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CS516 - Computer Vision

Prof. Russell Butler

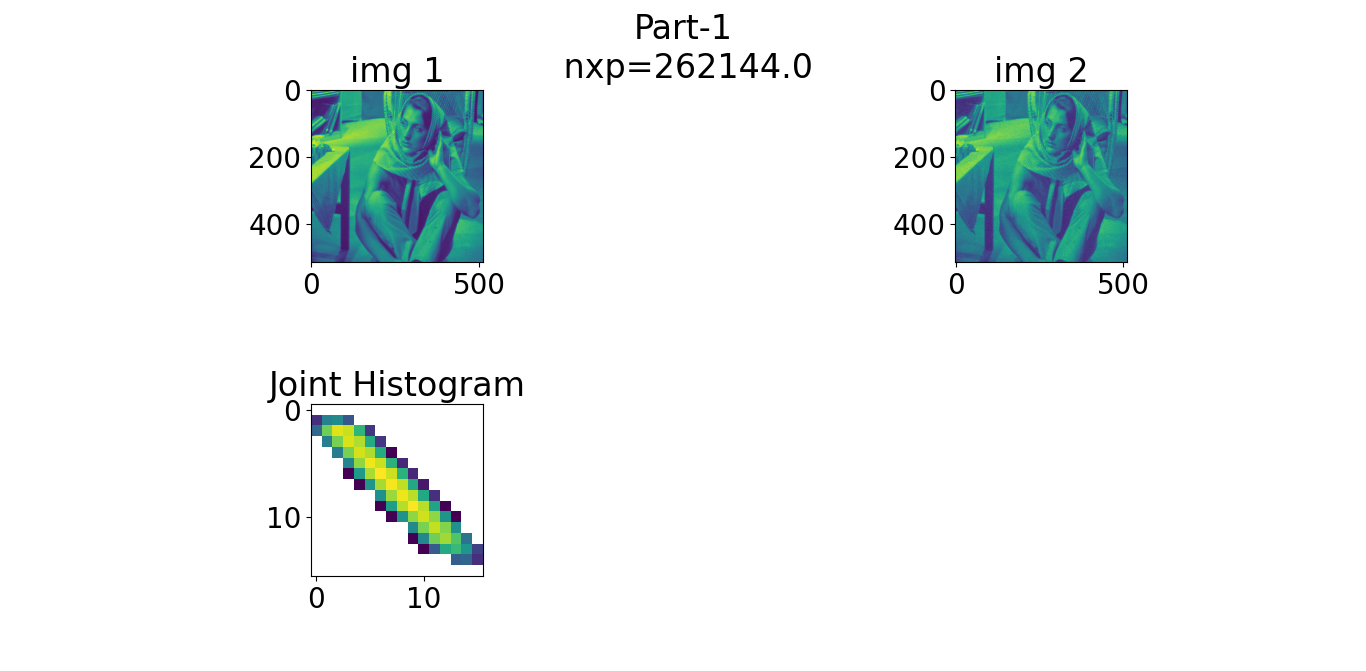
Students

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**Part 1: Joint histogram 10/100**

* We have not shown all the images ouput in this pdf but it’s written in code.



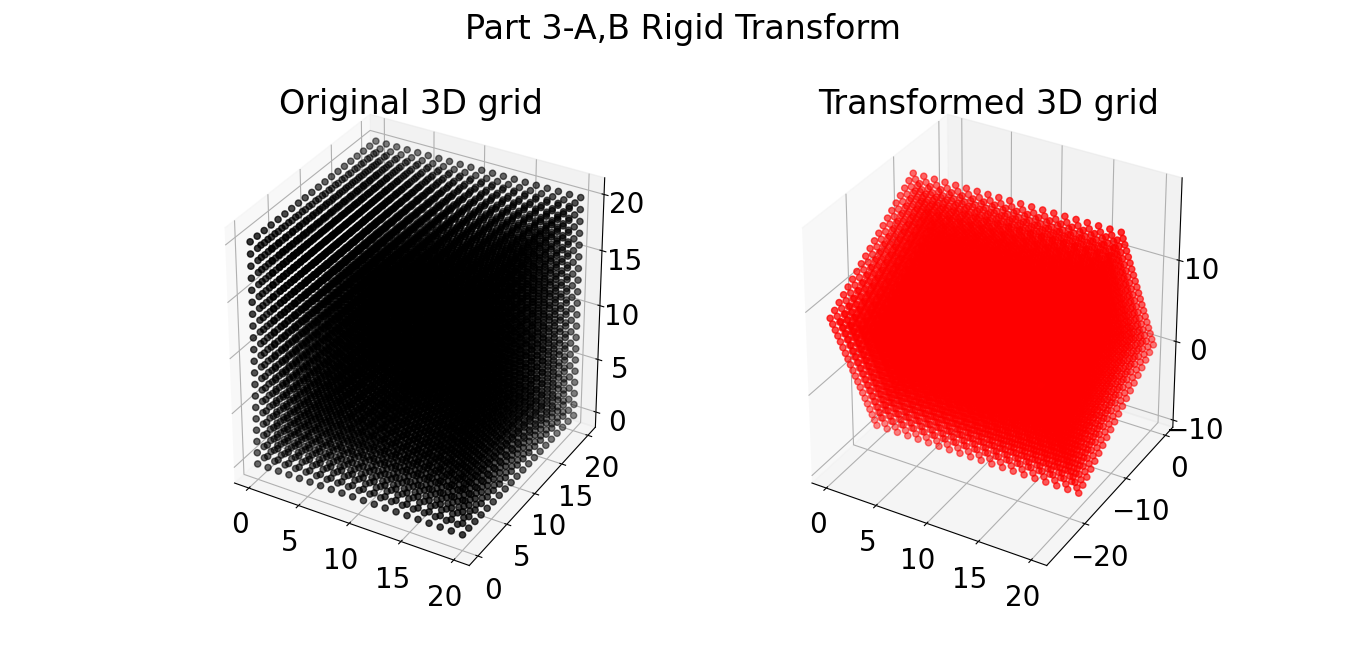
**Part 1(C) Observation:**

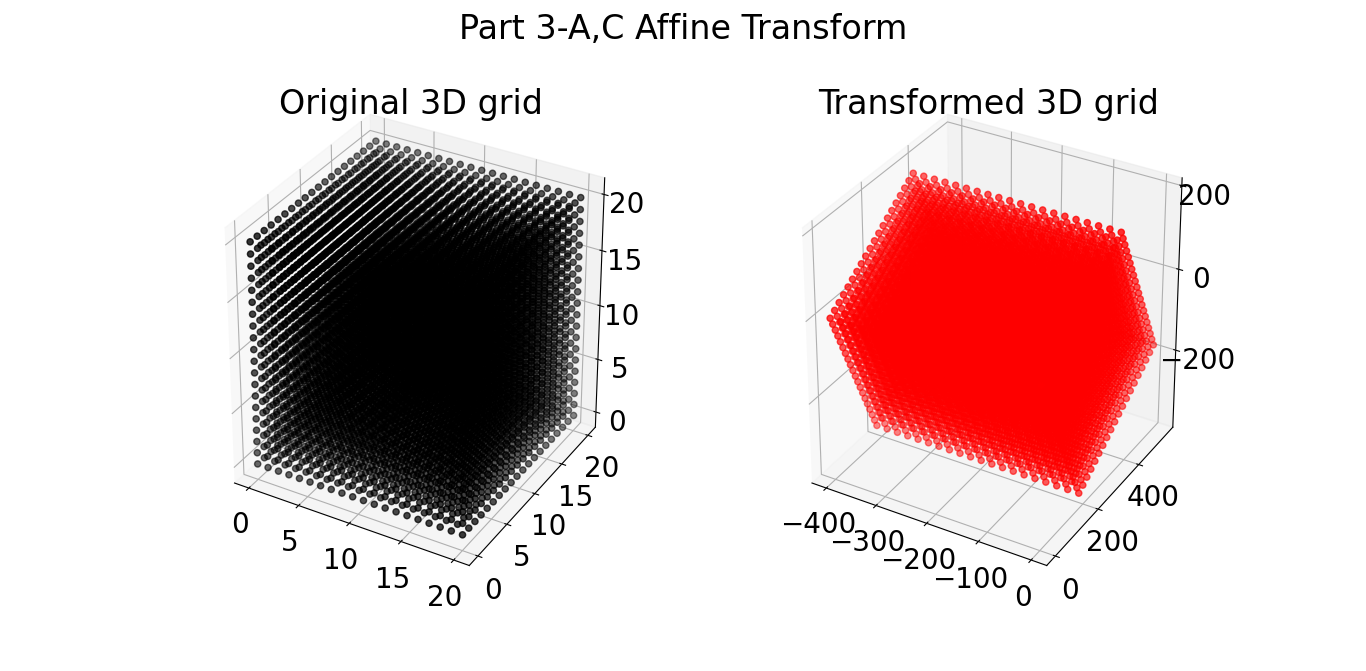
* we compared multiple images and found that joint histogram is good for finding pixel intensity relationship between two images. It requires images in same shape. As in image I3 and J3 face is shifted towards Y-axis and X-axis respectively due to which background yellow spot in joint histogram is spread in both directions. Similarly, in brain images due to skull we can see same spread of joint histogram.

**Part 2 (similarity criteria 20/100):**

* **completed all**

**Part 3 (spatial transforms 20/100):**



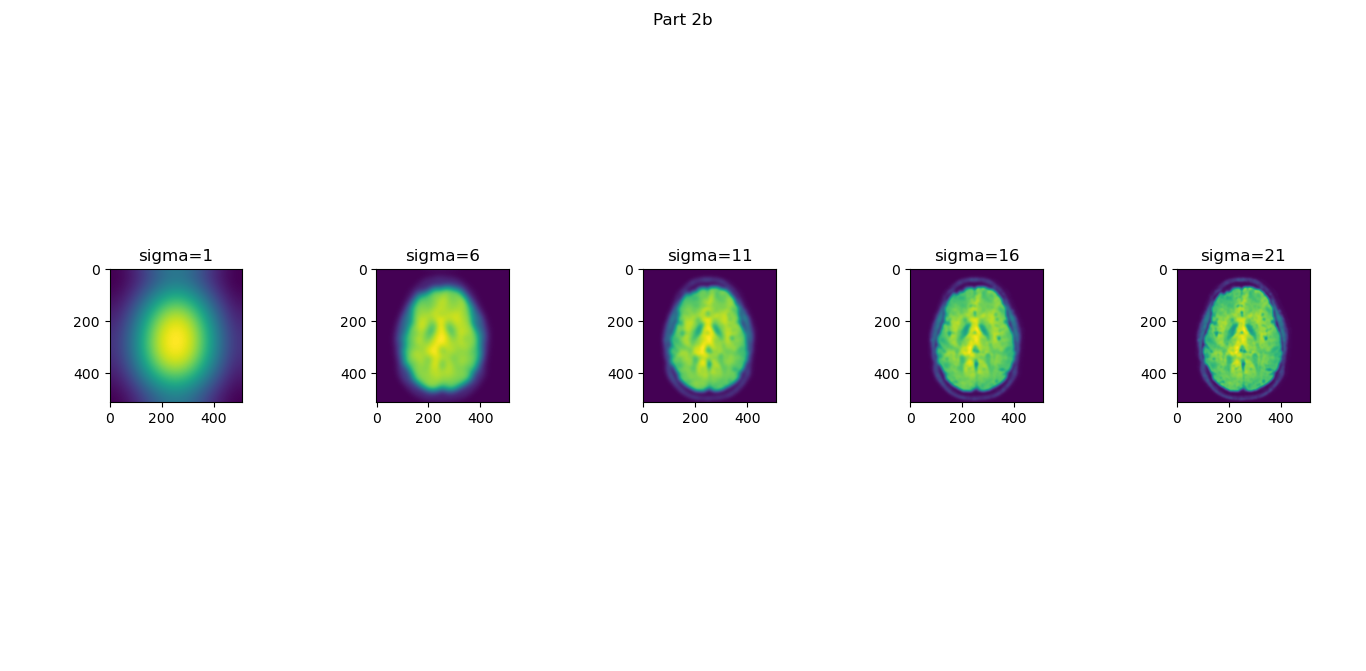


**Part 3(D) : (not done)**

**M1=**

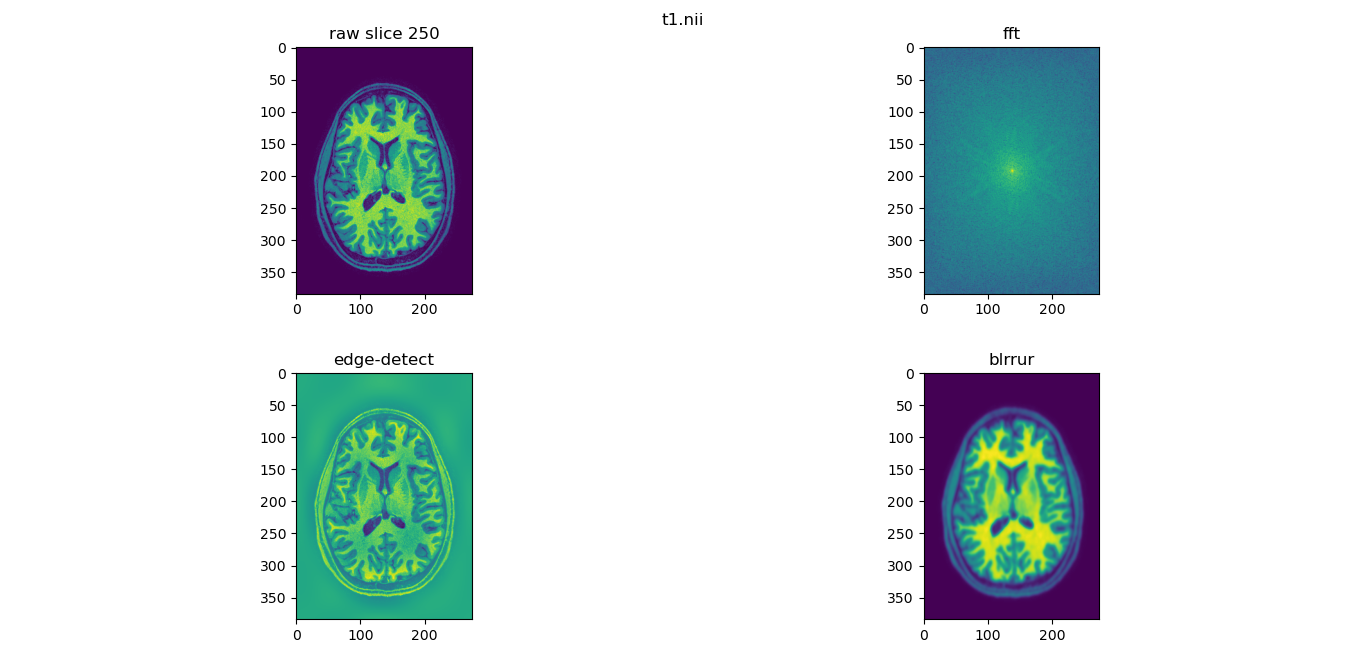
**M2=**

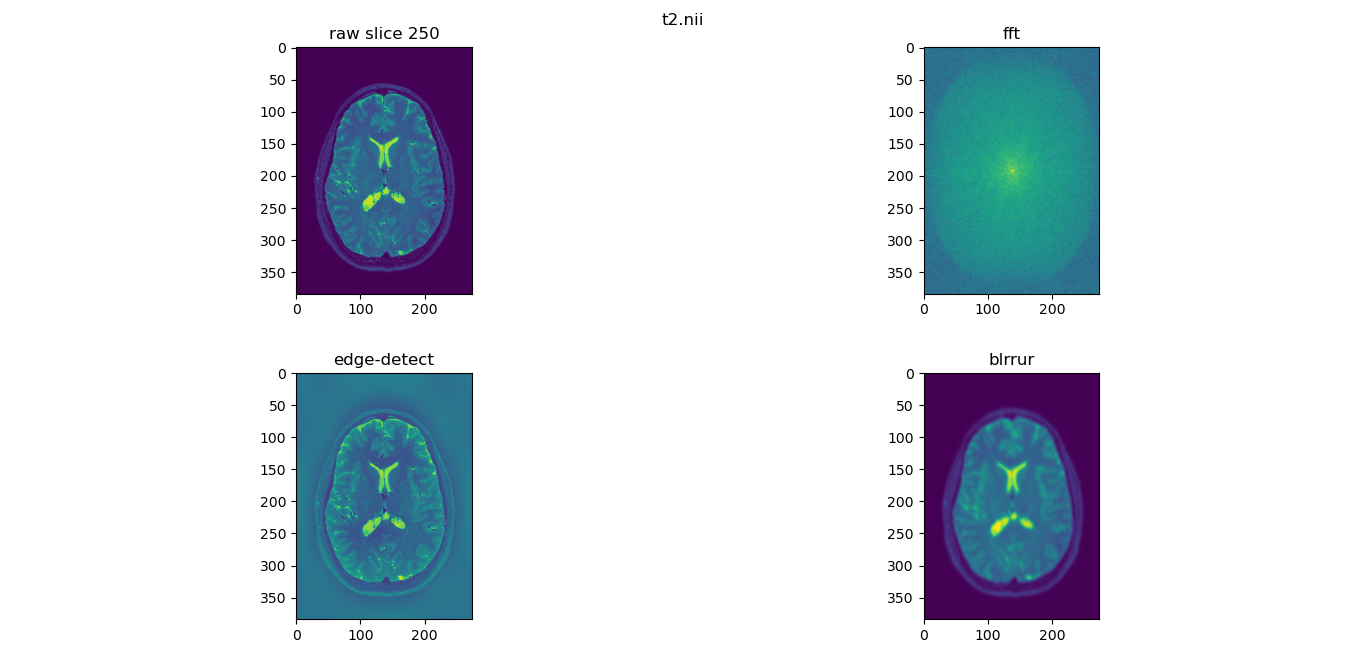
**M3=**

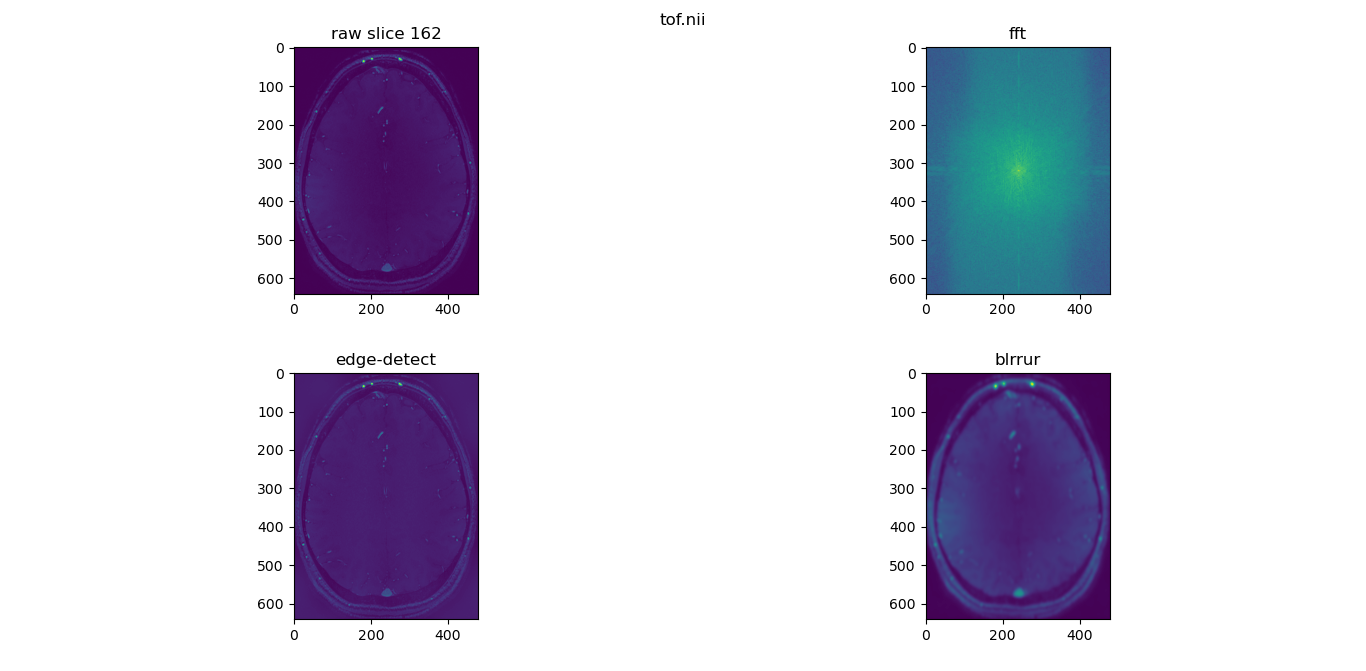


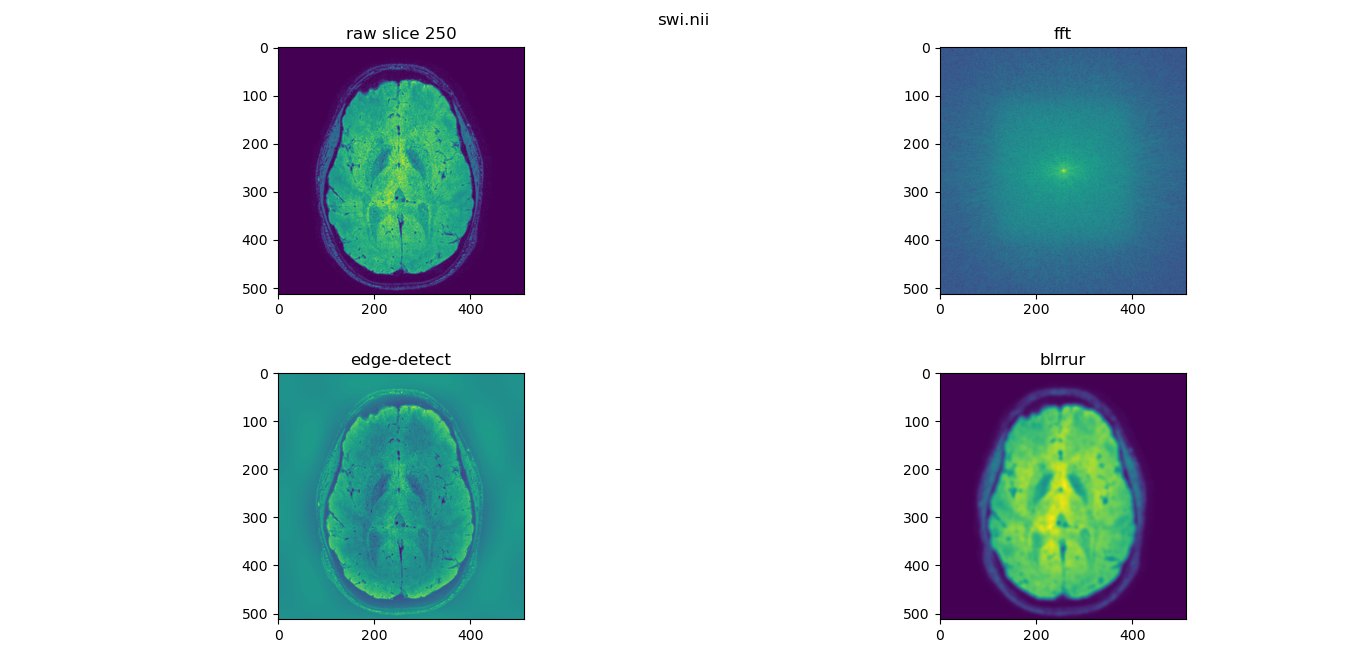
**Part 2c (20%):**

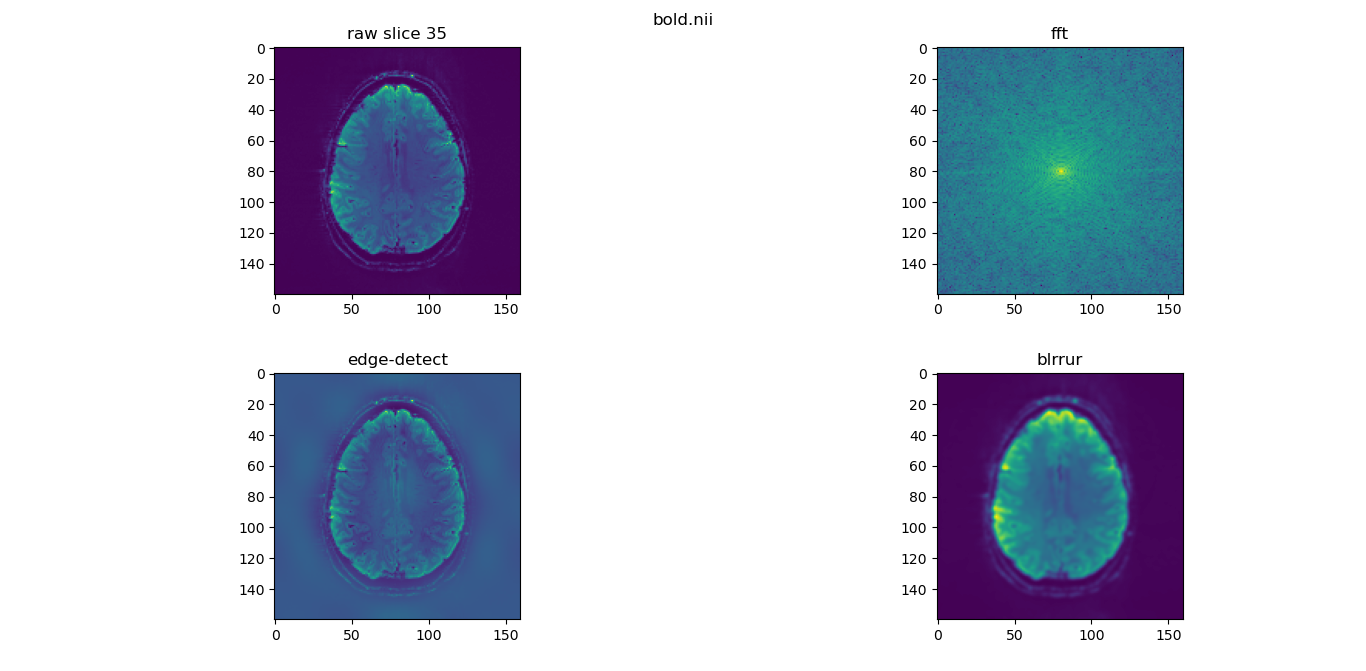
* **With all modalities**











* Bonus question +2.5%: Experiment with different filter shapes. What happens if you use a bar or a square, instead of a gaussian smooth? **– incomplete**
* Bonus question: +2.5%: all the images so far have skulls. Here is an image with no skull. Can you explain how this image was created? Give details on how the skull was removed from the image.

**An**s=> Component-based extraction may have been used here for extracting the brain. Meaning, all connected pixels are selected first which will form two groups; one group will contain all the pixels of the actual brain and another group contains pixels of the skull. Once this group is done then pixel group with a larger value of pixels than a certain threshold is selected which is nothing but the actual brain.

* **Bonus question:** +10% how did I create Mystery image (below)? Explain what the contrast is based on.

**An**s=> It is produced using gaussian blur filter on “bold.nii” modality, with very high sigma value around 150. Which is then plot with “gray” colormap.