

## Assignment 15 MarksJan 29<sup>th</sup> 12 Noon

As explained in class you are supposed to simulate denoising experiments in MATLAB.

The first step is to add noise to your clean image (I). This is done by

```
Inoisy = imnoise(I,'gaussian',0,v); % Gaussian Noise
```

```
Inoisy = imnoise(I,'salt & pepper',d) % Impulse Noise
```

For Gaussian noise, you will vary 'v' to generate three noise levels. The noise levels are 5%, 10% and 20% of the highest pixel value (1 if you are operating in 'double'). Therefore your v will be 0.05, 0.1 and 0.2.

For impulse noise, 'd' is the proportion of affected pixels. Keep it to be 0.05, 0.1 and 0.2.

Now you have to denoise the noisy image using mean filtering and median filtering. You have to apply the appropriate filter depending on the type of noise. This has been discussed multiple times in class. The denoising needs to be done with three different filters – 3x3, 5x5 and 7x7.

For calculating the weights of the Gaussian mask, use <http://dev.theomader.com/gaussian-kernel-calculator/>

You have to report the peak signal to noise ratio (SSIM) between the original (clean) image and your denoised images.

You have to fill the following tables for each image (baboon and lena).

Table I. Gaussian Denoising Results - Lena

Mask size	v = 0.05	v=0.1	v=0.2
3 x 3	21.2466	21.9286	21.3667
5 x 5	19.2578	20.4662	20.3217
7 x 7	17.2080	18.6832	18.6689

Table II. Impulse Denoising Results - Lena

Mask size	d = 0.05	d=0.1	d=0.2
3 x 3	25.1594	24.8064	23.2270
5 x 5	17.5006	16.9336	12.8138
7 x 7	23.2270	14.1906	9.1076

Table I. Gaussian Denoising Results - Baboon

Mask size	v = 0.05	v=0.1	v=0.2
3 x 3	17.6287	19.3532	19.8787
5 x 5	19.1379	20.5554	20.7273

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7 x 7	19.1471	20.5292	20.6277
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Table II. Impulse Denoising Results - Baboon

Mask size	d = 0.05	d=0.1	d=0.2
3 x 3	23.9433	17.1907	14.5055
5 x 5	23.6606	16.6148	12.3418
7 x 7	22.6015	13.2076	7.6816

The images you need to use and the code for PSNR are attached.

You also have to submit the your code.

YOU MUST NOT USE INBUILT MATLAB FUNCTIONS FOR IMAGE FILTERING. IF YOU DO, IT WILL BE CONSIDERED PLAGIARISM.