**TIFF IMAGE MANIPULATION USING PIL PILLOW**

A Mini Project

Submitted by

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**Problem Statement:**

To manipulate a Tagged Image File Format(TIFF) Image using Python Imaging Library(PIL) Pillow 4.0 and perform following actions on the input image:

1. Displaying Input Image
2. Resize Image File
3. Display Image Details and Attributes
4. Change Mode of Image
5. Change Contrast of Image
6. Rotate Image
7. Blur Image
8. Display Contour of Image
9. Display Image after Convolution
10. Crop Image
11. Mean and Median of Image
12. Standard Deviation of Image
13. Variance of Image
14. Root Mean Square of Image
15. Histogram of Image

**INTRODUCTION:**

**Tagged Image File Format**, abbreviated **TIFF** or **TIF**, is a computer file format for storing raster graphics images, popular among graphic artists, the publishing industry, and photographers. The TIFF format is widely supported by image-manipulation applications, by publishing and page layout applications, and by scanning, faxing, word processing, optical character recognition and other applications.

The **Python Imaging Library** adds image processing capabilities to your Python interpreter. This library provides extensive file format support, an efficient internal representation, and fairly powerful image processing capabilities. The core image library is designed for fast access to data stored in a few basic pixel formats. It should provide a solid foundation for a general image processing tool.

In this Project TIFF image is read via input name and Manipulated using Python Imaging Library Pillow. Pillow i.e. PIL Fork has large number of classes which help in easy image manipulation using image attributes and pixel values.

**Methodology:**

**Software Details:**

* **Programming Language:** Python 3.6
* **Operating System:** Windows 10

**Hardware Details:**

* **Processor:** Intel(R) Core(TM) i3-5005U CPU @ 2.00 GHZ
* **Memory:** 4.00 GB
* **System:** 64-Bit Operating System, X64 based processor

**Libraries:**

* Python Imaging Library Pillow 4.0

**Packages:**

Cycler 0.10.0 Pytz 2017.2

Markdown 2.6.8 Requests 2.13.0

Matplotlib 2.0.0 Six 1.10.0

Olefile 0.44 Pillow 4.0.0

Numpy 1.12.1 Pyparsing 2.2.0

Python-dateutil 2.6.0

**IMPLEMENTATION:**

from \_\_future\_\_ import print\_function

import os, sys

from PIL import Image

from PIL import PSDraw

from PIL import TarIO

from PIL import ImageEnhance

from PIL import ImageFilter

from PIL import ImageStat

from pylab import \*

image\_file = input("Enter the name of the TIFF Image to be manipulated: ")

p = -1

while(p == -1):

case = input("Enter Your Choice:\n 'a': Open Image File\n 'b': Resize Image File\n 'c': Image Histogram\n 'd': Display Image Attributes\n 'e': Change Mode of image into 'L'\n 'f' : Change Mode of image into 'RGB'\n 'g': Change Contrast of Image\n 'h': Rotate Image\n 'i': Blur Image\n 'j': Contour of Image\n 'k': Image Convolution\n 'l': Calculate Mean\n 'm': Calculate Median\n 'n': Calculate Variance\n 'o': Calculate Root Mean Square\n 'p': Calculate Standard Deviation\n 'q': Exit\n")

im = Image.open(image\_file)

if case == 'a':

im.show()

elif case == 'b':

x = input("Enter breadth:\n")

a = int(x)

y = input("Enter length:\n")

b = int(y)

out1 = im.resize((a, b))

out1.show()

elif case == 'c':

out2 = im.histogram()

print(out2)

elif case == 'd':

print("Format of image: ", im.format,"\n Size of Image: ", im.size,"\n Mode of Image: ", im.mode)

elif case == 'e':

out4 = im.convert("L")

print("\n Mode of Image: ", out4.mode)

out4.show()

elif case == 'f':

out5 = im.convert("RGB")

print("\n Mode of Image: ", out5.mode)

out5.show()

elif case == 'g':

choice = input("'1': Increase contrast by 50%:\n'2': Decrease contrast by 50%:\n")

if choice == '1':

out6 = im.point(lambda i: i \* 1.5)

out6.show()

elif choice == '2':

out7 = im.point(lambda i: i \* 0.2)

out7.show()

elif case == 'h':

choice = input("'1': Rotate Image by 45 degree:\n'2': Rotate Image by 90 degree:\n'3': Rotate Image by 135 degree:\n'4': Rotate Image by 180 degree:\n")

if choice == '1':

out8 = im.rotate(45)

out8.show()

elif choice == '2':

out9 = im.rotate(90)

out9.show()

elif choice == '3':

out10 = im.rotate(135)

out10.show()

elif choice == '4':

out11 = im.rotate(180)

out11.show()

elif case == 'i':

out12 = im.filter(ImageFilter.BLUR)

out12.show()

elif case == 'j':

out13 = array(im.convert('L'))

figure()

gray()

contour(out13, origin='image')

axis('equal')

axis('off')

show()

elif case == 'k':

out14 = im.filter(ImageFilter.Kernel((3,3),(0,-1,0,-1,10,-1,0,-1,0),scale=None,offset=0))

out14.show()

elif case == 'l':

out15 = ImageStat.Stat(im)

print(out15.mean)

elif case == 'm':

out15 = ImageStat.Stat(im)

print(out15.mdian)

elif case == 'n':

out15 = ImageStat.Stat(im)

print(out15.var)

elif case == 'o':

out15 = ImageStat.Stat(im)

print(out15.rms)

elif case == 'p':

out15 = ImageStat.Stat(im)

print(out15.stddev)

elif case == 'q':

p = 0

**RESULTS:**

C:\Users\dell>python tiff\_code.py

Enter the name of the TIFF Image to be manipulated: sample.tiff

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

a

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

b

Enter breadth:

500

Enter length:

600

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

c

[37, 35, 63, 130, 260, 429, 718, 1141, 1666, 2409, 3176, 4168, 5290, 6354, 7483, 8649, 10508, 11925, 13761, 15172, 17000, 18762, 20420, 22748, 24777, 27201, 29785, 33202, 36226, 39252, 42043, 44847, 47786, 50246, 53006, 55804, 59376, 62861, 65375, 67714, 70045, 71874, 73463, 76803, 80480, 83129, 85951, 88975, 91231, 94928, 96554, 99689, 102144, 104271, 106443, 107285, 108583, 109563, 109844, 110512, 110740, 111527, 110321, 108706, 105573, 101867, 97355, 92708, 87723, 82751, 78975, 74712, 70895, 66386, 63096, 58078, 53105, 48201, 43973, 40777, 37196, 33765, 31629, 29148, 27079, 25663, 24493, 23069, 22450, 21402, 20525, 20228, 19197, 18940, 18686, 18265, 17650, 17555, 17386, 16971, 17105, 16884, 17305, 17460, 17404, 17136, 16865, 16498, 16216, 15816, 15412, 15652, 15653, 15835, 15994, 16613, 16755, 17950, 19301, 20440, 20930, 20712, 20978, 21345, 22285, 23222, 24101, 24308, 25361, 27042, 28304, 28913, 28776, 27823, 27155, 25966, 23693, 22138, 20272, 18632, 17668, 17601, 17335, 17233, 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34408, 33308, 32139, 31107, 29661, 28970, 27373, 25326, 23101, 22786, 22608, 24106, 25873, 26345, 25361, 23350, 22059, 21181, 20046, 20599, 21400, 22639, 21448, 20439, 19812, 18999, 19892, 18964, 17905, 16880, 16649, 15674, 15908, 15736, 16804, 18025, 18351, 18877, 16477, 23674]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

d

Format of image: TIFF

Size of Image: (3264, 2448)

Mode of Image: RGB

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

e

Mode of Image: L

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

f

Mode of Image: RGB

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

g

'1': Increase contrast by 50%:

'2': Decrease contrast by 50%:

2

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

h

'1': Rotate Image by 45 degree:

'2': Rotate Image by 90 degree:

'3': Rotate Image by 135 degree:

'4': Rotate Image by 180 degree:

1

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

j

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'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

i

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

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'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

k

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

l

[100.87905230259996, 110.13113696254646, 93.10656107827118]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

m

[72, 83, 45]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

n

[3900.355290851237, 3874.923180095484, 6424.405739423737]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

o

[118.64627463313771, 126.50608882088898, 122.85453778857979]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

p

[62.45282452260456, 62.24888095456403, 80.15239072806087]

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

q

Enter breadth:

100

Enter length:

300

Enter Your Choice:

'a': Open Image File

'b': Resize Image File

'c': Image Histogram

'd': Display Image Attributes

'e': Change Mode of image into 'L'

'f' : Change Mode of image into 'RGB'

'g': Change Contrast of Image

'h': Rotate Image

'i': Blur Image

'j': Contour of Image

'k': Image Convolution

'l': Calculate Mean

'm': Calculate Median

'n': Calculate Variance

'o': Calculate Root Mean Square

'p': Calculate Standard Deviation

'q': Crop Image

'r': Exit

r

C:\Users\dell>

**CONCLUSION:**

Using Python Imaging Library we successfully implemented Image manipulation in Python with Menu Driven Program for user and displaying appropriate image outputs wherever and whenever required. We Implemented following Image filter and enhancements attributes:

1. Displaying Input Image
2. Resize Image File
3. Display Image Details and Attributes
4. Change Mode of Image
5. Change Contrast of Image
6. Rotate Image
7. Blur Image
8. Display Contour of Image
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