Shri Ramdeobaba College of Engineering and Management, Nagpur

Department of Electronics Engineering

Digital Image Processing (ENT 355-3)

Name: Prajwal Pandurang Shette

Roll No: B1- 12

Evaluation 1

Aim: Image enhancement using point processing by following transformation functions: a) Log Transform b) Power law Transform

Theory: The log transformation maps a narrow range of low input gray level values into a wider range of output values s=clog(1+r)

Map a narrow range of dark input values into a wider range of output values or vice versa Varying γ gives a whole family of curves s=Cr^r

varying gamma (γ) obtains family of possible transformation curves

γ > 1Compresses dark values Expands bright values

γ < 1 Expands dark values Compresses bright values

Code: Log Transform

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image


image = cv2.imread('i1.jpg')

# apply log transform
c = 255 / np.log(1 + np.max(image))
log_image = c * (np.log(image + 1))


# float value will be converted to int
log_image = np.array(log_image, dtype = np.uint8)

# Display both images
plt.imshow(image)
plt.show()
plt.imshow(log_image)
plt.show()
```

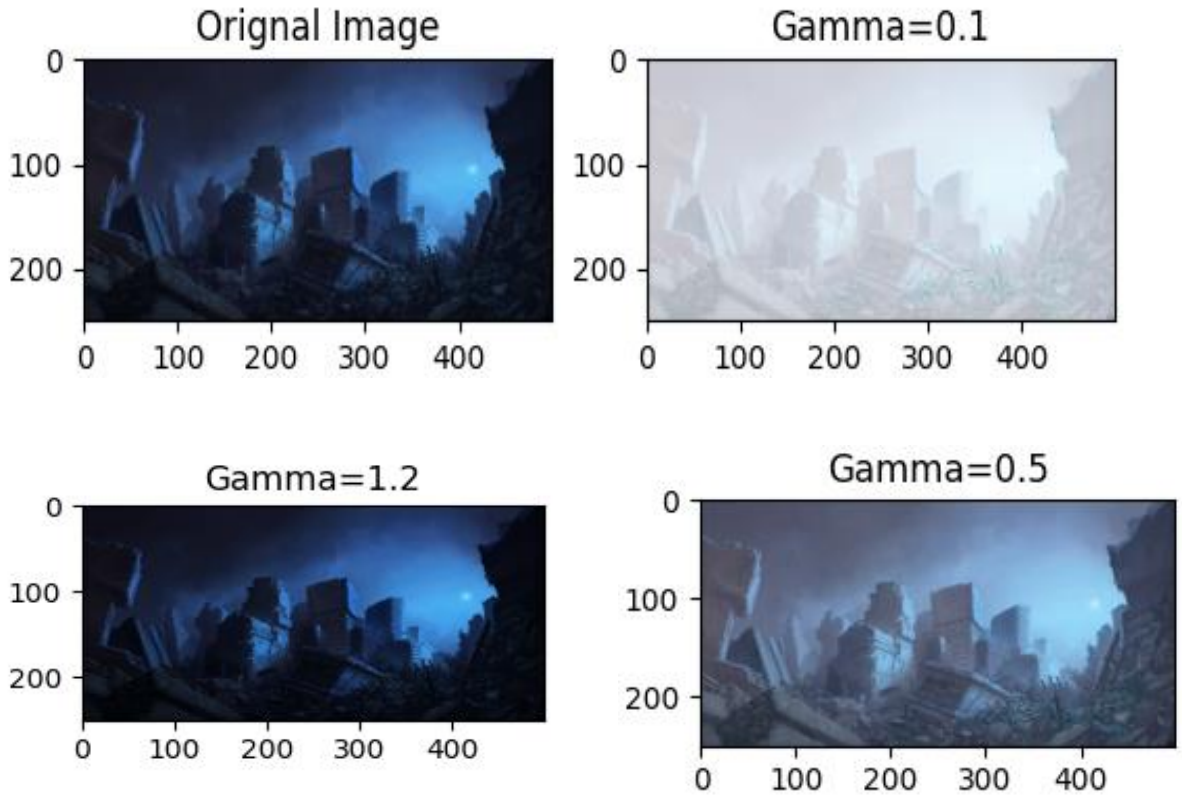
Input:

Output:

Code: Power Transform

```
import cv2
import numpy as np
import matplotlib.pyplot as plt
# Open the image.
img = cv2.imread('i1.jpg')
# Trying 4 gamma values.
plt.subplot(2,2,1)
plt.title('Orignal Image')
plt.imshow(img)
i=1
for gamma in [0.1, 0.5, 1.2, 2.2]:
    i+=1
    # Apply gamma correction.
    gamma_corrected = np.array(255*(img / 255) ** gamma, dtype = 'uint8')
    # Save edited images.
    cv2.imwrite('gamma_transformed'+str(gamma)+'.jpg', gamma_corrected)
    xyz=cv2.imread('gamma_transformed'+str(gamma)+'.jpg')
    plt.subplot(2,2,i)
    plt.title('Gamma='+str(gamma))
    plt.imshow(xyz)
    plt.show()
```

Output:



Conclusion: We learned about how to apply log and gamma or power law transform to an input image