svm-cvd

September 8, 2023

[2]:
```
import numpy as np
import os
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.svm import SVC
from PIL import Image
import zipfile
```

[3]:
```
PATH_TRAIN = "/kaggle/input/dogs-vs-cats/train.zip"
PATH_TEST = "/kaggle/input/dogs-vs-cats/test1.zip"
RANDOM_STATE = 42
```

[4]:
```
with zipfile.ZipFile(PATH_TRAIN, 'r') as train:
    train.extractall(".")
```

[5]:
```
with zipfile.ZipFile(PATH_TEST, 'r') as test:
    test.extractall(".")
```

[6]:
```
os.listdir()
```

[6]:
```
['.virtual_documents', 'test1', 'train']
```

[7]:
```
print(f"Test  : {os.listdir('test1')[:10]} \nTrain : {os.listdir('train')[:
  ↪10]}")
```

```
Test  : ['1253.jpg', '6024.jpg', '12403.jpg', '3526.jpg', '10931.jpg',
'1991.jpg', '1184.jpg', '5002.jpg', '356.jpg', '6379.jpg']
Train : ['cat.8114.jpg', 'cat.3002.jpg', 'cat.2539.jpg', 'cat.10044.jpg',
'cat.10149.jpg', 'cat.5518.jpg', 'cat.6961.jpg', 'dog.5560.jpg', 'cat.4708.jpg',
'dog.12420.jpg']
```

[8]:
```
extracted_train = "/kaggle/working/train"
extracted_test = "/kaggle/working/test1"
```

0.0.1 Testing one image

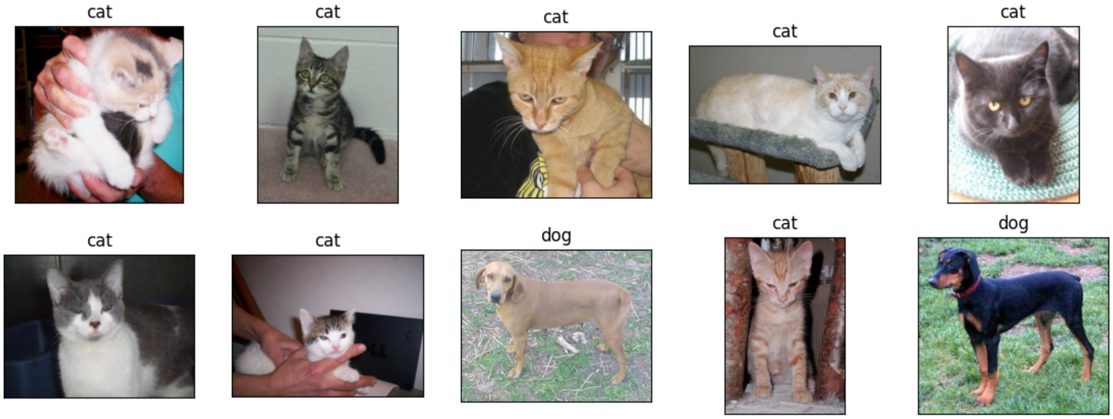
[29]:

```
img1 = Image.open(os.path.join(extracted_train,os.listdir('train')[0]))
plt.imshow(img1)
plt.title(os.listdir('train')[0].split('.')[0])
plt.xticks([])
plt.yticks([])
plt.show()
```

0.0.2 Sample training images

[30]:

```
plt.figure(figsize=(14,13))
for i in range(10):
    plt.subplot(5,5,i+1)
    plt.imshow(Image.open(os.path.join(extracted_train,os.listdir('train')[i])))
    plt.title(os.listdir('train')[i].split(".")[0])
    plt.xticks([])
    plt.yticks([])
```



[34]:

```python
def load_preprocess(directory):
    image_data = []
    labels = []

    for filename in os.listdir(directory):
        if filename.endswith('.jpg'):
            img = Image.open(os.path.join(directory, filename))
            img = img.resize((128, 128))
            img_array = np.array(img)

            label = filename.split(".")[0]

            image_data.append(img_array)
            labels.append(label)

    return np.array(image_data), np.array(labels)
```

[36]:

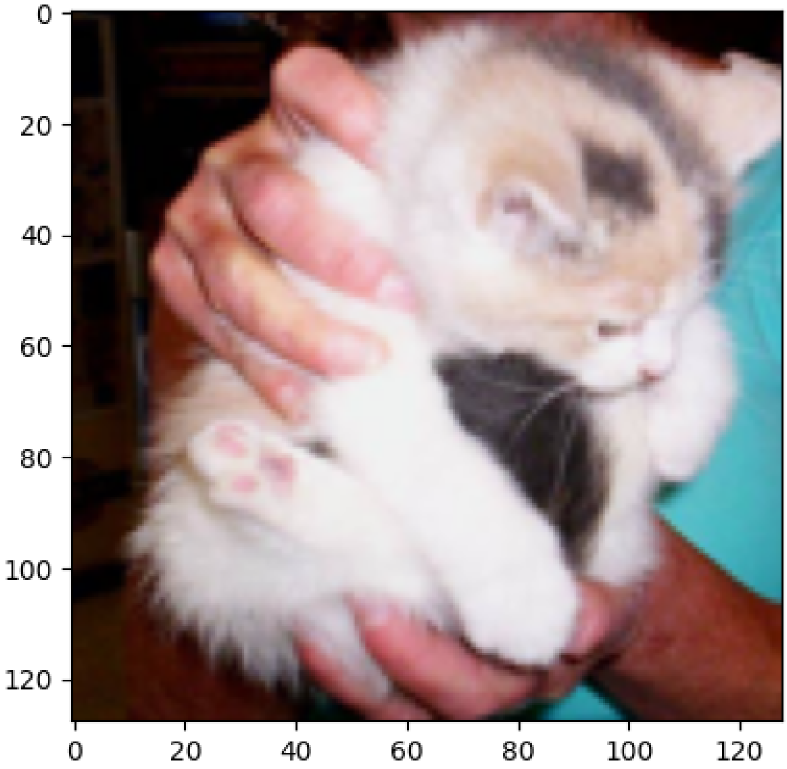
```python
train_images, train_labels = load_preprocess(extracted_train)
test_images, test_labels = load_preprocess(extracted_test)
```

[39]:

```python
plt.imshow(train_images[0])
```

[39]:

```
<matplotlib.image.AxesImage at 0x783027c5aad0>
```



[40]:
```
from tensorflow.keras.applications.vgg16 import VGG16
from tensorflow.keras.models import Model
```

[41]:
```
base_model = VGG16(weights = 'imagenet', include_top = False)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-
applications/vgg16/vgg16_weights_tf_dim_ordering_tf_kernels_notop.h5
58889256/58889256 [==============================] - 0s 0us/step
```

[42]:
```
train_features = base_model.predict(train_images)
```

```
782/782 [==============================] - 2351s 3s/step
```

[48]:
```
train_features.shape
```

[48]:
```
(25000, 4, 4, 512)
```

[65]:
```
4*4*512
```

[65]:
```
8192
```

[53]:
```
svc = SVC(kernel='rbf')
```

```
[49]: train_features_flattened = train_features.reshape(train_features.shape[0], -1)
      train_features_flattened.shape
```

```
[49]: (25000, 8192)
```

```
[54]: svc.fit(train_features_flattened, train_labels)
```

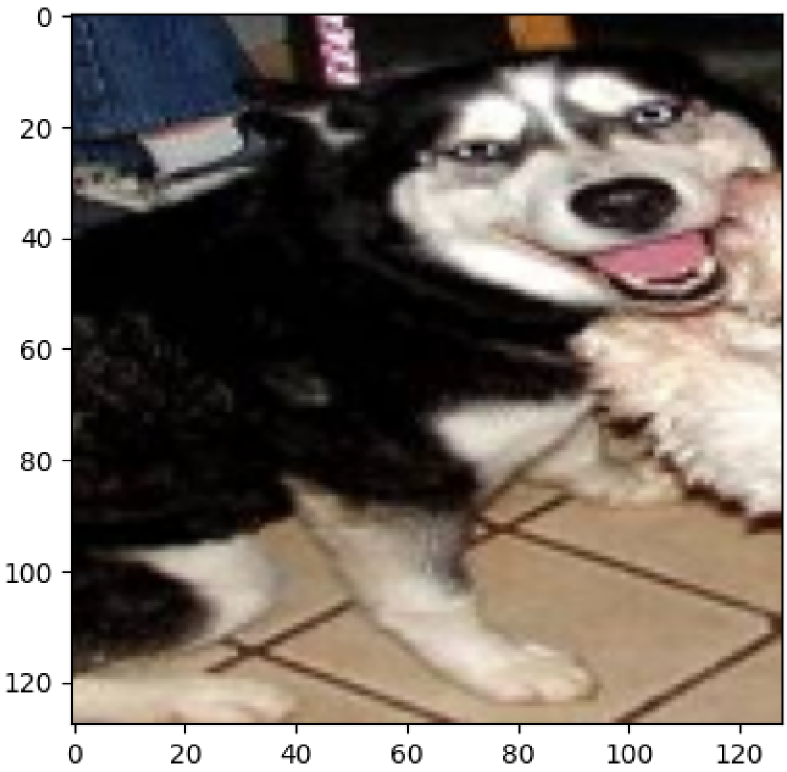
```
[54]: SVC()
```

```
[57]: svc.get_params()
```

```
[57]: {'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': False,
       'random_state': None,
       'shrinking': True,
       'tol': 0.001,
       'verbose': False}
```

```
[61]: plt.imshow(test_images[0])
```

```
[61]: <matplotlib.image.AxesImage at 0x782fe1249fc0>
```



[69]:
```
test_features = base_model.predict(test_images)
```

```
391/391 [==============================] - 1183s 3s/step
```

[70]:
```
test = test_features.reshape(test_features.shape[0], -1)
test.shape
```

[70]:
```
(12500, 8192)
```

[73]:
```
preds = svc.predict(test)
```

[74]:
```
preds
```

[74]:
```
array(['dog', 'cat', 'dog', …, 'cat', 'dog', 'cat'], dtype='<U3')
```

[75]:
```
submission = pd.read_csv("/kaggle/input/dogs-vs-cats/sampleSubmission.csv")
submission.head()
```

[75]:
```
   id  label
0   1      0
1   2      0
2   3      0
```

```
3   4       0
4   5       0
```

```
[78]: submission['l'] = preds
```

```
[92]: submission['label']=submission['l'].replace('dog',1).replace('cat',0)
```

```
[96]: submission.drop('l', axis=1, inplace=True)
```

```
[97]: submission
```

```
[97]:           id  label
      0          1      1
      1          2      0
      2          3      1
      3          4      1
      4          5      1
      …        …    …
      12495  12496      0
      12496  12497      1
      12497  12498      0
      12498  12499      1
      12499  12500      0

      [12500 rows x 2 columns]
```

```
[98]: submission.to_csv('submission.csv',)
```

```
[ ]:
```