

Experiment – 9: Image Processing, Scipy and Matplotlib

Aim: To demonstrate the application of Image processing in Python using Scipy and Matplotlib.

Theory:

Image is a 2D array or a matrix containing the pixel values arranged in rows and columns. For a grayscale, the pixel values lie in the range of (0,255). And a color image has three channels representing the RGB values at each pixel (x,y), each varying from 0 to 255. It now becomes a 3-dimensional array.

Image processing is a method of doing some operations on the image. There are different modules in Python which contain image processing tools.

Some of these are:

1. NumPy and Scipy
2. OpenCV
3. Scikit
4. PIL/Pillow
5. SimpleCV

SciPy is an open-source Python library which is used to solve scientific and mathematical problems. It is built on the NumPy extension and allows the user to manipulate and visualize data with a wide range of high-level commands. The scipy is a data-processing and system-prototyping environment. SciPy contain significant mathematical algorithms that provide easiness to develop sophisticated and dedicated applications.

Matplotlib is an amazing visualization library in Python for 2D plots of arrays. Matplotlib is a multi-platform data visualization library built on NumPy arrays and designed to work with the broader SciPy stack.

Conclusion:

Task for submission:

(Write comments for every statement of the program)

1. Write Python program to demonstrate Image processing operations given below
 - a. histogram of image
 - b. convert color image into the color spaces RGB, CMYK and YCbCr
 - c. split the color space planes and obtain individual histograms.
 - d. histogram equalization
 - e. edge detection
 - f. image segmentation