Project 1 Writeup

Instructions

- Provide an overview about how your project functions.
- Describe any interesting decisions you made to write your algorithm.
- Show and discuss the results of your algorithm.
- Feel free to include code snippets, images, and equations.
- List any extra credit implementation and result (optional).
- Use as many pages as you need, but err on the short side.
- **Please make this document anonymous.**

Project Overview

My project fulfils the basic assignment tasks. It is able to run a number of high-pass and low-pass filters on both black and white and color (RGB) images using a version of convolution that I implemented in the program. Additionally, it uses a combination of low-frequency filtered and high-frequency filtered images to create hybrid images: An image that seems to show one subject up close and another from a further vantage point.

Implementation Detail

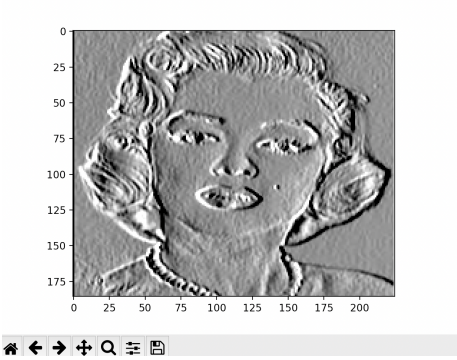
To write my algorithm, I had to pad my image appropriately. I separated my code into two parts: one part to process color images, and one to process black and white images. Then, I padded the channels of the color image with an offset that corresponded to the number of rows/columns of the kernel divided by two, so that the kernel was able to move over the image smoothly. I did the same for the black and white image, except I did not account for the third channel because it does not exist. Then, on both implementations, I looped through the dimensions of the image and added up the values of the image times the values of the kernel, and summed them up in the filtered image.

Here is how I completed the operations for one full movement of the kernel across the image:

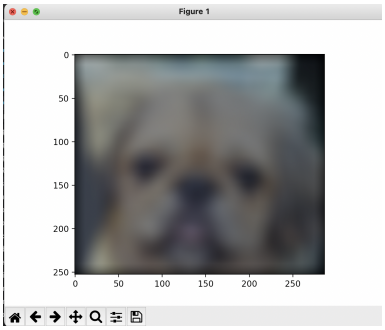
```
value = np.sum(np.multiply(imMaxPad[i - kernelFlipped.shape[0]//2 : i
                                    + kernelFlipped.shape[0]//2 + 1, j
                                    - kernelFlipped.shape[1]//2 : j +
                                    kernelFlipped.shape[1]//2 + 1],
                                    kernelFlipped))
```

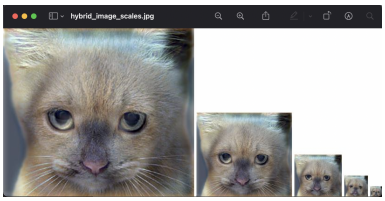
Result

1. Result 1 is a black-and white image with a high-pass filter.



2. Result 2 (Figure , left) Is a color image with a low-pass filter.
3. Result 3 (Figure , right) is a series of hybrid images that are meant to show the shift in subjects from a distance.





Extra Credit (Optional)

I did not do the extra credit.