

## 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