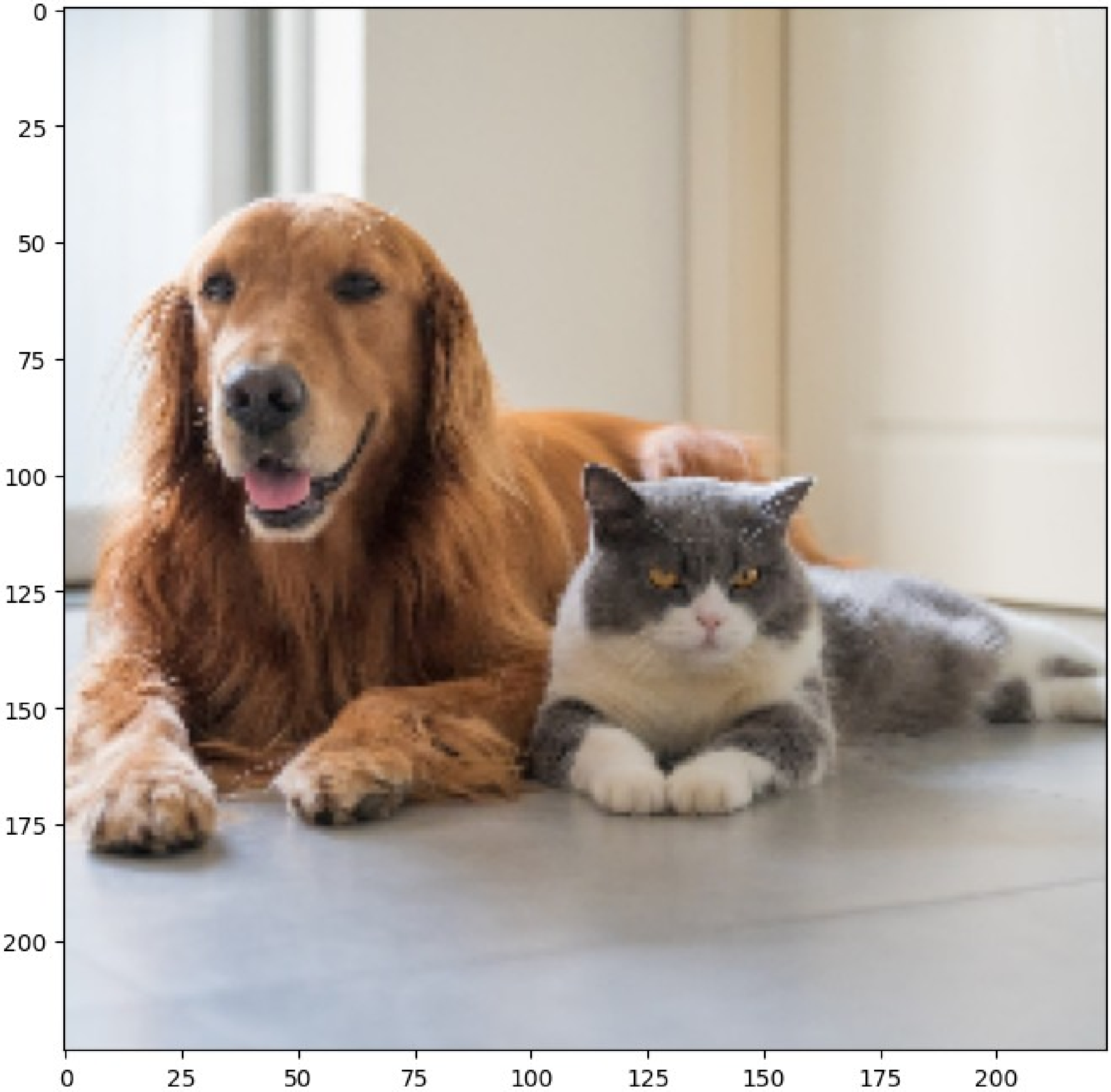
```python
import cv2
import numpy as np
import tensorflow as tf
import matplotlib.pyplot as plt
import urllib.request

def imshow(img):
    fig,ax=plt.subplots(1,1,figsize=(8,8))
    ax.imshow(img)

path_img='https://d.newsweek.com/en/full/1809693/cat-dog.jpg?w=1600&h=1600&q=88&f=117239ddc10e0929372035ef0b425e2e'

req=urllib.request.urlopen(path_img)
arr=np.asarray(bytearray(req.read()),dtype=np.uint8)
img =cv2.imdecode(arr,-1)
img=cv2.cvtColor(img,cv2.COLOR_BGR2RGB)
img=cv2.resize(img,(224,224))

imshow(img)
```



```
model = tf.keras.applications.vgg16.VGG16(weights="imagenet",
include_top = True)
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-
applications/vgg16/vgg16_weights_tf_dim_ordering_tf_kernels.h5
553467096/553467096 ━━━━━━━━━━━━━━━━━━━━ 14s 0us/step
```

```
model.summary()
```

```
Model: "vgg16"

┏━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━┳━━━━━━━━━━━━━━━━━━━━━━━━━━━━━┳
━━━━━━━━━━━━━━━━━┓
```

```
┃ Layer (type)                         ┃ Output Shape                ┃
Param # ┃
┡━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇━━━━━━━━━━━━━━━━━━━━━━━━━━━━━╇
━━━━━━━━━━━━━━━━━┩
│ input_layer (InputLayer)             │ (None, 224, 224, 3)         │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block1_conv1 (Conv2D)                │ (None, 224, 224, 64)        │
1,792 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block1_conv2 (Conv2D)                │ (None, 224, 224, 64)        │
36,928 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block1_pool (MaxPooling2D)           │ (None, 112, 112, 64)        │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block2_conv1 (Conv2D)                │ (None, 112, 112, 128)       │
73,856 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block2_conv2 (Conv2D)                │ (None, 112, 112, 128)       │
147,584 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block2_pool (MaxPooling2D)           │ (None, 56, 56, 128)         │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block3_conv1 (Conv2D)                │ (None, 56, 56, 256)         │
295,168 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block3_conv2 (Conv2D)                │ (None, 56, 56, 256)         │
590,080 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block3_conv3 (Conv2D)                │ (None, 56, 56, 256)         │
590,080 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block3_pool (MaxPooling2D)           │ (None, 28, 28, 256)         │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block4_conv1 (Conv2D)                │ (None, 28, 28, 512)         │
```

```
1,180,160 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block4_conv2 (Conv2D)                 │ (None, 28, 28, 512)         │
2,359,808 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block4_conv3 (Conv2D)                 │ (None, 28, 28, 512)         │
2,359,808 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block4_pool (MaxPooling2D)            │ (None, 14, 14, 512)         │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block5_conv1 (Conv2D)                 │ (None, 14, 14, 512)         │
2,359,808 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block5_conv2 (Conv2D)                 │ (None, 14, 14, 512)         │
2,359,808 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block5_conv3 (Conv2D)                 │ (None, 14, 14, 512)         │
2,359,808 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ block5_pool (MaxPooling2D)            │ (None, 7, 7, 512)           │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ flatten (Flatten)                     │ (None, 25088)               │
0 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ fc1 (Dense)                           │ (None, 4096)                │
102,764,544 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ fc2 (Dense)                           │ (None, 4096)                │
16,781,312 │
├──────────────────────────────────────┼─────────────────────────────┼
─────────────────┤
│ predictions (Dense)                   │ (None, 1000)                │
4,097,000 │
└──────────────────────────────────────┴─────────────────────────────┴
─────────────────┘

 Total params: 138,357,544 (527.79 MB)
 Trainable params: 138,357,544 (527.79 MB)
```

```
 Non-trainable params: 0 (0.00 B)
```

```
img_tensor=np.array([img])
```

```
img_tensor.shape
```

```
(1, 224, 224, 3)
```

```
np.argmax(model.predict(img_tensor))
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 655ms/step
```

```
216
```

```
!pip install tf_explain
```

```
/usr/lib/python3.10/pty.py:89: RuntimeWarning: os.fork() was called.
os.fork() is incompatible with multithreaded code, and JAX is
multithreaded, so this will likely lead to a deadlock.
  pid, fd = os.forkpty()
```

```
Collecting tf_explain
  Downloading tf_explain-0.3.1-py3-none-any.whl.metadata (9.3 kB)
Downloading tf_explain-0.3.1-py3-none-any.whl (43 kB)
━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 43.6/43.6 kB 1.4 MB/s eta
0:00:00
```

```
from tf_explain.core.grad_cam import GradCAM
```

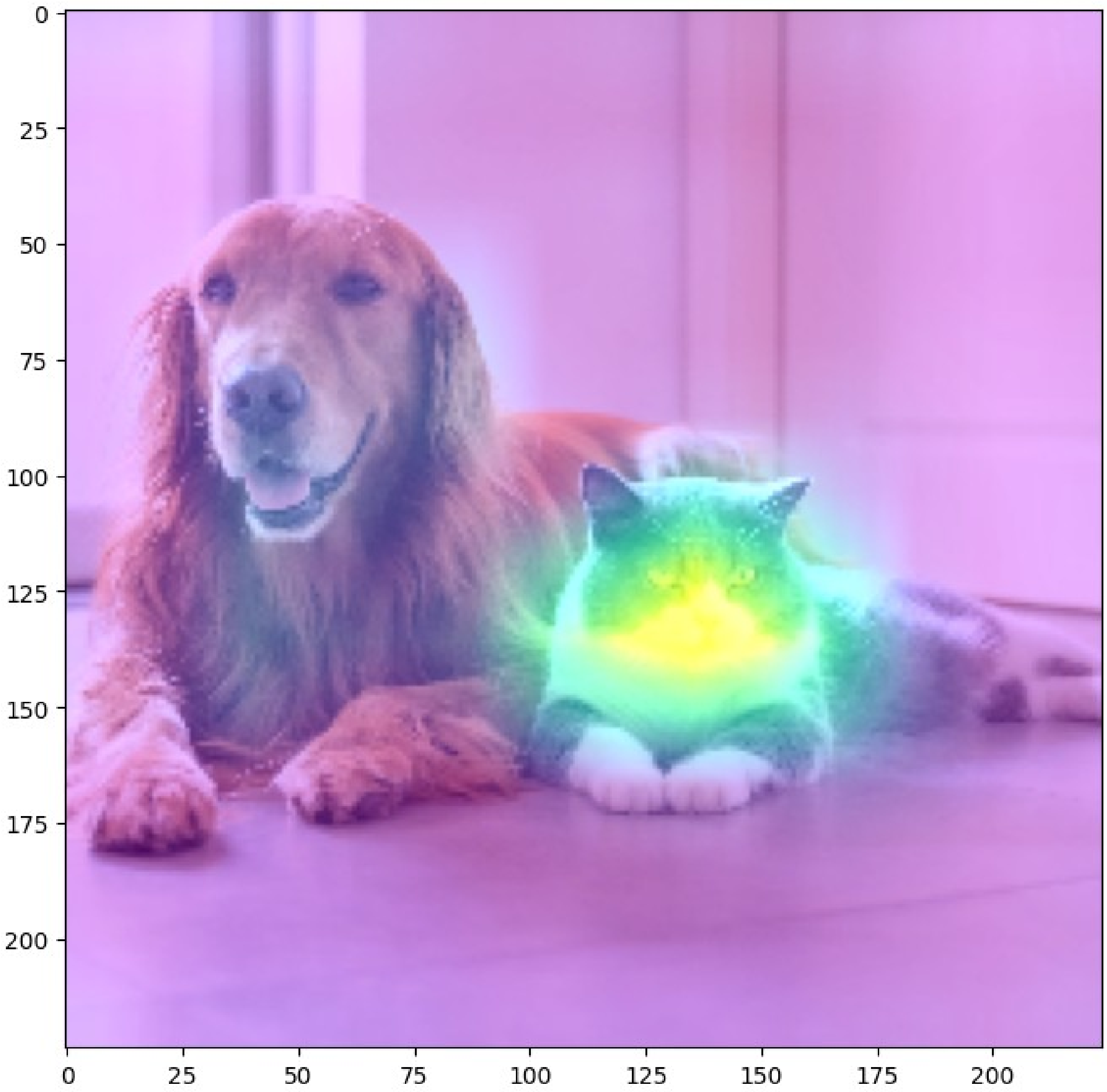
```
data=([img],None)
```

```
predict_class_index=281#np.argmax(model.predict(img_tensor))
```

```
explainer = GradCAM()
```

```
heatMap=explainer.explain(data,
model,class_index=predict_class_index,layer_name="block5_conv3")
```

```
imshow(heatMap)
```


0
25
50
75
100
125
150
175
200
0
25
50
75
100
125
150
175
200