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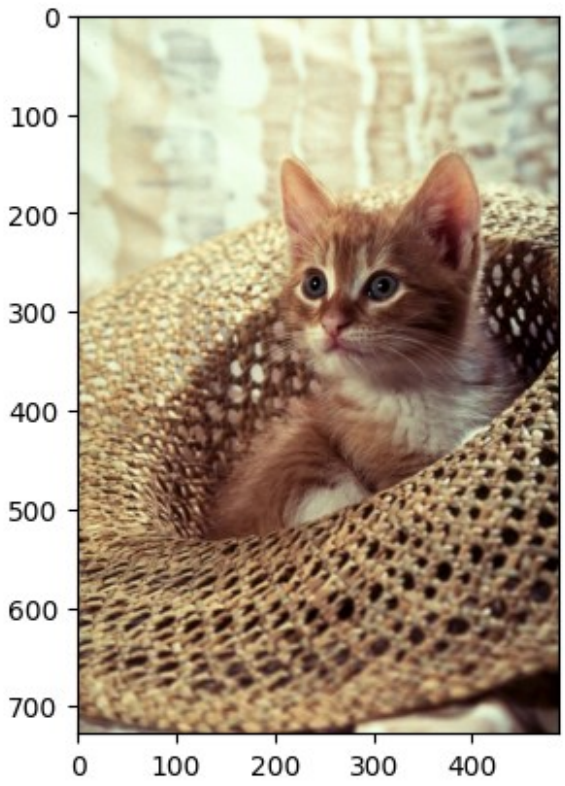
Aim: To determine HoG descriptor for given image.

```
import cv2
from skimage import data
from skimage.color import rgb2gray
import numpy as np
from skimage.io import imread
from skimage.transform import resize
from skimage.feature import hog
from skimage import exposure
import matplotlib.pyplot as plt

image1 = imread('cat.png')

img1 = resize(image1, (728, 488))
plt.imshow(img1)
```

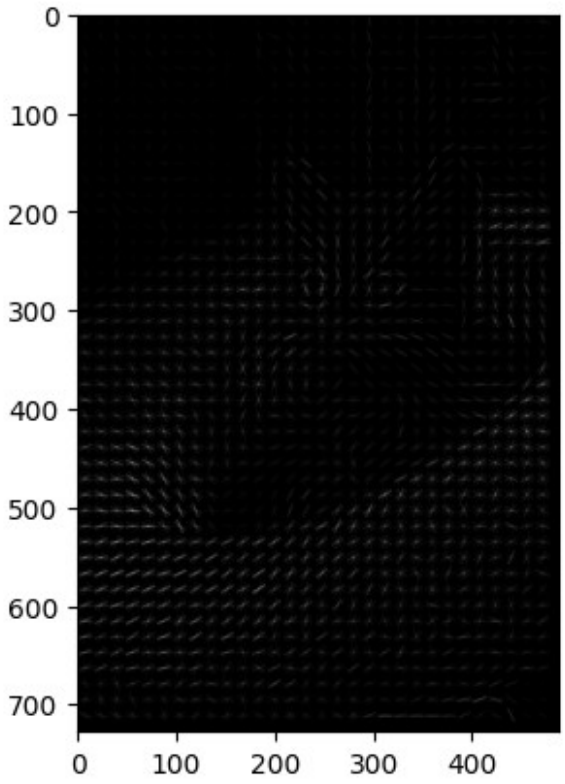
```
<matplotlib.image.AxesImage at 0x7d6f5172b150>
```




```
fd1,hog_image1 = hog(img1, orientations=9, pixels_per_cell=(16, 16),
                     cells_per_block=(16, 16), visualize=True,
channel_axis= -1)
```

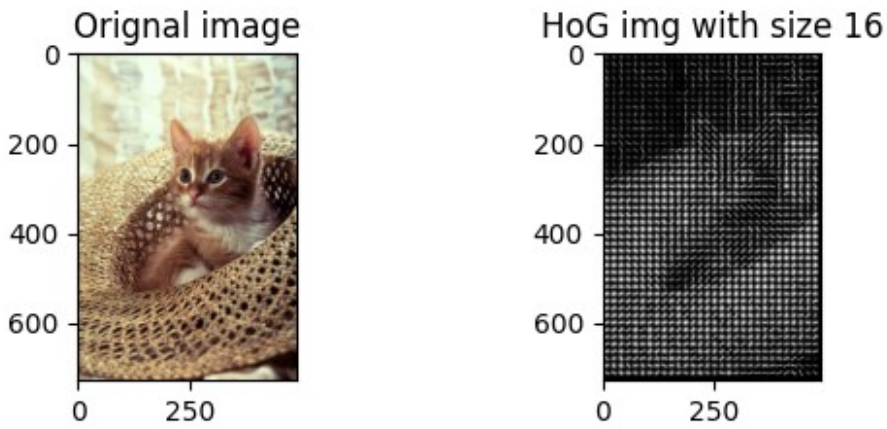
```
ln_fd1 = len(fd1)

plt.imshow(hog_image1, cmap="gray")
```

```
<matplotlib.image.AxesImage at 0x7d6f5179de10>
```




```
p2_1,p90_1=np.percentile(hog_image1,(2,90))
hog_image1_e = exposure.rescale_intensity(hog_image1,
in_range=(p2_1,p90_1))

plt.subplot(2,2,1)
plt.title('Orignal image')
plt.imshow(img1, cmap="gray")

plt.subplot(2,2,2)
plt.title('HoG img with size 16')
plt.imshow(hog_image1_e, cmap='gray')
```

```
<matplotlib.image.AxesImage at 0x7d6f51631990>
```




```
ln_fd1 = len(fd1)
ln_fd1
```

```
1036800
```

Conclusion: HoG is applied to determine feature descriptor of given image 'cat.png'. Parameters used for this are : No of pixels per cell (8,8) , no of cells per block (2,2), no of orientations (9), range of percentile to enhance HoG of image is 2-90%. For this combo len of feature vector- 199440. To reduce the effect of fine details like basket, cell size is increased from 8 * 8 to 16 * 16,block size is changed from 2 - 16 this reduces the length of feature vector to 1036800

Self - image

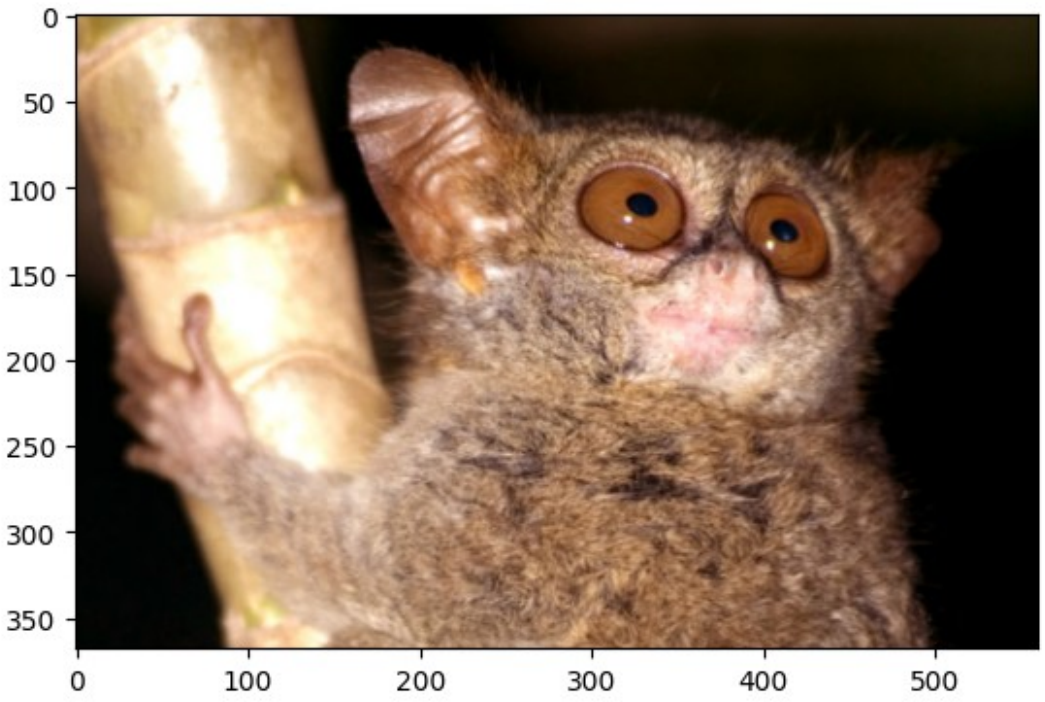
```
image = imread('/content/35957_hd.jpg')
image
```

```
array([[[190, 145,  88],
        [191, 146,  91],
        [192, 147,  92],
        ...,
        [ 43,  35,  14],
        [ 45,  32,  13],
        [ 45,  32,  13]],

       [[186, 144,  86],
        [188, 145,  90],
        [189, 146,  91],
        ...,
        [ 43,  35,  14],
        [ 44,  33,  13],
        [ 44,  33,  13]],

       [[183, 141,  83],
        [185, 142,  87],
        [189, 146,  91],
        ...,
```

```
        [ 42,  34,  13],
        [ 41,  35,  13],
        [ 41,  35,  13]],

       ...,

       [[  1,   5,   4],
        [  1,   5,   4],
        [  1,   5,   4],
        ...,
        [  0,   0,   0],
        [  0,   0,   0],
        [  0,   0,   0]],

       [[  5,   7,   4],
        [  4,   6,   3],
        [  4,   6,   3],
        ...,
        [  0,   0,   0],
        [  0,   0,   0],
        [  0,   0,   0]],

       [[  5,   7,   4],
        [  4,   6,   3],
        [  4,   6,   3],
        ...,
        [  0,   0,   0],
        [  0,   0,   0],
        [  0,   0,   0]]], dtype=uint8)
```

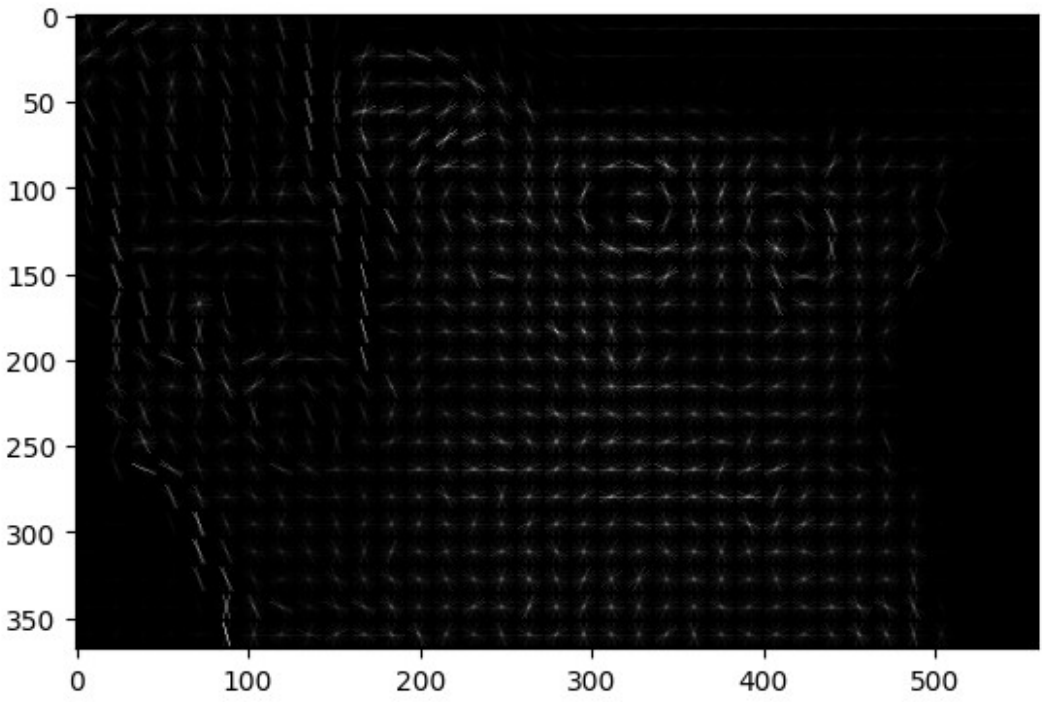
```
img1 = resize(image, (368, 560))
plt.imshow(img1)
```

```
<matplotlib.image.AxesImage at 0x7d6f516a7b10>
```



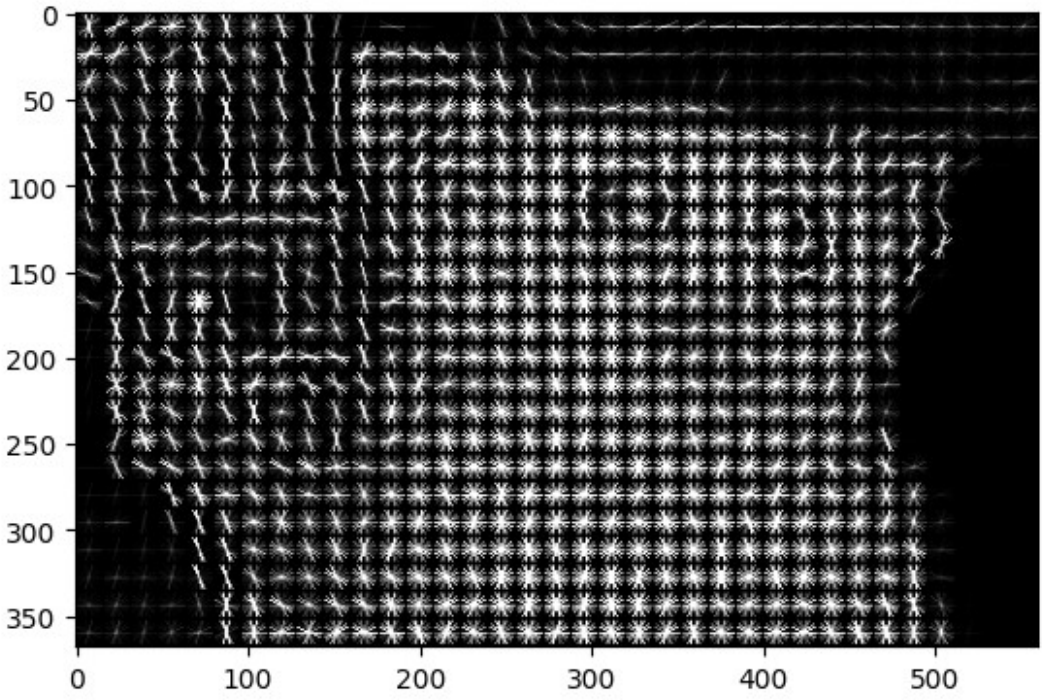

```
fd1,hog_image1 = hog(img1, orientations=9, pixels_per_cell=(16, 16),
                    cells_per_block=(2, 2), visualize=True,
channel_axis= -1)

ln_fd1 = len(fd1)

plt.imshow(hog_image1, cmap="gray")
```

```
<matplotlib.image.AxesImage at 0x7d6f51525e90>
```

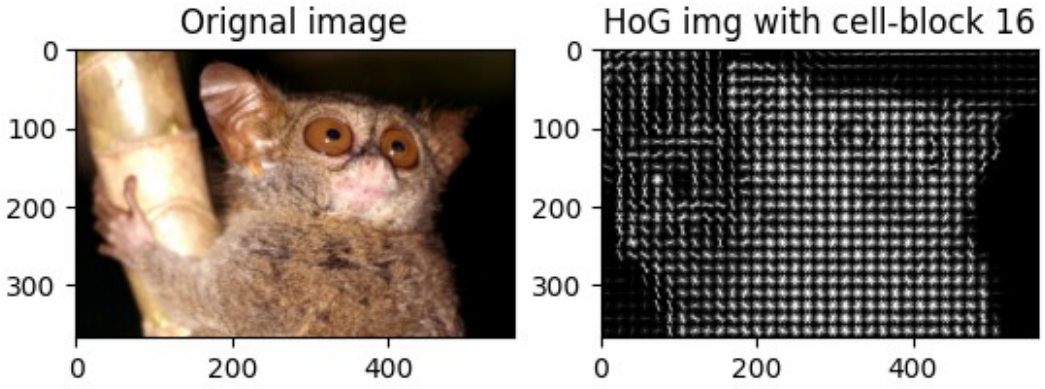



```
p2_1,p90_1=np.percentile(hog_image1,(2,90))
hog_image1_e = exposure.rescale_intensity(hog_image1,
in_range=(p2_1,p90_1))

plt.imshow(hog_image1_e, cmap="gray")
```

```
<matplotlib.image.AxesImage at 0x7d6f5158edd0>
```




```
plt.subplot(2,2,1)
plt.title('Orignal image')
plt.imshow(img1, cmap="gray")

plt.subplot(2,2,2)
plt.title('HoG img with cell-block 16')
plt.imshow(hog_image1_e, cmap='gray')

<matplotlib.image.AxesImage at 0x7d6f514d1f50>
```




```
ln_fd1 = len(fd1)
ln_fd1

26928
```