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.
- Use as many pages as you need, but err on the short side If you feel you only need to write a short amount to meet the brief, th
- **Please make this document anonymous.**

In the beginning...

To understand the concept of the question, as to implement convolution of imfilter() function, understanding convolution would be the most important part. As researched, convolution is a process of transforming the image by adding elements of given image to its neighbors which is weighted by the filter or kernel, using the form of mathematical convolution.

In such results, I could understand that the task is to implement mathematical convolution in MATLAB terms. Mathematical convolution is given as Equation 1

$$f(t) * g(t) = \int_{-\infty}^{\infty} f(x)g(t-x)\,dx \tag{1}$$

Interesting Implementation Detail

Two of the most interesting implementation details were about the difference between correlation and convolution, and implementing for both color and gray-scaled pictures.

Since convolution requires rotating 180 degrees compared to correlation, I used rot90() function to implement it.

```
1 filter = rot90(filter,2);
```

To implement for both gray-scale and RGB-scaled photos, I divided cases for the third factor of size(image), so that if there it is a RGB-based picture, I can handle it.

```
if(RGB == 3)

    output = zeros([imgRows imgCols 3]);

    for k = 1:3
        padImage = padarray(image(:,:,k),[fix(filRows/2)
           fix(filCols/2)]);
        for i = 1:imgRows
            for j = 1:imgCols
                Temp = padImage(i:i-1+filRows,j:j-1+
                   filCols).*filter;
                output(i,j,k) = sum(Temp(:));
            end
        end
    end

else
(...)
```

A Result

As the result, I could successfully get the same data as given by the assignment introduction, which means I succeeded to implement two functions as given task.

My functions could convolute images and hybrid them in final.