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Batch : C
SY COMPS

Experiment No. : 11

AIM:
Perform different image processing operations using the python Pillow library.

THEORY:
Python Imaging Library (expansion of PIL) is the de facto image processing package for Python language. It incorporates lightweight image processing tools that aids in editing, creating and saving images. Pillow supports a large number of image file formats including BMP, PNG, JPEG, and TIFF. The library encourages adding support for newer formats in the library by creating new file decoders.
This module is not preloaded with Python. So to install it execute the following command in the command-line:

CODE:

```
# -*- coding: utf-8 -*-
"""pillow_221071047.ipynb

Automatically generated by Colaboratory.

Original file is located at

https://colab.research.google.com/drive/1lkF1kJH6FnilZUCagEmHuvugQzphGtpv
"""

from google.colab import files
uploaded = files.upload()

!pip install pillow
```

```python
from PIL import Image

img = Image.open(r"test_image.jpeg")
display(img)

print(img.mode)

print(img.size)
print(img.format)

angle = 50
img.rotate(angle)
#diplay(img)

angle=90
img1=img.rotate(angle)
size=(300,300)
img1.resize(size)

# img.rotate(0)

# size=(300,300)
# img1 = img.resize(size)
# display(img1)

vertical_img = img.transpose(Image.FLIP_TOP_BOTTOM)
display(vertical_img)

r_img=img.rotate(45, expand=True)
display(r_img)

img.getbands()
img_gray = img.convert("L")
display(img_gray)
img_gray.getbands()
# img.convert("L")
# img.getbands()

cropped_img = img.crop((20,20,100,100))
display(cropped_img)
```

```python
red, green, blue = img.split()

display(red, green, blue)

red.mode
blue.mode
green.mode

img_merge = Image.merge("RGB", (red,red,blue))
display(img_merge)

from PIL import ImageFilter
blur_img = img.filter(filter = ImageFilter.BLUR)
display(blur_img)

import numpy as np
a = np.asarray(img)
print(a)
print(a.shape)

from PIL import ImageDraw
draw=ImageDraw.Draw(img)
draw.text((20,100),'dell')
display(img)

img.thumbnail((60,60))
display(img)
```

OUTPUT:

pillow_221071047.ipynb ☆

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+ Code   + Text

```
[ ] from google.colab import files
    uploaded = files.upload()
```

Browse... No files selected.   Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
Saving test_image.jpeg to test_image.jpeg

```
[ ] !pip install pillow
```

Requirement already satisfied: pillow in /usr/local/lib/python3.10/dist-packages (9.4.0)

```
from PIL import Image

img = Image.open(r"test_image.jpeg")
display(img)
```



```
[ ] print(img.mode)
```

RGB

```
[ ] print(img.size)
    print(img.format)
```

(284, 177)
JPEG

```
[ ] angle = 50
    img.rotate(angle)
```

pillow_221071047.ipynb

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```
angle = 50
img.rotate(angle)
#diplay(img)
```



```
angle=90
img1=img.rotate(angle)
size=(300,300)
img1.resize(size)

# img.rotate(0)

# size=(300,300)
# img1 = img.resize(size)
# display(img1)
```

+ Code   + Text

```
vertical_img = img.transpose(Image.FLIP_TOP_BOTTOM)
display(vertical_img)
```



```
r_img=img.rotate(45, expand=True)
display(r_img)
```



```
img.getbands()
img_gray = img.convert("L")
display(img_gray)
img_gray.getbands()
# img.convert("L")
# img.getbands()
```

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```
[ ]  img.getbands()
     img_gray = img.convert("L")
     display(img_gray)
     img_gray.getbands()
     # img.convert("L")
     # img.getbands()
```


('L',)

```
[ ]  cropped_img = img.crop((20,20,100,100))
     display(cropped_img)
```



```
[ ]  red, green, blue = img.split()

     display(red, green, blue)
```
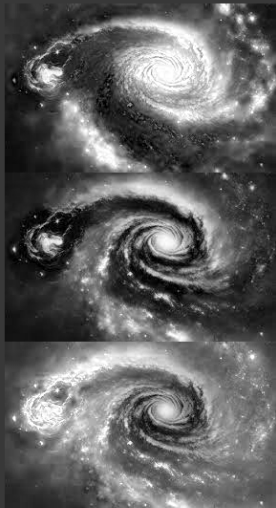
pillow_221071047.ipynb

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```
[ ]  red, green, blue = img.split()

     display(red, green, blue)
```



```
[ ]  red.mode
     blue.mode
     green.mode
```

```
'L'
```

pillow_221071047.ipynb ☆
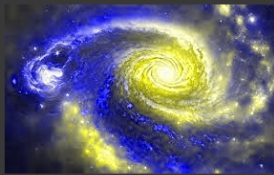
+ Code   + Text

[ ]

'L'

```
[ ] img_merge = Image.merge("RGB", (red,red,blue))
    display(img_merge)
```



```
[ ] from PIL import ImageFilter
    blur_img = img.filter(filter = ImageFilter.BLUR)
    display(blur_img)
```



```
[ ] import numpy as np
    a = np.asarray(img)
    print(a)
    print(a.shape)
```

```
[[[45 23 46]
  [45 23 46]
  [48 22 47]
  ...
```

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+ Code + Text

```python
import numpy as np
a = np.asarray(img)
print(a)
print(a.shape)
```

```
[[[45 23 46]
  [45 23 46]
  [48 22 47]
  ...
  [35 35 69]
  [35 36 67]
  [35 36 67]]

 [[45 23 46]
  [45 23 46]
  [48 22 47]
  ...
  [28 28 62]
  [28 29 60]
  [28 29 60]]

 [[45 23 46]
  [45 23 46]
  [48 22 47]
  ...
  [20 23 56]
  [22 22 56]
  [22 22 56]]

 ...

 [[12 17 37]
  [12 17 37]
  [13 18 38]
  ...
  [33 50 96]
  [33 49 98]
  [33 49 98]]

 [[12 17 37]
  [12 17 37]
  [13 18 38]
  ...
  [33 51 97]
  [33 51 97]
  [31 52 97]]
```

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```
                [33 50 96]
[ ]             [33 49 98]
                [33 49 98]]

              [[12 17 37]
               [12 17 37]
               [13 18 38]
               ...
               [33 51 97]
               [33 51 97]
               [31 52 97]]

              [[15 20 40]
               [15 20 40]
               [15 20 40]
               ...
               [34 55 98]
               [32 57 98]
               [30 58 98]]]
             (177, 284, 3)
```

```python
[ ]  from PIL import ImageDraw
     draw=ImageDraw.Draw(img)
     draw.text((20,100),'dell')
     display(img)
```



```python
[ ]  img.thumbnail((60,60))
     display(img)
```
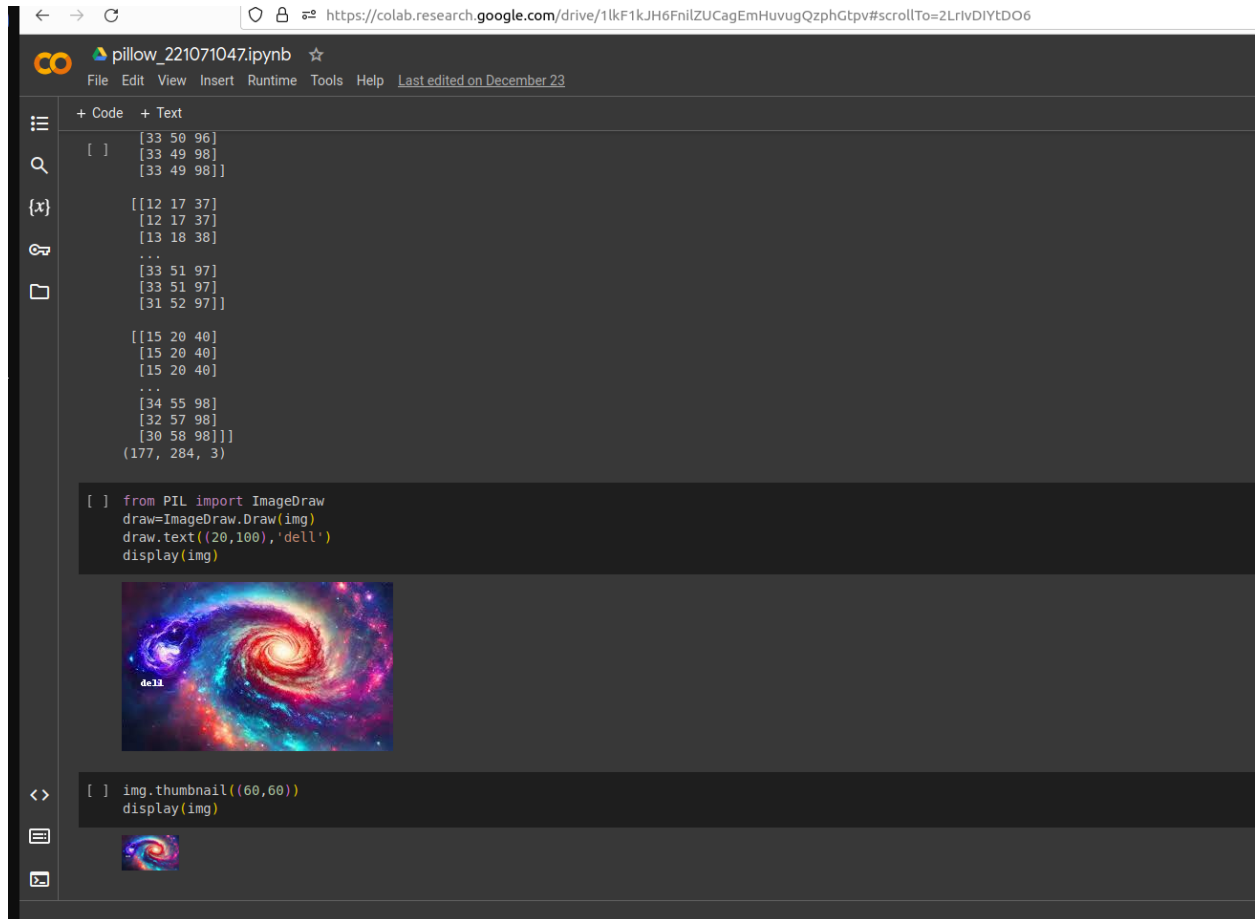

CONCLUSION:
In this exp, we learnt how to perform different image processing operations using the python Pillow library.