Assignment 3

Computer Vision
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1 Exercise 1

Image denoising The goal of this exercise is to apply the image three types of filtering:

- Gaussian filtering,
- median filtering,
- bilateral filtering.

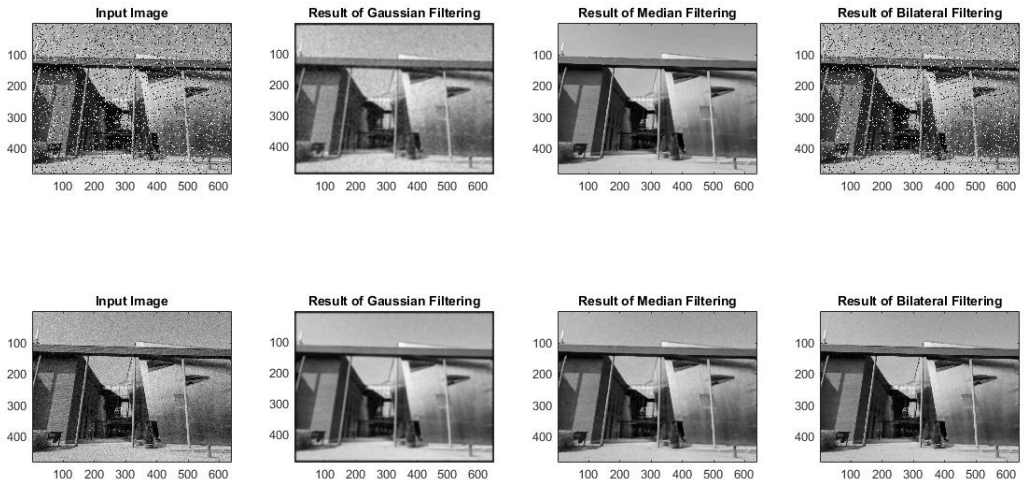

Figure 1: Comparison between filtering strategies

The Gaussian filtering with Gaussian noise as expected but not very well with the salt and pepper noise. Median filtering is the best one to deal with salt and pepper noise and also works very well with Gaussian noise. The last filtering we used, the bilateral filtering, works very well with the Gaussian noise but is the worst against salt and pepper noise as it tries to maintain the edges.

2 Exercise 2

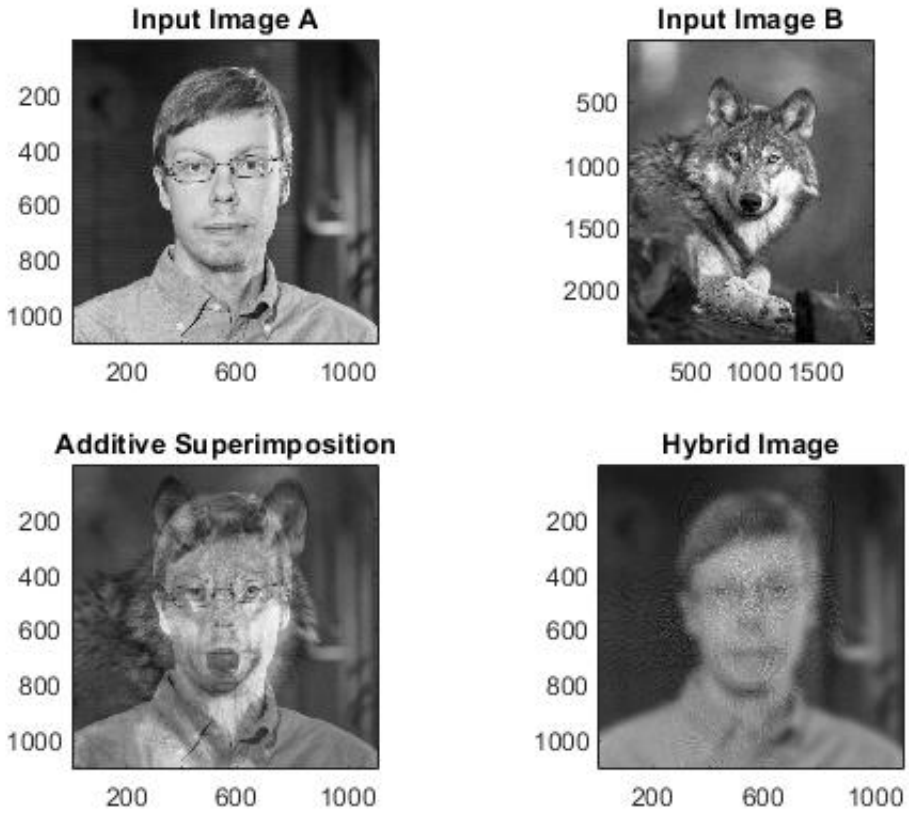

Figure 2: Superimposition and hybrid image

In order to obtain the hybrid image we combined the low pass component of the man image and the high pass component of the wolf image. The result we obtained is thus the blurred version of the man image composed with the details of the wolf one. In the figure is showed the fft spectrum of the two images and their high and low pass component.

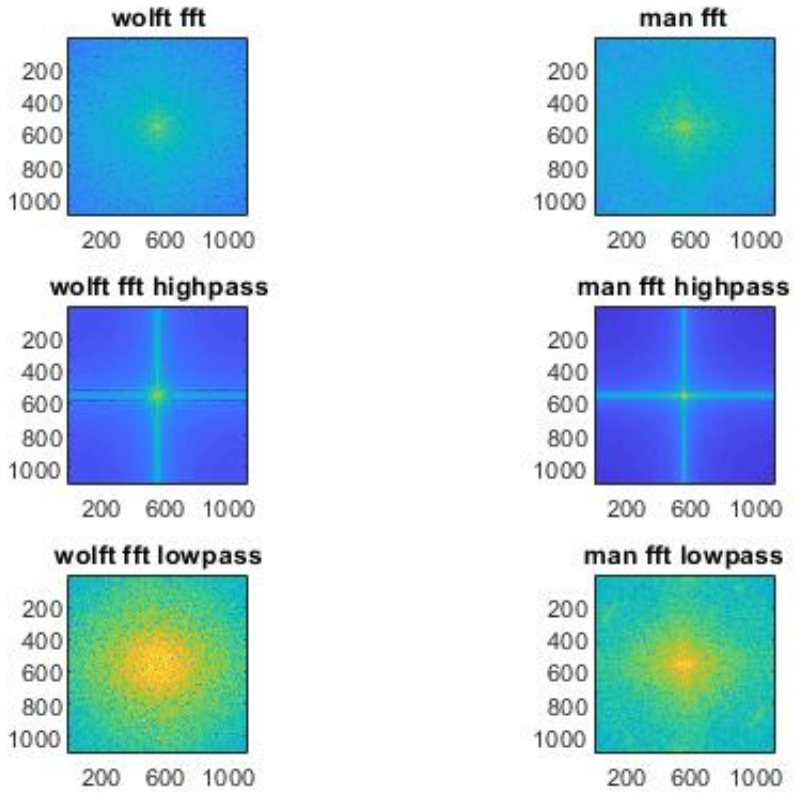

Figure 3: Fast Fourier Transform

3 Exercise 3

In order to obtain the last blended image I developed a method to generate Laplacian and Gaussian pyramids. Firstly, I added zeros to the original image with the purpose to have an image with dimensions divisible by 2. Then after all the operations the added zeros have been removed to reach the final result. The last image: "difference" has been computed as the difference between the image blended with and without the use of the pyramid blending.

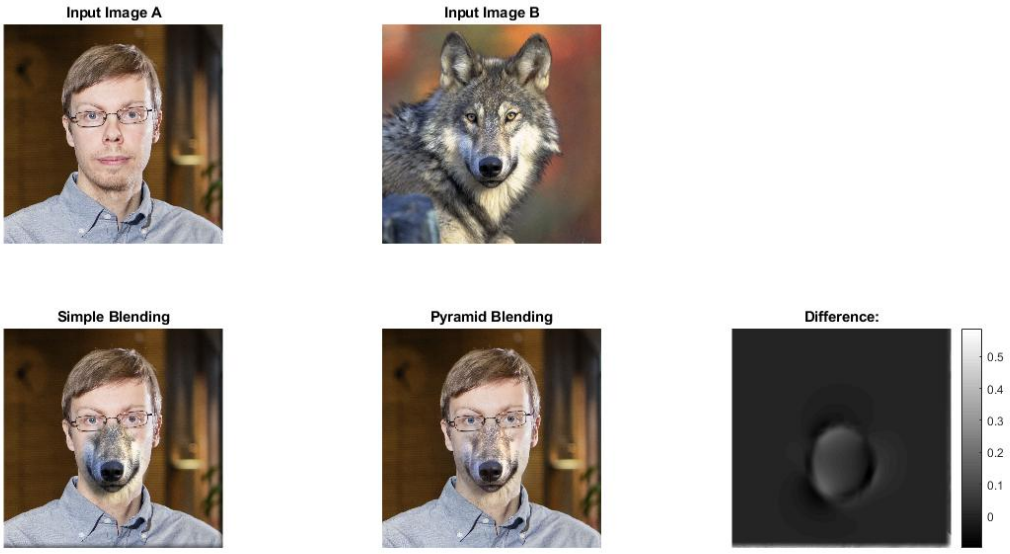

Figure 4: Image blending