



UNIVERSITAS NUSA PUTRA
FAKULTAS TEKNIK, KOMPUTER DAN DESAIN
TEKNIK INFORMATIKA

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KELAS : TI22E
MATA KULIAH : PENGOLAHAN CITRA DIGITAL
PRAKTIKUM SESI : 5, 6

1. Buatlah program untuk pemrosesan citra digital seperti gambar-gambar berikut ini:

a. Translasi Citra

```
import imageio.v3 as img
import numpy as np
import matplotlib.pyplot as plt

def Translasi(image, shiftX, shiftY):

    imgTranslasi = np.roll(image, shift=shiftY, axis=0) # Geser vertikal
    imgTranslasi = np.roll(imgTranslasi, shift=shiftX, axis=1) # Geser horizontal

    # Mengisi bagian yang kosong dengan warna hitam (0)
    if shiftY > 0:
        imgTranslasi[:shiftY, :] = 0 # Bagian atas jika geser ke bawah
    elif shiftY < 0:
        imgTranslasi[shiftY:, :] = 0 # Bagian bawah jika geser ke atas
    if shiftX > 0:
        imgTranslasi[:, :shiftX] = 0 # Bagian kiri jika geser ke kanan
    elif shiftX < 0:
        imgTranslasi[:, shiftX:] = 0 # Bagian kanan jika geser ke kiri

    return imgTranslasi

image = img.imread("/users/alunsujjada/downloads/tiger.jpg")

imgResult = Translasi(image, shiftX=50, shiftY=-300)

plt.figure(figsize=(10,10))
plt.subplot(2,1,1)
plt.imshow(image)
plt.subplot(2,1,2)
plt.imshow(imgResult)
plt.show()
```

b. Mirroring

```
import numpy as np
import imageio as img
import matplotlib.pyplot as plt

path = 'D:\\source.jpg'
image = img.imread(path)

height, width = image.shape[:2]
horizontal = np.zeros_like(image)
vertical = np.zeros_like(image)

for y in range(height):
    for x in range(width):
        horizontal[y, x] = image[y, width - 1 - x]

for y in range(height):
    for x in range(width):
        vertical[y, x] = image[height - 1 - y, x]

plt.figure(figsize=(10, 5))

plt.subplot(1, 3, 1)
plt.imshow(image)

plt.subplot(1, 3, 2)
plt.imshow(horizontal)

plt.subplot(1, 3, 3)
plt.imshow(vertical)

plt.show()
```

c. Rotasi Citra

```
import imageio as img
import numpy as np
import matplotlib.pyplot as plt

def rotateImage(image, degree):
    radian_deg = np.radians(degree)
    cos_deg, sin_deg = np.cos(radian_deg), np.sin(radian_deg)

    height, width = image.shape[:2]
    max_dim = int(np.sqrt(height**2 + width**2))
    outputImage = np.zeros((max_dim, max_dim, 3), dtype=image.dtype)

    centerY, centerX = max_dim//2, max_dim//2

    for y in range(-height//2, height//2):
        for x in range(-width//2, width//2):
            newX = int(cos_deg * x - sin_deg * y) + centerX
            newY = int(sin_deg * x + cos_deg * y) + centerY

            if 0 <= newX < max_dim and 0 <= newY < max_dim:
                outputImage[newY, newX] = image[y + height//2, x + width//2]
    return outputImage

image = img.imread('D:/source.jpg')

rotated_image = rotateImage(image, 45)

plt.subplot(1, 2, 1)
plt.imshow(image)

plt.subplot(1, 2, 2)
plt.imshow(rotated_image)

plt.show()
```

d. Zooming

```
import numpy as np
import imageio as img
import matplotlib.pyplot as plt

def zoomPlus(image, factor):
    height, width = image.shape[:2]
    new_height = int(height / factor)
    new_width = int(width / factor)
    imgZoom = np.zeros((new_height, new_width, 3), dtype=image.dtype)

    for y in range(new_height):
        for x in range(new_width):

            ori_y = int(y * factor)
            ori_x = int(x * factor)

            ori_y = min(ori_y, height - 1)
            ori_x = min(ori_x, width - 1)

            imgZoom[y, x] = image[ori_y, ori_x]

    return imgZoom

image = img.imread('D:\\source.jpg')
skala = 2.0

imgZoom= zoomPlus(image, skala)
img.imwrite("D:\\z.jpg",imgZoom)
plt.subplot(1, 2, 1)
plt.imshow(image)

plt.subplot(1, 2, 2)
plt.imshow(imgZoom)
plt.show()
```

2. Ubahlah kode program tersebut yaitu

- a. Mirroring untuk vertical dan horizontal dilakukan secara bersamaan
- b. Rotasi Citra menggunakan pivot di titik (0,0) pojok kiri atas
- c. Zoom Minus untuk memperkecil gambar.

LEMBAR JAWABAN

NO.	JAWABAN
1.a	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Translasi
1.b	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Mirror
1.c	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Rotate
1.d	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Zoom
2.a	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Mirror
2.b	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Rotate
2.c	https://github.com/MochAdriq/semester5/tree/Master/PCD/sesi5dan6/Zoom