< RT704 Assignment 1 >

Download CT data below.

https://dgistackr-my.sharepoint.com/:f:/g/personal/won548_dgist_ac_kr/EmET9UgGZ_VOtWCh4txhA3cB4sUlEERzMySDyz9Ddk6Gmg?e=xzxdOw

You can load the data like below:

```
import pydicom
import skimage
path_LDCT = "L506_QD_3_1.CT.0003.0105.2015.12.22.20.45.42.541197.358793241.IMA"
path_NDCT = "L506_FD_3_1.CT.0001.0105.2015.12.22.20.19.39.34094.358586575.IMA"
img_LDCT = pydicom.dcmread(path_LDCT).pixel_array
img_NDCT = pydicom.dcmread(path_NDCT).pixel_array
```

[30pt] 1. Perform denoising of LDCT "img_LDCT" via (a) box filtering, (b) Gaussian filtering, (c) sharpening filtering, and (d) median filtering. Please show the results with PSNR scores between your results and NDCT image "img_NDCT" in the report.

[30pt] 2. Run and understand the codes below. Please describe the main results in the report.
https://scikit-learn.org/stable/auto_examples/decomposition/plot_image_denoising.html#sphx-glr-auto-examples-decomposition-plot-image-denoising-py

[40pt] 3. Perform denoising of LDCT "img_LDCT" using dictionary learning. Use all available NDCT images as the training data. Please show the results with PSNR scores between your results and NDCT image "img_NDCT" in the report. Please show several dictionary patches as well.

Submit your report with the codes on LMS by 10/30. When you submit, make your zip filename **"HW1_yourfirstname.zip"**.