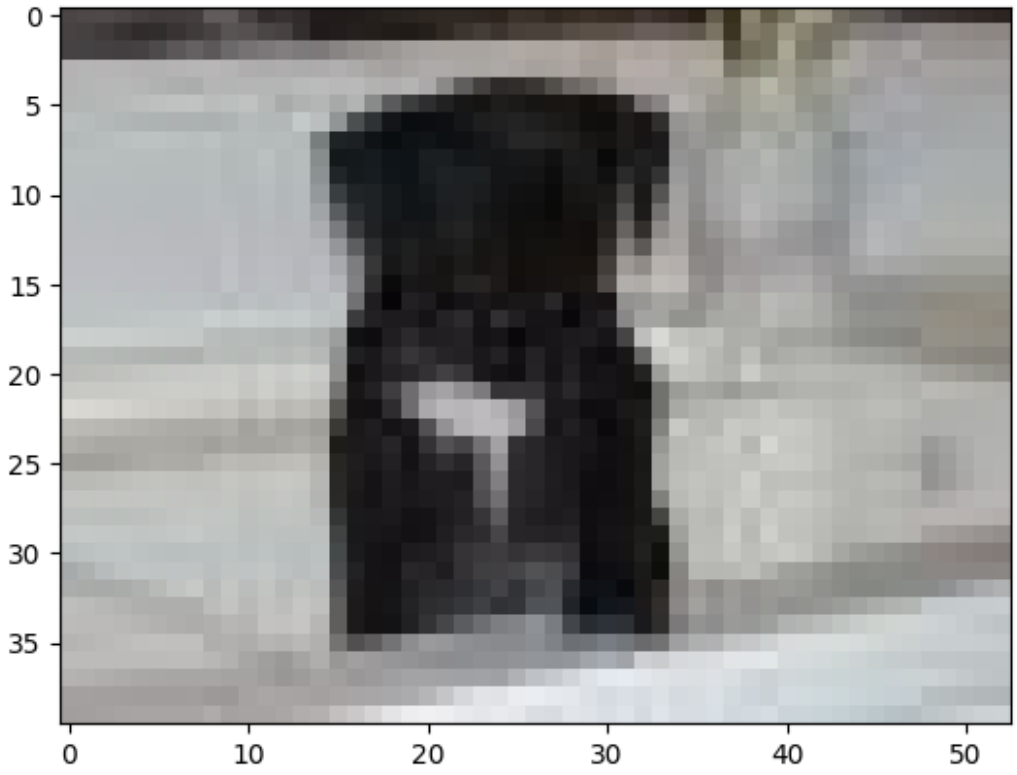
```
import os
# counting the number of files in train folder
path, dirs, files = next(os.walk('./images'))
file_count = len(files)
print('Number of images: ', file_count)
```

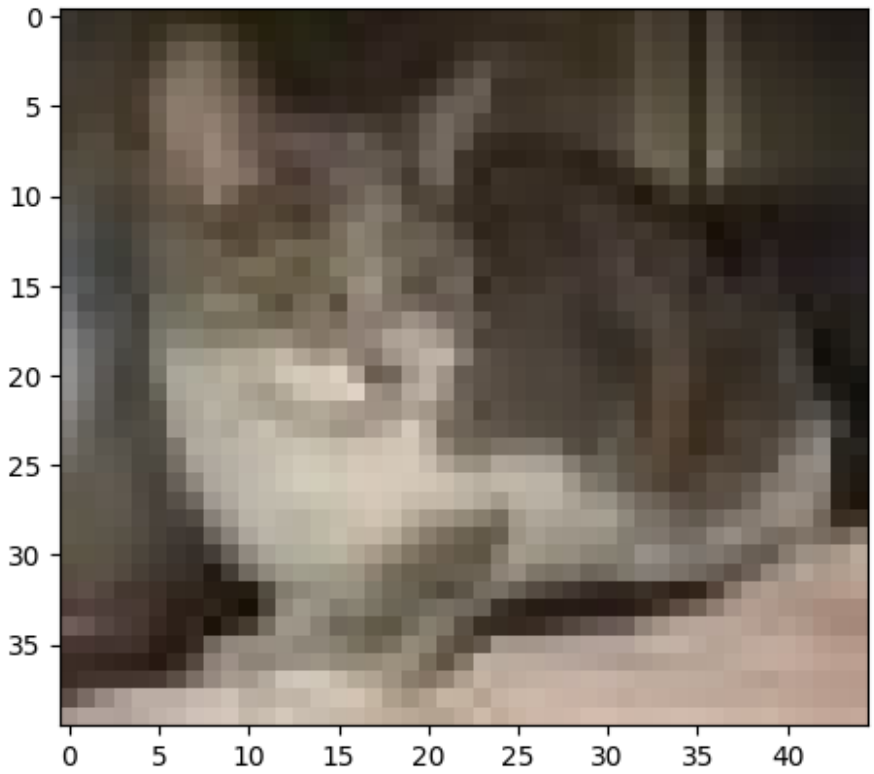
```
Number of images:  25000
```

```
import numpy as np
from PIL import Image
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
from sklearn.model_selection import train_test_split
import cv2

# display dog image
img = mpimg.imread('./images/dog.8298.jpg')
imgplt = plt.imshow(img)
plt.show()
```




```
# display cat image
img = mpimg.imread('./images/cat.4352.jpg')
imgplt = plt.imshow(img)
plt.show()
```




```
original_folder = './images/'
resized_folder = './resized/'

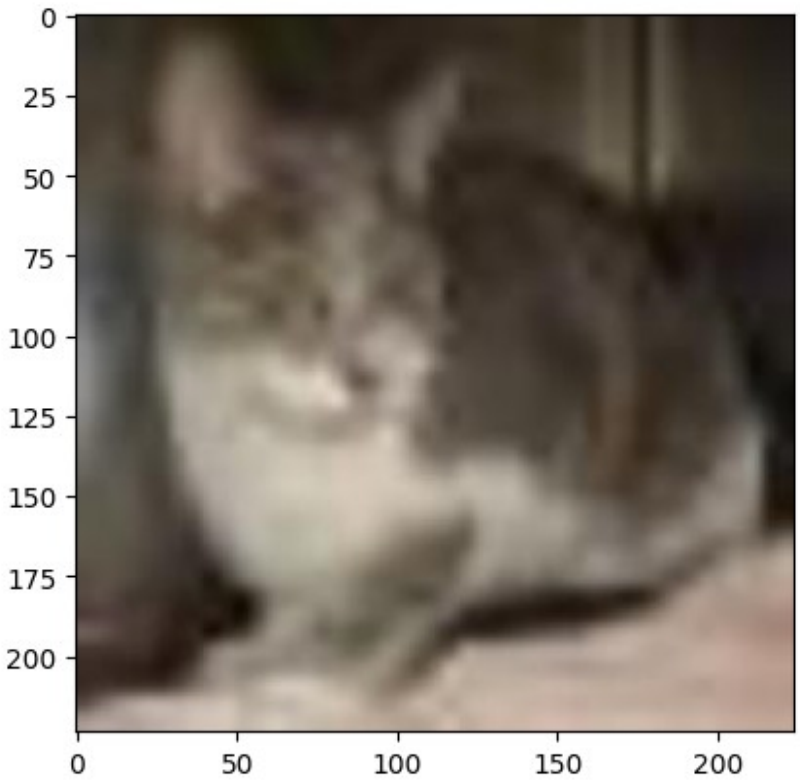
for i in range(25000):

  filename = os.listdir(original_folder)[i]
  img_path = original_folder+filename

  img = Image.open(img_path)
  img = img.resize((224, 224))
  img = img.convert('RGB')

  newImgPath = resized_folder+filename
  img.save(newImgPath)

# display cat image
img = mpimg.imread('./resized/cat.4352.jpg')
imgplt = plt.imshow(img)
plt.show()
```




```
# creaing a for loop to assign labels
filenames = os.listdir('./resized/')


labels = []

for i in range(25000):

  file_name = filenames[i]
  label = file_name[0:3]

  if label == 'dog':
    labels.append(1)

  else:
    labels.append(0)

print(filenames[0:5])
print(len(filenames))
```

```
['cat.0.jpg', 'cat.1.jpg', 'cat.10.jpg', 'cat.100.jpg',
'cat.1000.jpg']
25000
```

```
print(labels)
print(len(labels))
```

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25000

# counting the images of dogs and cats out of 25000 images
values, counts = np.unique(labels, return_counts=True)
```

```
print(values)
print(counts)
```

```
[0 1]
[12500 12500]
```

```
import glob
image_directory = './resized/'
image_extension = ['png', 'jpg']

files = []

[files.extend(glob.glob(image_directory + '*.' + e)) for e in
image_extension]

dog_cat_images = np.asarray([cv2.imread(file) for file in files])

print(dog_cat_images)
```

```
[[[[ 89 161 201]
   [ 89 161 201]
   [ 89 164 203]
   ...
   [133 207 241]
   [133 207 241]
   [133 207 241]]

  [[ 88 160 200]
   [ 89 161 201]
   [ 88 163 202]
   ...
   [133 207 241]
   [133 207 241]
   [133 207 241]]

  [[ 88 160 200]
   [ 89 161 201]
   [ 88 163 202]
   ...
   [133 207 241]
   [133 207 241]
   [133 207 241]]

  ...

  [[ 53 124 162]
   [ 53 124 162]
   [ 52 123 161]
   ...
   [  3   1   1]
   [  3   1   1]
```

```
   [  3   1   1]]

  [[ 53 124 162]
   [ 53 124 162]
   [ 53 124 162]
   ...
   [  5   0   1]
   [  5   0   1]
   [  5   0   1]]

  [[ 54 125 163]
   [ 54 125 163]
   [ 53 124 162]
   ...
   [  5   0   1]
   [  5   0   1]
   [  5   0   1]]]


 [[[ 48  44  39]
   [ 47  43  38]
   [ 47  43  38]
   ...
   [184 184 178]
   [188 189 185]
   [191 192 188]]

  [[ 48  44  39]
   [ 47  43  38]
   [ 47  43  38]
   ...
   [184 184 178]
   [188 189 185]
   [191 192 188]]

  [[ 47  43  38]
   [ 47  43  38]
   [ 47  43  38]
   ...
   [185 184 180]
   [189 190 186]
   [192 193 189]]

  ...

  [[ 22  23  21]
   [ 22  23  21]
   [ 22  23  21]
   ...
   [ 42  45  59]
```

```
   [ 42  45  59]
   [ 41  44  58]]

  [[ 22  23  21]
   [ 22  23  21]
   [ 22  23  21]
   ...
   [ 41  44  58]
   [ 40  43  57]
   [ 40  43  57]]

  [[ 22  23  21]
   [ 22  23  21]
   [ 22  23  21]
   ...
   [ 41  44  58]
   [ 40  43  57]
   [ 39  42  56]]]


 [[[ 58  50  33]
   [ 58  50  33]
   [ 57  49  32]
   ...
   [160 167 132]
   [161 168 133]
   [161 168 133]]

  [[ 58  50  33]
   [ 57  49  32]
   [ 57  49  32]
   ...
   [160 167 132]
   [161 168 133]
   [161 168 133]]

  [[ 58  49  35]
   [ 58  49  35]
   [ 57  48  34]
   ...
   [160 167 132]
   [161 168 133]
   [161 168 133]]

  ...

  [[117 152 166]
   [117 152 166]
   [117 152 166]
   ...
```

```
   [ 27 178 185]
   [ 27 178 185]
   [ 27 178 185]]

  [[115 150 164]
   [116 151 165]
   [116 151 165]
   ...
   [ 27 178 185]
   [ 25 178 185]
   [ 25 178 185]]

  [[115 150 164]
   [115 150 164]
   [115 150 164]
   ...
   [ 27 178 185]
   [ 25 178 185]
   [ 25 178 185]]]


 ...


 [[[ 52  38  40]
   [ 53  39  41]
   [ 54  40  42]
   ...
   [ 53  65  75]
   [ 54  66  76]
   [ 55  67  77]]

  [[ 52  38  40]
   [ 53  39  41]
   [ 54  40  42]
   ...
   [ 54  66  76]
   [ 54  66  76]
   [ 55  67  77]]

  [[ 52  37  41]
   [ 53  38  42]
   [ 53  39  43]
   ...
   [ 54  66  76]
   [ 55  67  77]
   [ 55  67  77]]

  ...
```

```
  [[ 59  90 113]
   [ 60  91 114]
   [ 66  97 120]
   ...
   [ 98 142 173]
   [ 99 143 174]
   [ 99 143 174]]

  [[ 58  89 112]
   [ 59  90 113]
   [ 65  96 119]
   ...
   [ 98 141 174]
   [ 99 142 175]
   [ 98 141 174]]

  [[ 58  89 112]
   [ 59  90 113]
   [ 65  96 119]
   ...
   [ 98 141 174]
   [ 98 141 174]
   [ 98 141 174]]]


 [[[227 246 254]
   [225 244 252]
   [223 241 252]
   ...
   [232 254 255]
   [232 254 255]
   [232 254 255]]

  [[227 246 254]
   [225 244 252]
   [224 242 253]
   ...
   [229 251 255]
   [230 252 255]
   [230 252 255]]

  [[226 245 253]
   [225 244 252]
   [224 242 253]
   ...
   [222 244 255]
   [223 245 255]
   [223 245 255]]

  ...
```

```
  [[ 73  82  96]
   [ 73  82  96]
   [ 73  82  96]
   ...
   [107 113 118]
   [107 113 118]
   [107 113 118]]

  [[ 74  83  97]
   [ 74  83  97]
   [ 74  83  97]
   ...
   [106 112 117]
   [106 112 117]
   [106 112 117]]

  [[ 74  83  97]
   [ 74  83  97]
   [ 74  83  97]
   ...
   [105 111 116]
   [105 111 116]
   [105 111 116]]]


 [[[232 243 247]
   [232 243 247]
   [232 243 247]
   ...
   [244 249 250]
   [244 249 250]
   [244 249 250]]

  [[231 242 246]
   [231 242 246]
   [231 242 246]
   ...
   [245 250 251]
   [245 250 251]
   [245 250 251]]

  [[231 242 246]
   [231 242 246]
   [231 242 246]
   ...
   [245 250 251]
   [245 250 251]
   [245 250 251]]
```

```
  ...

  [[ 82  83  79]
   [ 82  83  79]
   [ 83  84  80]
   ...
   [254 254 254]
   [254 254 254]
   [254 254 254]]

  [[ 83  84  80]
   [ 83  84  80]
   [ 84  85  81]
   ...
   [254 254 254]
   [254 254 254]
   [254 254 254]]

  [[ 83  84  80]
   [ 84  85  81]
   [ 84  85  81]
   ...
   [254 254 254]
   [254 254 254]
   [254 254 254]]]
```

```
type(dog_cat_images)
```

```
numpy.ndarray
```

```
print(dog_cat_images.shape)
```

```
(25000, 224, 224, 3)
```

```
X = dog_cat_images
Y = np.asarray(labels)

X_train, X_test, Y_train, Y_test = train_test_split(X, Y,
test_size=0.2, random_state=2)
```

```
print(X.shape, X_train.shape, X_test.shape)
```

```
(25000, 224, 224, 3) (20000, 224, 224, 3) (5000, 224, 224, 3)
```

20000 --> training images

5000 --> test images

```
# scaling the data
X_train_scaled = X_train/255
```

```
X_test_scaled = X_test/255

print(X_train_scaled)
```

```
[[[[0.16862745 0.24705882 0.31372549]
   [0.16862745 0.24705882 0.31372549]
   [0.16862745 0.24705882 0.31372549]
   ...
   [0.68235294 0.69803922 0.70196078]
   [0.67843137 0.69411765 0.69803922]
   [0.6745098  0.69019608 0.69411765]]

  [[0.17254902 0.25098039 0.31764706]
   [0.17254902 0.25098039 0.31764706]
   [0.17254902 0.25098039 0.31764706]
   ...
   [0.68235294 0.69803922 0.70196078]
   [0.67843137 0.69411765 0.69803922]
   [0.67843137 0.69411765 0.69803922]]

  [[0.18431373 0.2627451  0.32941176]
   [0.18039216 0.25882353 0.3254902 ]
   [0.18039216 0.25882353 0.3254902 ]
   ...
   [0.68627451 0.70196078 0.70588235]
   [0.68235294 0.69803922 0.70196078]
   [0.68235294 0.69803922 0.70196078]]

  ...

  [[0.38039216 0.42745098 0.44313725]
   [0.38431373 0.43137255 0.44705882]
   [0.38431373 0.43137255 0.44705882]
   ...
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]]

  [[0.37254902 0.41960784 0.43529412]
   [0.37254902 0.41960784 0.43529412]
   [0.37647059 0.42352941 0.43921569]
   ...
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]]

  [[0.37254902 0.41960784 0.43529412]
   [0.37254902 0.41960784 0.43529412]
   [0.37254902 0.41960784 0.43529412]
```

```
   ...
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]
   [0.62352941 0.62745098 0.61176471]]]


 [[[0.5254902  0.49411765 0.52156863]
   [0.52156863 0.49019608 0.51764706]
   [0.50980392 0.47843137 0.50588235]
   ...
   [0.03921569 0.09019608 0.14509804]
   [0.03921569 0.09019608 0.14509804]
   [0.03921569 0.09019608 0.14509804]]

  [[0.53333333 0.50196078 0.52941176]
   [0.5254902  0.49411765 0.52156863]
   [0.51764706 0.48627451 0.51372549]
   ...
   [0.04705882 0.09803922 0.15294118]
   [0.04313725 0.09411765 0.14901961]
   [0.04313725 0.09411765 0.14901961]]

  [[0.54117647 0.50980392 0.5372549 ]
   [0.53333333 0.50196078 0.52941176]
   [0.5254902  0.49411765 0.52156863]
   ...
   [0.0627451  0.11372549 0.16862745]
   [0.05882353 0.10980392 0.16470588]
   [0.05882353 0.10980392 0.16470588]]

  ...

  [[0.74509804 0.66666667 0.68627451]
   [0.74117647 0.6627451  0.68235294]
   [0.74117647 0.6627451  0.68235294]
   ...
   [0.59607843 0.54901961 0.59607843]
   [0.59215686 0.54509804 0.59215686]
   [0.59215686 0.54509804 0.59215686]]

  [[0.77254902 0.69019608 0.72156863]
   [0.77254902 0.69019608 0.72156863]
   [0.77254902 0.69019608 0.72156863]
   ...
   [0.59607843 0.54901961 0.59607843]
   [0.59215686 0.54509804 0.59215686]
   [0.59215686 0.54509804 0.59215686]]

  [[0.78039216 0.69803922 0.72941176]
   [0.78039216 0.69803922 0.72941176]
```

```
   [0.78039216 0.69803922 0.72941176]
   ...
   [0.59215686 0.54509804 0.59215686]
   [0.59215686 0.54509804 0.59215686]
   [0.58823529 0.54117647 0.58823529]]]


 [[[0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   ...
   [0.79607843 0.75294118 0.69803922]
   [0.79215686 0.74901961 0.69411765]
   [0.79215686 0.74901961 0.69411765]]

  [[0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   ...
   [0.8        0.75686275 0.70196078]
   [0.79607843 0.75294118 0.69803922]
   [0.79215686 0.74901961 0.69411765]]

  [[0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   [0.70196078 0.81960784 0.8627451 ]
   ...
   [0.80392157 0.76078431 0.70588235]
   [0.8        0.75686275 0.70196078]
   [0.8        0.75686275 0.70196078]]

  ...

  [[0.28235294 0.38823529 0.44313725]
   [0.27843137 0.38431373 0.43921569]
   [0.2745098  0.38039216 0.43529412]
   ...
   [0.63137255 0.59607843 0.58431373]
   [0.62745098 0.59215686 0.58039216]
   [0.62352941 0.58823529 0.57647059]]

  [[0.28235294 0.38823529 0.44313725]
   [0.28235294 0.38823529 0.44313725]
   [0.27843137 0.38431373 0.43921569]
   ...
   [0.63137255 0.59607843 0.58431373]
   [0.62352941 0.58823529 0.57647059]
   [0.61960784 0.58431373 0.57254902]]

  [[0.28235294 0.38823529 0.44313725]
```

```
   [0.28235294 0.38823529 0.44313725]
   [0.27843137 0.38431373 0.43921569]
   ...
   [0.63137255 0.59607843 0.58431373]
   [0.62352941 0.58823529 0.57647059]
   [0.61960784 0.58431373 0.57254902]]]


 ...


 [[[0.31372549 0.41960784 0.50196078]
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   [0.29803922 0.39215686 0.47843137]
   ...
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]]

  [[0.30980392 0.41568627 0.49803922]
   [0.30196078 0.40784314 0.49019608]
   [0.29411765 0.38823529 0.4745098 ]
   ...
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]]

  [[0.30980392 0.41568627 0.49803922]
   [0.30196078 0.40784314 0.49019608]
   [0.29411765 0.38823529 0.4745098 ]
   ...
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]
   [0.10980392 0.09019608 0.08627451]]

  ...

  [[0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   ...
   [0.09019608 0.10196078 0.09411765]
   [0.09019608 0.10196078 0.09411765]
   [0.09019608 0.10196078 0.09411765]]

  [[0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   ...
   [0.09019608 0.10196078 0.09411765]
```

```
   [0.09019608 0.10196078 0.09411765]
   [0.09411765 0.10588235 0.09803922]]

  [[0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   [0.87058824 0.74901961 0.61960784]
   ...
   [0.09019608 0.10196078 0.09411765]
   [0.09411765 0.10588235 0.09803922]
   [0.09411765 0.10588235 0.09803922]]]


 [[[0.69411765 0.64313725 0.69803922]
   [0.68235294 0.63137255 0.68627451]
   [0.65882353 0.60784314 0.6627451 ]
   ...
   [0.75686275 0.61568627 0.75686275]
   [0.78039216 0.62745098 0.77647059]
   [0.78039216 0.62745098 0.77647059]]

  [[0.69019608 0.63921569 0.69411765]
   [0.67843137 0.62745098 0.68235294]
   [0.65490196 0.60392157 0.65882353]
   ...
   [0.75294118 0.61176471 0.75294118]
   [0.77647059 0.62352941 0.77254902]
   [0.77647059 0.62352941 0.77254902]]

  [[0.68235294 0.63137255 0.68627451]
   [0.67058824 0.61960784 0.6745098 ]
   [0.64313725 0.59215686 0.64705882]
   ...
   [0.74901961 0.60784314 0.74901961]
   [0.76862745 0.61568627 0.76470588]
   [0.76862745 0.61568627 0.76470588]]

  ...

  [[0.78431373 0.6627451  0.78431373]
   [0.77647059 0.65490196 0.77647059]
   [0.76470588 0.64313725 0.76470588]
   ...
   [0.68627451 0.54901961 0.70588235]
   [0.69411765 0.55686275 0.71372549]
   [0.69803922 0.56078431 0.71764706]]

  [[0.79215686 0.66666667 0.78823529]
   [0.78431373 0.65882353 0.78039216]
   [0.77254902 0.64705882 0.76862745]
   ...
```

```
   [0.69019608 0.55294118 0.70980392]
   [0.70196078 0.56470588 0.72156863]
   [0.70588235 0.56862745 0.7254902 ]]

  [[0.79215686 0.66666667 0.78823529]
   [0.78823529 0.6627451  0.78431373]
   [0.77647059 0.65098039 0.77254902]
   ...
   [0.69019608 0.55294118 0.70980392]
   [0.70196078 0.56470588 0.72156863]
   [0.70588235 0.56862745 0.7254902 ]]]


 [[[0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   ...
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]]

  [[0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   ...
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]]

  [[0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   [0.65882353 0.81960784 0.87843137]
   ...
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]
   [0.70980392 0.81176471 0.8745098 ]]

  ...

  [[0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
   ...
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]]

  [[0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
```

```
   ...
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]]

  [[0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
   [0.61960784 0.80784314 0.90196078]
   ...
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]
   [0.58039216 0.78823529 0.89411765]]]
```

```
import tensorflow as tf
import tensorflow_hub as hub
```

```
<module 'tensorflow._api.v2.version' from 'c:\\Users\\Piotr\\Desktop\\
School\\IntelOb\\.venv\\Lib\\site-packages\\tensorflow\\_api\\v2\\
version\\__init__.py'>
<function version at 0x000001D40F2DADE0>
```

```
import keras
from keras.applications import MobileNetV2
from keras.applications.mobilenet import preprocess_input
from tensorflow.keras.layers import Dense
from tensorflow.keras.models import Sequential

model = Sequential()

pretrained_model = tf.keras.applications.MobileNetV2(input_shape=(224,
224, 3), include_top=False, classifier_activation="softmax",
classes=2)

for layer in pretrained_model.layers:
    layer.trainable = False

model.add(pretrained_model)
model.add(Dense(2, activation='softmax'))
model.summary()
```

```
Model: "sequential_40"
```

```
┏━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━┳━━━━━━━━━━━━━━━━━━━━━━━━━━━━━┳━━━━━━━━━━━━━
━━┓
┃ Layer (type)                         ┃ Output Shape                ┃
Param # ┃
┡━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇━━━━━━━━━━━━━
━━┩
│ mobilenetv2_1.00_224                 │ ?                           │
2,257,984 │
│ (Functional)                         │                             │
```

```
┃                                      ┃                             ┃            ┃
┡━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇━━━━━━━━━━━━┩
│ dense_34 (Dense)                     │ ?                           │          0 │
└──────────────────────────────────────┴─────────────────────────────┴────────────┘

 Total params: 2,257,984 (8.61 MB)

 Trainable params: 0 (0.00 B)

 Non-trainable params: 2,257,984 (8.61 MB)
```

```
pretrained_model =
hub.KerasLayer("https://www.kaggle.com/models/google/mobilenet-v2/
TensorFlow2/tf2-preview-feature-vector/4")
!set TF_USE_LEGACY_KERAS=1
num_of_classes = 2
m = tf.keras.Sequential([
    hub.KerasLayer("https://www.kaggle.com/models/google/mobilenet-
v2/TensorFlow2/tf2-preview-feature-vector/4", output_shape=[1280],
                   trainable=False),  # Can be True, see below.
    tf.keras.layers.Dense(2, activation='softmax')
])

#model.compile(optimizer='adam',
loss='sparse_categorical_crossentropy', metrics=['accuracy'])

model.summary()
```

```
---------------------------------------------------------------------------
-----
ValueError                                Traceback (most recent call
last)
Cell In[86], line 4
      2 get_ipython().system('set TF_USE_LEGACY_KERAS=1')
      3 num_of_classes = 2
----> 4 m = tf.keras.Sequential([
      5
hub.KerasLayer("https://www.kaggle.com/models/google/mobilenet-v2/
TensorFlow2/tf2-preview-feature-vector/4", output_shape=[1280],
      6                    trainable=False),  # Can be True, see
below.
      7     tf.keras.layers.Dense(2, activation='softmax')
      8 ])
     10 #model.compile(optimizer='adam',
loss='sparse_categorical_crossentropy', metrics=['accuracy'])
     12 model.summary()

File c:\Users\Piotr\Desktop\School\IntelOb\.venv\Lib\site-packages\
```

```
keras\src\models\sequential.py:73, in Sequential.__init__(self,
layers, trainable, name)
     71 if layers:
     72     for layer in layers:
---> 73         self.add(layer, rebuild=False)
     74     self._maybe_rebuild()

File c:\Users\Piotr\Desktop\School\IntelOb\.venv\Lib\site-packages\
keras\src\models\sequential.py:95, in Sequential.add(self, layer,
rebuild)
     93         layer = origin_layer
     94 if not isinstance(layer, Layer):
---> 95     raise ValueError(
     96         "Only instances of `keras.Layer` can be "
     97         f"added to a Sequential model. Received: {layer} "
     98         f"(of type {type(layer)})"
     99     )
    100 if not self._is_layer_name_unique(layer):
    101     raise ValueError(
    102         "All layers added to a Sequential model "
    103         f"should have unique names. Name '{layer.name}' is
already "
    104         "the name of a layer in this model. Update the `name`
argument "
    105         "to pass a unique name."
    106     )

ValueError: Only instances of `keras.Layer` can be added to a
Sequential model. Received: <tensorflow_hub.keras_layer.KerasLayer
object at 0x000001D415106DE0> (of type <class
'tensorflow_hub.keras_layer.KerasLayer'>)
```

```
# model.compile(
#     optimizer = 'adam',
#     loss =
tf.keras.losses.SparseCategoricalCrossentropy(from_logits=True),
#     metrics = ['acc']
# )

# model.fit(X_train_scaled, Y_train, epochs=5)
```

```
Epoch 1/5

---------------------------------------------------------------------
-----
ValueError                                Traceback (most recent call
last)
Cell In[67], line 1
----> 1 model.fit(X_train_scaled, Y_train, epochs=5)
```

```
File c:\Users\Piotr\Desktop\School\IntelOb\.venv\Lib\site-packages\
keras\src\utils\traceback_utils.py:122, in
filter_traceback.<locals>.error_handler(*args, **kwargs)
    119     filtered_tb = _process_traceback_frames(e.__traceback__)
    120     # To get the full stack trace, call:
    121     # `keras.config.disable_traceback_filtering()`
--> 122     raise e.with_traceback(filtered_tb) from None
    123 finally:
    124     del filtered_tb

File c:\Users\Piotr\Desktop\School\IntelOb\.venv\Lib\site-packages\
keras\src\backend\tensorflow\nn.py:642, in
sparse_categorical_crossentropy(target, output, from_logits, axis)
    636     raise ValueError(
    637         "Argument `output` must be at least rank 1. "
    638         "Received: "
    639         f"output.shape={output.shape}"
    640     )
    641 if len(target.shape) != len(output.shape[:-1]):
--> 642     raise ValueError(
    643         "Argument `output` must have rank (ndim) `target.ndim
- 1`. "
    644         "Received: "
    645         f"target.shape={target.shape},
output.shape={output.shape}"
    646     )
    647 for e1, e2 in zip(target.shape, output.shape[:-1]):
    648     if e1 is not None and e2 is not None and e1 != e2:

ValueError: Argument `output` must have rank (ndim) `target.ndim - 1`.
Received: target.shape=(32,), output.shape=(32, 7, 7, 2)
```