Lab4

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1 Lab4

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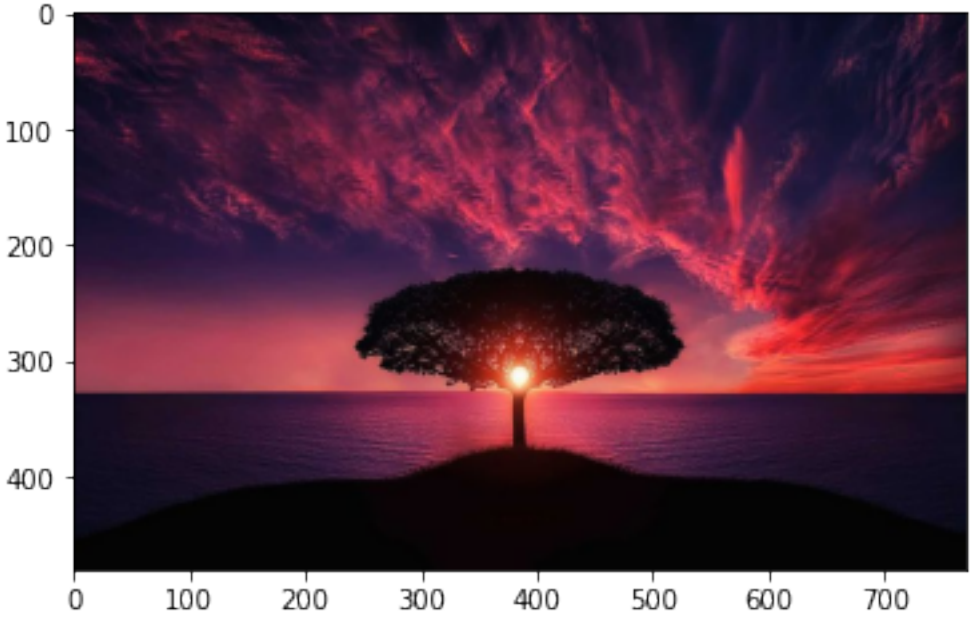
1.1 Import Necessary Modules

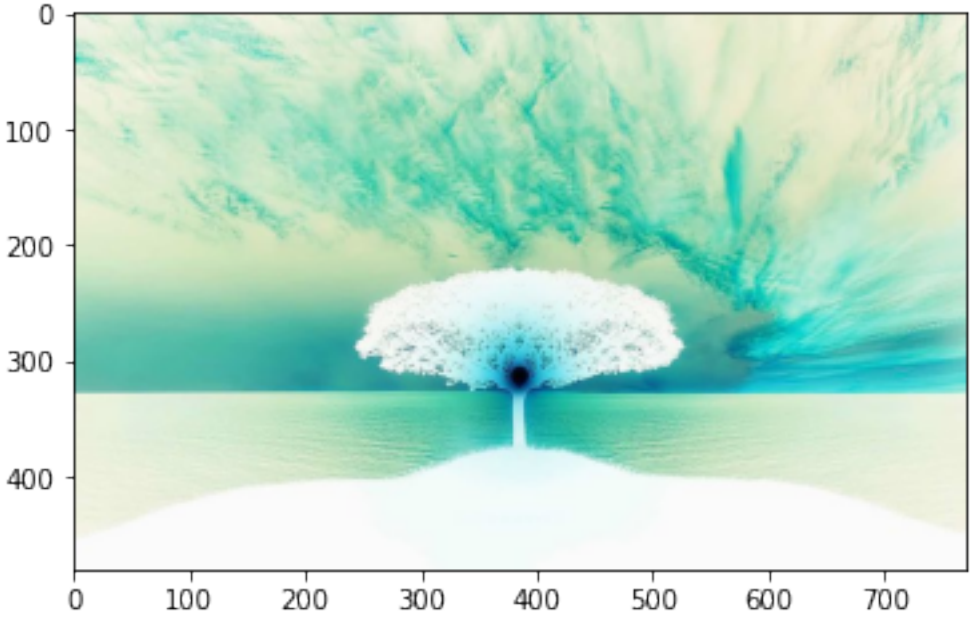
[1]:
```
import matplotlib.pyplot as plt
import cv2
import numpy as np
from PIL import Image
```

1.2 Objective 1

1.2.1 To understand and implement the Colour Inversion operation of an image.

[2]:
```
img = cv2.imread('tree.jpg')
plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
plt.show()
shape = img.shape
for i in range(shape[0]):
    for j in range(shape[1]):
        img[i][j] = 255 - img[i][j]
plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
plt.show()
```


0
100
200
300
400
0
100
200
300
400
500
600
700

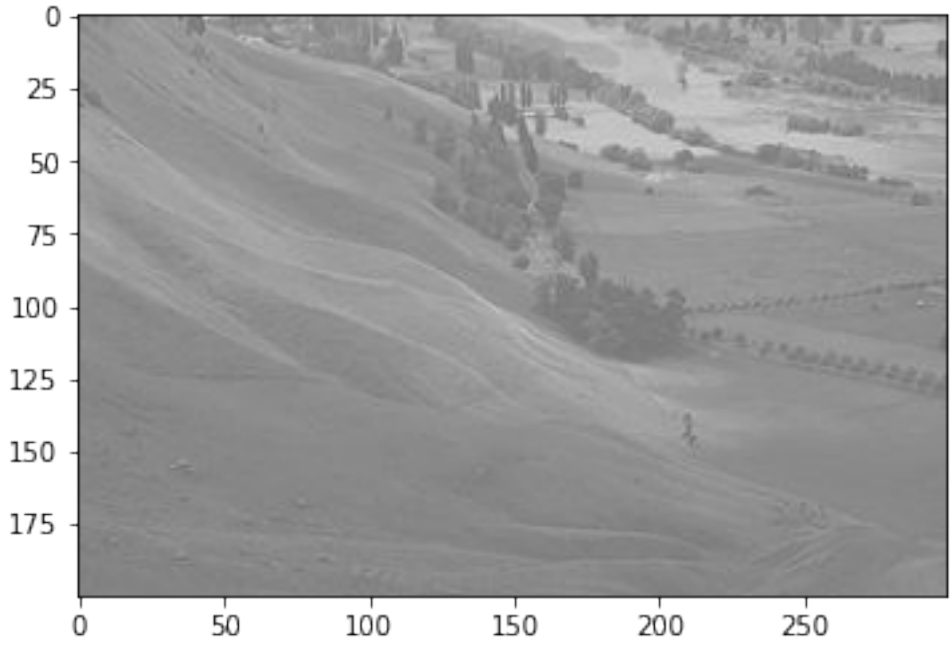

0
100
200
300
400
0
100
200
300
400
500
600
700

1.3 Objective 2

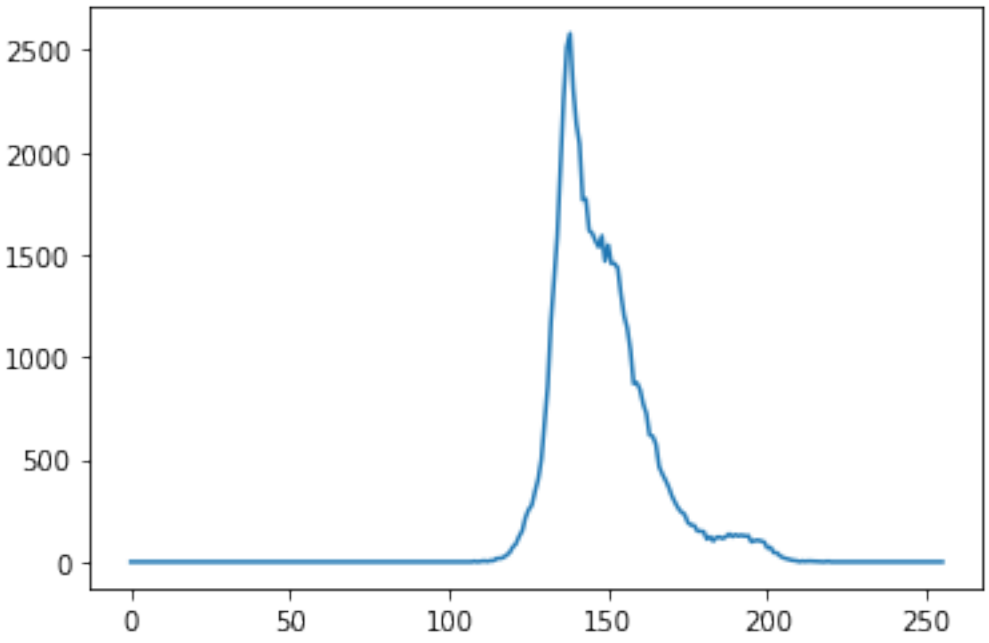
1.3.1 To understand and implement the histogram, histogram equalization technique of an image

[3]:
```
img = cv2.imread('desert.jpg')
img = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
[rows, cols] = img.shape
print('Original Image: ')
plt.imshow(cv2.cvtColor(img, cv2.COLOR_GRAY2RGB))
plt.show()
histogram = np.zeros(256, dtype='int')
bins = np.zeros(256, dtype='int')
smax=255
smin=0
maxi=0
mini=255
for i in range(256):
    bins[i]=i
for i in range(rows):
    for j in range(cols):
        histogram[img[i][j]]+=1
        maxi = max(maxi, img[i][j])
        mini = min(mini, img[i][j])
slope = float(smax-smin)/float(maxi-mini)
print('Original Histogram: ')
plt.plot(bins, histogram)
plt.show()
```

```
Original Image:
```



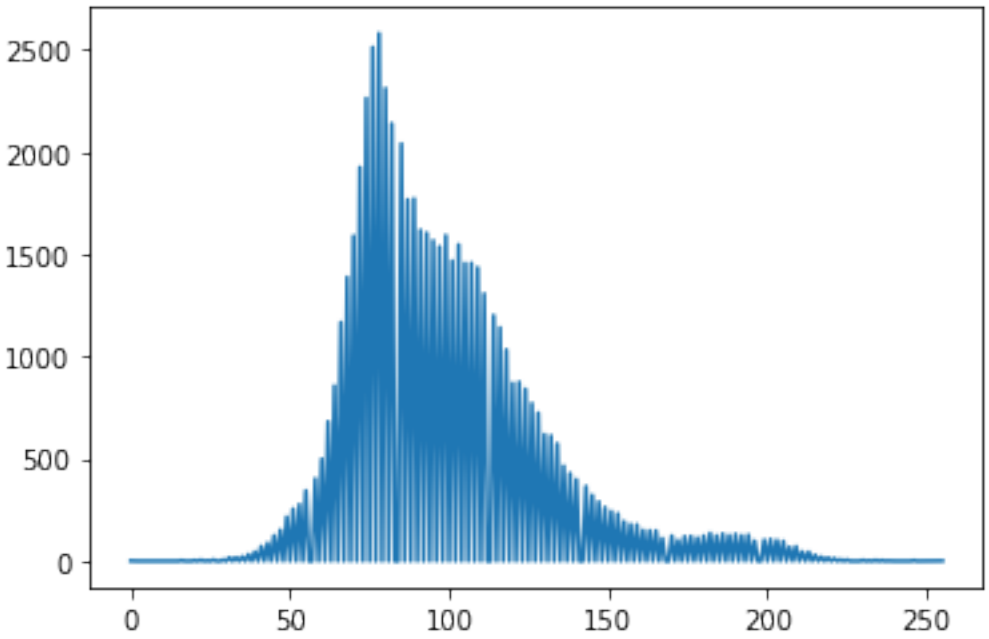
Original Histogram:



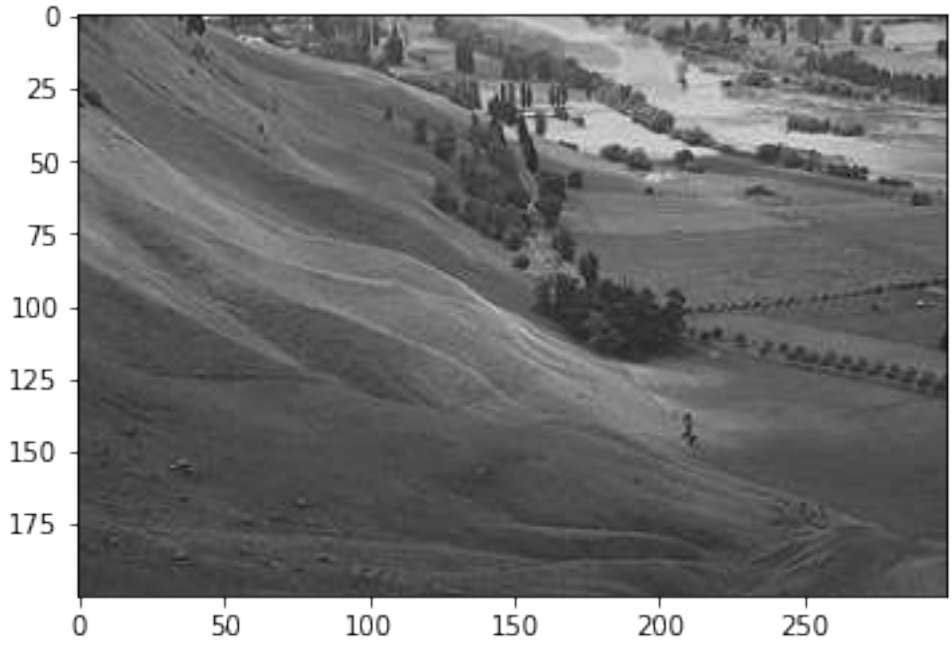
[4]:
```
histogram2 = np.zeros(256, dtype='int')
print(slope, maxi, mini)
```

```
for i in range(rows):
    for j in range(cols):
        img[i][j] = slope*(img[i][j]-mini)
        histogram2[img[i][j]]+=1
print('Final Histogram after applying streching: ')
plt.plot(bins, histogram2)
plt.show()
print('Image after applying Histogram streching: ')
plt.imshow(cv2.cvtColor(img, cv2.COLOR_GRAY2RGB))
plt.show()
```

```
2.073170731707317 223 100
Final Histogram after applying streching:
```




```
Image after applying Histogram streching:
```


0
25
50
75
100
125
150
175
0
50
100
150
200
250