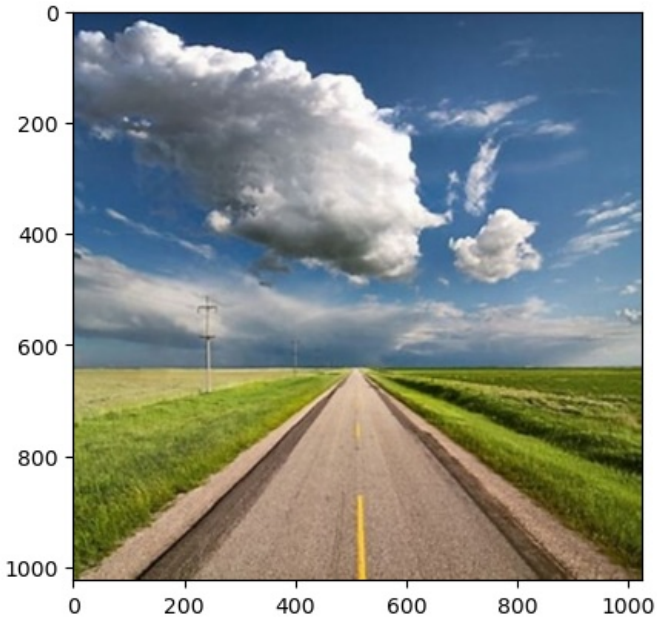
In [38]:
```
!pip install opencv-python
!pip install google
```

```
Requirement already satisfied: opencv-python in c:\users\aryan\appdata\roaming\python\python311\site-packages (
4.9.0.80)
Requirement already satisfied: numpy>=1.21.2 in c:\users\aryan\appdata\roaming\python\python311\site-packages (
from opencv-python) (1.26.3)
Collecting google
  Downloading google-3.0.0-py2.py3-none-any.whl (45 kB)
     ---------------------------------------- 0.0/45.3 kB ? eta -:--:--
     --------- ------------------------------ 10.2/45.3 kB ? eta -:--:--
     ---------- ----------------------------- 20.5/45.3 kB 131.3 kB/s eta 0:00:01
     ---------- ----------------------------- 20.5/45.3 kB 131.3 kB/s eta 0:00:01
     ------------------------ ------------ 30.7/45.3 kB 146.3 kB/s eta 0:00:01
     ------------------------ ------------ 30.7/45.3 kB 146.3 kB/s eta 0:00:01
     ------------------------ ------------ 30.7/45.3 kB 146.3 kB/s eta 0:00:01
     ------------------------ ------------ 30.7/45.3 kB 146.3 kB/s eta 0:00:01
     ---------------------------------------- 45.3/45.3 kB 97.5 kB/s eta 0:00:00
Requirement already satisfied: beautifulsoup4 in c:\users\aryan\anaconda3\lib\site-packages (from google) (4.12
.2)
Requirement already satisfied: soupsieve>1.2 in c:\users\aryan\anaconda3\lib\site-packages (from beautifulsoup4
->google) (2.4)
Installing collected packages: google
Successfully installed google-3.0.0
```

In [1]:
```
import cv2
import matplotlib.pyplot as plt
```

In [6]:
```
img = cv2.imread('img.jpg' )
plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
```

Out[6]:
```
<matplotlib.image.AxesImage at 0x235b3fa4d10>
```



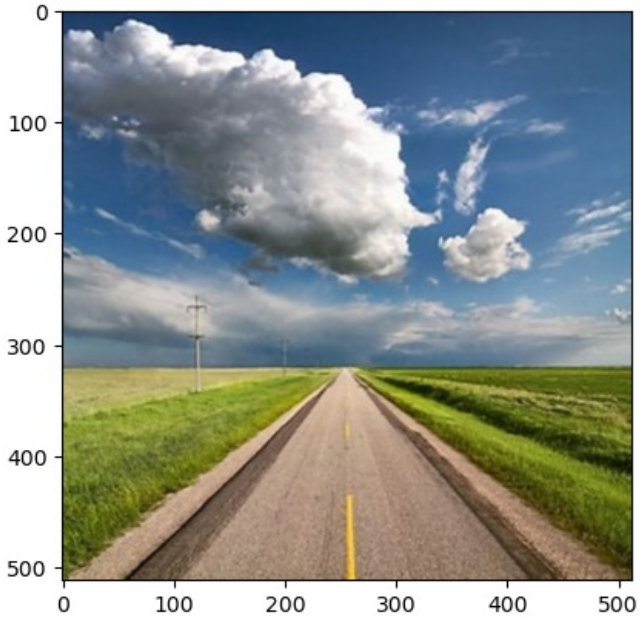
In [7]:
```
height,width =img.shape[:2]
print(width)
print(height)
```

```
1024
1024
```

In [ ]:
```
# Subsampling the Original image(1024*1024) to size(512*512)
```

In [8]:
```
#New Dimensions of image
new_height=512
new_width = 512
# Resize the image using subsampling
subsampled_img1 =cv2.resize(img,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(subsampled_img1,cv2.COLOR_BGR2RGB))
```

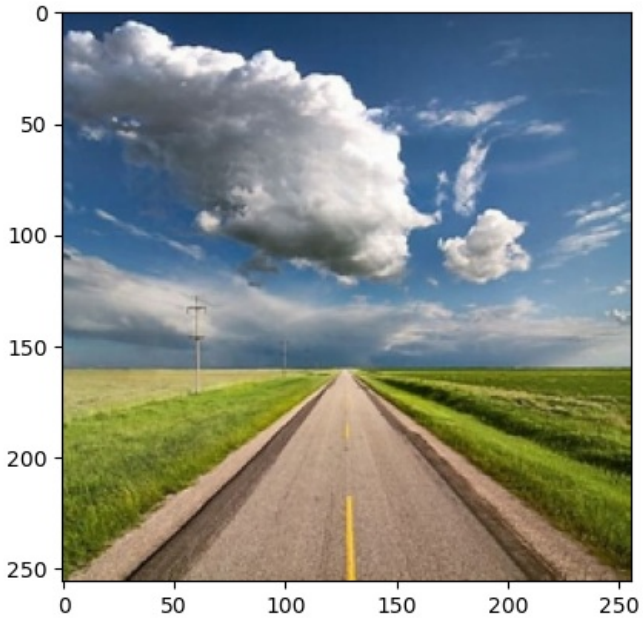
Out[8]:
```
<matplotlib.image.AxesImage at 0x235b413ef90>
```



In [ ]:
```
# Subsampling the Original image(1024*1024) to size(256*256)
```

In [9]:
```
# New Dimensions of image
new_height=256
new_width = 256
# Resize the image using subsampling
subsampled_img2 =cv2.resize(img,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(subsampled_img2,cv2.COLOR_BGR2RGB))
```

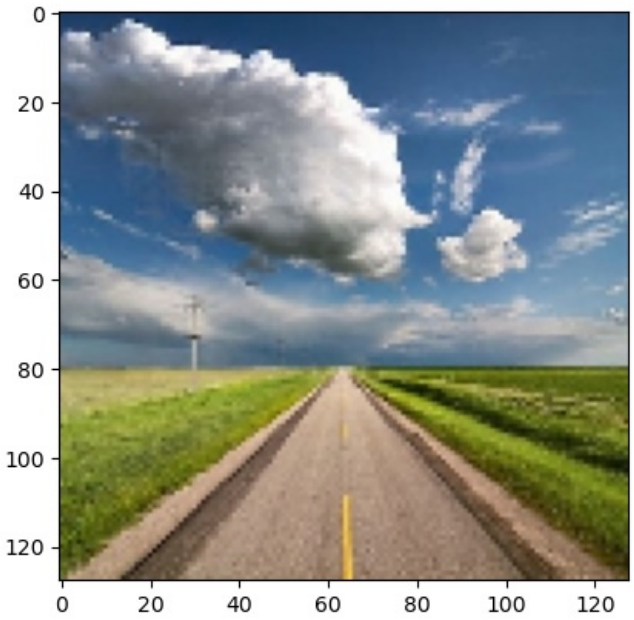
Out[9]:
```
<matplotlib.image.AxesImage at 0x235b61ad7d0>
```



In [ ]:
```
# Subsampling the Original image(1024*1024) to size(128*128)
```

In [10]:
```
# New Dimensions of image
new_height=128
new_width = 128
# Resize the image using subsampling
subsampled_img3 =cv2.resize(img,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(subsampled_img3,cv2.COLOR_BGR2RGB))
```

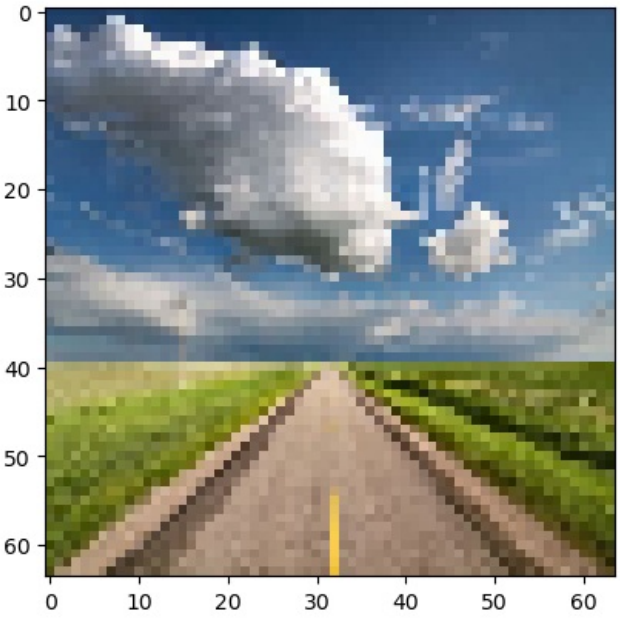
Out[10]:
```
<matplotlib.image.AxesImage at 0x235b6234f50>
```



In [ ]:
```
# Subsampling the Original image(1024*1024) to size(64*64)
```

In [11]:
```
# New Dimensions of image
new_height=64
new_width =64
# Resize the image using subsampling
subsampled_img4 =cv2.resize(img,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(subsampled_img4,cv2.COLOR_BGR2RGB))
```

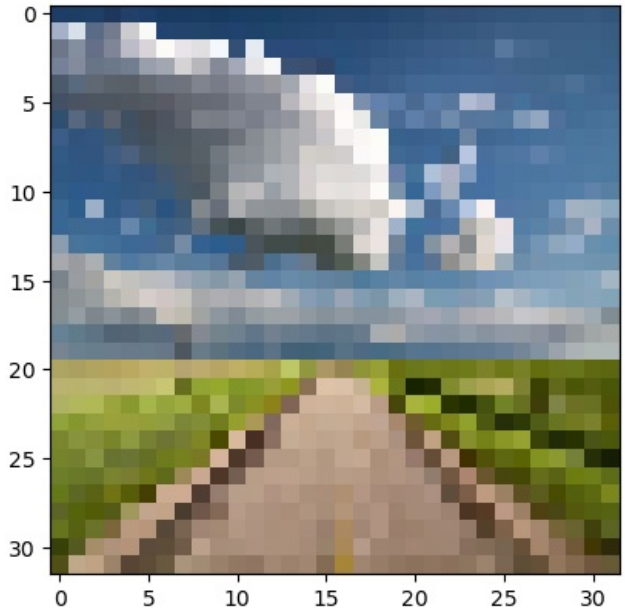
Out[11]:
```
<matplotlib.image.AxesImage at 0x235b6ad6f90>
```



In [ ]:
```
# Subsampling the Original image(1024*1024) to size(32*32)
```

In [12]:
```
# New Dimensions of image
new_height=32
new_width = 32
# Resize the image using subsampling
subsampled_img5 =cv2.resize(img,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(subsampled_img5,cv2.COLOR_BGR2RGB))
```

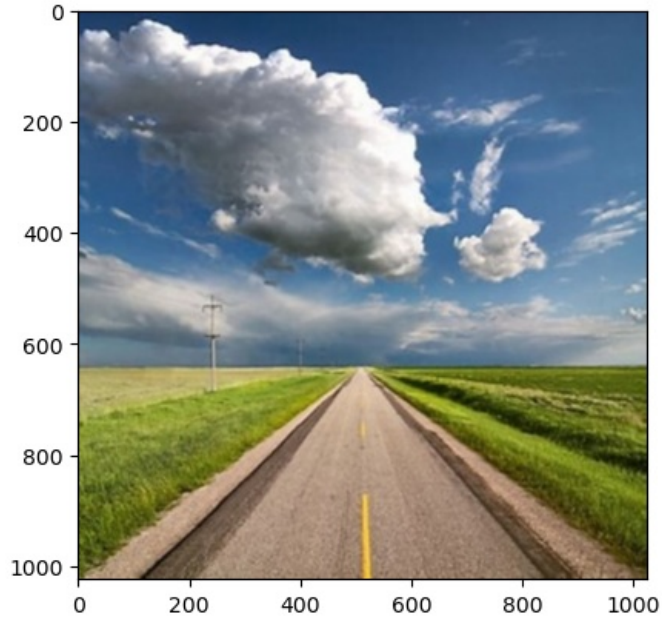
Out[12]:
```
<matplotlib.image.AxesImage at 0x235b6b3b410>
```



In [ ]:
```
# Resampling the image of size 512*512 to the original size(1024*1024)
```

In [13]:
```
# New Dimensions of image
new_height=1024
new_width = 1024
# Resize the image using resampling to original size
resampled_img1 =cv2.resize(subsampled_img1,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(resampled_img1,cv2.COLOR_BGR2RGB))
```

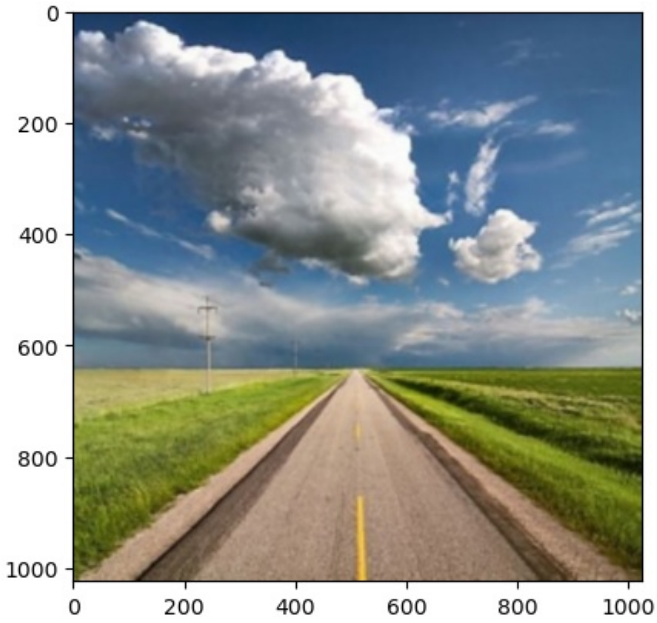
Out[13]:
```
<matplotlib.image.AxesImage at 0x235b6b76a50>
```



In [ ]:
```
# Resampling the image of size 256*256 to the original size(1024*1024)
```

In [14]:
```
# New Dimensions of image
new_height=1024
new_width = 1024
# Resize the image using resampling to original size
resampled_img2 =cv2.resize(subsampled_img2,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(resampled_img2,cv2.COLOR_BGR2RGB))
```

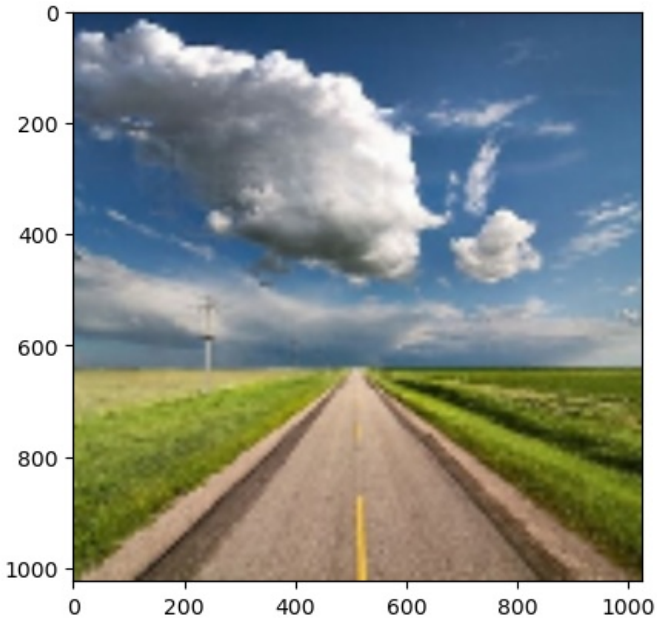
Out[14]:
```
<matplotlib.image.AxesImage at 0x235b62fffd0>
```



In [ ]:
```
# Resampling the image of size 128*128 to the original size(1024*1024)
```

In [15]:
```
# New Dimensions of image
new_height=1024
new_width = 1024
# Resize the image using resampling to original size
resampled_img3 =cv2.resize(subsampled_img3,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(resampled_img3,cv2.COLOR_BGR2RGB))
```

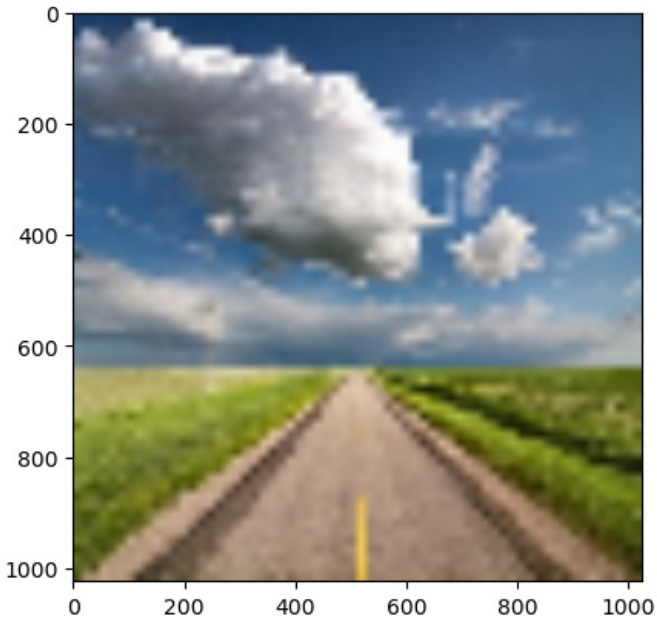
Out[15]:
```
<matplotlib.image.AxesImage at 0x235b6350e50>
```



In [ ]:
```
# Resampling the image of size 64*64 to the original size(1024*1024)
```

In [16]:
```
# New Dimensions of image
new_height=1024
new_width = 1024
# Resize the image using resampling to original size
resampled_img4 =cv2.resize(subsampled_img4,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(resampled_img4,cv2.COLOR_BGR2RGB))
```

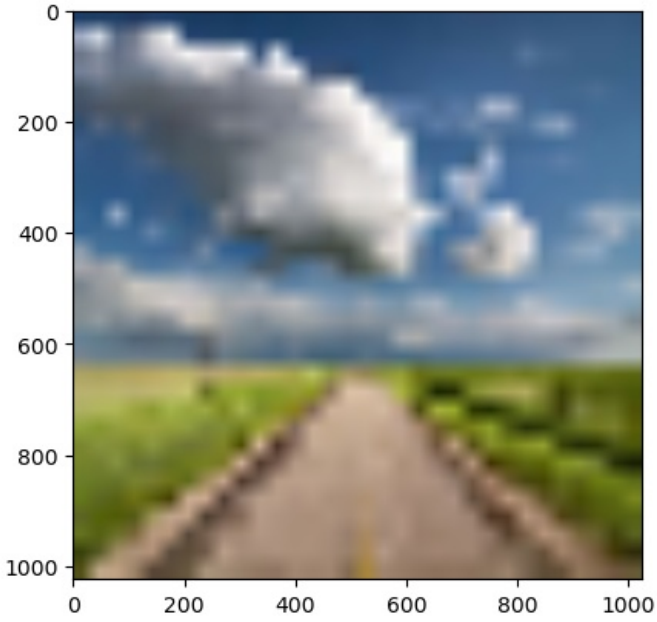
Out[16]:
```
<matplotlib.image.AxesImage at 0x235b63b8e50>
```



In [ ]:
```
# Resampling the image of size 32*32 to the original size(1024*1024)
```

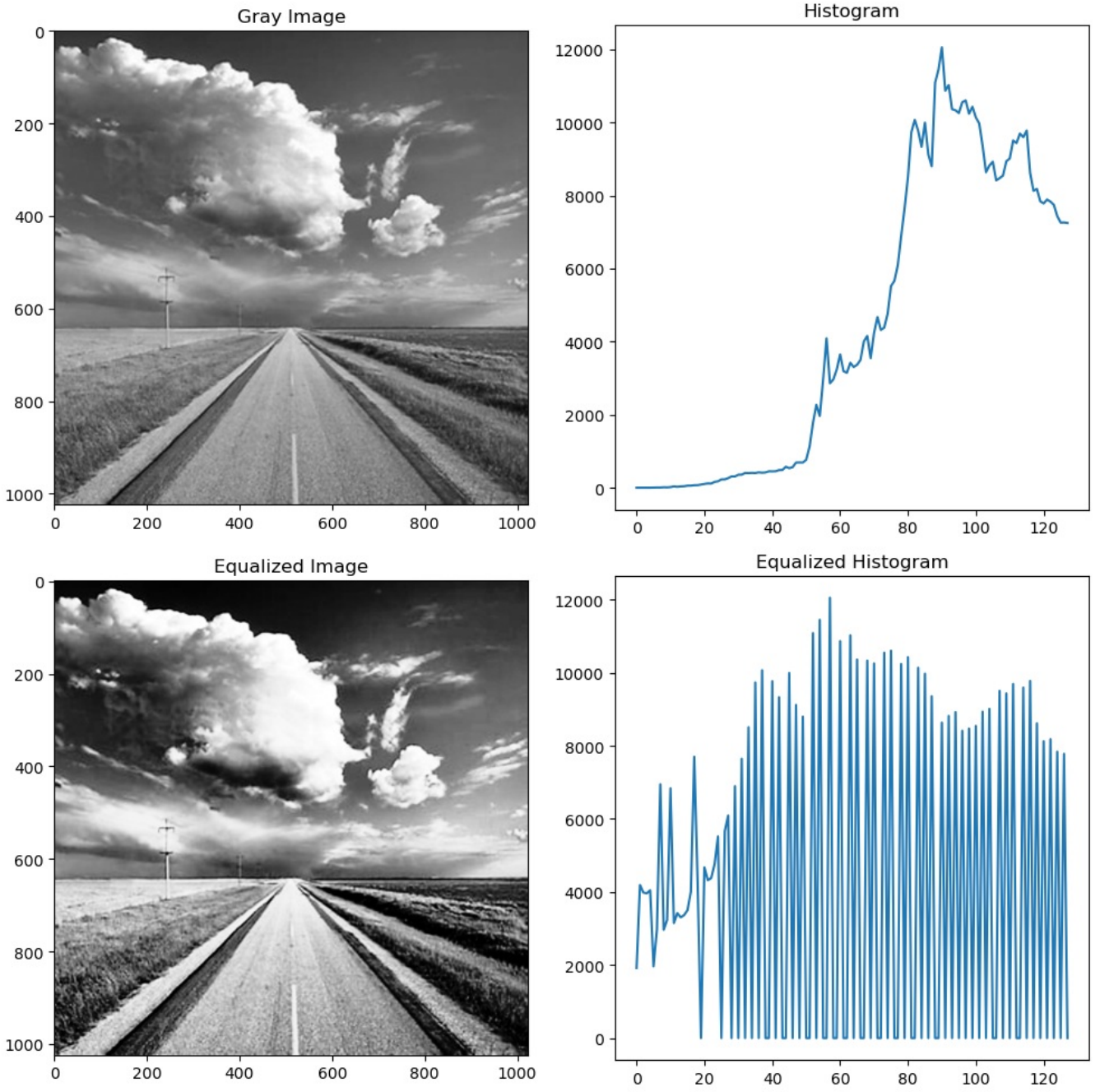
In [17]:
```
# New Dimensions of image
new_height=1024
new_width = 1024
# Resize the image using resampling to original size
resampled_img5 =cv2.resize(subsampled_img5,(new_height, new_width),interpolation=cv2.INTER_LINEAR)
plt.imshow(cv2.cvtColor(resampled_img5,cv2.COLOR_BGR2RGB))
```

Out[17]:
```
<matplotlib.image.AxesImage at 0x235b3fbbdd0>
```



In [20]:
```
img =cv2.imread('img.jpg',cv2.IMREAD_GRAYSCALE)

hist=cv2.calcHist([img],[0],None,[128],[0,128])

equalized_img=cv2.equalizeHist(img)

equalized_hist= cv2.calcHist([equalized_img],[0],None,[128],[0,128])

fig,axs =plt.subplots(nrows=2, ncols=2, figsize=(10,10))

axs[0][0].imshow(img, cmap='gray')
axs[0][0].set_title('Gray Image')
axs[0][1].plot(hist)
```

```
axs[0][1].set_title('Histogram')

axs[1][0].imshow(equalized_img, cmap='gray')
axs[1][0].set_title('Equalized Image')
axs[1][1].plot(equalized_hist)
axs[1][1].set_title('Equalized Histogram')

plt.tight_layout()
plt.show()
```



In [ ]: