Digital Image Processing using Python -Basic Level 1

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Digital Image Processing using Python

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Python Libraries to be Installed

- Python 3.7 from Python.org
- Numpy
- Scipy
- Matplotlib
- Cv2 (OpenCV) package

Tutorial 1- To read an image and save it in another image file format

```
import math, numpy
import scipy.misc
import matplotlib.pyplot as plt
from scipy import misc
im = misc.imread('images/Senthilkumar.jpg')
misc.imsave('images/demo.png',im)
plt.imshow(im)
plt.show()
```

Input image : senthilkumar.jpg

Output image: senthilkumar.png

Tutorial 2 – To read an colour image and convert into grayscale image using OpenCV package

```
import numpy as np
import cv2
import math
img = cv2.imread('images/Senthilkumar.jpg',cv2.IMREAD_GRAYSCALE)
cv2.imshow('image',img)
```

Result: Input Colour Image

Result: Output Gray Scale

Tutorial 3 – To increase the contrast of an image by a scale using OpenCV package

```
import numpy as np
import cv2
import math
img = cv2.imread('images/Senthilkumar.jpg',cv2.IMREAD_GRAYSCALE)
height = img.shape[0]
width = img.shape[1]
contrast = 1.3
for i in np.arange(height):
    for j in np.arange(width):
```

```
a = img.item(i,j)
        b = math.ceil(a*contrast)
        if b > 255:
            b = 255
img.itemset((i,j),b)
cv2.imwrite('images/contrast.jpg',img)
cv2.imshow('image',img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Result: Input Colour Image

Result: Grayscale image

Result: Contrast adjusted Image

Tutorial 4 – To increase the brightness of an image using OpenCV package

```
import numpy as np
import cv2
import math
img =
cv2.imread('images/Senthilkumar.jpg',cv2.IMREAD
_GRAYSCALE)
height = img.shape[0]
width = img.shape[1]
brightness = 50
for i in np.arange(height):
    for j in np.arange(width):
```

```
a = img.item(i,j)
        b = a+brightness
        if b > 255:
            b = 255
        img.itemset((i,j),b)
cv2.imwrite('images/brightness.jpg',img)
cv2.imshow('image',img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Result: Original Colour Image

Result: Original Gary Scale Image

Result: Brightness adjusted Image

Tutorial 5: To display the image name of images stored in a directory using Python Imaging Library (PIL)

```
from PIL import Image
import os
for f in os.listdir('images'):
    if f.endswith('.jpg'):
        print(f)
```

Result: text displayed in python shell

brightness.jpg
contrast.jpg
Senthilkumar.jpg
Senthilkumar_grayscale.jpg