

INT3404E 20 - Image Processing: Homeworks 2

Chu Ngoc Vuong

1 Flip image

```
# flip an image as function
def flip_image(image):
    """
    Flip an image horizontally using OpenCV
    """
    # pass
    return cv2.flip(image, 1)
```

Result: The function use cv2.flip() which flip the image horizontally (input = 1) or vertically (input = 0).



Figure 1: flip_image function result

2 Rotate image

```
# rotate an image as function
def rotate_image(image, angle):
    """
    Rotate an image using OpenCV. The angle is in degrees
    """
    # pass
    image_center = tuple(np.array(image.shape[1::-1]) / 2)
    rot_mat = cv2.getRotationMatrix2D(image_center, angle, 1.0)
    result = cv2.warpAffine(image, rot_mat, image.shape[1::-1], flags=cv2.INTER_LINEAR)
    return result
```

Result: The function above rotate the image with any input angle which in the result i'm showing is 45 degree.



Figure 2: rotate_image function result

3 Grayscale image

```
def grayscale_image(image):
    """
    Convert an image to grayscale. Convert the original image to a grayscale image.
    In a grayscale image, the pixel value of the
    5 3 channels will be the same for a particular X, Y coordinate. The equation for the pixel value
    [1] is given by:
         $p = 0.299R + 0.587G + 0.114B$ 
    Where the R, G, B are the values for each of the corresponding channels. We will do this by
    creating an array called img_gray with the same shape as img
    10 """
    # pass
    gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)
    return gray_image
```

Result: The function use cv2.cvtColor() which is a simple way to convert an image to another color space.



Figure 3: grayscale_image function result