

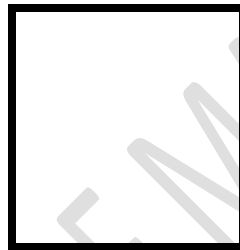


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Intramuros, Manila

Elective 3

Laboratory Activity No. 1

Image Acquisition and Manipulation



Score

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I. Objectives

This laboratory activity aims to implement the principles and techniques of image acquisition through MATLAB/Octave and open CV using Python

- Acquire the image.
- Rotate the image by 30 degrees.
- Flip the image horizontally.

II. Methods

A. Perform a task given in the presentation

- Copy and paste your MATLAB code

```
% Read the image img = imread('E:\PLM CET SUBJECTS\Digital Image
Processing\flower.jpg');
% Rotate by 45 degrees
rotated_img = imrotate(img, 45);

% Flip horizontally
flipped_img = fliplr(rotated_img);

% Display results
figure(1);
plot(1,1);
imshow(img);
title('Original Image');
figure(2);
plot(1,1);
imshow(rotated_img);
title('Rotated 45°'); figure(3); plot(1,1);
imshow(flipped_img); title('Rotated & Flipped');
```



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B. Supplementary Activity

- Write a Python program that will implement the output in Method A.

- **CODE:**

```
- import cv2
- #Read the image
- img = cv2.imread("flower.jpg")
- #Rotate by 45 degrees
- center_img = (img.shape[1]//2, img.shape[0]//2)
- rotation_img = cv2.getRotationMatrix2D(center_img, 30, 1)
- rotated_img = cv2.warpAffine(img,
- rotation_img,(img.shape[1],img.shape[0]))
- #Flip horizontally
- flipped_img = cv2.flip(rotated_img,1)
- #Display results
- cv2.imshow('Original Image', img)
- cv2.imshow('Rotated 30°', rotated_img)
- cv2.imshow('Rotated & Flipped', flipped_img)
- cv2.waitKey(0)
- cv2.destroyAllWindows()
-
```

**Using VSCode with python and OpenCV Libraries installed.*



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C. Results

1. Copy/crop and paste your results. Label each output (Figure1, Figure2, Figure3)

OUTPUTS:

**Using VSCode with python and OpenCV Libraries installed.*

picture file: flower.jpg



Figure 1: Acquire an Image of a Flower



Figure 2: Rotate by 30 degrees (sample)



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Figure 3: OUTPUT



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Figure 4: Flip horizontally (sample)



Figure 5: OUTPUT



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2. Visualize the results, analyze and interpret:

Rotation by 30 Degrees

Effect on the Image:

- The rotation algorithm reorients the image by 30 degrees around its center.
- As a result, the flower appears tilted, and the image takes on a new perspective.
- However, this operation also introduces black areas at the corners of the image. These black regions are empty spaces where the original image data does not reach after rotation, creating a noticeable artifact.

Effectiveness:

- The rotation is effective in changing the orientation of the image, achieving the desired outcome of a 30-degree tilt.
- Despite the introduction of black corners, the main content of the image (the flower) remains intact and is successfully reoriented.

Horizontal Flipping

Effect on the Image:

- The horizontal flipping mirrors the image along its vertical axis.
- This means that the left side of the rotated image becomes the right side, and vice versa.
- The flipping does not alter the content of the image but changes its orientation.

Effectiveness:

- The flipping is effective in mirroring the image, creating a horizontally reversed version of the rotated image.
- This operation helps in visualizing the image from a different perspective, providing a mirrored view that might be useful in certain applications.

Combined Rotation and Flipping

Effect on the Image:

- The combination of rotation and flipping results in a significant change in the image's orientation.
- The flower appears both rotated and mirrored, presenting a new visual arrangement.
- The black corners from the rotation step remain, but the overall appearance of the image is altered further by the flipping.

Effectiveness:

- The combined effect of these operations is effective in achieving a transformed view of the image.



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- The rotation and flipping together provide a unique perspective that would not be possible with either operation alone.
- Despite the black corners, the transformations successfully demonstrate how simple image manipulation techniques can be applied to achieve specific visual outcomes.

IV. Conclusion

In this lab exercise, we performed a series of image processing tasks—rotating and flipping—on a picture of a flower. First, we rotated the image by 30 degrees, which changed its orientation. Then, we flipped the rotated image horizontally, creating a mirrored effect. These steps showed how simple image editing techniques can change how an image looks. The rotated image had black corners, which is a typical result of such adjustments. Overall, the process worked well, demonstrating how useful OpenCV is for basic image editing.



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References

[1] D.J.D. Sayo. "University of the City of Manila Computer Engineering Department Honor Code," PLM-CpE Departmental Policies, 2020.

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