Image Processing in Python (Scaling, Rotating, Shifting and Edge Detection)

Difficulty Level : Easy • Last Updated : 17 Sep, 2018

Taking pictures is just a matter of click so why playing around with it should be more than few lines of code. Seems not a case with python. There are quite a few good libraries available in python to process images such as open-cv, Pillow etc. In this article we'll be using Open CV, an open source library for computer vision. It has C++, python and java interfaces available. It's highly optimized (written in C/C++) for real time applications in the domain of computer vision.

Let's start with a simple one i.e Scaling an image.

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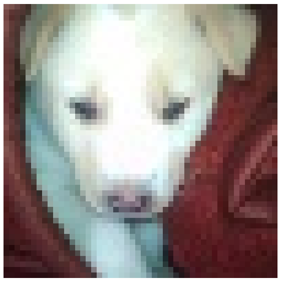
Scaling an Image :-

Scaling operation increases/reduces size of an image.

```
mport cv2
mport numpy as np

FILE_NAME = 'volleyball.jpg'
```

```
try:
    # Read image from disk.
    img = cv2.imread(FILE_NAME)

    # Get number of pixel horizontally and vertically.
    (height, width) = img.shape[:2]

    # Specify the size of image along with interploation methods.
    # cv2.INTER_AREA is used for shrinking, whereas cv2.INTER_CUBIC
    # is used for zooming.
    res = cv2.resize(img, (int(width / 2), int(height / 2)), interpolation = cv2.INT

    # Write image back to disk.
    cv2.imwrite('result.jpg', res)

except IOError:
    print ('Error while reading files !!!')
```

Output:

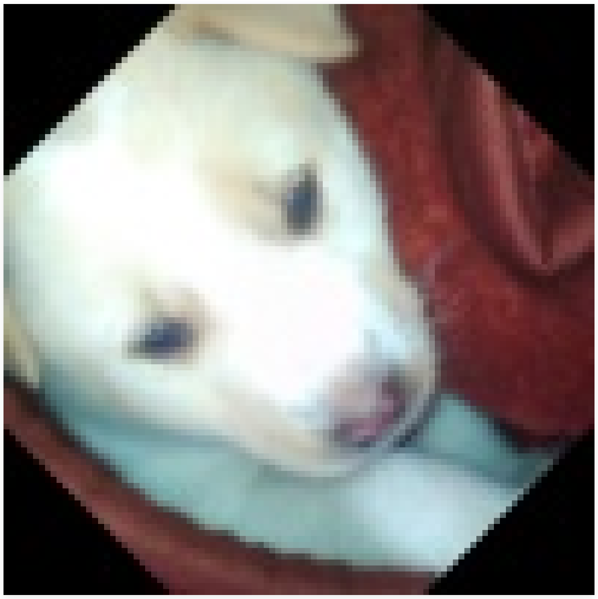


Rotating an image :-

Images can be rotated to any degree clockwise or otherwise. We just need to define rotation matrix listing rotation point, degree of rotation and the scaling factor.

```
import cv2
import numpy as np

FILE_NAME = 'volleyball.jpg'
try:
    # Read image from the disk.
    img = cv2.imread(FILE_NAME)
    # Shape of image in terms of pixels.
    (rows, cols) = img.shape[:2]

    # getRotationMatrix2D creates a matrix needed for transformation.
    # We want matrix for rotation w.r.t center to 45 degree without scaling.
    M = cv2.getRotationMatrix2D((cols / 2, rows / 2), 45, 1)
    res = cv2.warpAffine(img, M, (cols, rows))

    # Write image back to disk.
    cv2.imwrite('result.jpg', res)
except IOError:
    print ('Error while reading files !!!')
```

Output:

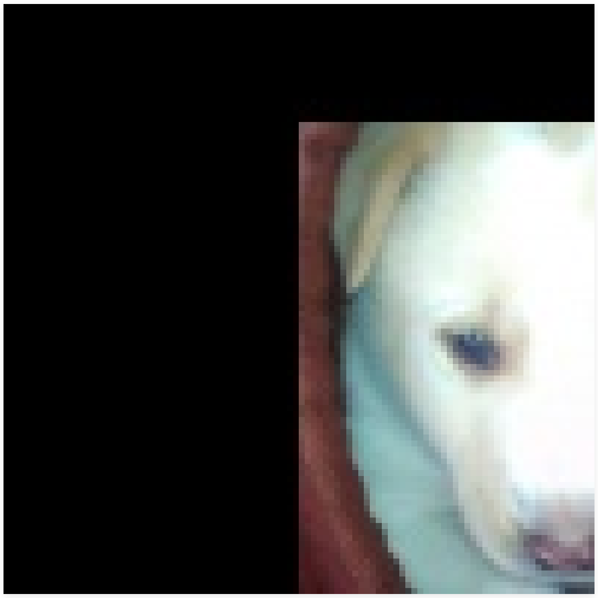


Translating an Image :-

Translating an image means shifting it within a given frame of reference.

```
import cv2
import numpy as np

FILE_NAME = 'volleyball.jpg'
# Create translation matrix.
# If the shift is (x, y) then matrix would be
# M = [1 0 x]
#     [0 1 y]
# Let's shift by (100, 50).
M = np.float32([[1, 0, 100], [0, 1, 50]])

try:

    # Read image from disk.
    img = cv2.imread(FILE_NAME)
    (rows, cols) = img.shape[:2]
    # warpAffine does appropriate shifting given the
    # translation matrix.
    res = cv2.warpAffine(img, M, (cols, rows))

    # Write image back to disk.
    cv2.imwrite('result.jpg', res)

except IOError:
    print ('Error while reading files !!!')
```

Output:

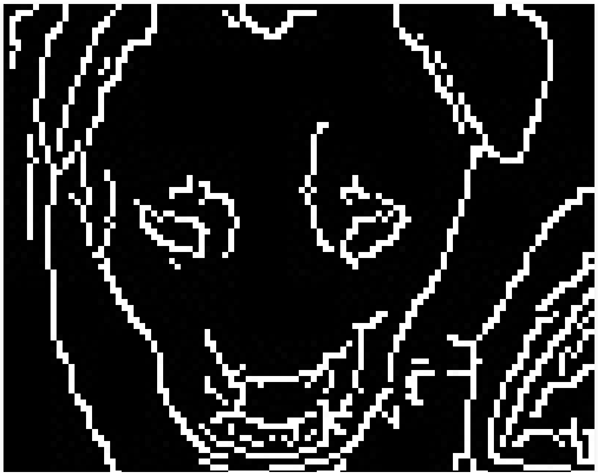


Edge detection in an Image :-

The process of image detection involves detecting sharp edges in the image. This edge detection is essential in context of image recognition or object localization/detection. There are several algorithms for detecting edges due to it's wide applicability. We'll be using one such algorithm known as Canny Edge Detection.

```
import cv2
import numpy as np

FILE_NAME = 'volleyball.jpg'
try:
    # Read image from disk.
    img = cv2.imread(FILE_NAME)

    # Canny edge detection.
    edges = cv2.Canny(img, 100, 200)

    # Write image back to disk.
    cv2.imwrite('result.jpg', edges)
except IOError:
    print ('Error while reading files !!!')
```

Output:



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