Project 1: Image Hybridization

Computer Vision CIE 552

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In this project, we implemented an image hybridization algorithm along with other required functions.

- We have implemented the "**my_imfilter**" function that performs convolution between a filter kernel and a given image. The function also pads the image in one of two ways: zero padding or reflection padding.
- We have also implemented the "**gen_hybrid_image**" that takes in two images, one from which we take the low frequencies and the other from which we take the high frequencies. We use a hyperparameter to control this operation, "cutoff_frequency" which is the standard deviation, in pixels, of the Gaussian blur which will remove high frequencies.

Results:

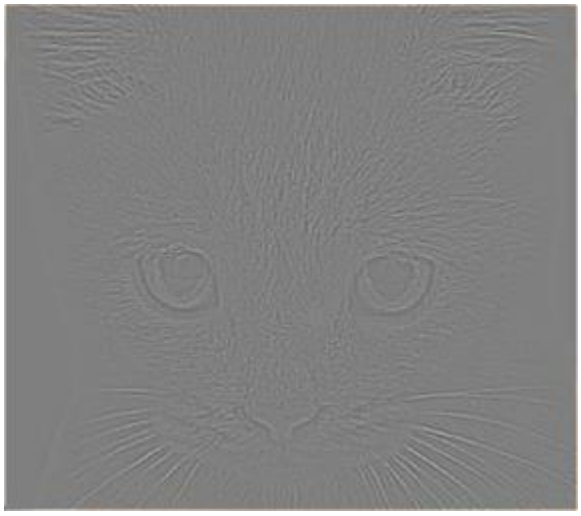
1. Testing the convolution function:

a. image passed through an identity filter (unchanged):

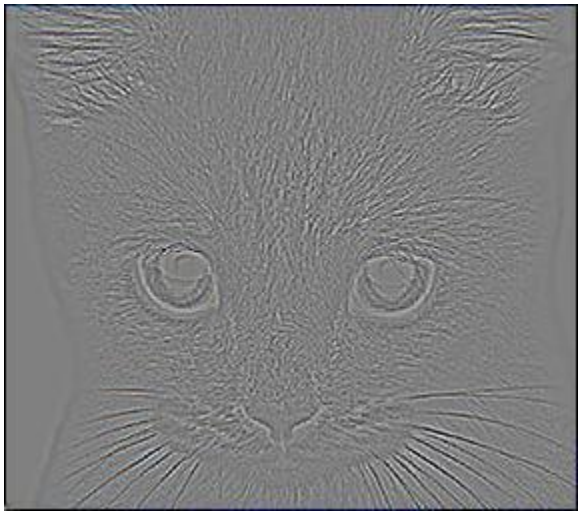
b. Significantly blurred by CV2 generated Gaussian kernel :

c. A little bit blurred by a box filter:

d. High pass filter alternative (original- blurred)



e. Discrete laplacian HPF:



f. Sobel operator:

2. Testing the Hybridization of images:

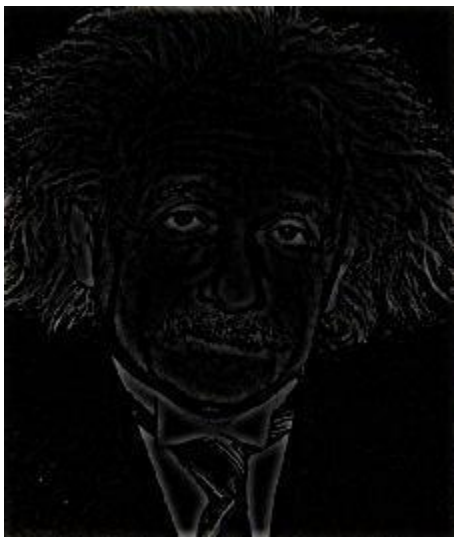
a. Marilyn Monroe and Einstein:

Parameters used:

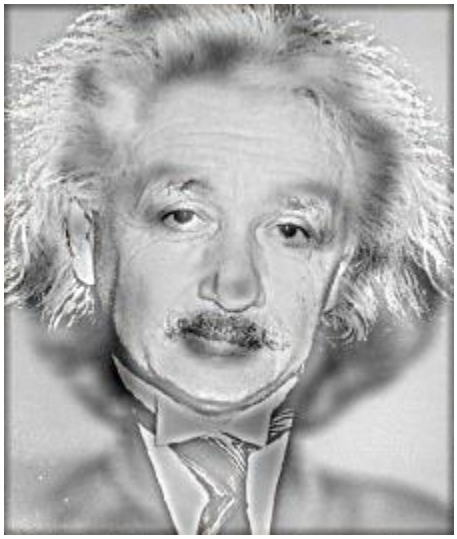
cutoff_frequency = 9 kernel_size = 9

i. Low frequency image:

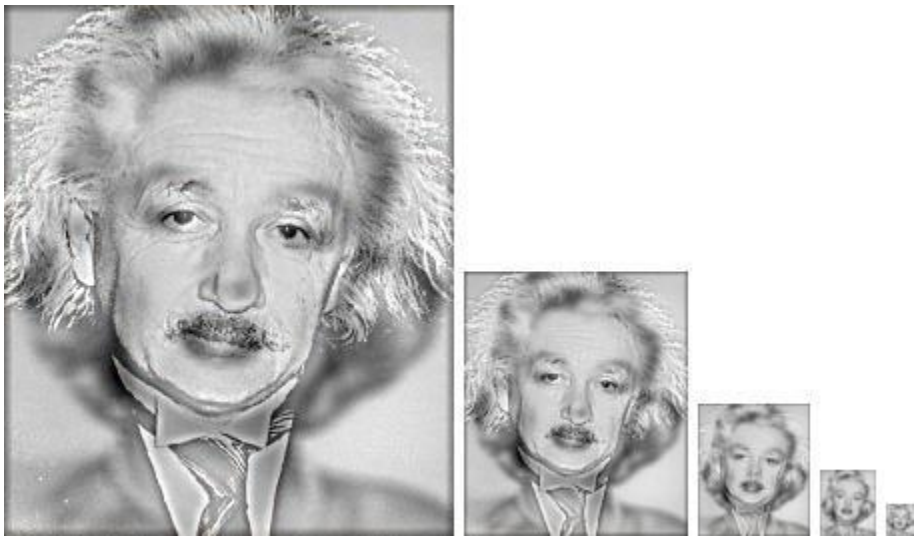
ii. High Frequency image:



iii. Hybrid Image:



iv. Visualization:

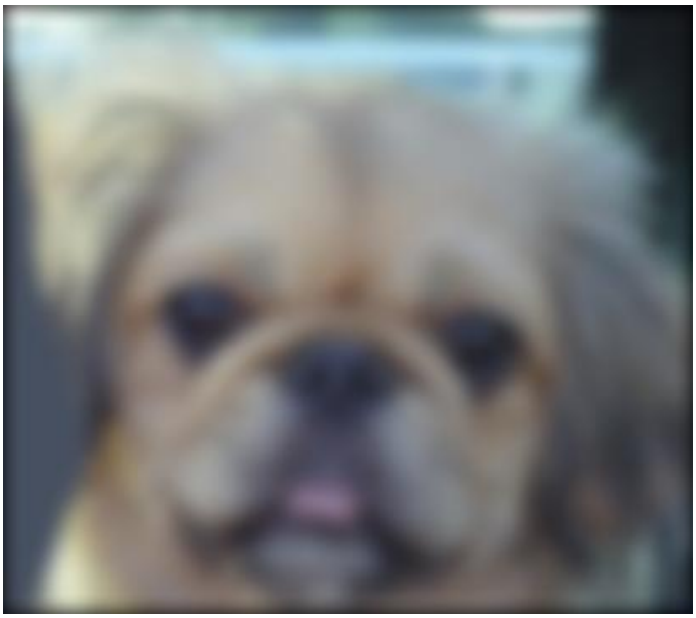


b. Puppy and Kitten:

Parameters used:

cutoff_frequency = 6 kernel_size = 23

i. Low Frequency image:



ii. High Frequency Image:

iii. Hybrid Image:

iv. Visualization: