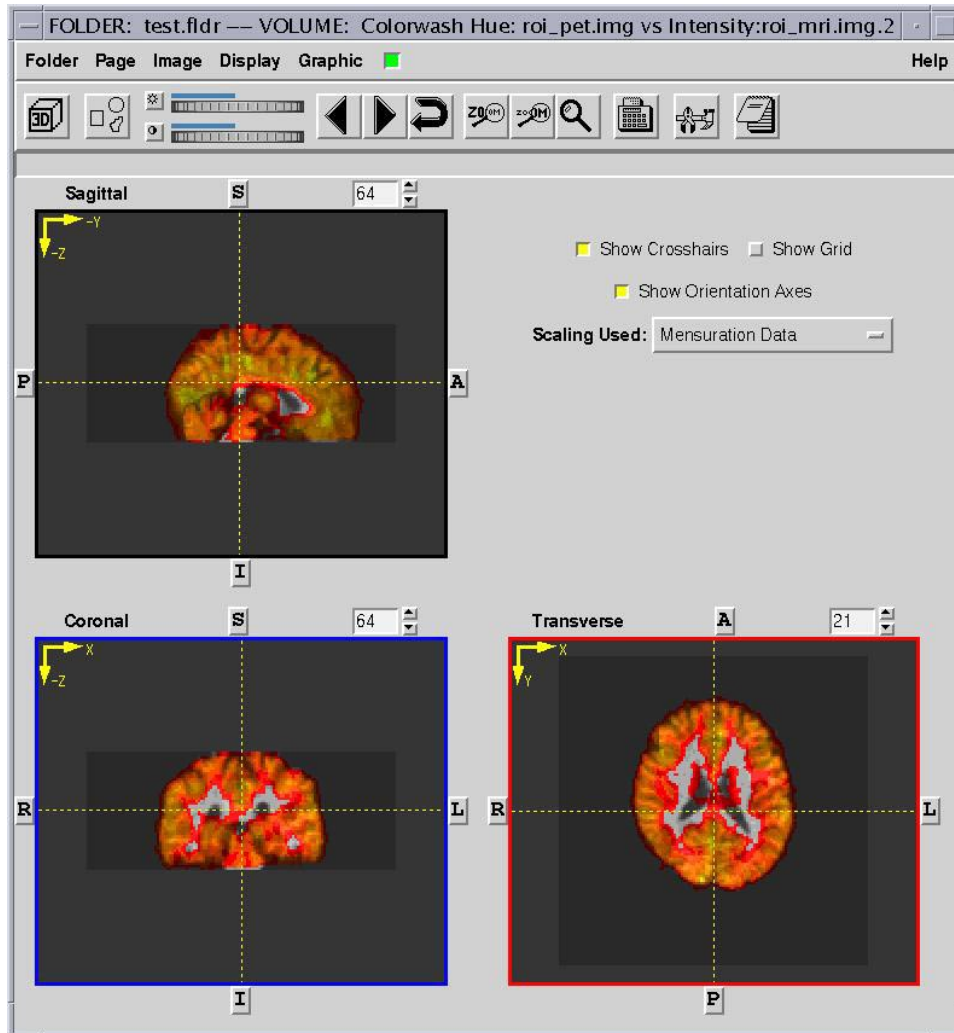


Figure 13.2 Fused Image in the Orthogonal View

This ends the Image Fusion Tutorial.