7 - 8.5. Rotation

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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

```
[1]: # 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)
```
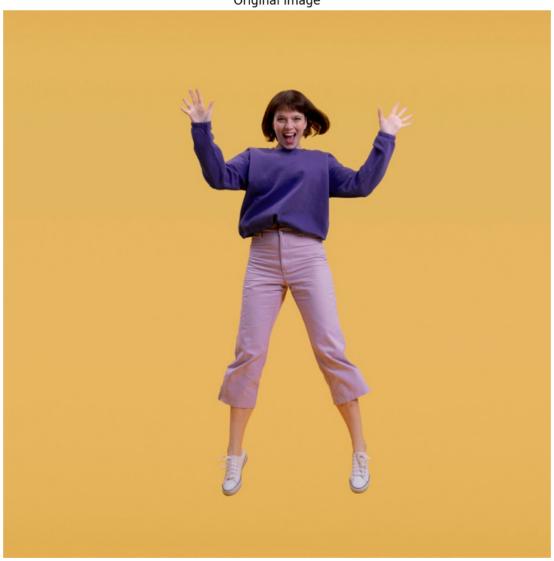
```
plt.title("Original Image")
plt.axis('off')

plt.show()
```

Original Image

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.

```
[2]:  # 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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