```
!pip install bing-image-downloader
```

```
Collecting bing-image-downloader
  Downloading https://files.pythonhosted.org/packages/c2/04/1872a689a30036aa0b81ac9fc
Installing collected packages: bing-image-downloader
Successfully installed bing-image-downloader-1.1.1
```

```
!mkdir images
```

```
from bing_image_downloader import downloader
downloader.download("pretty sunflower",limit=30,output_dir='images',adult_filter_off=True)
```

```
[%] Downloading Images to /content/images/pretty sunflower


[!!]Indexing page: 1

[%] Indexed 30 Images on Page 1.

===============================================

[%] Downloading Image #1 from https://pixfeeds.com/images/flowers/sunflowers/1280-
[%] File Downloaded !

[%] Downloading Image #2 from https://www.stonecirclecoaching.com/wp-content/uploa
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[%] Downloading Image #3 from https://i.pinimg.com/originals/41/e5/5b/41e55b93113d
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[%] Downloading Image #4 from https://i.pinimg.com/originals/0a/02/7a/0a027a31f226
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[%] Downloading Image #5 from https://i.pinimg.com/736x/6b/97/ae/6b97ae9fc532684b7
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[%] Downloading Image #6 from https://i.pinimg.com/originals/75/ad/3f/75ad3f4512a7
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[%] Downloading Image #7 from https://i.pinimg.com/originals/99/85/f2/9985f2356659
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[%] Downloading Image #11 from https://i.pinimg.com/originals/a9/5d/5f/a95d5fcd307
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[%] Downloading Image #12 from https://i.pinimg.com/originals/28/64/0b/28640bb3517
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[%] Downloading Image #13 from https://i.pinimg.com/originals/ae/dc/b4/aedcb4cfe5c
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[%] Downloading Image #14 from https://i.pinimg.com/originals/b0/95/1b/b0951bcdcef
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[%] Downloading Image #15 from https://api.time.com/wp-content/uploads/2016/08/sun
[%] File Downloaded !

[%] Downloading Image #16 from https://s-media-cache-ak0.pinimg.com/736x/02/64/cf/
[%] File Downloaded !

[%] Downloading Image #17 from https://i.pinimg.com/originals/0a/10/14/0a101432514
```

```
from bing_image_downloader import downloader
downloader.download("rugby ball leather",limit=30,output_dir='images',adult_filter_off=Tru
```

```
[%] Downloading Images to /content/images/rugby ball leather


[!!]Indexing page: 1

[%] Indexed 30 Images on Page 1.

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[%] Downloading Image #1 from https://i.pinimg.com/originals/36/ac/18/36ac18ae7124
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[%] Downloading Image #6 from https://i.ebayimg.com/images/g/4bcAAOSwTXdciFwx/s-l4
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[%] Downloading Image #12 from https://s-media-cache-ak0.pinimg.com/736x/f5/05/f0/
[%] File Downloaded !

[%] Downloading Image #13 from https://i.ebayimg.com/images/g/JFQAAOSw3ytec0Tw/s-l
[%] File Downloaded !

[%] Downloading Image #14 from https://sportantiques.co.uk/pub/media/catalog/produ
[%] File Downloaded !

[%] Downloading Image #15 from https://i.ebayimg.com/images/g/2rgAAOSwuvtbzNOr/s-l
[%] File Downloaded !

[%] Downloading Image #16 from https://cdn.shopify.com/s/files/1/0072/5064/1005/pr
[%] File Downloaded !

[%] Downloading Image #17 from https://www.rugbygear.com/static/ecommerce/214/2148
```

```
from bing_image_downloader import downloader
downloader.download("ice cream cone",limit=30,output_dir='images',adult_filter_off=True)
```

```
[%] Downloading Images to /content/images/ice cream cone


[!!]Indexing page: 1

[%] Indexed 30 Images on Page 1.

===============================================

[%] Downloading Image #1 from http://graphics8.nytimes.com/images/2013/06/02/magaz
[%] File Downloaded !

[%] Downloading Image #2 from https://americacomesalive.com/i/ice-cream-cone.jpg
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[%] Downloading Image #3 from https://www.thespruceeats.com/thmb/3zSpyarxfOBVAZS3C
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[%] Downloading Image #4 from https://cdn.ebs.newsner.com/wp-content/uploads/sites
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[%] Downloading Image #5 from http://www.koshericecream.com/wp-content/uploads/mag
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```

```
[%] Downloading Image #11 from https://americacomesalive.com/i/Ice_cream_cone_.jpg
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[%] Downloading Image #13 from https://www.sheknows.com/wp-content/uploads/2018/08
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[%] Downloading Image #14 from https://mysunshineroom.com/_Media/dipped-ice-cream-
[%] File Downloaded !

[%] Downloading Image #15 from https://cdn.shopify.com/s/files/1/0061/1794/9553/pr
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[%] Downloading Image #16 from https://www.barnorama.com/wp-content/images/2012/03
[%] File Downloaded !

[%] Downloading Image #17 from http://cdn-image.myrecipes.com/sites/default/files/
```

```
# preprocessing
# 1.resize
# 2.flatten
```

```
import os
import matplotlib.pyplot as plt
import numpy as np
from skimage.io import imread
from skimage.transform import resize
```

```
target = []
images = []         #images are of 2d to transform them to vector we use flat_data()
flat_data = []

DATADIR = '/content/images'
CATEGORIES = ['pretty sunflower', 'rugby ball leather', 'ice cream cone']

for category in CATEGORIES :
  class_num = CATEGORIES.index(category)    #label encoding
  path = os.path.join(DATADIR,category)          #create path to use all the images
  for img in os.listdir(path):
    img_array = imread(os.path.join(path,img))
    #print(img_array.shape)      #h,w,d
    #plt.imshow(img_array)
    img_resized = resize(img_array,(150,150,3))   #normalizes the values from 0 to 1
    flat_data.append(img_resized.flatten())
    images.append(img_resized)
    target.append(class_num)

flat_data = np.array(flat_data)
target = np.array(target)
images = np.array(images)
```

```
flat_data[0]
```

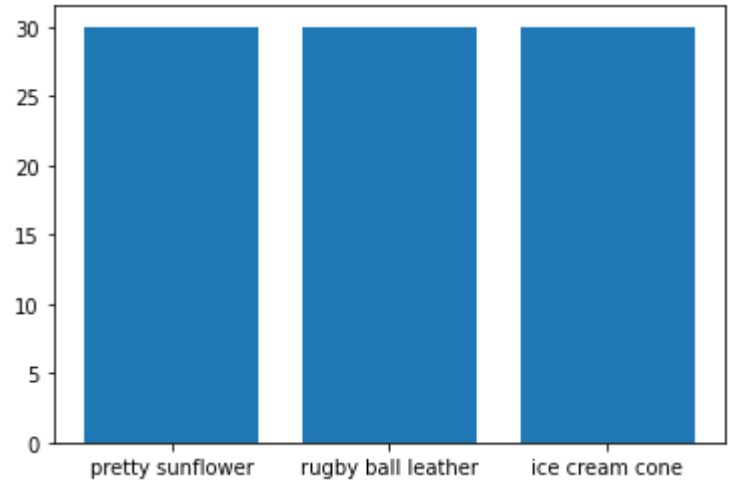
```
array([0.99607843, 0.94509804, 0.6       , ..., 0.0547519 , 0.05811765,
       0.05882353])
```

```
target
```

```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2,
       2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
       2, 2])
```

```
unique,count = np.unique(target,return_counts=True)
plt.bar(CATEGORIES,count)
```

```
<BarContainer object of 3 artists>
```




```
#split data into training and testing

from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(flat_data,target,test_size = 0.3,rando


from sklearn.model_selection import GridSearchCV
from sklearn import svm
param_grid = [
              { 'C' : [1,10,100,1000],'kernel':['linear']},
              { 'C' : [1,10,100,1000],'gamma':[0.001,0.0001],'kernel' : ['rbf']},
]

svc = svm.SVC(probability=True)
clf = GridSearchCV(svc,param_grid)
clf.fit(x_train,y_train)
```

```
GridSearchCV(cv=None, error_score=nan,
             estimator=SVC(C=1.0, break_ties=False, cache_size=200,
                           class_weight=None, coef0=0.0,
                           decision_function_shape='ovr', degree=3,
                           gamma='scale', kernel='rbf', max_iter=-1,
                           probability=True, random_state=None, shrinking=True,
```

```
                       tol=0.001, verbose=False),
             iid='deprecated', n_jobs=None,
             param_grid=[{'C': [1, 10, 100, 1000], 'kernel': ['linear']},
                        {'C': [1, 10, 100, 1000], 'gamma': [0.001, 0.0001],
                         'kernel': ['rbf']}],
             pre_dispatch='2*n_jobs', refit=True, return_train_score=False,
             scoring=None, verbose=0)
```

```
y_pred = clf.predict(x_test)
y_pred
```

```
array([2, 0, 1, 1, 2, 1, 0, 1, 1, 0, 1, 0, 1, 2, 2, 0, 2, 1, 0, 2, 2, 2,
       2, 0, 0, 2, 1])
```

```
y_test
```

```
array([1, 0, 1, 2, 2, 1, 0, 1, 1, 0, 1, 0, 1, 2, 2, 1, 2, 1, 0, 1, 2, 2,
       2, 0, 0, 0, 1])
```

```
from sklearn.metrics import accuracy_score,confusion_matrix
```

```
accuracy_score(y_pred,y_test)
```

```
0.8148148148148148
```

```
confusion_matrix(y_pred,y_test)
```

```
array([[7, 1, 0],
       [0, 8, 1],
       [1, 2, 7]])
```

```
#save the model using Pickel library
import pickle
pickle.dump(clf,open('img_model.p','wb'))
```

```
model = pickle.load(open('img_model.p','rb'))
```

```
#test the model with example
from google.colab import files
uploaded = files.upload()
```

Choose Files No file chosen Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
Saving ryg.jpg to ryg.jpg

```
#testing a brand new image
import cv2
flat_data = []
img = cv2.imread('ryg.jpg')
img_resized = resize(img,(150,150,3))
flat_data.append(img_resized.flatten())
```

```
flat_data = np.array(flat_data)
print(img.shape)
plt.imshow(img_resized)
y_out = model.predict(flat_data)
y_out = CATEGORIES[y_out[0]]
print(f' PREDICTED OUTPUT : {y_out}')
```

```
(225, 225, 3)
 PREDICTED OUTPUT : rugby ball leather
```