Lab Assignment 6

Sharpening filters

1. **Write a program for edge detection using following methods:**

- Roberts,
- Prewitt,
- Sobel
- Canny

Study the effect of these filters over input image and compare the results.

Jupyter Notebook guide:

```
import numpy as np
import matplotlib.pyplot as plt

from skimage.data import camera     # You can use any other input image as well
from skimage.filters import roberts, sobel, scharr, prewitt

image = camera()

# Use the inbuilt functions for edge detection

plt.show()
```

2. **Compare the results obtained by following two approaches.**
   a) Edge detection using Laplacian mask
   b) Apply Gaussian followed by Laplace to study LoG filter. Does it show an improvement? Justify

Jupyter Notebook guide for part a):

```
from scipy import misc, signal

from scipy import ndimage, misc

from skimage.io import imread

from skimage.color import rgb2gray

from skimage.filters import threshold_otsu
```

```
im = rgb2gray(imread('Image path')).astype(float)

print(np.max(im))

print(im.shape)


# Define Laplacian mask/kernel

laplace_kernel = np.array()

im_edges = ?      # Write program to convolve Input image with Laplacian mask

plt.show()
```

3. **Combining Spatial Enhancement Methods**
   Follow these steps:
   a) Read an input image (grayscale)
   b) Laplacian of a)
   c) Add a) and b). By this, sharpened image will be obtained
   d) Sobel of a)
   e) Sobel image smoothed with a 5*5 averaging filter
   f) Mask image formed by the product of (c) and (e).
   g) Sharpened image obtained by the sum of (a) and (f).

Optional Problem

Solve problem 1 in Python/Matlab without using inbuilt functions