CS-E4850 Computer Vision, Answers to Exercise Round 3

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Exercise 1. Image denoising.

a) Gaussian filtering:

```
gflt_imns=conv2(imns,h1);
gflt_imns=conv2(gflt_imns,h2);
gflt_imng=conv2(imng,h1);
gflt_imng=conv2(gflt_imng,h2);
```

The detail of separating 2d Gaussian filter into two 1d Gaussian filter is in **separate.m**

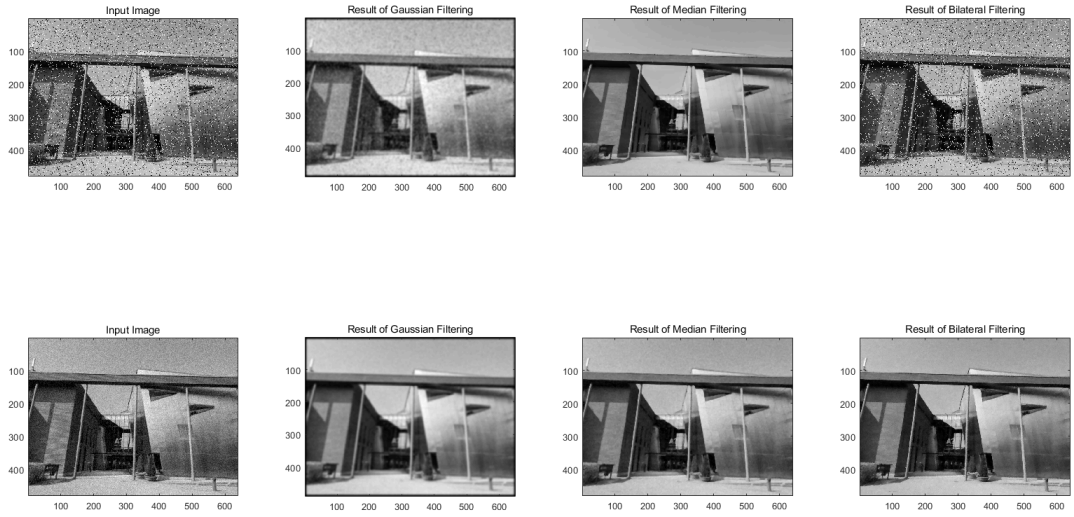
b) Median filtering:

```
medflt_imns=medfilt2(imns,[5 5]);
medflt_imng=medfilt2(imng,[5 5]);
```

c) Bilateral filtering:

```
bflt_imns = bfilter2(imns,w,sigma);
bflt_imng = bfilter2(imng,w,sigma);
```

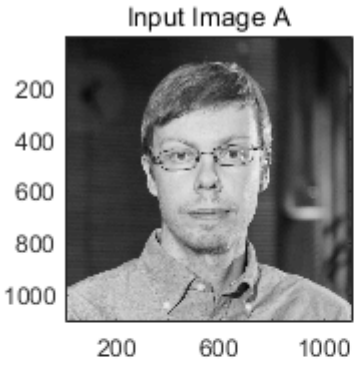
The implementation of the function **bfilter2** is in **bfilter2.m**, and the final results is

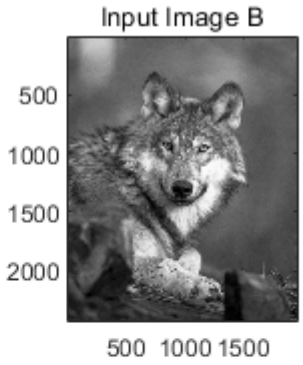


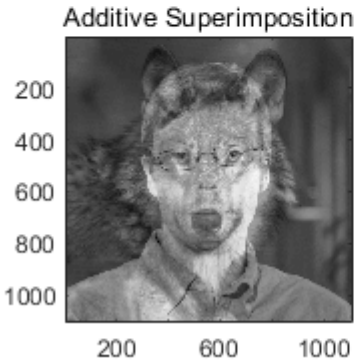
Exercise 2. Hybrid images.

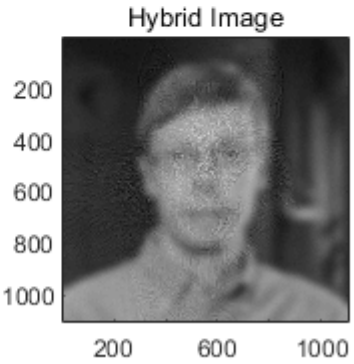
```
% create a hybrid image by combining a low-pass filtered
% version of the human face with a high-pass filtered wolf face.
wolft_highpass=wolft-wolft_lowpass;
hybrid_image = man_lowpass + wolft_highpass;


% original images
man_fft=fftshift(fft2(man));
wolf_fft=fftshift(fft2(wolft ));
% filtered version
man_lowfft=fftshift(fft2(man_lowpass ));
wolf_highfft=fftshift(fft2(wolft_highpass ));
```

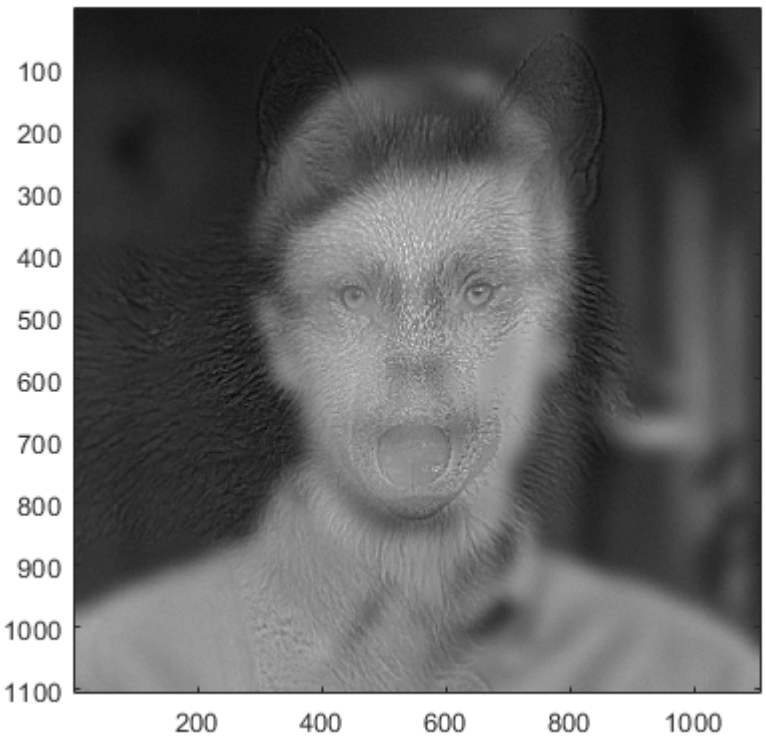
Result of the hybrid image is


Input Image A
200
400
600
800
1000
200
600
1000

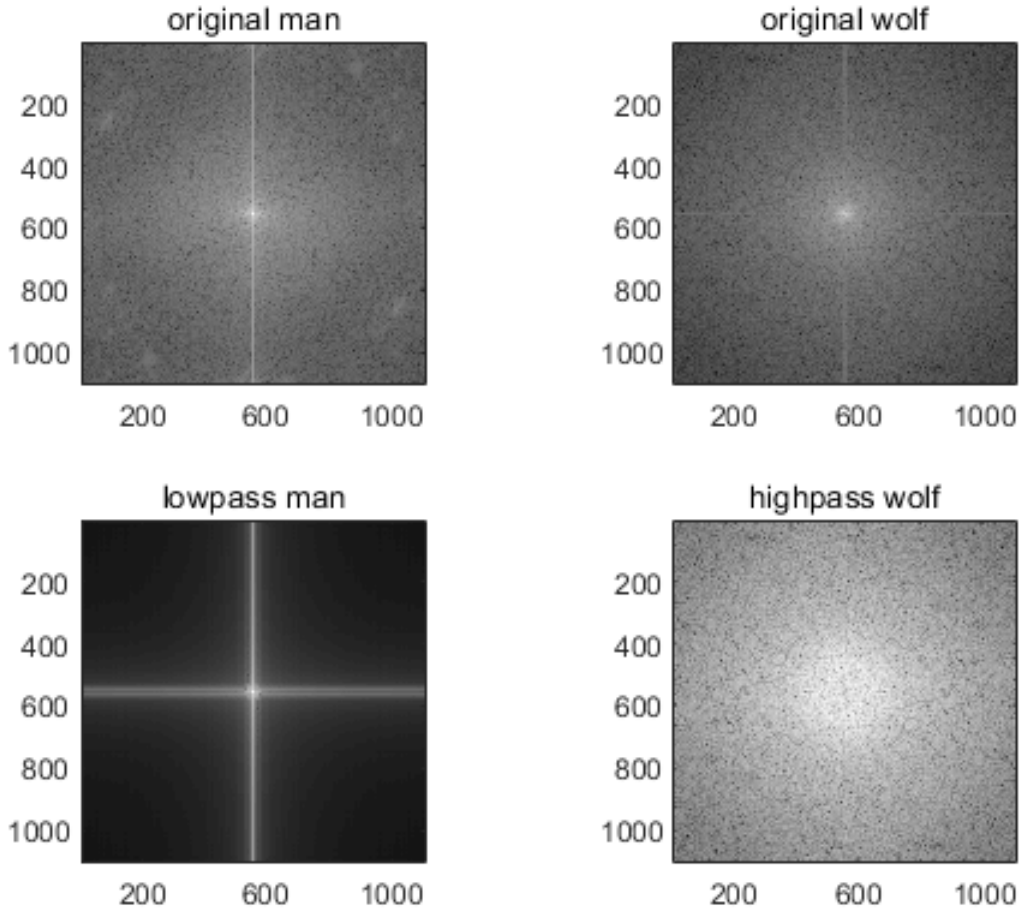

Input Image B
500
1000
1500
2000
500
1000
1500


Additive Superimposition
200
400
600
800
1000
200
600
1000


Hybrid Image
200
400
600
800
1000
200
600
1000

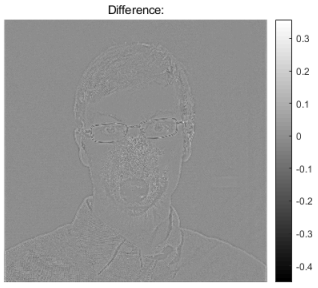


Then the visualization the log magnitudes of the Fourier transforms is



Exercise 3

Here's the result of the image blending.



More details are shown in the MATLAB functions **generateLaplacianPyramid.m** and **reconstLaplacianPyramid.m**.

References

[1] **bfilter2.m** Douglas R. Lanman, Brown University, September 2006. dlanman@brown.edu, http://mesh.brown.edu/dlanman