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Computer Vision Assignment 1

Importing Libraries

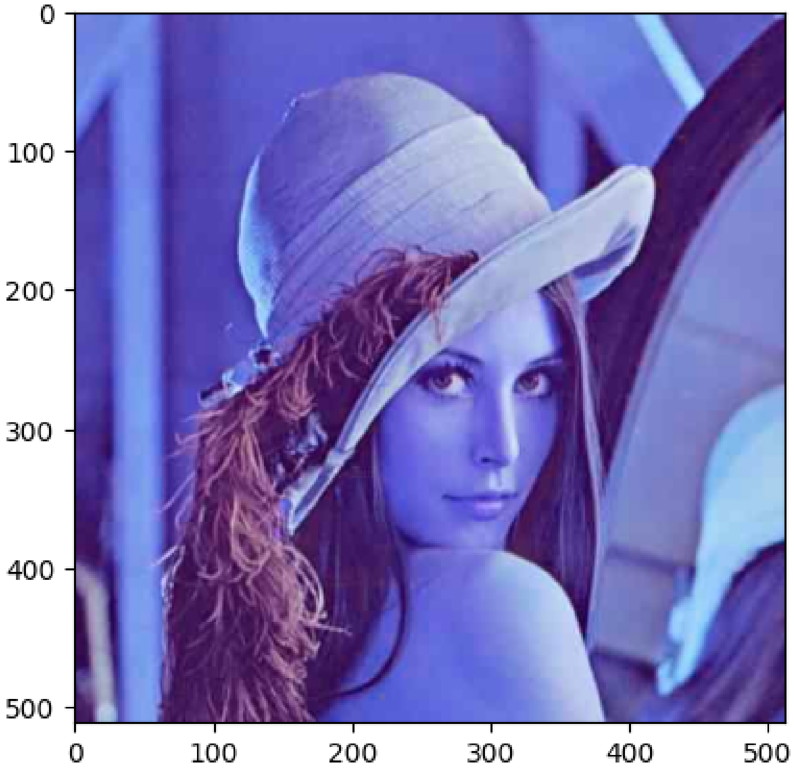
[41]:
```
import cv2
import numpy as np
import matplotlib.image as img
import matplotlib.pyplot as plt
```

Reading Image

[42]:
```
img=cv2.imread("R.jpg")
```

[43]:
```
cv2.imshow("hi",img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

[44]:
```
plt.imshow(img)
plt.show()
```



```
[74]: cv2.imwrite("a1.jpg",img)
```

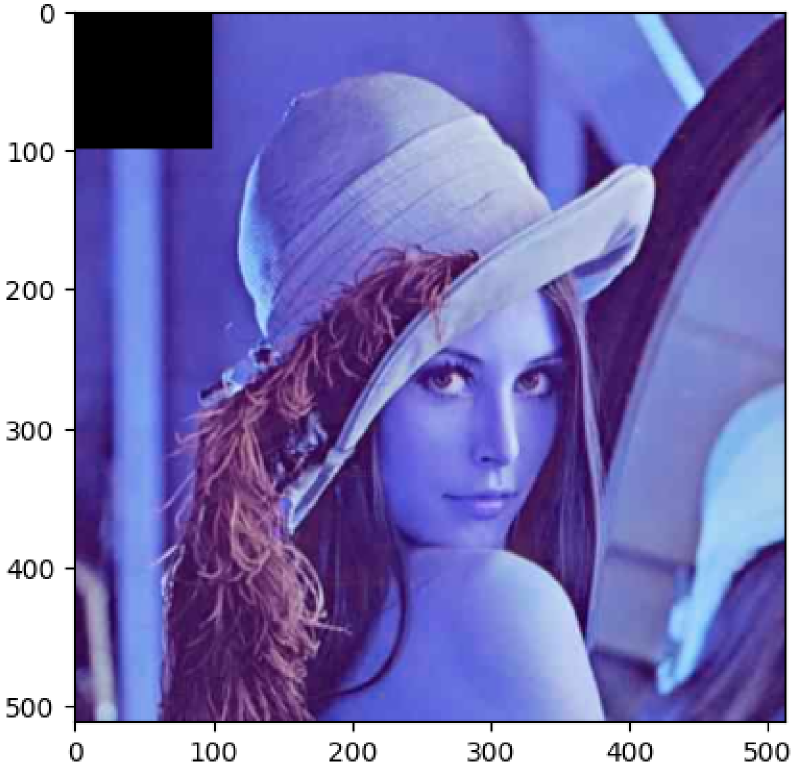
```
[74]: True
```

Question 1: Write a Python code that changes the colour value of the first 100X100 pixels of an image to black (0,0,0).

```
[75]: for i in range (0,100):
          for j in range (0,100):
              img[i][j]=np.array([0,0,0])
```

```
[76]: cv2.imshow("hi",img)
      cv2.waitKey(0)
      cv2.destroyAllWindows()
```

```
[77]: plt.imshow(img)
      plt.show()
```



[78]:

```
cv2.imwrite("a1.jpg",img)
```

[78]:

```
True
```

Question 2: Write a program to combine two images side by side and display them using OpenCV
.

[79]:

```
img=cv2.imread("R.jpg")
img2=cv2.imread("panda.jpg")
l,r,h=img.shape
a,b,c=img2.shape
```

[80]:

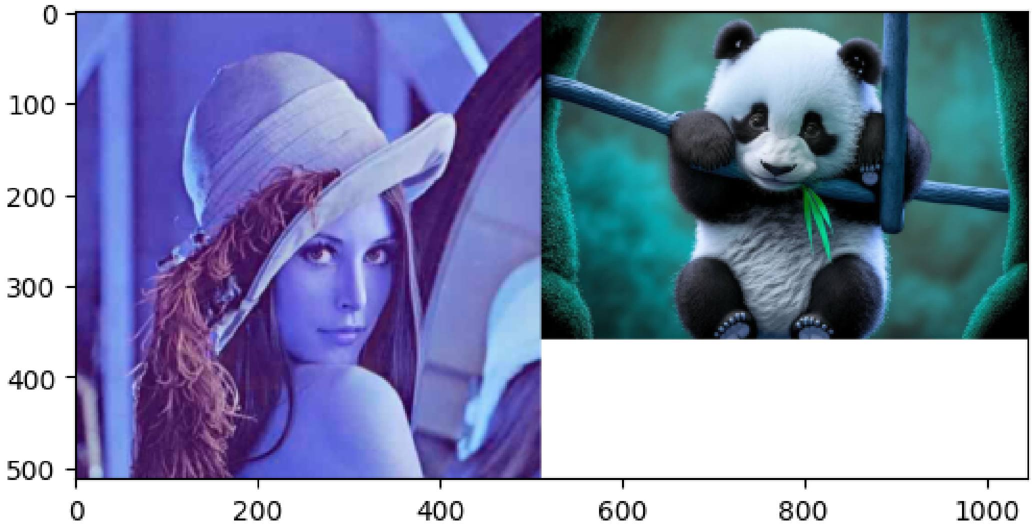
```
blank_image = np.zeros((max(l,a),r+b,3), np.uint8)
blank_image[:,:,:]=(255,255,255)
for i in range (0,l):
    for j in range (0,r):
        blank_image[i][j]=img[i][j]
for i in range (0,a):
    for j in range (r,r+b):
        blank_image[i][j]=img2[i][j-r]
```

[81]:

```
cv2.imshow("hi",blank_image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

[82]:

```
plt.imshow(blank_image)
plt.show()
```



[83]:

```
cv2.imwrite("a2.jpg",blank_image)
```

[83]:

```
True
```

Queston 3: Write an OpenCV code to load an image, extract a specific image region, and display both the original and extracted regions using Python.

[84]:

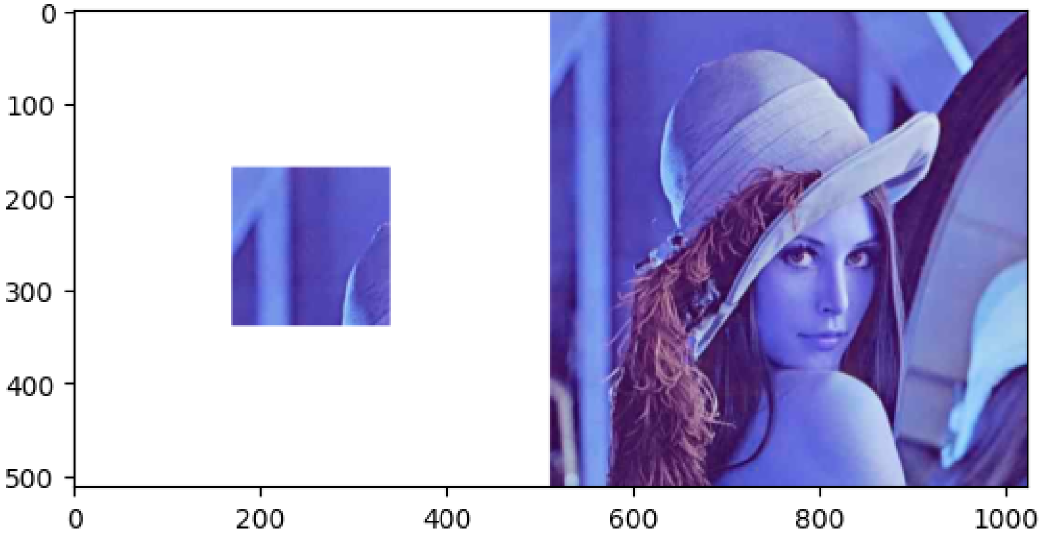
```
img=cv2.imread("R.jpg")
blank_image = np.zeros((l,r*2,3), np.uint8)
blank_image[:,:,:]=(255,255,255)
for i in range (0,int(l/3)):
    for j in range (0,int(r/3)):
        blank_image[i+int(l/3)][j+int(r/3)]=img[i][j]
for i in range (0,l):
    for j in range (r,r*2):
        blank_image[i][j]=img[i][j-r]
```

[85]:

```
cv2.imshow("hi",blank_image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

[86]:

```
plt.imshow(blank_image)
plt.show()
```



[88]:

```
cv2.imwrite("a3.jpg",blank_image)
```

[88]:

```
True
```

Question 4: Implement a Python script that reads an image and calculates and plots the histogram of its grayscale version. Save the histogram plot as an image file.

[89]:

```
img=cv2.imread("R.jpg")
img=cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
```

[90]:

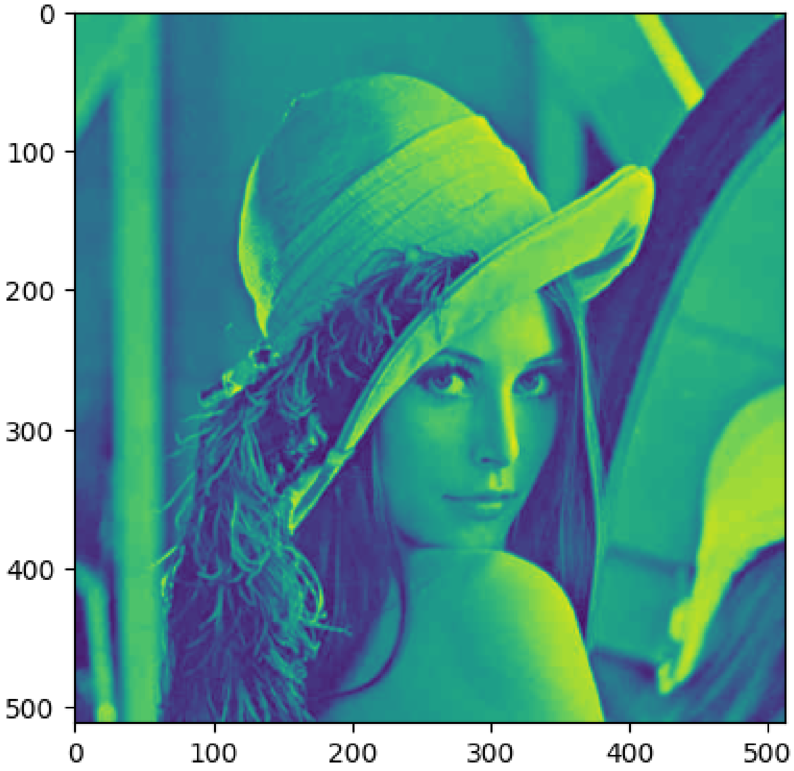
```
l,r=img.shape
```

[91]:

```
cv2.imshow("hi",img)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

[92]:

```
plt.imshow(img)
plt.show()
```



[93]:

```
count = []
for i in range(0,255):
    count.append(0)
```

[94]:

```
for i in range (0,l):
    for j in range (0,r):
        count[img[i][j]]=count[img[i][j]]+1
```

[95]:

```
val = []
for i in range (0,255):
        val.append(i)
```

[96]:

```
len(val)
```

[96]:

```
255
```

[97]:

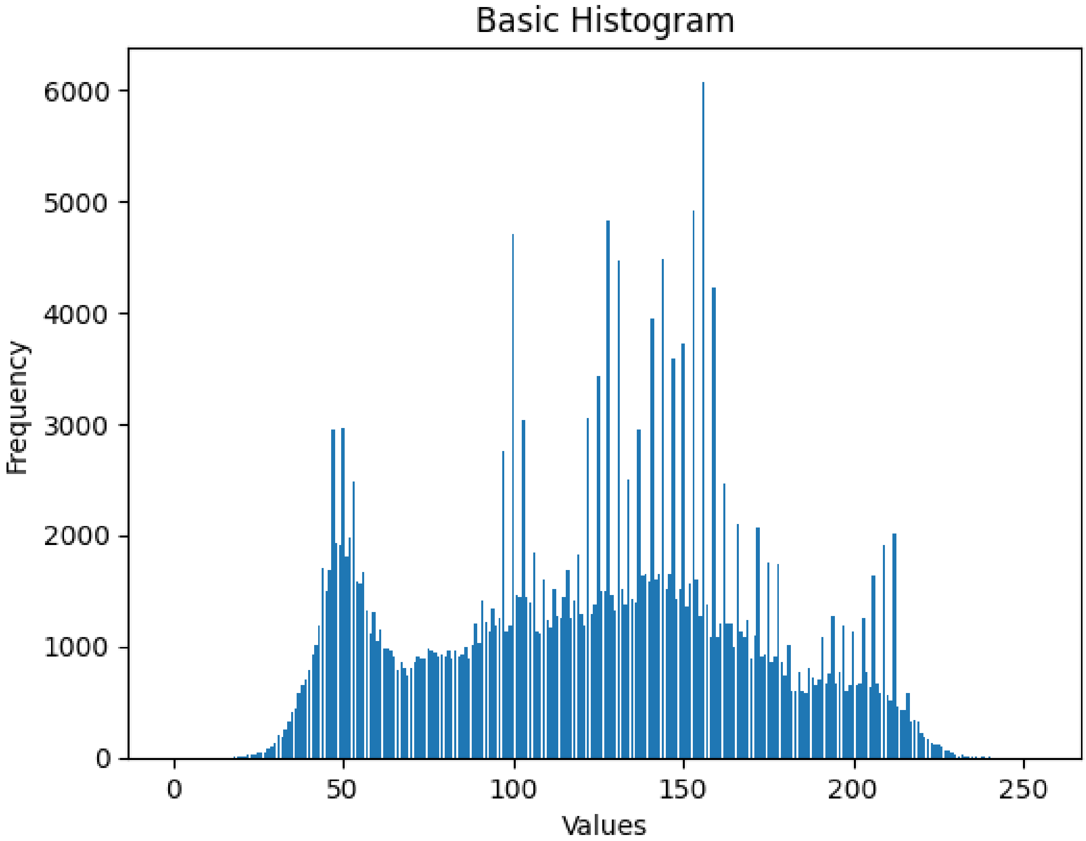
```
count[149]
```

[97]:

```
1512
```

[98]:

```python
# plt.hist(count,bins=30, edgecolor='black')
plt.bar(val,count,width=0.8)
plt.xlabel('Values')
plt.ylabel('Frequency')
plt.title('Basic Histogram')
plt.show()
```



Question 5: Create a program that reads an image and applies a Gaussian blur to it using the filter shown in the image below. Display both the original image and the blurred image. (To apply a filter, you have to convolve the filter with the image)

[104]:

```python
img=cv2.imread("R.jpg")
```

[105]:

```python
id_kernel = np.array([[1, 2, 1],
                      [2, 4, 2],
                      [1, 2, 1]])
id_kernel=id_kernel/16
```

[106]:

```python
flt_img = cv2.filter2D(src=img, ddepth=-1, kernel=id_kernel)
```

```
[111]: img[1][1]
```

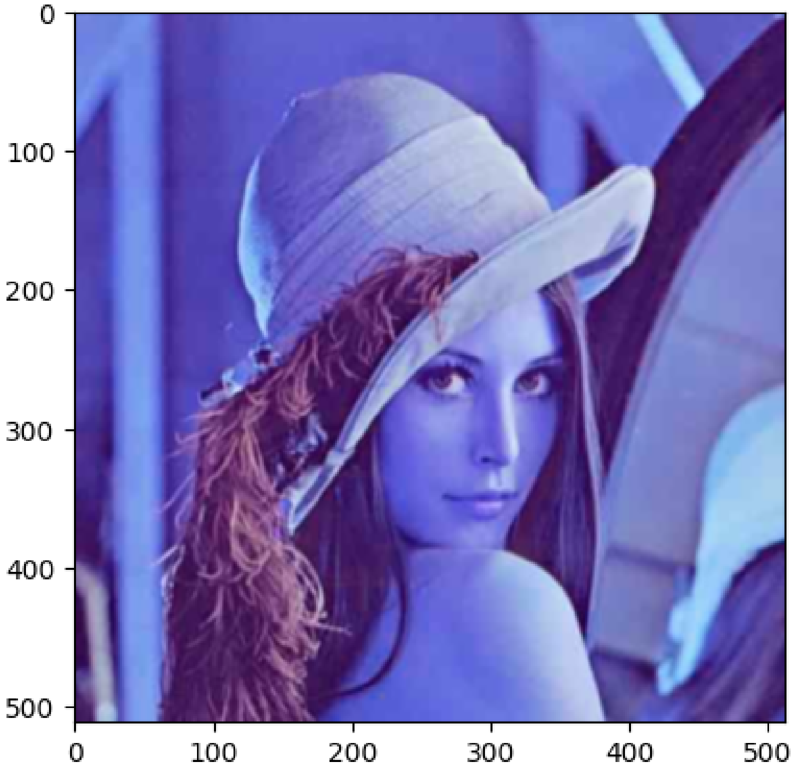
```
[111]: array([116, 134, 225], dtype=uint8)
```

```
[112]: flt_img[1][1]
```

```
[112]: array([116, 134, 225], dtype=uint8)
```

```
[113]: cv2.imshow("hi",flt_img)
       cv2.waitKey(0)
       cv2.destroyAllWindows()
```

```
[114]: plt.imshow(flt_img)
       plt.show()
```



```
[115]: cv2.imwrite("a5.jpg",flt_img)
```

```
[115]: True
```