

Lab Report: 02
Title: Take an image and convert it digital negative
&
Image enhancement in contrast stretching

Course title: Digital Image Processing Laboratory
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Experiment Name: Take an image and convert it digital negative

Objectives:

1. Invert the colors of the image
2. Adjust the contrast and brightness
3. Add grain or texture

Code-01: Python

```
from PIL import Image, ImageOps
image_path = 'Image/nature.jpeg'
image = Image.open(image_path)
negative_image = ImageOps.invert(image)
negative_image.save('negative_image.jpg')
negative_image.show()
```

Output:



Figure 1.1: Showing the digital negative image using python code

Code-02: MATLAB

```
skI = imread("nature.jpeg");  
subplot(1, 2, 1),  
imshow(skI);  
title("Original image");  
L = 2 ^ 8;  
neg = (L - 1) - skI;  
subplot(1, 2, 2),  
imshow(neg);  
title("Negative Image")
```

Output:

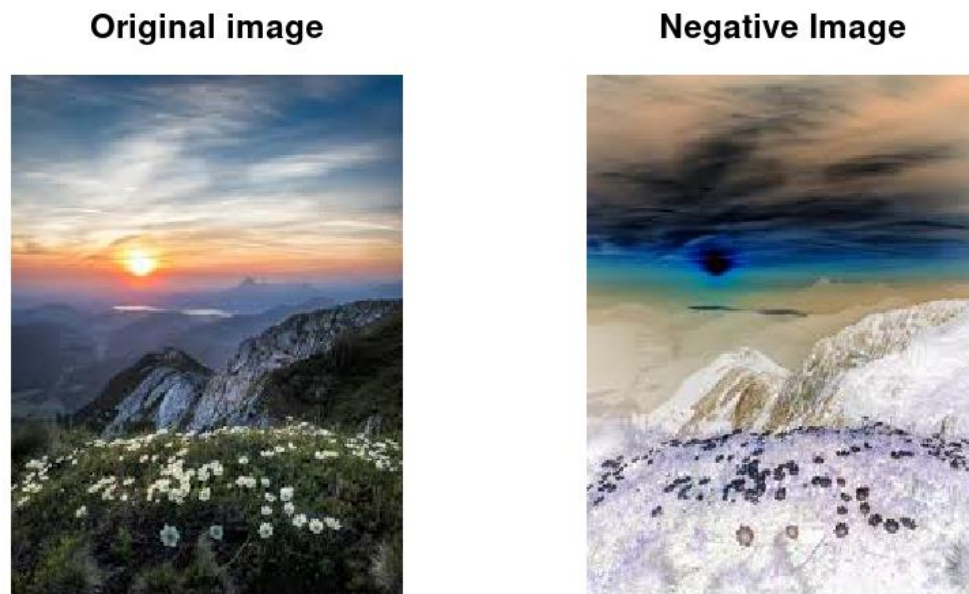


Figure 1.2: Showing the digital negative image using MATLAB

Experiment Name: Image enhancement in contrast stretching.

Objectives:

1. Make the dark areas of the image darker.
2. Make the bright areas of the image brighter

Code-01: Python

```
import numpy as np
from PIL import Image
import matplotlib.pyplot as plt
def contrast_stretching(image, m, E):
    normalized_image = np.array(image) / 255.0
    transformed_image = 1 / (1 + np.exp(-E * (normalized_image - m)))
    output_image = (transformed_image * 255).astype(np.uint8)
    return output_image
image_path = 'Image/nature.jpeg'
image = Image.open(image_path)
m = 0.5
E = 10
output_image = contrast_stretching(image, m, E)
fig, axes = plt.subplots(1, 2, figsize=(10, 5))
axes[0].imshow(image)
axes[0].set_title('Original Image')
axes[0].axis('off')
axes[1].imshow(output_image)
axes[1].set_title('Contrast Stretched Image')
axes[1].axis('off')
plt.tight_layout()
plt.show()
```

Output:

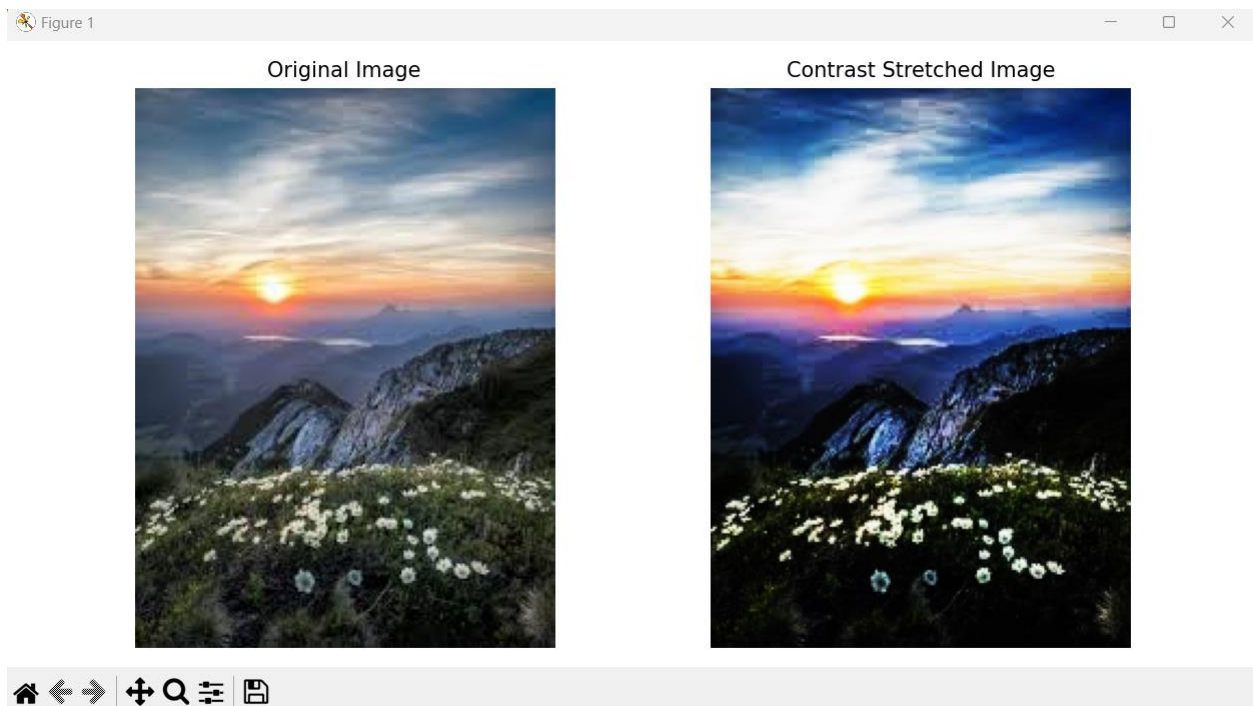


Figure 2.1: Showing the image enhancement in contrast stretching using python code

Code-02: MATLAB

```
image_path = 'nature.jpeg';  
image = imread(image_path);  
normalized_image = im2double(image);  
m = 0.5;  
E = 10;  
transformed_image = 1 ./ (1 + exp(-E * (normalized_image - m)));  
output_image = uint8(transformed_image * 255);  
figure;  
subplot(1, 2, 1);  
imshow(image);  
title('Original Image');  
subplot(1, 2, 2);  
imshow(output_image);  
title('Contrast Stretched Image');
```

Output:

Original Image



Contrast Stretched Image



Figure 2.2: Showing the image enhancement in contrast stretching in MATLAB