**Project 1: Image Hybridization**

Computer Vision CIE 552

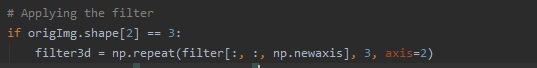
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**Introduction:**

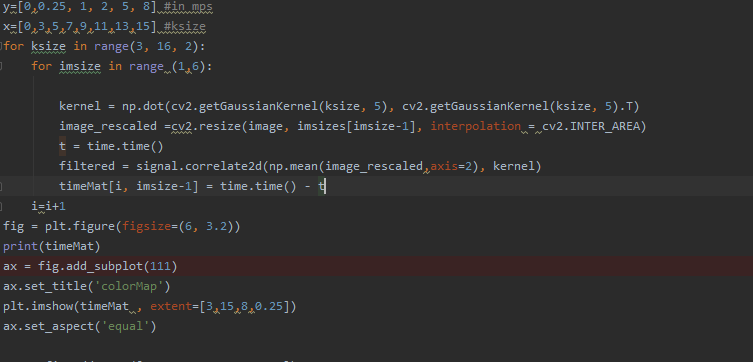
In this mini-project, we have implemented a function my\_imfilter that convolves a filter kernel to a given image. The function also pads the image in one of two ways: zero padding and reflection padding. Padding method is given to the function as an additional string input that is either ‘zero’ or ‘reflect’. We have also implemented a hybrid image generator that applies a low pass Gaussian filter to the images in the time domain using the my\_imfilter function.

**Interesting implementation detail:**

1-replicating the kernel 3 more times in an additional axis for colored images:



**2-** creating a color map of varying run time with different kernel sizes and image sizes:



**Results:**

**Part 1: testing the convolution function:**

**1- image passed through an identity filter (unchanged):**

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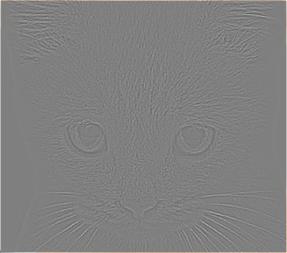
**2- Significantly blurred by CV2 generated Gaussian kernel :**

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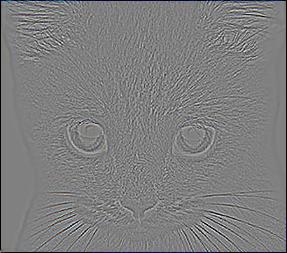
**3- a little bit blurred by a box filter:**

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**4- High pass filter alternative (original- blurred)**

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**5- Discrete laplacian HPF:**

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**6- Sobel operator:**

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**Part 2: Testing the Hybridization images:**

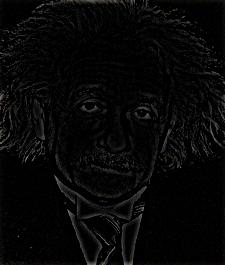
**A- Marilyn Monroe and Einstein:**

**Parameters used: cutoff\_frequency = 9 kernel\_size = 9**

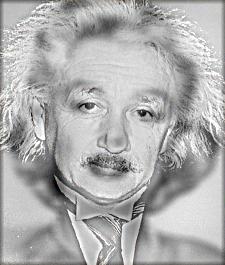
**1- Low frequency image:**

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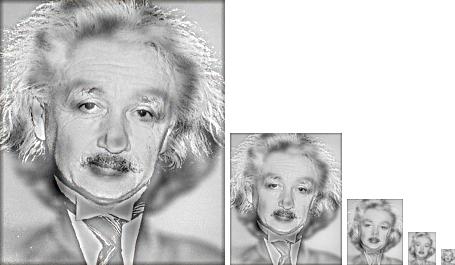
**2- High pass image:**

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**3- Hybrid Image:**

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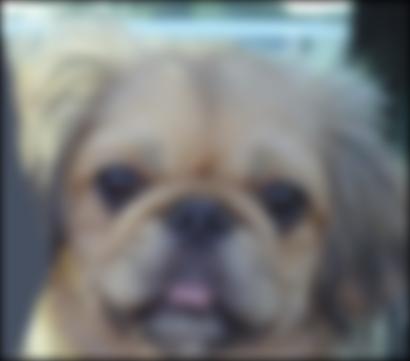
**4- Visualization:**

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**B- Puppy and Kitten:**

**cutoff\_frequency = 6 kernel\_size = 23**

**1- Low pass image:**

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**2- High pass Image:**

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**3- Hybrid Image:**

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**4-Visualization:**

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