

```
In [51]: import pandas as pd
import numpy as np
from glob import glob
import cv2
from PIL import Image
import matplotlib.pyplot as plt
```

Reading In Images

```
In [52]: cat_files=glob(r"C:\Users\Shruthy\training_set\cats\*.jpg")
dog_files=glob(r"C:\Users\Shruthy\training_set\dogs\*.jpg")
```

```
In [85]: img_mpl=plt.imread(cat_files[19]) # reading in matplotlib
```

```
In [86]: img_cv2=cv2.imread(cat_files[19]) # reading using cv2
```

```
In [87]: img_mpl.shape , img_cv2.shape
```

```
Out[87]: ((377, 499, 3), (377, 499, 3))
```

Image Array (Height, Width, Channels)

```
In [88]: #Display image
fig,ax=plt.subplots(figsize=(10,10))
ax.imshow(img_mpl)
plt.show()
```



```
In [89]: fig,axs=plt.subplots(1,3,figsize=(15,5))
axs[0].imshow(img_mpl[:, :, 0],cmap='Reds')
axs[1].imshow(img_mpl[:, :, 1],cmap='Greens')
```

```
axs[2].imshow(img_mpl[:, :, 0], cmap='Blues')
axs[0].axis('off')
axs[1].axis('off')
axs[2].axis('off')
axs[0].set_title('Red Channel')
axs[1].set_title('Red Channel')
axs[2].set_title('Red Channel')
plt.show()
```

Red Channel



Red Channel



Red Channel



```
In [90]: fig, axs=plt.subplots(1,2,figsize=(15,5))
axs[0].imshow(img_mpl)
axs[1].imshow(img_cv2)
axs[0].axis('off')
axs[1].axis('off')
axs[0].set_title('MATPLOTLIB IMAGE')
axs[1].set_title('CV2 image')
plt.show()
```

MATPLOTLIB IMAGE



CV2 image



```
In [91]: # converting the open cv format that is GBR to RGB  
img_cv2_rgb=cv2.cvtColor(img_cv2, cv2.COLOR_BGR2RGB)
```

```
In [92]: fig,ax=plt.subplots()  
ax.imshow(img_cv2_rgb)  
ax.axis('off')  
plt.show()
```



## Image Manipulation

```
In [114]: img=plt.imread(dog_files[19])
```

```
In [115]: fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(img)
ax.axis('off')
plt.show()
```



```
In [116]: img_gray=cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)  
img_gray.shape
```

Out[116]: (500, 320)

```
In [117]: fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(img_gray, cmap='Greys')
ax.axis('off')
ax.set_title('Grey Image')
plt.show()
```

### Grey Image



In [123...]

```
#Resizing and scaling  
img_resized=cv2.resize(img,None,fx=0.25,fy=0.25)
```

```
fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(img_resized)
ax.axis('off')
plt.show()
```



```
In [124...]: image_resize=cv2.resize(img,(500,300))  
fig,ax=plt.subplots(figsize=(8,8))  
ax.imshow(image_resize)
```

```
ax.axis('off')
plt.show()
```



In [125...]

```
image_resize=cv2.resize(img,(5000,5000),interpolation=cv2.INTER_CUBIC)
fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(image_resize)
ax.axis('off')
plt.show()
```



In [128...]

```
#sharpening image
kernel_sharpening=np.array([[[-1,-1,-1],
                            [-1,9,-1],
```

```
[ -1, -1, -1]])
sharpened=cv2.filter2D(img,-1,kernel_sharpener)
fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(sharpened)
ax.axis('off')
plt.show()
```



In [130...]

```
#blurring  
kernel_3x3=np.ones((3,3),np.float32)/10  
blurred=cv2.filter2D(img,-1,kernel_3x3)
```

```
fig,ax=plt.subplots(figsize=(8,8))
ax.imshow(blurred)
ax.axis('off')
ax.set_title('Blurred_Image')
plt.show()
```

### Blurred\_Image



In [131...]

```
##saving  
plt.imsave('mpl_dog.png',blurred)
```

```
cv2.imwrite('cv2_dog.png',sharpened)
```

Out[131]: True