International Islamic University Chittagong.

Department of Computer Science and Engineering.

Course Code: CSE-4876

Course Title: Pattern Recognition & Image Processing

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Semester: 8th

Section: 8AF

Submitted To:

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Lab No: 04

Lab Title:

-Thresholding

- Single
- Dual
- Grayscale

-Gray Level Slicing

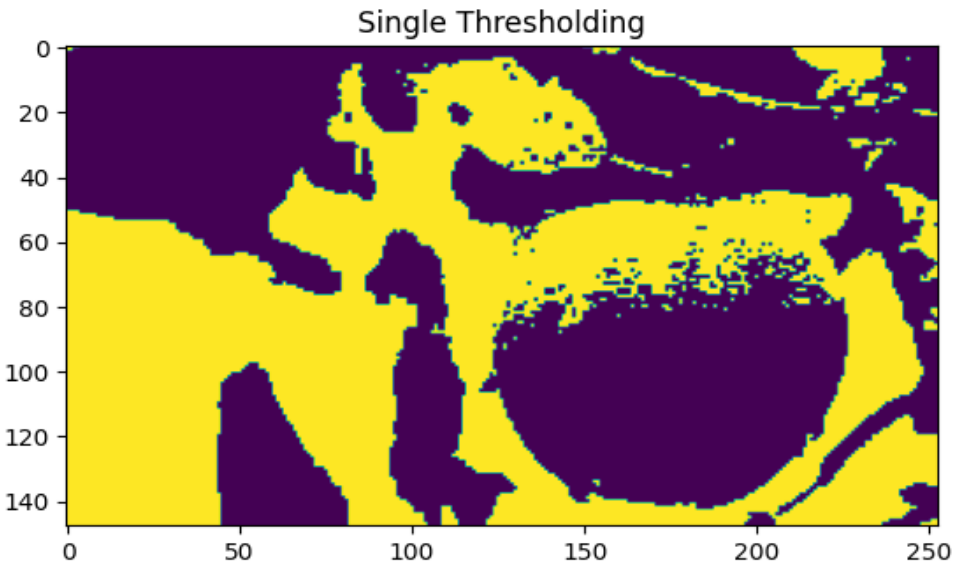
- 1st approach
- 2nd approach

Methodology:

✓ Thresholding

- Single

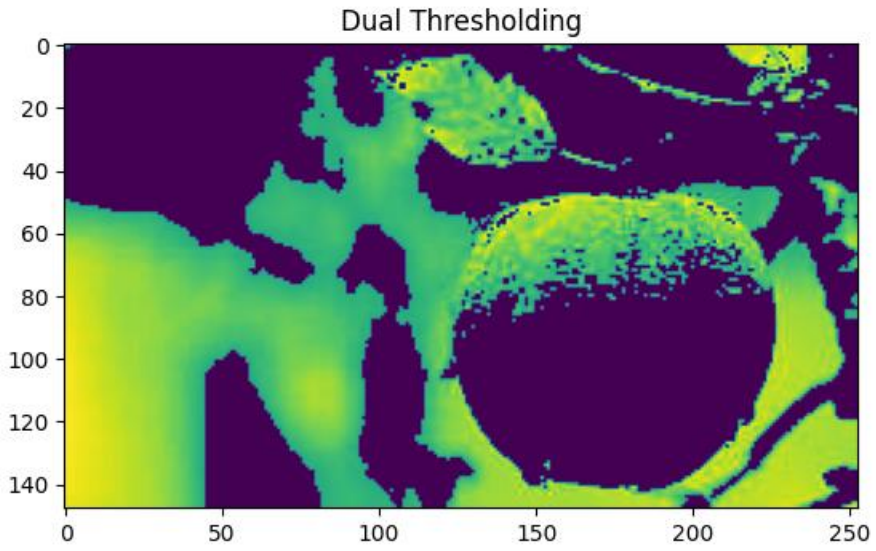
```
import cv2
import numpy as np
from matplotlib import pyplot as plt
img = cv2.imread('/content/images.jpg',0)
# Get the dimensions of the image
[M, N] = img.shape
# Set the threshold value
T = 125

# Apply single thresholding
for i in range(M):
    for j in range(N):
        if img[i, j] > T:
            img[i, j] = 1  # Set pixel to white
        else:
            img[i, j] = 0    # Set pixel to black

# Display the thresholded image
plt.imshow(img)
plt.title("Single Thresholding")
plt.show()
```



- ✓ Thresholding
  - Dual

```
[3] import cv2
    import numpy as np
    from matplotlib import pyplot as plt
    img = cv2.imread('/content/images.jpg',0)

    [M,N]=(img.shape)
    T1=125
    T2=200
    for i in range (M):
        for j in range(N):
            if (img[i,j] <=T2 and img[i,j] >=T1):
                pass
            else:
                img[i,j] =0

    plt.imshow(img)
    plt.title("Dual Thresholding")
```

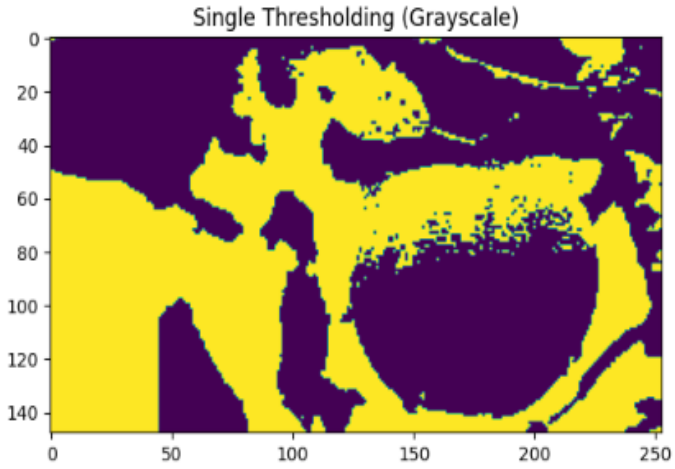
```
Text(0.5, 1.0, 'Dual Thresholding')
```



✓ Thresholding

- Grayscale

```python
import cv2
import numpy as np
from matplotlib import pyplot as plt

# Read the image in color mode
img_color = cv2.imread('/content/images.jpg')

# Convert the image to grayscale
img_gray = cv2.cvtColor(img_color, cv2.COLOR_BGR2GRAY)

# Get the dimensions of the grayscale image
[M, N] = img_gray.shape

# Set the threshold value
T = 125

# Apply single thresholding
for i in range(M):
    for j in range(N):
        if img_gray[i, j] >= T:
            img_gray[i, j] = 1  # Set pixel to white
        else:
            img_gray[i, j] = 0    # Set pixel to black

# Display the thresholded image
plt.imshow(img_gray)
plt.title("Single Thresholding (Grayscale)")
plt.show()
```

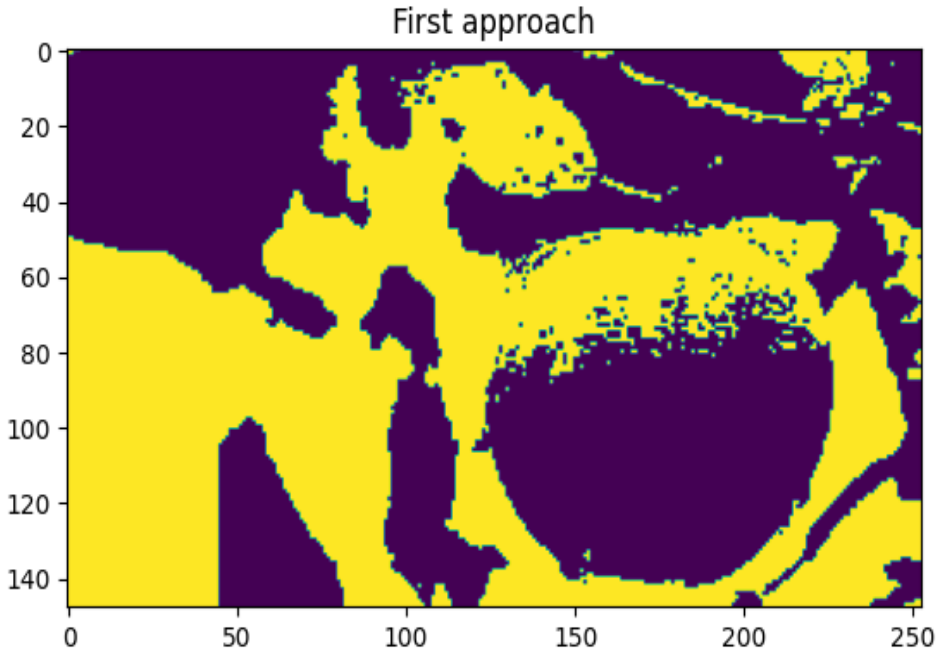


-Gray Level Slicing

- 1st approach

```
import cv2
import numpy as np
from matplotlib import pyplot as plt
img = cv2.imread('/content/images.jpg',0)

[M,N]=(img.shape)
T1=125
T2=200
for i in range (M):
    for j in range(N):
        if (img[i,j] <=T2 and img[i,j] >=T1):
            img[i,j] =255
        else:
            img[i,j] =0

plt.imshow(img)
plt.title("First approach")
```

```
Text(0.5, 1.0, 'First approach')
```



-Gray Level Slicing

- 2nd approach

```
[M,N]=(img.shape)
T1=125
T2=200
for i in range (M):
    for j in range(N):
        if (img[i,j] <=T2 and img[i,j] >=T1):
            img[i,j] =255
        else:
             pass

plt.imshow(img)
plt.title("Second approach")
```

```
Text(0.5, 1.0, 'Second approach')
```