267: HW#2

ROJIN ZANDI
014491256

Problem 1

(Use MATLAB or any language of your choice for this problem; Attach well-commented source code and the input and output images.)
Add a random noise to Lena image, and apply Gaussian filter as discussed in slides #6 to #10 of Lecture Note 3. You may use "imnoise" if using MATLAB.
List your well-commented source code and attach filtered output images.

The MATLAB code is provided in *one.mat* file.

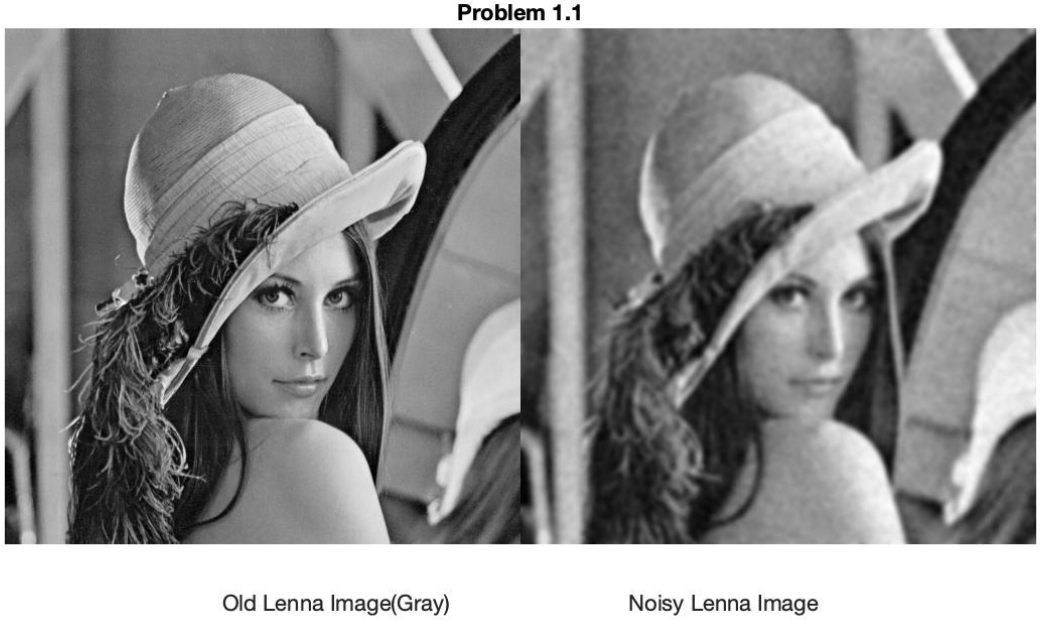

Fig.1: The original image and the noisy image

Fig.2: The original image (Lenna) and the smoothed image via `imgaussfilt` command

Fig.3: Noisy Lenna image and the smoothed image via manual code

Problem 1.4

Gaussian Smoothed Image(MATLAB command) Gaussian Smoothed(manual code)

Fig. 4: As it can be seen in both images, we the smoothness is clear.

Problem 2

Apply LOG filter, as discussed in slides #22 to #30 of Lecture Note 3, to the Lena image, and show the output edge images, along with a well-commented source code.

Here is the MATLAB code and the following figure shows filtered Lenna image:

```
clc;

I= imread('Lenna.png');          %reading the Lenna image
I = rgb2gray(I);                 %reducinng spectral dimension to 1 (Gray)
F=fspecial('log',10,1.2);        %defining the log filter of size 10x10 and STD 1.2
B=imfilter(I,F,'replicate');     %applying the log filter
B = imbinarize(B);               %binarizing the filtered Lenna image
imshowpair(I,B,'montage')        %showing the old image and the filtered one
title('Problem 2')
xlabel('Old Lenna Image(Gray)                              Filtered Lenna Image')
```

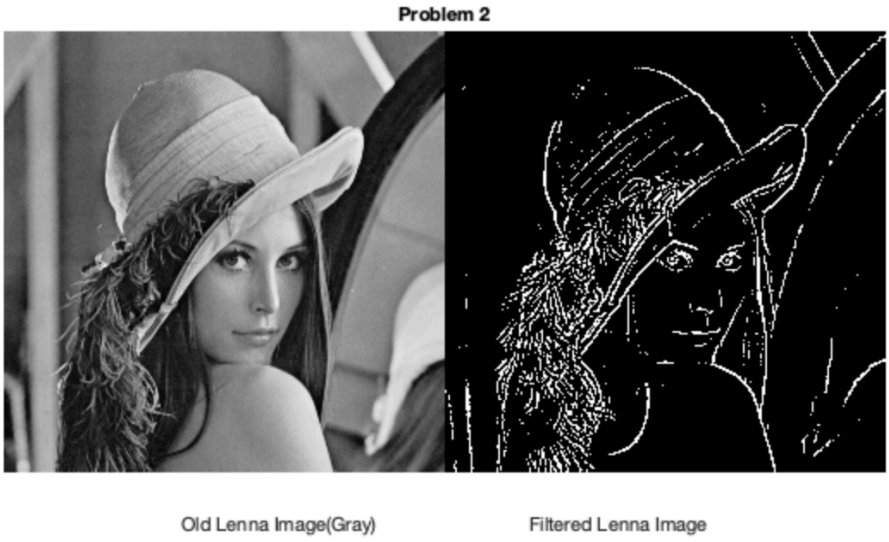

Fig. 5: The original Lenna image and the edge detected image.

Problem 3

Add a random noise to Lena image, and apply bilateral filter as discussed in slides #36 to #39 of Lecture Note 3.
List your well-commented source code and attach the filtered output images.

The code is provided in *three.mat* and *bilateral_each_channel.mat* files.

Fig. 6: The original Lenna image and Bilateral filtered one, using MATLAB command

Fig. 7: The original Lenna image and Bilateral filtered one via manual code