CS-3150

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Homework-4

Same as before, import package first.

A screen shot of a television

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I used the skimage package to use the image quality assessment tool, so I need to pip install them first.

Reference:

<https://scikit-image.org/docs/dev/api/skimage.metrics.html#skimage.metrics.peak_signal_noise_ratio>

<https://stackoverflow.com/questions/55178229/importerror-cannot-import-name-structural-similarity-error>

Then, read the image

Text

Description automatically generated

Then, create several different images based on the original one. (make\_g\_noise function is the same in the demo code)

I also applied a median filter on the images which has uniform noise, so that I can compare the results of those two.

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The last thing is call the skimage function to get the ssim, mse, and psnr value for each pairs of images.

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Here are the results:

Comparing the original image with itself will definitely got MSE as 0, PSNR as positive infinity, SSIM as 1.

A picture containing text

Description automatically generated

Adding Gaussian noise would increase MSE, decrease PSNR and SSIM.

A picture containing application

Description automatically generated

Adding uniform noise would similar result as adding Gaussian noise

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After applying median filter, it’s hard to see by human eyes that the quantity was better, but the SSIM value increased from 0.4695 to 0.6704, which shows that quality became better.

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Description automatically generated

Applying image enhancement, which are applying histogram equalization and contrast stretching, the quality will be better, and it’s obvious that these two images have better quality than previous two. However, the MSE and PSNR values shows that these images have worse quality. Thanks for the SSIM value, we can know that these two images do has more similarity with the original one comparing with the previous two.

A picture containing graphical user interface, text, application

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