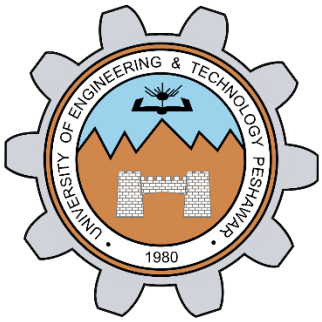
UNIVERSITY OF ENGINEERING AND TECHNOLOGY PESHAWAR

DEPARTMENT OF COMPUTER SYSTEM ENGINEERING

Digital Image Processing

Assignment no: 1



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Implementation of all the intensity transformations (Python/MATLAB)

Installing library:

```
PS F:\study\Python>
PS F:\study\Python> pip install opencv-python numpy matplotlib
>>
```

Importing libraries:

Assignment 1 DIP.py

assignemnt 1 dip > Assignment 1 DIP.py

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

```

Loading image:

```python
# Load an image
image_path = r'F:\study\Python\image.jpg'
image = cv2.imread(image_path, cv2.IMREAD_GRAYSCALE)
if image is None:
    raise ValueError(f"Error loading image from path: {image_path}")

def plot_images(images, titles):
    plt.figure(figsize=(20, 10))
    for i, (img, title) in enumerate(zip(images, titles)):
        plt.subplot(1, len(images), i + 1)
        plt.imshow(img, cmap='gray')
        plt.title(title)
        plt.axis('off')
    plt.show()
```

Negative image, Log transformation, Gamma transformation, Apply transformation & Plot Image:

Assignment 1 DIP.py

assignemnt 1 dip > Assignment 1 DIP.py

```python
# Negative transformation
def negative_transformation(img):
    return 255 - img

# Log transformation
def log_transformation(img):
    c = 255 / np.log(1 + np.max(img))
    return c * np.log(1 + img)

# Gamma transformation
def gamma_transformation(img, gamma):
    img_normalized = img / 255.0
    return 255.0 * np.power(img_normalized, gamma)

# Apply transformations
negative_img = negative_transformation(image)
log_img = log_transformation(image)
gamma_img = gamma_transformation(image, 2.2)

# Display the images
plot_images(
    [image, negative_img, log_img, gamma_img],
    ['Original Image', 'Negative Transformation', 'Log Transformation', 'Gamma Transformation (γ=2.2)']
)
```

Result: