

LAB ACTIVITY

PENGOLAHAN CITRA DIGITAL

Pertemuan 8 – Perbaikan Kualitas Citra (Part 1)

Nama: Muhammad Rifqi Amir Putra
Kelas: 5 CA

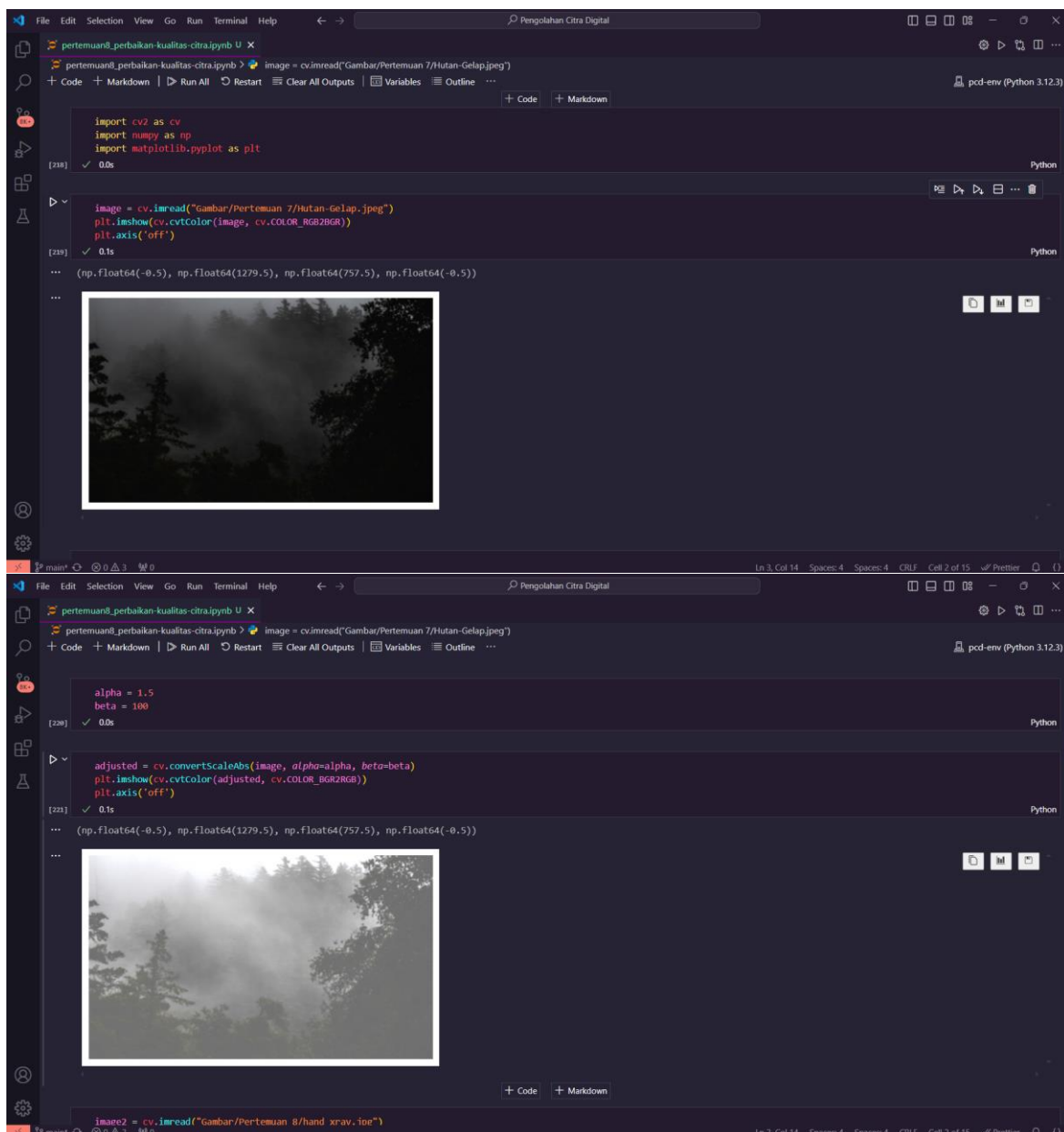
NPM: 062230701416
Mata Kuliah: Pengolahan Citra Digital

Alat dan Bahan:

1. Text Editor
2. Python
3. Library Python numpy, opencv, matplotlib
4. Google Colab (Opsional)

1. Perbaikan Kualitas Citra Menggunakan Python

a) Pencerahan Citra (Image Brightening)



b) Menegatifkan Citra (Image Negatives)

peremuan8_perbaikan_kualitas_citra.ipynb X

peremuan8_perbaikan_kualitas_citra.ipynb > image = cv.imread("Gambar/Peremuan 7/Hutan-Gelap.jpeg")


+ Code + Markdown | Run All Restart Clear All Outputs Variables Outline ...

pcd-env (Python 3.12.3)

```
image2 = cv.imread("Gambar/Peremuan 8/hand_xray.jpg")
plt.imshow(cv.cvtColor(image2, cv.COLOR_BGR2RGB))
plt.axis('off')
```

[222]

(np.float64(-0.5), np.float64(719.5), np.float64(414.5), np.float64(-0.5))



KONVERSI IMAGE MENJADI NEGATIF

```
height, width, _ = image2.shape
for i in range(height - 1, -1, -1):
    for j in range(width - 1, -1, -1):
        # MENGUBAH NILAI SUATU PIXEL
        pixel = image2[i, j]
        # MENGURANGI NILAINYA DENGAN 255
        pixel[0] = 255 - pixel[0] # BLUE CHANNEL
        pixel[1] = 255 - pixel[1] # GREEN CHANNEL
        pixel[2] = 255 - pixel[2] # RED CHANNEL
        image2[i, j] = pixel
```

[223]

main* 0 0 0 0

peremuan8_perbaikan_kualitas_citra.ipynb X

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```
# MENGURANGI NILAINYA DENGAN 255
pixel[0] = 255 - pixel[0] # BLUE CHANNEL
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pixel[2] = 255 - pixel[2] # RED CHANNEL


image2[i, j] = pixel
```

[223]

```
plt.imshow(cv.cvtColor(image2, cv.COLOR_BGR2RGB))
plt.axis('off')
```

[224]

(np.float64(-0.5), np.float64(719.5), np.float64(414.5), np.float64(-0.5))




c) Gamma Correction

```
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pertemuan8_perbaikan_kualitas_citra.ipynb X
+ Code + Markdown | ▶ Run All ⌂ Restart Clear All Outputs Variables Outline ... pcd-env (Python 3.12.3)

def adjust_gamma(image, gamma=1.0):
    invGamma = 1.0 / gamma
    table = np.array([(1/255.0) ** invGamma] * 255)
    for i in np.arange(0, 256)):
        return cv.LUT(image, table)

original = cv.imread("Gambar/gambar-kucing.jpg")
plt.imshow(cv.cvtColor(original, cv.COLOR_BGR2RGB))
plt.axis('off')


... (np.float64(-0.5), np.float64(1199.5), np.float64(674.5), np.float64(-0.5))
...



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+ Code + Markdown | ▶ Run All ⌂ Restart Clear All Outputs Variables Outline ... pcd-env (Python 3.12.3)

gamma = 0.4
adjusted = adjust_gamma(original, gamma=gamma)
plt.imshow(cv.cvtColor(adjusted, cv.COLOR_BGR2RGB))
plt.axis('off')

... (np.float64(-0.5), np.float64(1199.5), np.float64(674.5), np.float64(-0.5))
...



dark_image = cv.imread("Gambar/Pertemuan 7/Hutan-Gelap.jpeg", 0)
plt.imshow(dark_image, cmap="gray")
plt.axis('off')

... (np.float64(-0.5), np.float64(1279.5), np.float64(757.5), np.float64(-0.5))
...

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```

d) Peregangkan Kontras (Contrast Stretching)

```
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pertemuan8_perbaikan_kualitas_citra.ipynb X
pertemuan8_perbaikan_kualitas_citra.ipynb ▶ plt.imshow(image_contrast, cmap="gray")
+ Code + Markdown ▶ Run All ⌂ Restart Clear All Outputs Variables Outline ... pcd-env (Python 3.12.3)

dark_image = cv.imread("Gambar/Pertemuan 8/dark_image.jpg", 0)
plt.imshow(dark_image, cmap="gray")
plt.axis('off')
[31] ✓ 0.1s
... (np.float64(-0.5), np.float64(599.5), np.float64(399.5), np.float64(-0.5))
...

min_val, max_val, _, _ = cv.minMaxLoc(dark_image)
[32] ✓ 0.0s

if max_val != min_val:
    alpha = 255.0 / (max_val - min_val)
    beta = -alpha * min_val
    table = np.array([np.clip(alpha * i + beta, 0, 255)
                      for i in range(256)]).astype("uint8")
else:
    table = np.arange(256, dtype="uint8")
[33] ✓ 0.0s

image_contrast = cv.LUT(dark_image, table)
[34] ✓ 0.0s

plt.imshow(image_contrast, cmap="gray")
plt.axis('off')
[35] ✓ 0.1s
... (np.float64(-0.5), np.float64(599.5), np.float64(399.5), np.float64(-0.5))
...
```

