ASSIGNMENT 2

APOORVA JAIN
800904863

Hybrid Image:

The aim is to create a hybrid image provided the same orientation of both the input image. Hybrid image is created by adding low frequency of one image with high frequency of another image. Using Gaussian filter, we get low frequency of image and to obtain high frequency we subtract the image with the Gaussian filter of the same image. The filter size that I have taken is 2.5*cut off frequency – 0.5 where cut off frequency means sigma i.e. standard deviation of image. For each image sigma varies to get good hybrid image. Below is the algorithm:

Algorithm

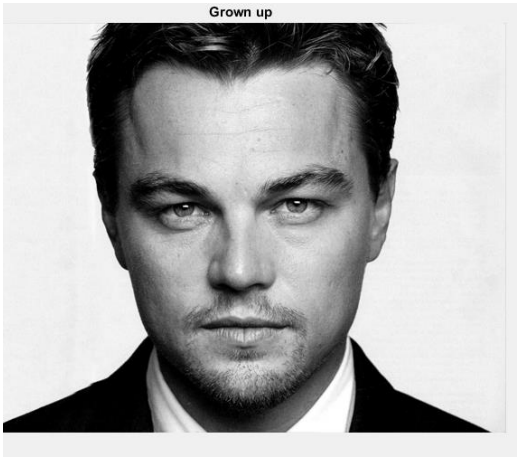
1. Read a pair of images say image1 and image2
2. Choose the standard deviation of image and filter size to be applied.
3. Apply low pass Gaussian filter on one image.
4. Apply high pass Laplacian filter on second image. Subtract the image with the Gaussian filter of itself
5. Hybrid image is produced by combining low pass and high pass filtered image

Design Consideration:

- Using trial and error I have chosen value of sigma and also considered the intensity of image. Started with keeping the value of high frequency and low frequency same and gradually increasing low frequency and decreasing high pass
- Filter size as 2.5*cut off frequency – 0.5 i.e. almost half of the width of sigma as it is one of the appropriate size of the filter.

Results

Input 1:

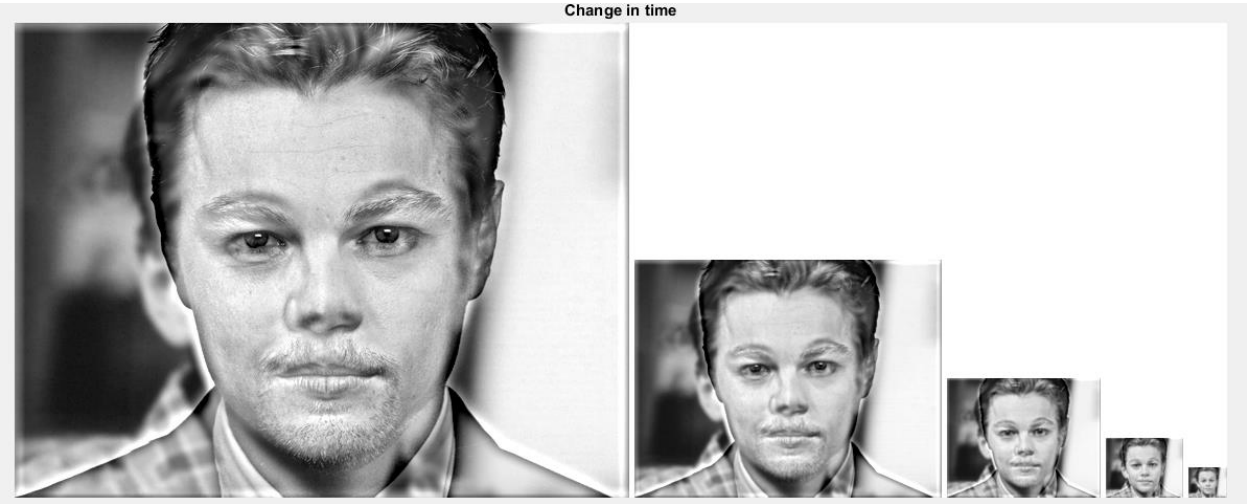


High frequency image sigma = 9

Low frequency image sigma = 4

Hybrid

Pyramid



Input 2:

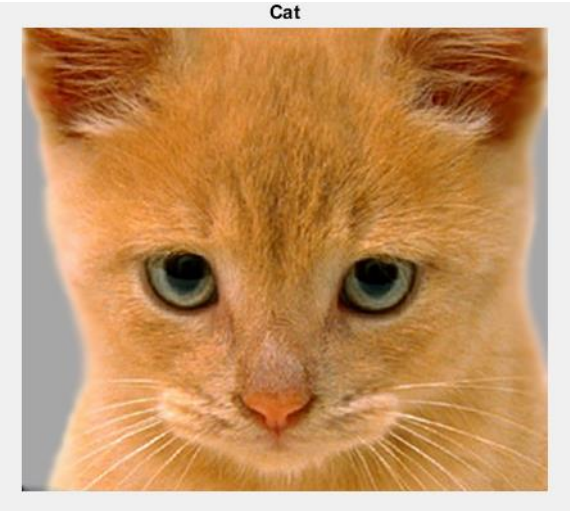
High frequency image sigma = 5

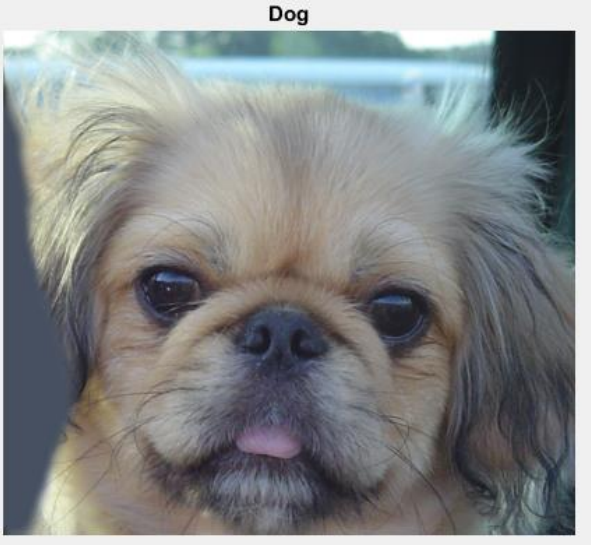
Low frequency image sigma = 25

Hybrid Image

Pyramid

Input 3:



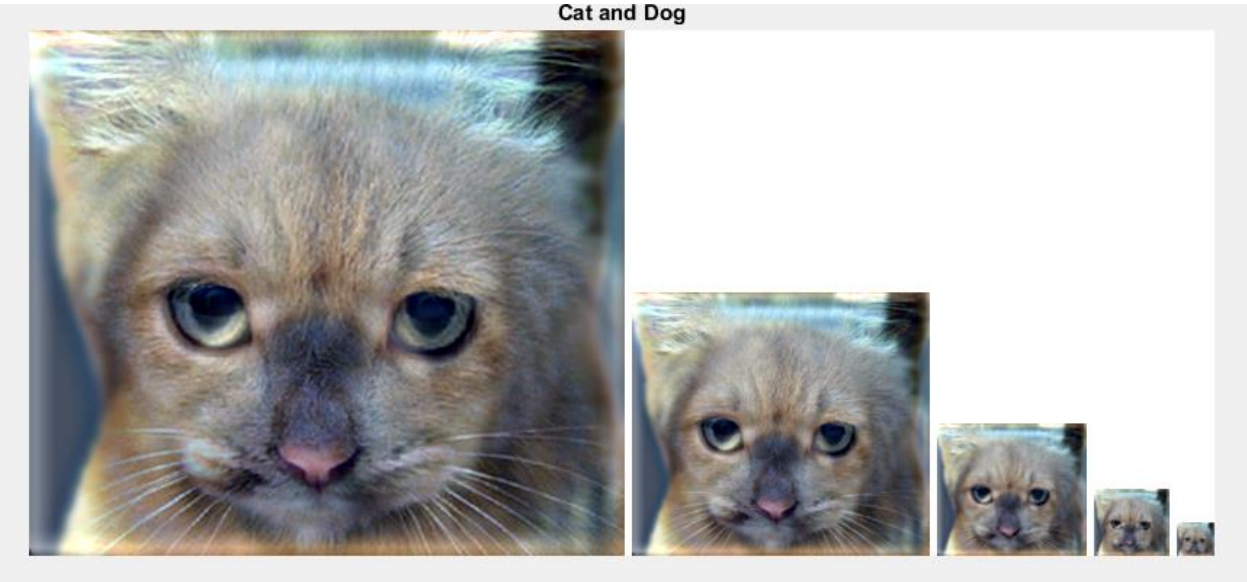


High frequency image sigma =15

Low frequency image sigma = 5

Hybrid Image

Pyramid



Observation:

As image becomes smaller or seen from far away low frequency images and their characteristics are prominent. Characteristics of high frequency images ae best seen when they are close.

Keeping low pass frequency too low and high pass frequency too high results in blurry image or one image supersede other image. As the features of one image will not dominate the other image.

Bells and Whistles:

Using color provides better results as compare to gray scale. Color images are dominated by their low frequency image. But keeping one color and one gray scale image will not give good results, and many characteristics of the image will be hidden. If low pass image is very bright or dark, it will not produce good hybrid image.