AIM

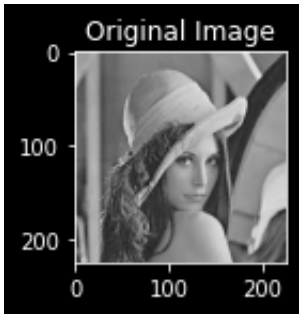
To apply power law transformation, image negative, and image thresholding on the given test images.

Preet Jha
B030
B1
B.Tech CE
21 JUL 2022

In [ ]:
```
from skimage import io
import matplotlib.pyplot as plt
from skimage.color import rgb2gray
```

In [ ]:
```
image = io.imread("lenna_grey.jpg")
image.shape
image = rgb2gray(image)
image.shape
image = 255*image
plt.figure()
plt.subplot(1, 3, 1)
plt.imshow(image, cmap="gray")
#to make it gray use cmap
plt.title("Original Image")
```

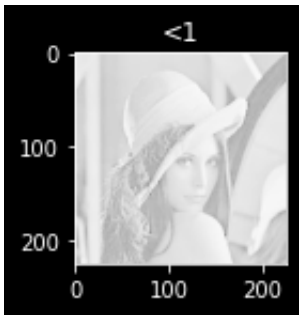
Out[ ]:
```
Text(0.5, 1.0, 'Original Image')
```



In [ ]:
```
def pwr(r,g):
    s=r**g
    return s
```

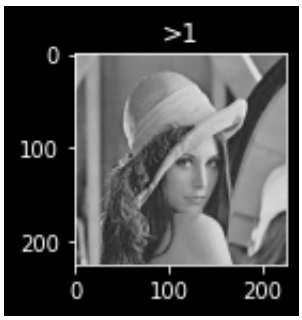
In [ ]:
```
[row,col]= image.shape
g = 0.2
image_gamma1=image.copy()
for rw in range(0, row):
    for cl in range(0, col):
        temp = image[rw, cl]
        temp_gamma = pwr(temp, g)
        image_gamma1[rw, cl] = temp_gamma
plt.subplot(1, 3, 2)
plt.imshow(image_gamma1, cmap='gray')
plt.title("<1")
```

Out[ ]:
```
Text(0.5, 1.0, '<1')
```



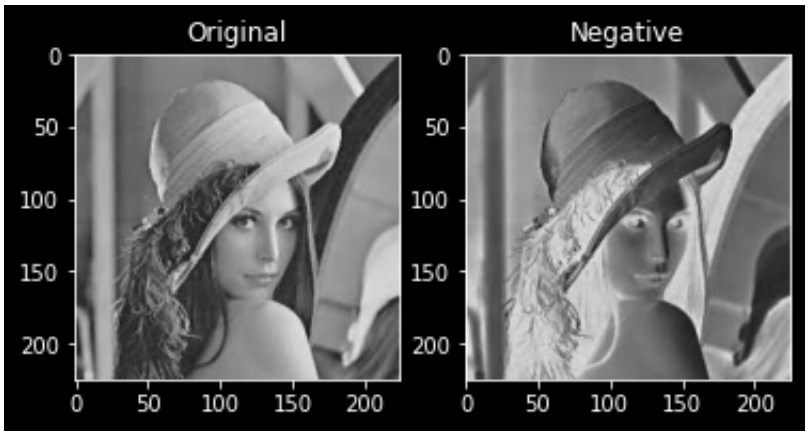
In [ ]:
```
[row, col] = image.shape
g = 1.8
image_gamma2 = image.copy()
for rw in range(0, row):
    for cl in range(0, col):
        temp = image[rw, cl]
        temp_gamma = pwr(temp, g)
        image_gamma1[rw, cl] = temp_gamma
plt.subplot(1, 3, 3)
plt.imshow(image_gamma2, cmap='gray')
plt.title(">1")
```

Out[ ]:
```
Text(0.5, 1.0, '>1')
```



In [ ]:
```
image_negative = image.copy()
for rw in range(0, row):
    for cl in range(0, col):
        temp1 = image[rw,cl]
        temp2=255-temp1
        image_negative[rw,cl]=temp2
plt.figure()
plt.subplot(1,2,1)
plt.imshow(image,cmap="gray")
plt.title("Original")
plt.subplot(1,2,2)
plt.imshow(image_negative,cmap="gray")
plt.title("Negative")
```

Out[ ]:
```
Text(0.5, 1.0, 'Negative')
```



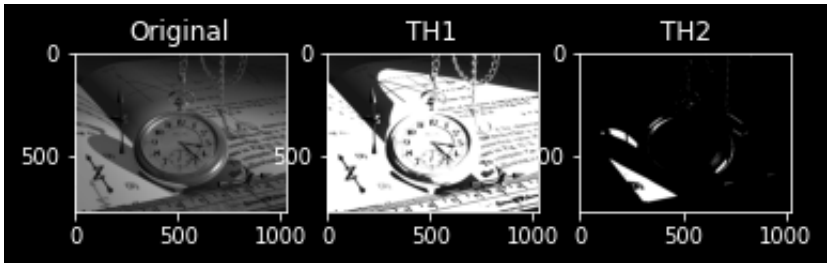
In [ ]:
```
image1 = io.imread("watch.png")
image1 = rgb2gray(image1)
[row,col]=image1.shape
image1=255*image1
th=50
image_th1=image1.copy()
```

In [ ]:
```
for rw in range(0, row):
    for cl in range(0, col):
        temp3=image1[rw,cl]
        if temp3>th:
            image_th1[rw,cl]=255
```

In [ ]:
```
image_th2=image1.copy()
th=150
for rw in range(0, row):
    for cl in range(0, col):
        temp4=image1[rw,cl]
        if temp4>th:
            image_th2[rw,cl]=255
        else:
            image_th2[rw,cl]=0
```

In [ ]:
```
plt.figure()
plt.subplot(1, 3, 1)
plt.imshow(image1, cmap="gray")
plt.title("Original")
plt.subplot(1, 3, 2)
plt.imshow(image_th1, cmap="gray")
plt.title("TH1")
plt.subplot(1, 3, 3)
plt.imshow(image_th2, cmap="gray")
plt.title("TH2")
```

Out[ ]:
```
Text(0.5, 1.0, 'TH2')
```



Conclusion

- Power law transformation is applied on the test image and the image looks lighter when the value of gamma is < 1.
- Image looks darker when the value of gamma is > 1.
- Image thresholding is applied on the given test image:
  - For the threshold of 100 pixels with intensity of more than 100 are converted to white and remaining pixels are unchanged.
  - For the threshold of 150 is used to convert the given gray image to binary image.
- Image negative operation is applied to the given test image which changes bright image to dark image.