```python
# 1.) Importing the necessary files
import os
import cv2
import numpy as np
from skimage.feature import hog
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score, classification_report
```

```python
# 2.) Extracting the HOG features.
DATADIR = '/content/PetImages'
CATEGORIES = ['Cat', 'Dog']
IMG_SIZE = 64

features = []
labels = []
```

```python
for category in CATEGORIES:
    path = os.path.join(DATADIR, category)
    class_num = CATEGORIES.index(category)

    for img_name in os.listdir(path)[:1500]:
        try:
            img_path = os.path.join(path, img_name)
            img = cv2.imread(img_path, cv2.IMREAD_GRAYSCALE)
            img = cv2.resize(img, (IMG_SIZE, IMG_SIZE))

            fd = hog(img, orientations=9, pixels_per_cell=(8, 8),
                     cells_per_block=(2, 2), visualize=False)
```

```
            features.append(fd)
            labels.append(class_num)
        except Exception as e:
            continue
```

```
# 3.) Converting to numpy arrays.
X = np.array(features)
y = np.array(labels)

# 4.) Splitting the data.
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
# 5.) Training SVM.
svm_model = SVC(kernel='rbf', C=1.0, probability=True)
svm_model.fit(X_train, y_train)
```

SVC

SVC(probability=True)

```
y_pred = svm_model.predict(X_test)
print(f"Accuracy with HOG: {accuracy_score(y_test, y_pred) * 100:.2f}%")
print(classification_report(y_test, y_pred, target_names=CATEGORIES))
```

```
Accuracy with HOG: 74.67%
              precision    recall  f1-score   support

         Cat       0.77      0.74      0.75       313
         Dog       0.73      0.75      0.74       287
```

```
    accuracy                           0.75       600
   macro avg       0.75      0.75      0.75       600
weighted avg       0.75      0.75      0.75       600
```