

Homework 2 Writeup

Instructions

- 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.
- **Please make this document anonymous.**

Interesting Implementation Detail

Image Filtering

For Fast Filtering

The most intuitive way to apply filtering(convolution / correlation) is to apply filter to every pixel in image one-by-one. To do this, we have to conduct calculation as many as the size of the image. In my implementation, I made several shifted images and multiplied with kernel pixel, according to its location. With this implementation, we need to only conduct calculation as many as the size of kernel. In general cases, the size of kernel is much smaller than the size of image, so we can filter image faster.

```
filtered_image = np.array([
    padded_image[i:i+image_h, j:j+image_w] * kernel[i, j]
    for i in range(kernel_h)
    for j in range(kernel_w)
]).sum(axis=0)
```

Reflection Padding Option

I simply added reflection padding option by taking "mode" as attribute, and delivered it to numpy.pad() function.

```
padded_image = np.pad(image, pad_width=pad_width, mode=mode)
```

Hybrid Images

Not many interesting implementation was applied here.

A Result

Image Filtering

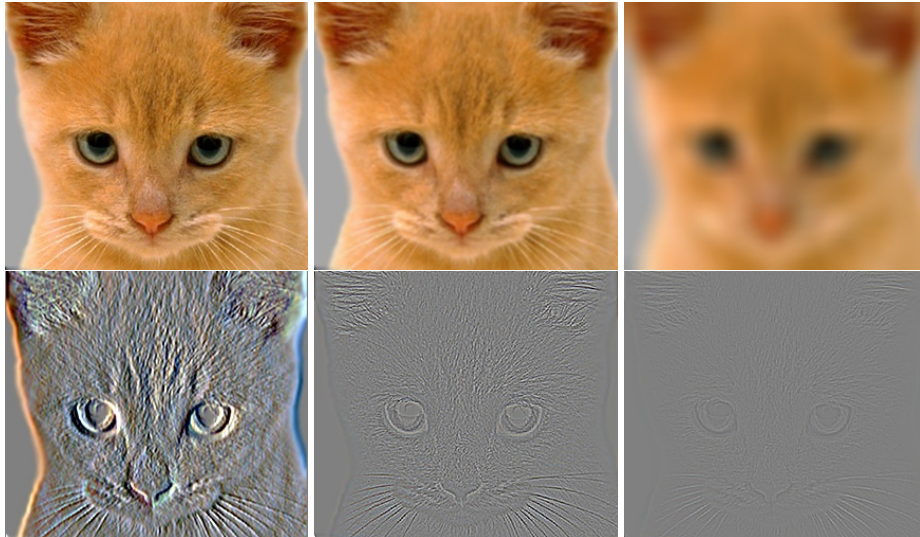


Figure 1: 1 identity 2 blur 3 large blur 4 sobel 5 laplacian 6 high-pass

Hybrid Image



Figure 2: hybrid image with bicycle and motorcycle