

```
from keras.preprocessing.image import ImageDataGenerator
```

```
train_datagen=ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=0.2, horizontal_
text_dataset=ImageDataGenerator(rescale=1./255)
```

```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator(rescale= 1./255, horizontal_flip = True, vertical_flip =
test_datagen = ImageDataGenerator(rescale= 1./255)
```

```
x_train = train_datagen.flow_from_directory("/content/drive", target_size = (64,64),
class_mode = "categorical", batch_size = 24)
```

Found 12656 images belonging to 4 classes.

```
x_test = test_datagen.flow_from_directory("/content/drive", target_size = (64,64),
```

clas

Found 12702 images belonging to 4 classes.

```
import cv2
```

```
img = cv2.imread("/content/drive/MyDrive/AI_IBM/Dataset/TEST_SET/APPLES/n07740461_1191.jpg
```

```
img
```

```
array([[[174, 188, 207],
        [173, 187, 206],
        [171, 185, 204],
        ...,
        [181, 192, 206],
        [180, 192, 204],
        [179, 191, 203]],
       [[175, 189, 208],
        [174, 188, 207],
        [174, 188, 207],
        ...,
        [182, 193, 207],
        [182, 193, 207],
        [181, 193, 205]],
       [[178, 192, 211],
        [177, 191, 210],
        [177, 191, 210],
        ...,
        [184, 195, 209],
        [184, 195, 209],
        [184, 195, 209]],
       ...,
       ...])
```

```

[[161, 185, 209],
 [164, 188, 212],
 [163, 191, 215],
 ...,
 [184, 198, 216],
 [186, 200, 218],
 [187, 201, 220]],

[[157, 185, 209],
 [158, 186, 210],
 [156, 187, 210],
 ...,
 [185, 199, 217],
 [187, 201, 219],
 [187, 201, 220]],

[[154, 186, 209],
 [153, 185, 208],
 [150, 182, 205],
 ...,
 [187, 199, 217],
 [188, 202, 221],
 [189, 203, 222]]], dtype=uint8)

```

`img.ndim`

3

`type(img)`

`numpy.ndarray`

`img.shape`

(256, 256, 3)

`img_flag = cv2.imread("/content/drive/MyDrive/AI_IBM/Dataset/TEST_SET/APPLES/n07740461_119`

`img_flag`

```

array([[[174, 188, 207],
 [173, 187, 206],
 [171, 185, 204],
 ...,
 [181, 192, 206],
 [180, 192, 204],
 [179, 191, 203]],

[[175, 189, 208],
 [174, 188, 207],
 [174, 188, 207],
 ...,
 [182, 193, 207],
 [182, 193, 207],
 [181, 193, 205]],

```

```

[[178, 192, 211],
 [177, 191, 210],
 [177, 191, 210],
 ...,
 [184, 195, 209],
 [184, 195, 209],
 [184, 195, 209]],

...,

[[161, 185, 209],
 [164, 188, 212],
 [163, 191, 215],
 ...,
 [184, 198, 216],
 [186, 200, 218],
 [187, 201, 220]],

[[157, 185, 209],
 [158, 186, 210],
 [156, 187, 210],
 ...,
 [185, 199, 217],
 [187, 201, 219],
 [187, 201, 220]],

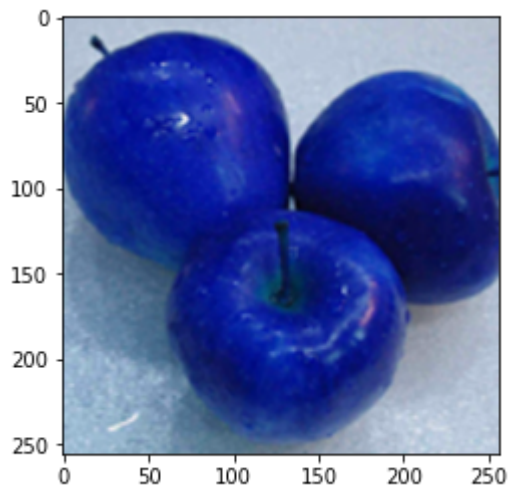
[[154, 186, 209],
 [153, 185, 208],
 [150, 182, 205],
 ...,
 [187, 199, 217],
 [188, 202, 221],
 [189, 203, 222]]], dtype=uint8)

```

```
import matplotlib.pyplot as plt
```

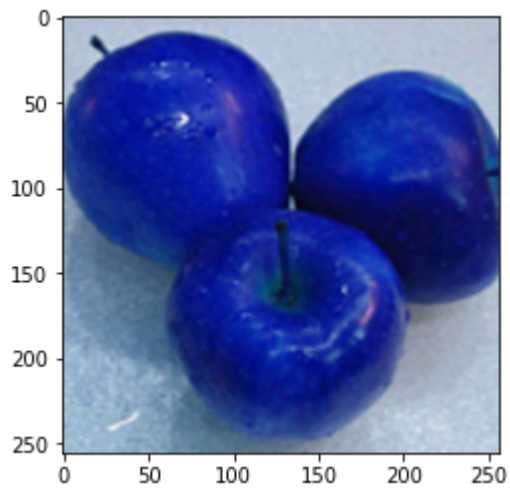
```
plt.imshow(img)
```

```
<matplotlib.image.AxesImage at 0x7fda968014d0>
```



```
plt.imshow(img_flag)
```

```
<matplotlib.image.AxesImage at 0x7fda962e0190>
```



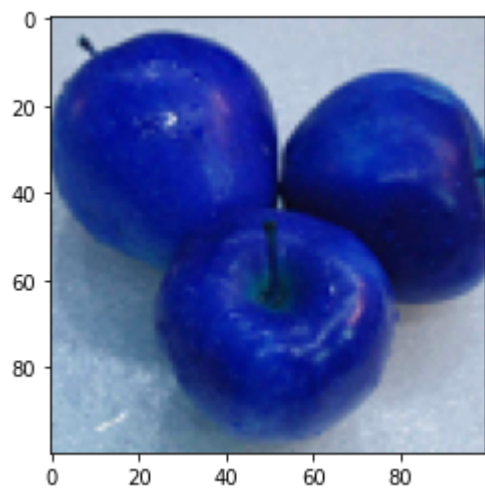
```
resized_img = cv2.resize(img,(100,100))
```

```
resized_img.shape
```

```
↳ (100, 100, 3)
```

```
plt.imshow(resized_img)
```

```
<matplotlib.image.AxesImage at 0x7fda962c7f90>
```



```
cv_img = cv2.cvtColor(img,cv2.COLOR_BGR2YCR_CB)
```

```
plt.imshow(cv_img)
```

```
<matplotlib.image.AxesImage at 0x7fda96233810>
```

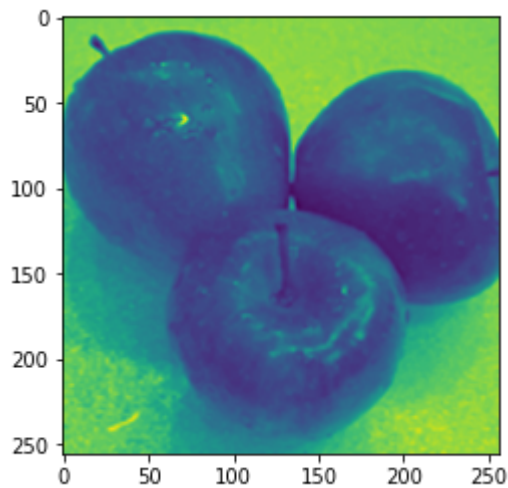


```
cv_img = cv2.cvtColor(img,cv2.COLOR_BGR2GRAY)
```



```
plt.imshow(cv_img)
```

```
<matplotlib.image.AxesImage at 0x7fda96218e50>
```

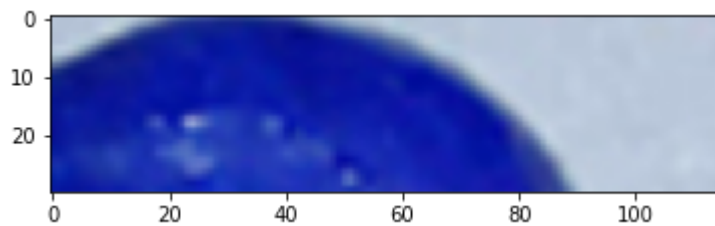


```
roi_img = img[50:280,35:150]
```

```
roi_img = img[10:40,35:150]
```

```
plt.imshow(roi_img)
```

```
<matplotlib.image.AxesImage at 0x7fda961935d0>
```



```
roi_img = img[10:40,0:90]
```

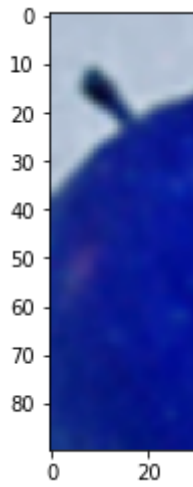
```
plt.imshow(roi_img)
```

```
roi_img = img[0:90,10:40]
```



```
plt.imshow(roi_img)
```

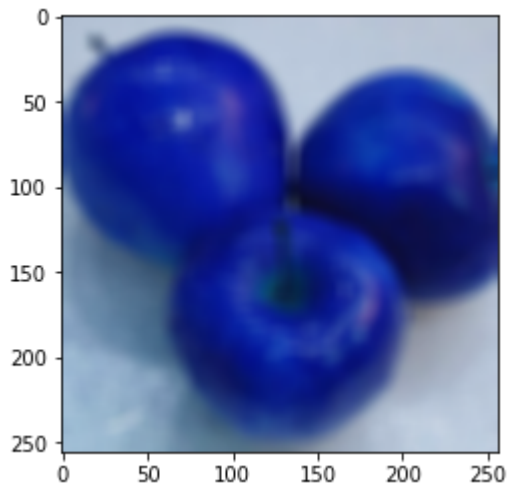
<matplotlib.image.AxesImage at 0x7fda9605ac50>



```
img_bl = cv2.blur(img,(10,10))
```

```
plt.imshow(img_bl)
```

<matplotlib.image.AxesImage at 0x7fda96041b10>



```
img_gbl = cv2.GaussianBlur(img,(5,5),0)
```

```
plt.imshow(img_gbl)
```

```
<matplotlib.image.AxesImage at 0x7fda95fb41d0>
```

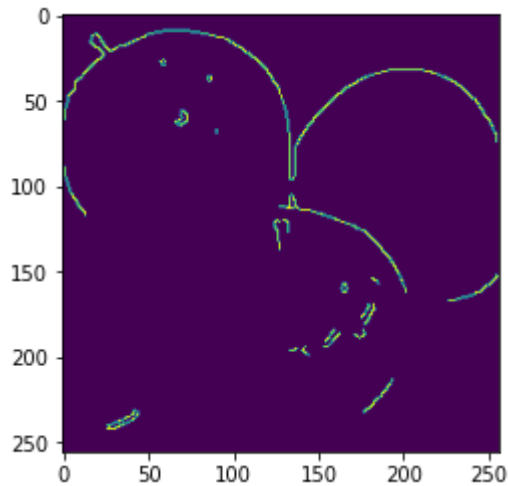


```
img_edge = cv2.Canny(img,230,350)
```



```
plt.imshow(img_edge)
```

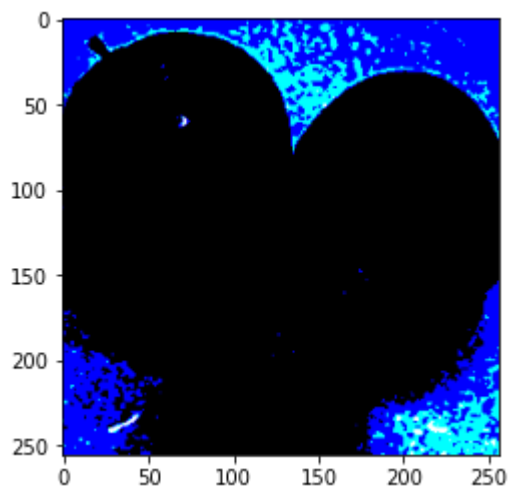
```
<matplotlib.image.AxesImage at 0x7fda95f1a850>
```



```
thresh, thresh_img = cv2.threshold(img, 200, 255, cv2.THRESH_BINARY)
```

```
plt.imshow(thresh_img)
```

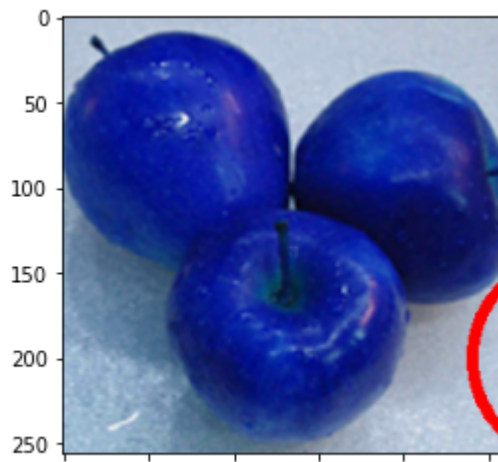
```
<matplotlib.image.AxesImage at 0x7fda962ab910>
```



```
circle = cv2.circle(img,(300,200),60,(255,0,0),5)
```

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

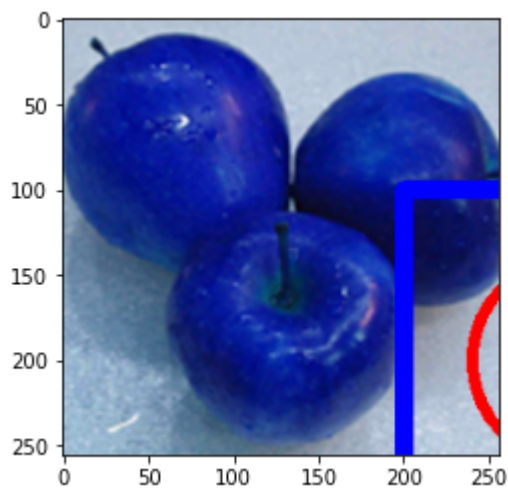
```
<matplotlib.image.AxesImage at 0x7fda96021850>
```



```
rectangle = cv2.rectangle(img,(200,100),(400,300),(0,0,255),10)
```

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

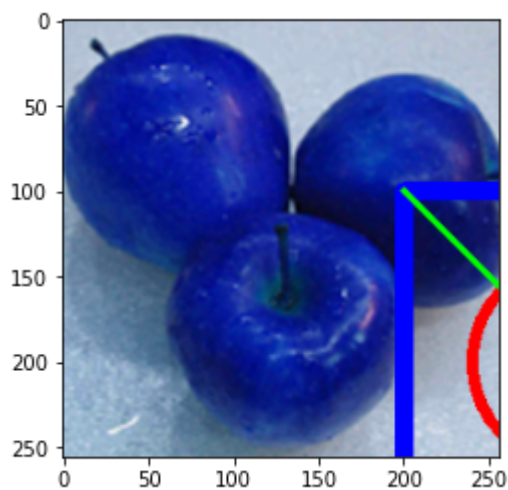
```
<matplotlib.image.AxesImage at 0x7fda95e23b50>
```



```
line = cv2.line(img,(200,100),(400,300),(0,255,0),3)
```

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

```
<matplotlib.image.AxesImage at 0x7fda95e15250>
```




```
text = cv2.putText(img,"Opencv",(200,50),cv2.FONT_HERSHEY_SIMPLEX,2,(255,255,255),5)
```

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

<matplotlib.image.AxesImage at 0x7fda95d7a910>

