

In [6]: `pip install opencv-python`

Requirement already satisfied: opencv-python in c:\users\reshma_koduri\anaconda3\lib\site-packages (4.6.0.66)
Requirement already satisfied: numpy>=1.19.3 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from opencv-python) (1.20.3)
Note: you may need to restart the kernel to use updated packages.

In [7]: `pip install matplotlib`

Requirement already satisfied: matplotlib in c:\users\reshma_koduri\anaconda3\lib\site-packages (3.4.3)
Requirement already satisfied: pillow>=6.2.0 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (8.4.0)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: cycler>=0.10 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (0.10.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (1.3.1)
Requirement already satisfied: pyparsing>=2.2.1 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (3.0.4)
Requirement already satisfied: numpy>=1.16 in c:\users\reshma_koduri\anaconda3\lib\site-packages (from matplotlib) (1.20.3)
Requirement already satisfied: six in c:\users\reshma_koduri\anaconda3\lib\site-packages (from cycler>=0.10->matplotlib) (1.16.0)
Note: you may need to restart the kernel to use updated packages.

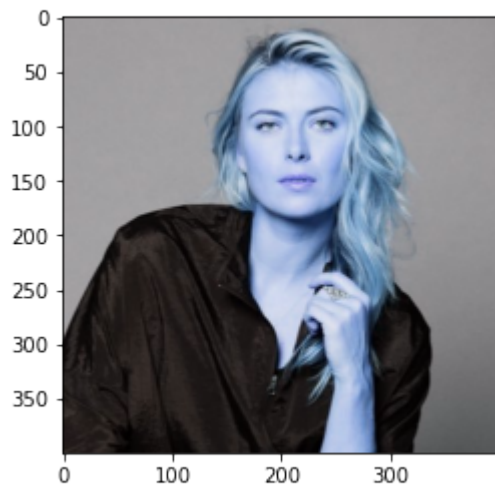
In [8]: `import numpy as np
import cv2
import matplotlib
from matplotlib import pyplot as plt
%matplotlib inline`

In [9]: `img=cv2.imread("C:\\Users\\reshma_koduri\\OneDrive\\Desktop\\cjLHfMMJ_400x400.jpg")
img.shape`

Out[9]: (400, 400, 3)

In [10]: `plt.imshow(img)`

Out[10]: <matplotlib.image.AxesImage at 0x23549a1ee50>



```
In [11]: gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
         gray.shape
```

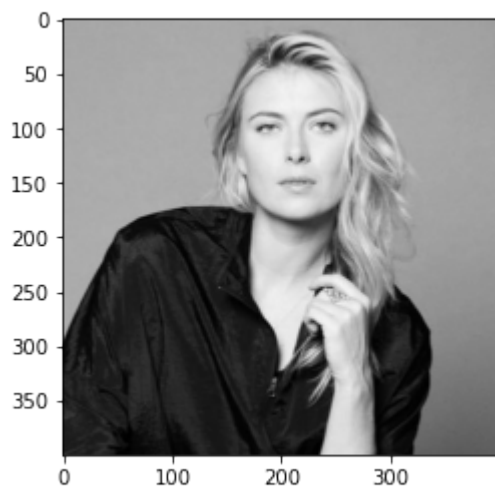
```
Out[11]: (400, 400)
```

```
In [12]: gray
```

```
Out[12]: array([[156, 156, 156, ..., 150, 149, 147],
                [156, 156, 156, ..., 150, 149, 147],
                [156, 156, 156, ..., 150, 149, 147],
                ...,
                [ 32,  32,  34, ...,  92,  92,  91],
                [ 38,  40,  43, ...,  90,  89,  89],
                [ 46,  48,  48, ...,  88,  87,  87]], dtype=uint8)
```

```
In [13]: plt.imshow(gray,cmap='gray')
```

```
Out[13]: <matplotlib.image.AxesImage at 0x2354a1db580>
```



```
In [14]: face_cascade=cv2.CascadeClassifier("C:\\Users\\reshma_koduri\\anaconda3\\Lib\\site-p
eye_cascade=cv2.CascadeClassifier("C:\\Users\\reshma_koduri\\anaconda3\\Lib\\site-pa

faces = face_cascade.detectMultiScale(gray, 1.3,5);
faces
```

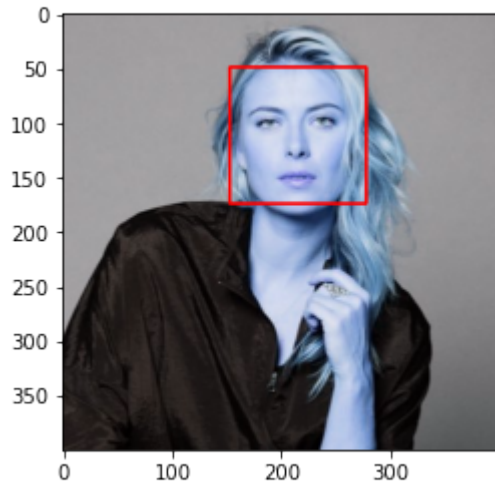
```
Out[14]: array([[153,  49, 125, 125]])
```

```
In [15]: (x,y,w,h)=faces[0]
         x,y,w,h
```

```
Out[15]: (153, 49, 125, 125)
```

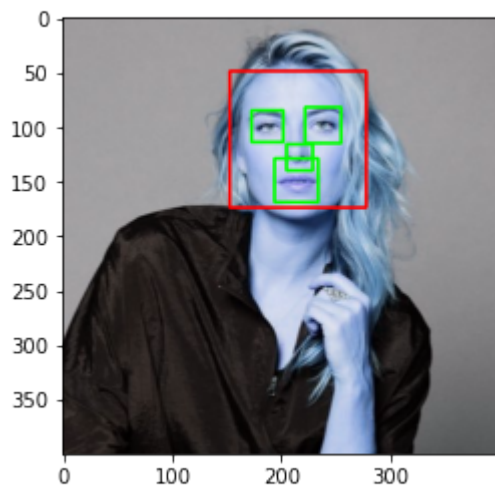
```
In [16]: face_img=cv2.rectangle(img,(x,y),(x+w,y+h),(255,0,0),2)
         plt.imshow(face_img)
```

```
Out[16]: <matplotlib.image.AxesImage at 0x23555c81190>
```



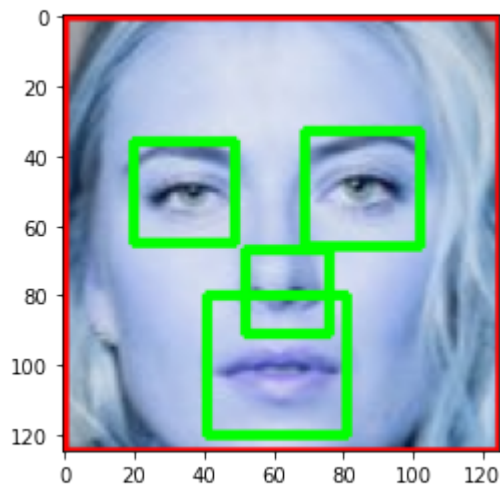
```
In [17]: cv2.destroyAllWindows()
         for (x,y,w,h) in faces:
             face_img=cv2.rectangle(img,(x,y),(x+w,y+h),(255,0,0),2)
             roi_gray=gray[y:y+h,x:x+w]
             roi_color=face_img[y:y+h,x:x+w]
             eyes=eye_cascade.detectMultiScale(roi_gray)
             for (ex,ey,ew,eh) in eyes:
                 cv2.rectangle(roi_color,(ex,ey),(ex+ew,ey+eh),(0,255,0),2)

         plt.figure()
         plt.imshow(face_img,cmap='gray')
         plt.show()
```



```
In [18]: %matplotlib inline
         plt.imshow(roi_color,cmap='gray')
```

Out[18]: <matplotlib.image.AxesImage at 0x23555d4b310>



In [19]: `cropped_img=np.array(roi_color)`
`cropped_img.shape`

Out[19]: (125, 125, 3)

In [20]:

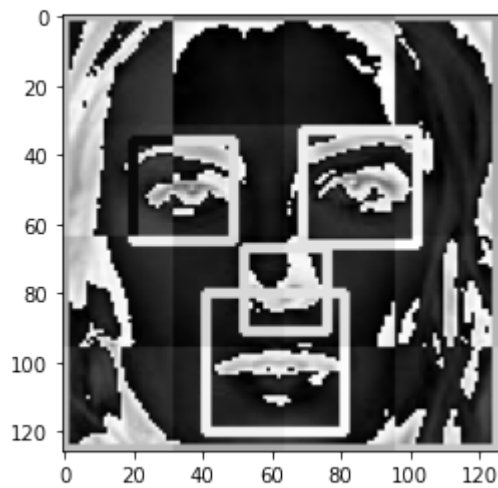
```
import numpy as np
import pywt
import cv2

def w2d(img,mode='haar',level=1):
    imArray=img
    imArray=cv2.cvtColor(imArray,cv2.COLOR_RGB2GRAY)
    imArray=np.float32(imArray)
    imArray/=255;
    coeffs=pywt.wavedec2(imArray,mode,level=level)
    coeffs_H=list(coeffs)
    coeffs_H[0]*=0;
    imArray_H=pywt.waverec2(coeffs_H,mode);
    imArray_H*=255;
    imArray_H=np.uint8(imArray_H)

    return imArray_H
```

In [21]: `im_har = w2d(cropped_img,'db1',5)`
`plt.imshow(im_har,cmap='gray')`

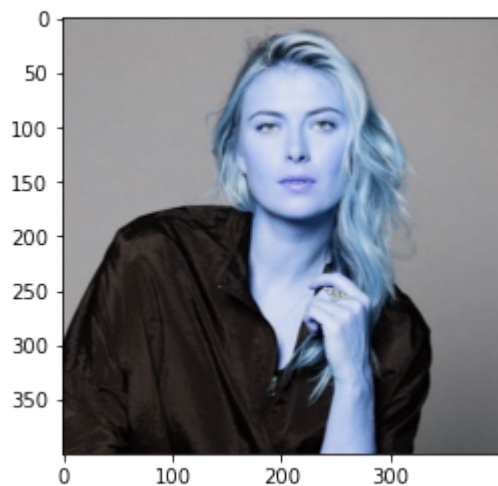
Out[21]: <matplotlib.image.AxesImage at 0x23557270f10>



```
In [22]: def get_cropped_image_if_2_eyes(image_path):
img=cv2.imread(image_path)
gray=cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
faces=face_cascade.detectMultiScale(gray,1.3,5)
for (x,y,w,h) in faces:
    roi_gray=gray[y:y+h,x:x+w]
    roi_color=img[y:y+h,x:x+w]
    eyes=eye_cascade.detectMultiScale(roi_gray)
    if len(eyes)>=2:
        return roi_color
```

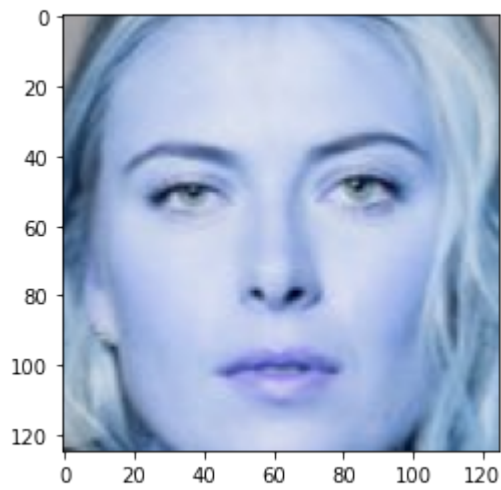
```
In [23]: original_image=cv2.imread("C:\\Users\\reshma_koduri\\OneDrive\\Desktop\\cjLHfMMJ_400
plt.imshow(original_image)
```

```
Out[23]: <matplotlib.image.AxesImage at 0x235572dfcd0>
```



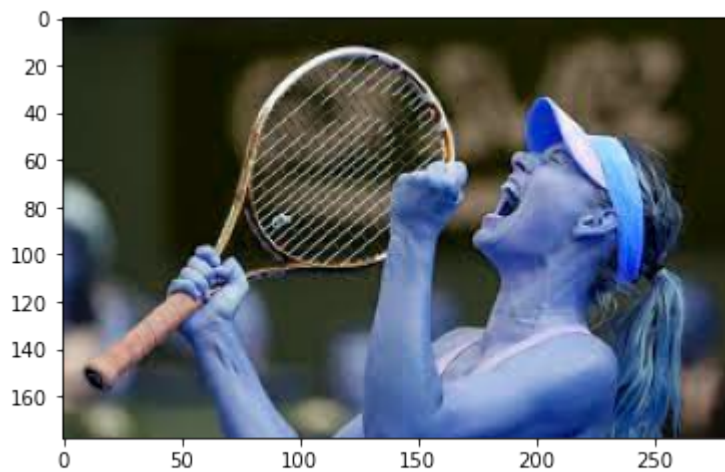
```
In [24]: cropped_image = get_cropped_image_if_2_eyes("C:\\Users\\reshma_koduri\\OneDrive\\Des
plt.imshow(cropped_image)
```

```
Out[24]: <matplotlib.image.AxesImage at 0x23557351400>
```



```
In [40]: org_image_obstructed=cv2.imread("C:\\Users\\reshma_koduri\\OneDrive\\Desktop\\images  
plt.imshow(org_image_obstructed)
```

```
Out[40]: <matplotlib.image.AxesImage at 0x23555bf3790>
```



```
In [42]: cropped_image_no_2_eyes = get_cropped_image_if_2_eyes("C:\\Users\\reshma_koduri\\One  
cropped_image_no_2_eyes
```