

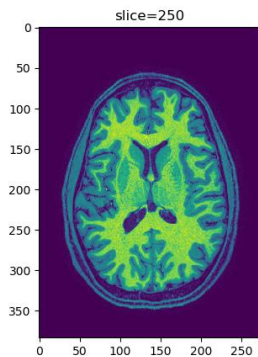
## CS516 assignment1

### Part1:

1a: We create viewer function to show the images, in the viewer function, we add event handlers and create `scroll_press`, `on_key_press`, `axes_enter_event`, and `axes_enter_event` functions to implement the interactions with images. Here is the result:

`viewer(img_data, slice=250, view='axial')` //img\_data is the t1.nii image data

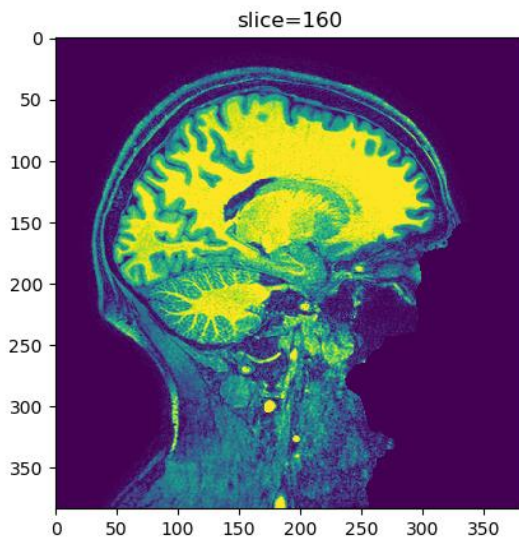
you can use mouse and keyboard to change the slice (rotate mouse wheel and press up and down key)



Bonus: histogram equalization option:

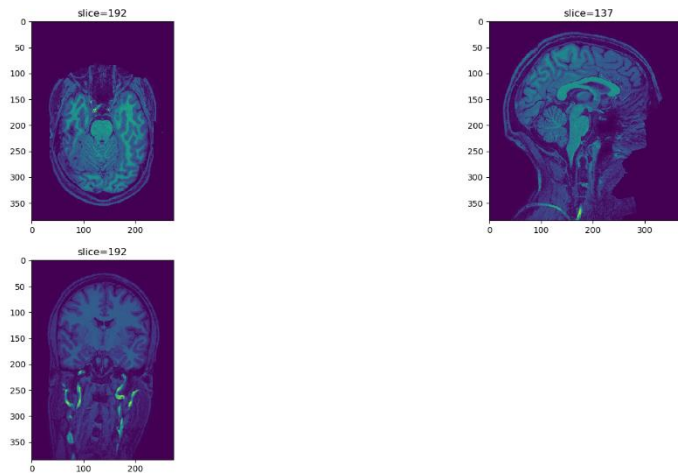
`viewer(img_data, slice =160, view='sagittal', histeq=True)`

We did the histogram equalization to the whole 3d image, and it cause the program slow, if you want test this function it may cost a few minutes to show the image, here is the result:



Bonus: display all views

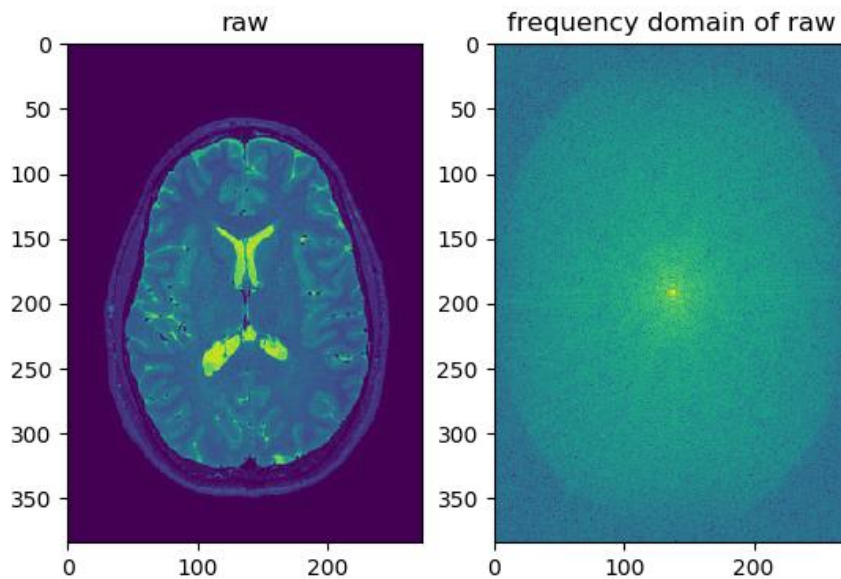
`viewer(img_data,view='all')` //the viewer function show the middle slice image at first, you can rotate the mouse wheel and press up and down key to change slice



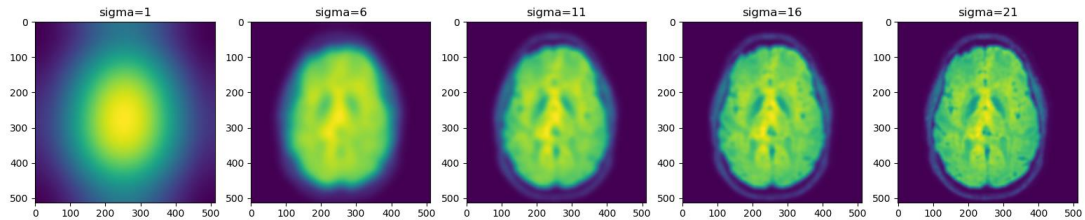
## Part2

2a:

Here is the result: we take No. 250 slice as example



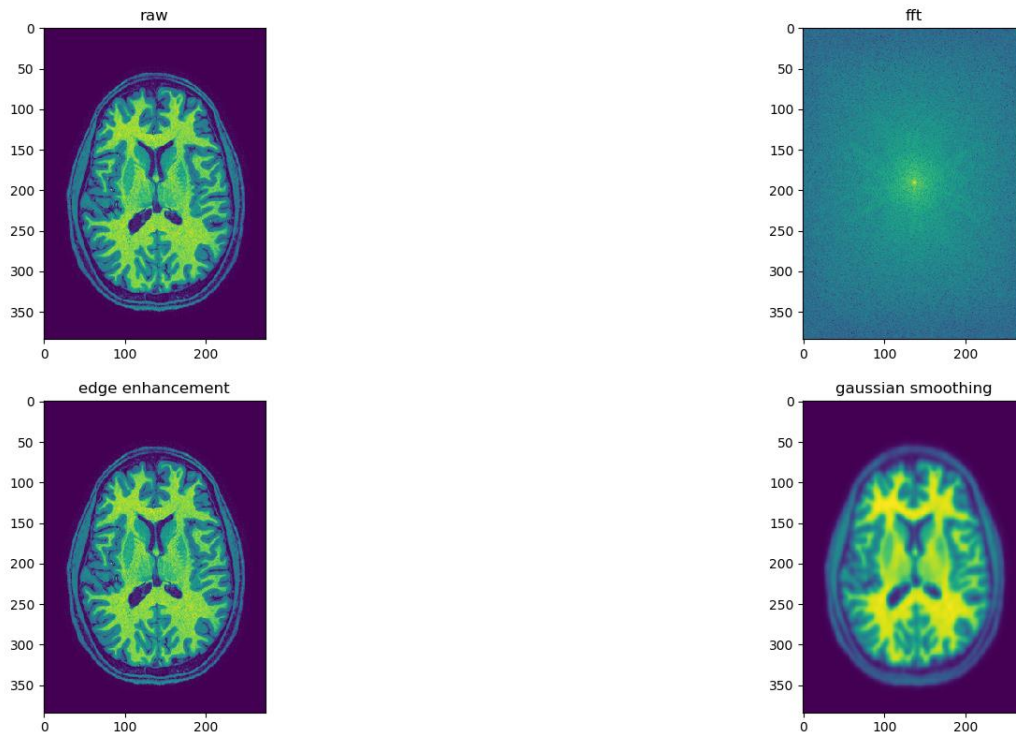
2b: Here is the result, we take No. 250 slice as example



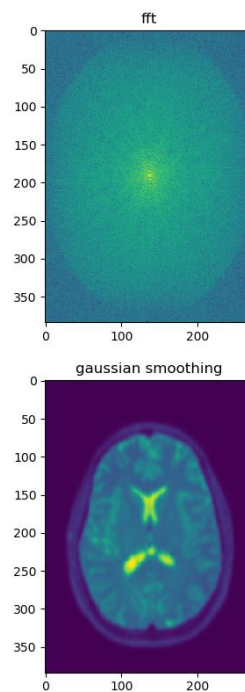
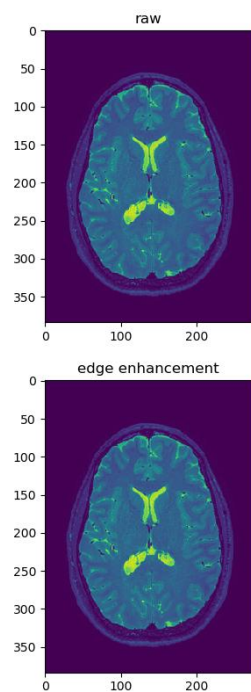
2c: we create two views, one using gaussian filter as smoothing filter and 1-gaussianfilter as edge enhancement filter, and another using high pass filter as edge enhancement filter and low pass filter as smoothing filter.

The first viewer results:

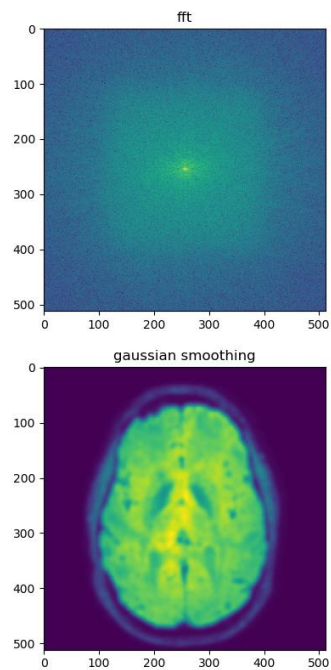
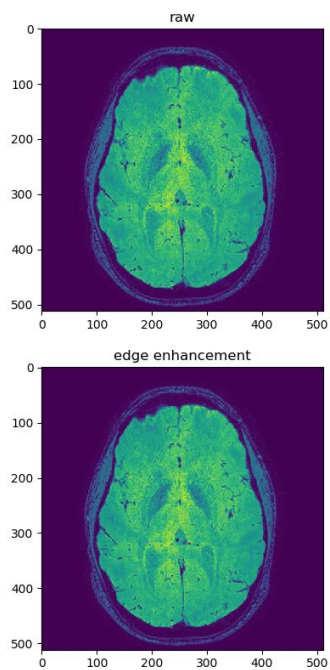
T1.nii: axial view, slice=250



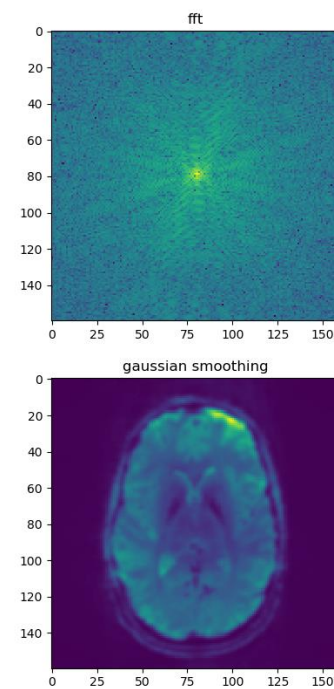
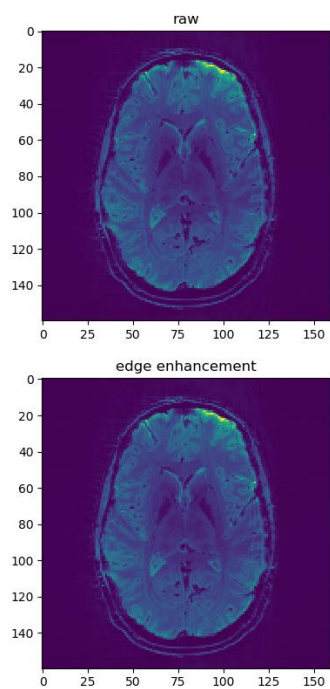
T2.nii: axial view, slice=250



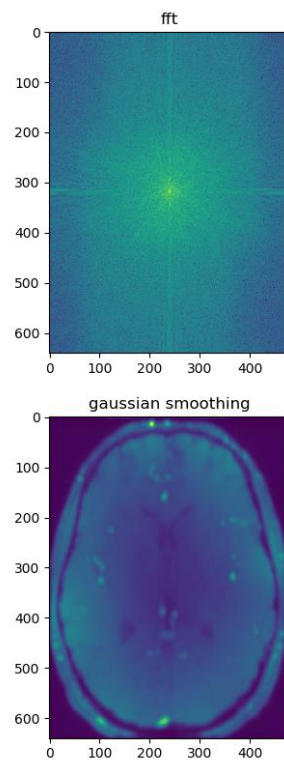
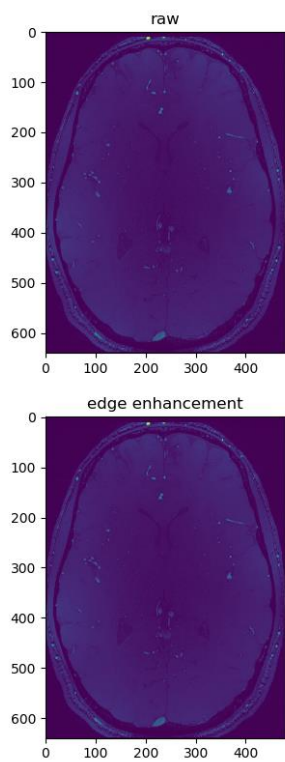
Swi.nii: axial view, slice=250



Bold.nii: axial view, slice=18

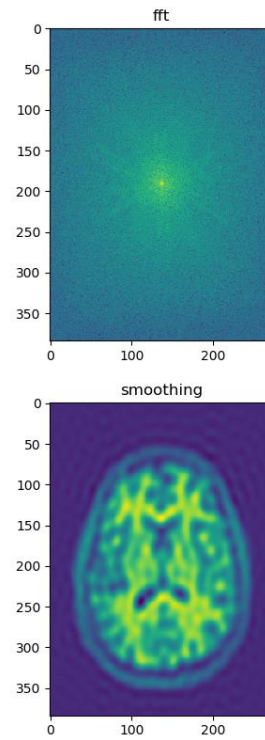
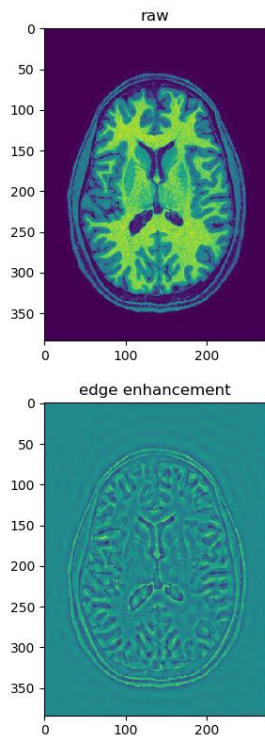


Tof.nii: axial view, slice=81



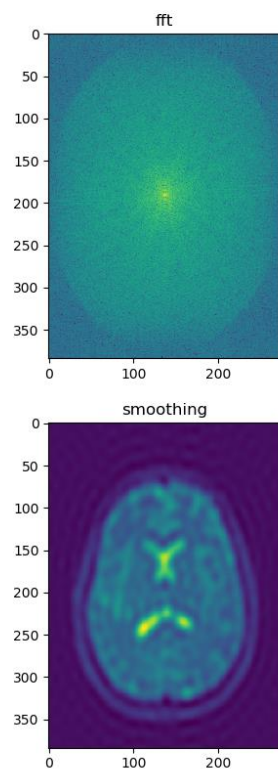
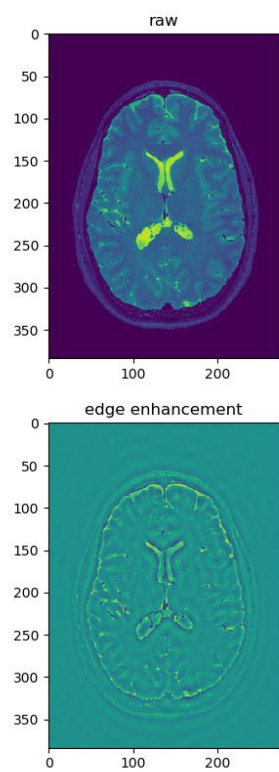
The second viewer result:

T1.nii: axial view, slice=250

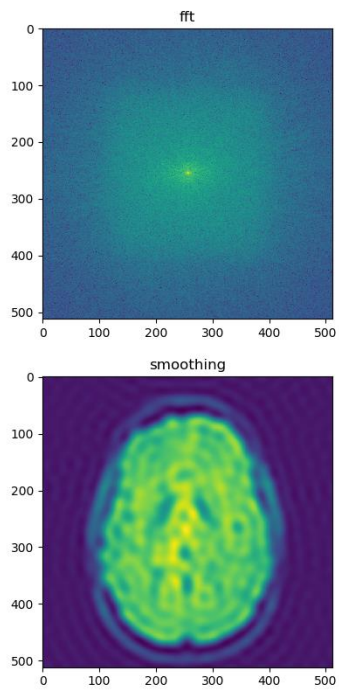
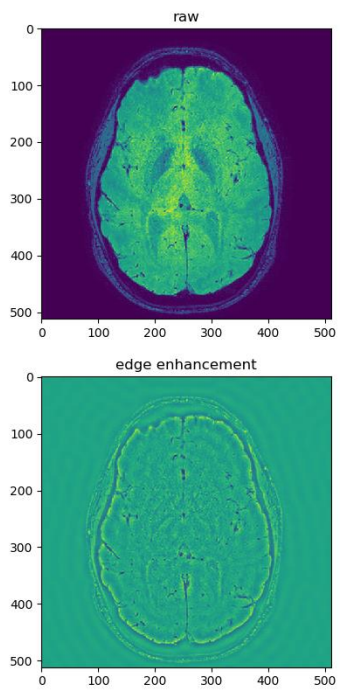


T2.nii: axial view, slice=250

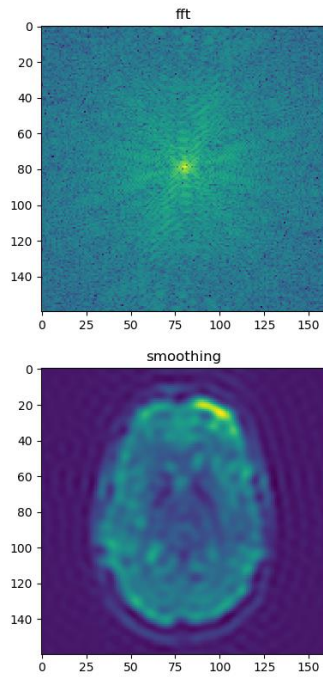
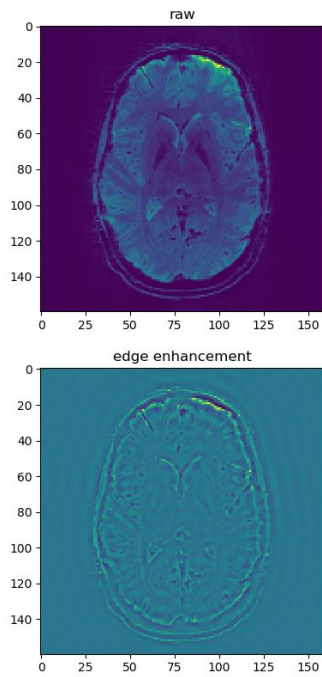




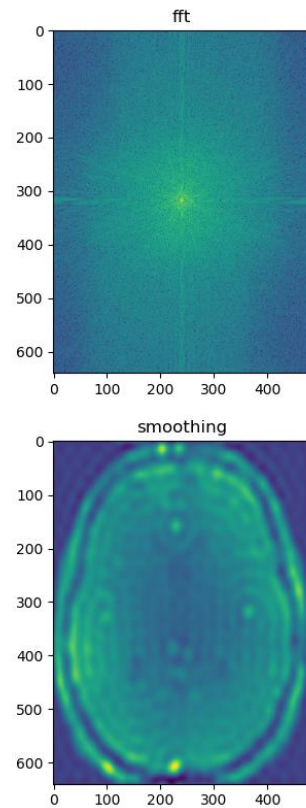
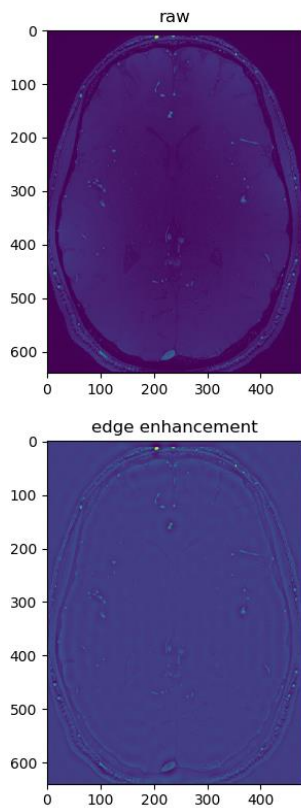
Swi.nii: axial view, slice=250



Bold.nii: axial view, slice=18



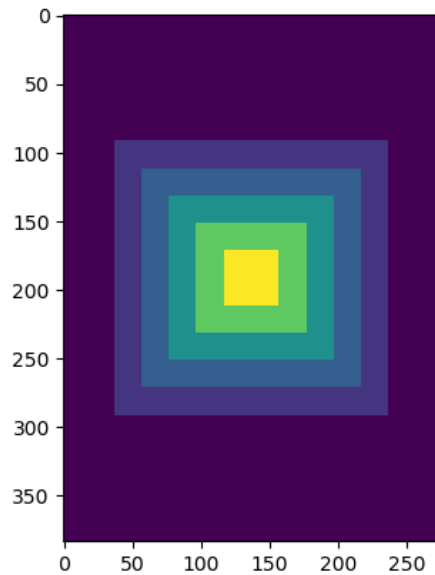
Tof.nii: axial view, slice=81



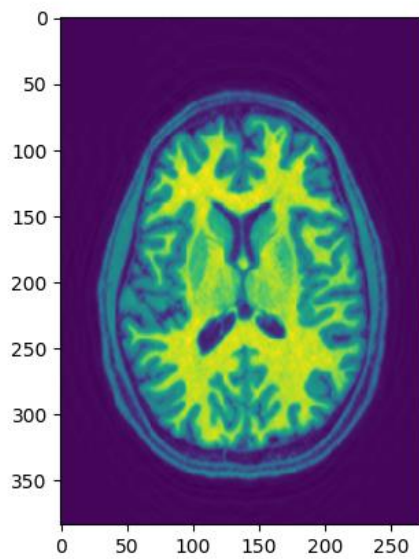
Bonus: square filter result: use t1.nii as example axial view, slice =250



There is the filter image:



There is result:



This image is more clear compare with the image after gaussian smooth.

Bonus: image with no skull

There is a way to create image without skull.

First, set up a suitable threshold to create a binary image (use histogram to find that threshold), then, find the largest connected component as mask to create the image without skull.

Bonus: mystery image:

This image is similar with the image after edge enhancement, but this image have bright edges and dark connected component, I guess this image did an edge enhancement and histogram equalization.