VGG_Transfer_Learning

April 30, 2020

1 Demo: Using VGG with Keras

Below, you'll be able to check out the predictions from an ImageNet pre-trained VGG network with Keras.

1.0.1 Load some example images

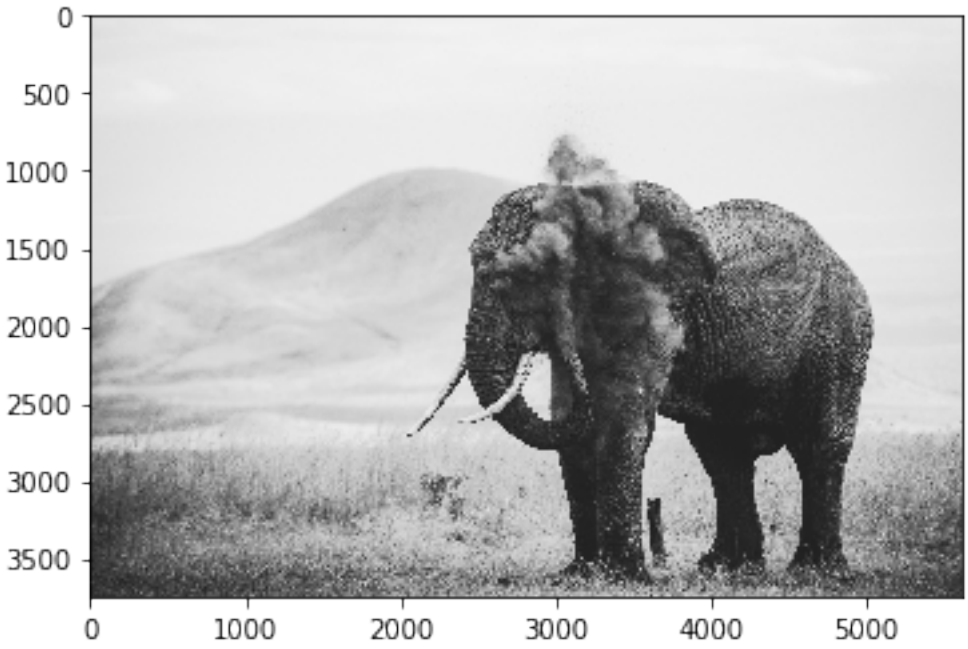
In [5]:
```
# Load our images first, and we'll check what we have
from glob import glob
import matplotlib.image as mpimg
import matplotlib.pyplot as plt

image_paths = glob('images/*.jpg')

# Print out the image paths
print(image_paths)

# View an example of an image
example = mpimg.imread(image_paths[1])
plt.imshow(example)
plt.show()
```

```
['images/zebra.jpg', 'images/elephant.jpg', 'images/dog_labrador.jpg']
```



1.0.2 Pre-process an image

Note that the `image.load_img()` function will re-size our image to 224x224 as desired for input into this VGG16 model, so the images themselves don't have to be 224x224 to start.

```
In [13]: # Here, we'll load an image and pre-process it
         from keras.preprocessing import image
         from keras.applications.vgg16 import preprocess_input
         import numpy as np

         i = 1 # Can change this to your desired image to test
         img_path = image_paths[i]
         img = image.load_img(img_path, target_size=(224, 224))
         x = image.img_to_array(img)
         x = np.expand_dims(x, axis=0)
         x = preprocess_input(x)
```

1.0.3 Load VGG16 pre-trained model

We won't throw out the top fully-connected layer this time when we load the model, as we actually want the true ImageNet-related output. However, you'll learn how to do this in a later lab. The inference will be a little slower than you might expect here as we are not using GPU just yet.

Note also the use of `decode_predictions` which will map the prediction to the class name.

```
In [14]: # Note - this will likely need to download a new version of VGG16
         from keras.applications.vgg16 import VGG16, decode_predictions
```

```
# Load the pre-trained model
model = VGG16(weights='imagenet')

# Perform inference on our pre-processed image
predictions = model.predict(x)

# Check the top 3 predictions of the model
print('Predicted:', decode_predictions(predictions, top=3)[0])
```

```
Predicted: [('n01871265', 'tusker', 0.72201991), ('n02504458', 'African_elephant', 0.17709592),
```

You should mostly get the correct answers here. In our own run, it predicted a Tusker elephant with an African elephant in second place (the image is of an African elephant), correctly selected a labrador, and very confidently predicted a zebra. You can add some of your own images into the `images/` folder by clicking on the jupyter logo in the top left and see how it performs on your own examples!