Neeraj Appari T073

SHETH L.U.J. COLLEGE OF ARTS &
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Department of Computer Science

Digital Image Processing   Practical - 07

Aim- Write a python-program for negative of image.
log transformation and gamma correction

Description -

1) Ð Negative of Image
2) a) Image negative means inverting the grey levels
   b) The negative of a digital image is obtained by the transformation function.

   $$S = T(x) = L - 1 - x$$

   c) [0, L-1] the range of grey levels.

2) Logarithmic transformation.
   a) There are two types of log log transformation -i a) log transformation and ii) inverse log transformation
   b) log transformation is also known as Dynamic Range Compression
   c) log transformation can be defined as

   $$S = c \log(x+1)$$

3) Power Gamma correction (power transformation)
   a) Power law transformation are of two types i) n^{th} power transformation and ii) n^{th} root transformation
   b) Power law transformation have a basic form of

   $$S = C \cdot x^{y}$$

   c) The exponent in the power-law equation is reffered as gamma.

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

# Read an image
img_bgr = cv2.imread('SCG003Sgray.jpg', 1)
plt.imshow(img_bgr)
plt.show()

print("Neeraj Appari T073")
# get height and width of the image
height, width, _ = img_bgr.shape

for i in range(0, height - 1):
    for j in range(0, width - 1):

        # Get the pixel value
        pixel = img_bgr[i, j]

        # Negate each channel by
        # subtracting it from 255

        # 1st index contains red pixel
        pixel[0] = 255 - pixel[0]

        # 2nd index contains green pixel
        pixel[1] = 255 - pixel[1]

        # 3rd index contains blue pixel
        pixel[2] = 255 - pixel[2]

        # Store new values in the pixel
        img_bgr[i, j] = pixel
```
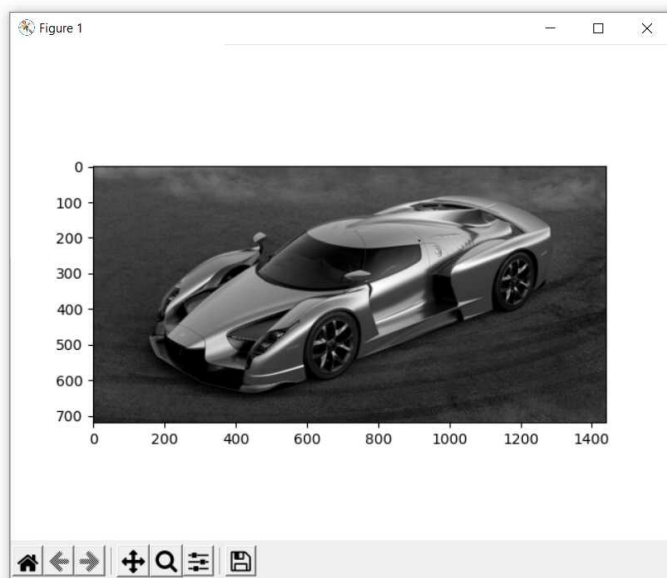
Figure 1

Ln: 5   Col: 0

```python
print("Neeraj Appari T073")
# get height and width of the image
height, width, _ = img_bgr.shape

for i in range(0, height - 1):
    for j in range(0, width - 1):

        # Get the pixel value
        pixel = img_bgr[i, j]

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        # 2nd index contains green pixel
        pixel[1] = 255 - pixel[1]

        # 3rd index contains blue pixel
        pixel[2] = 255 - pixel[2]

        # Store new values in the pixel
        img_bgr[i, j] = pixel

# Display the negative transformed image
plt.imshow(img_bgr)
plt.show()
```
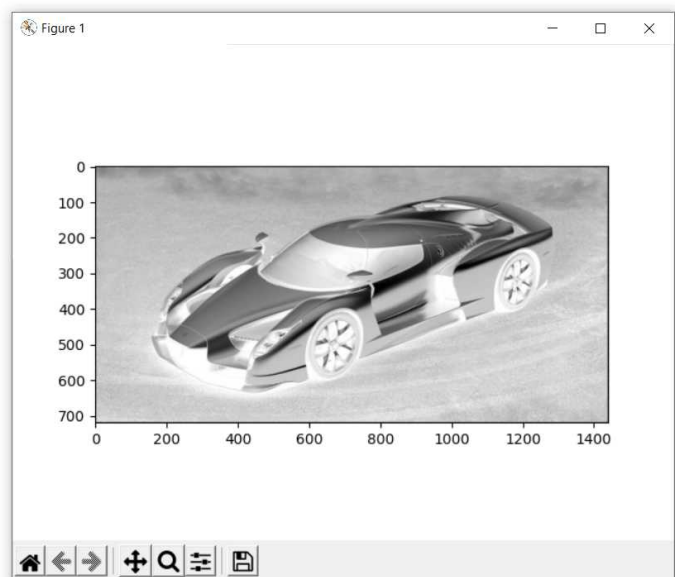
File Edit Format Run Options Window Help

File Edit Shell Debug Options Window Help

```
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v
.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more info
rmation.
>>>
========== RESTART: E:/fffiiles/college pracs and projects/DIP/p
1-a.py ==========
Neeraj Appari T073
```


Figure 1

p1-b.py - E:/fffiiles/college pracs and projects/DIP/p1-b.py (3.9.6)

File Edit Format Run Options Window Help

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

# Read an image
image = cv2.imread('SCG003Sgray.jpg')

print("Neeraj Appari T073")
# Apply log transformation method
c = 255 / np.log(1 + np.max(image))
log_image = c * (np.log(image + 1))

# Specify the data type so that
# 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()
```
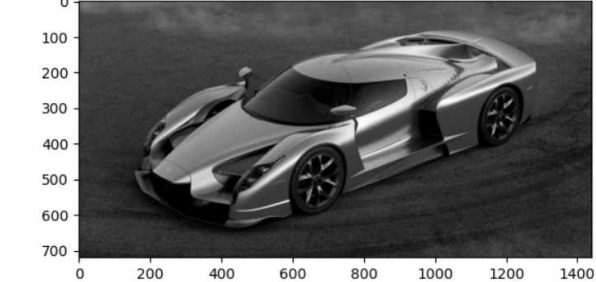
IDLE Shell 3.9.6

File Edit Shell Debug Options Window Help

```
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v
.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more info
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>>>
========== RESTART: E:/fffiiles/college pracs and projects/DIP/p
1-a.py =========
Neeraj Appari T073
>>>
== RESTART: E:/fffiiles/college pracs and projects/DIP/p1-b.py =
Neeraj Appari T073
```


Figure 1

/p1-b.py", lin

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

# Read an image
image = cv2.imread('SCG003Sgray.jpg')

print("Neeraj Appari T073")
# Apply log transformation method
c = 255 / np.log(1 + np.max(image))
log_image = c * (np.log(image + 1))

# Specify the data type so that
# 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()
```
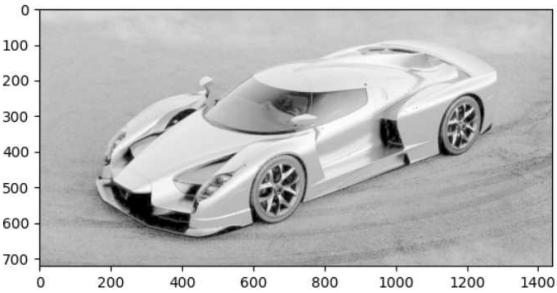
```
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v
.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more info
rmation.
>>>
========== RESTART: E:/fffiiles/college pracs and projects/DIP/p
1-a.py =========
Neeraj Appari T073
>>>
== RESTART: E:/fffiiles/college pracs and projects/DIP/p1-b.py =
Neeraj Appari T073
```


Figure 1

File   Edit   Format   Run   Options   Window   Help

```python
import cv2

# Load the input image
image = cv2.imread('SCG003s.jpg')
cv2.imshow('Original', image)
cv2.waitKey(0)

# Use the cvtColor() function to grayscale the image
gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Grayscale', gray_image)
cv2.waitKey(0)

# Window shown waits for any key pressing event
cv2.destroyAllWindows()
```

Photos - gamma_transformed0.1.jpg


```
>>>
== RESTART: E:/fffiiles/college pracs an
d projects/DIP/p1-c.py =
Neeraj Appari T073
>>>
```

Type here to search

File Edit Format Run Options Window Help

```python
import cv2

# Load the input image
image = cv2.imread('SCG003s.jpg')
cv2.imshow('Original', image)
cv2.waitKey(0)

# Use the cvtColor() function to grayscale the image
gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Grayscale', gray_image)
cv2.waitKey(0)

# Window shown waits for any key pressing event
cv2.destroyAllWindows()
```

Photos - gamma_transformed0.5.jpg


```
>>>
== RESTART: E:/fffiiles/college pracs an
d projects/DIP/p1-c.py =
Neeraj Appari T073
>>>
```

File Edit Format Run Options Window Help

```python
import cv2

# Load the input image
image = cv2.imread('SCG003s.jpg')
cv2.imshow('Original', image)
cv2.waitKey(0)

# Use the cvtColor() function to grayscale the image
gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Grayscale', gray_image)
cv2.waitKey(0)

# Window shown waits for any key pressing event
cv2.destroyAllWindows()
```

Photos - gamma_transformed2.2.jpg


```
>>>
== RESTART: E:/fffiiles/college pracs an
d projects/DIP/p1-c.py =
Neeraj Appari T073
>>>
```

File Edit Format Run Options Window Help

```python
import cv2

# Load the input image
image = cv2.imread('SCG003s.jpg')
cv2.imshow('Original', image)
cv2.waitKey(0)

# Use the cvtColor() function to grayscale the image
gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Grayscale', gray_image)
cv2.waitKey(0)

# Window shown waits for any key pressing event
cv2.destroyAllWindows()
```

Photos - gamma_transformed1.2.jpg


```
>>>
== RESTART: E:/fffiiles/college pracs an
d projects/DIP/p1-c.py =
Neeraj Appari T073
>>>
```

Type here to search