7 - 8.5. Rotation

October 6, 2024

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1 Introduction

`Rotation` in image processing is a transformation that rotates the image by a certain angle around a given point. The point of rotation is the center of the image by default. The rotation angle is specified in degrees. The rotation angle is positive in the counter-clockwise direction. If the angle is negative, the rotation is in the clockwise direction.

2 Setup

[ ]:
```
%pip install opencv-python opencv-contrib-python numpy matplotlib scipy
```

3 Initial Setup

[29]:
```
# Import Libraries
import os
import cv2
import matplotlib.pyplot as plt
import scipy.ndimage as nd

# Asset Root
asset_root = os.path.join(os.getcwd(), '../../assets')

# Image Path
image_path = os.path.join(asset_root, 'images', 'pose_jump.jpg')

# Read Image and convert to RGB
input_image = cv2.cvtColor(cv2.imread(image_path), cv2.COLOR_BGR2RGB)

# Display Both Image
plt.figure("Rotation", figsize=(10, 10))

plt.imshow(input_image)
```

```
plt.title("Original Image")
plt.axis('off')

plt.show()
```

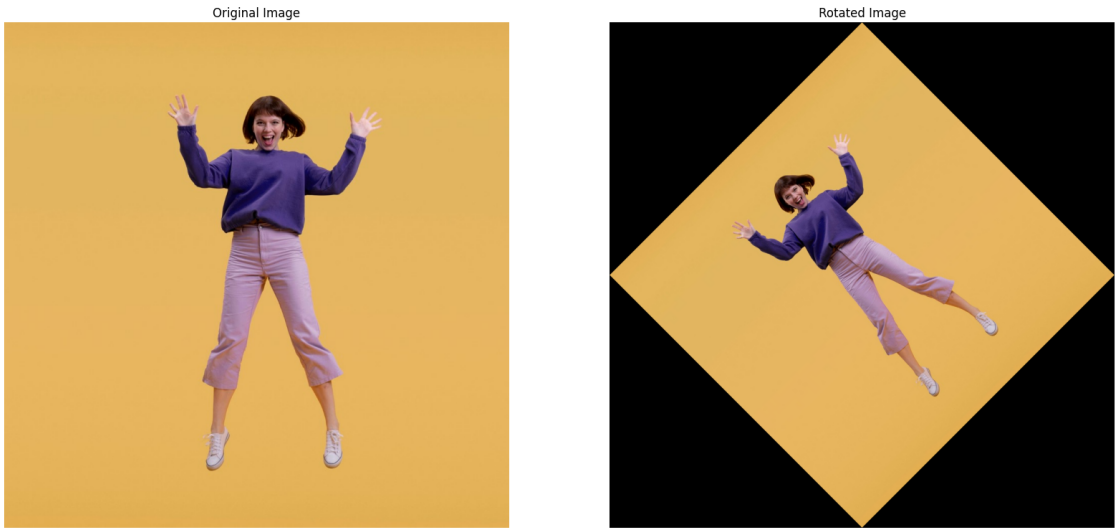
4 Rotating an Image

To rotate an image, we can use the `scipy.ndimage.rotate` function. The function takes the following parameters:

- `input`: The input image to be rotated.
- `angle`: The angle of rotation in degrees.

- `reshape`: If `True`, the output image is resized to fit the whole image.

[25]:
```
# Set the rotation angle
angle = 45

# Rotate the image where center is the top-left corner
rotated_image = nd.rotate(input_image, angle, reshape=True)

# Display Both Image
plt.figure("Rotation", figsize=(20, 10))

plt.subplot(1, 2, 1)
plt.imshow(input_image)
plt.title("Original Image")
plt.axis('off')

plt.subplot(1, 2, 2)
plt.imshow(rotated_image)
plt.title("Rotated Image")
plt.axis('off')

plt.show()
```



The code above rotates the image by 45 degrees. The `reshape` parameter is set to `True` to resize the output image to fit the whole image. If `reshape` is set to `False`, the output image will have the same size as the input image, and the corners of the image will be cropped.

5 Summary

- `Rotation` is a transformation that rotates the image by a certain angle around a given point.

- The rotation angle is specified in degrees, and the point of rotation is the center of the image by default.
- The `scipy.ndimage.rotate` function can be used to rotate an image.
- The function takes the input image and the rotation angle as parameters.
- The `reshape` parameter can be set to `True` to resize the output image to fit the whole image.
- If `reshape` is set to `False`, the output image will have the same size as the input image, and the corners of the image will be cropped.

6 References

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