

CNN_Implementation

April 8, 2023

```
[1]: import numpy as np
import cv2
from os import listdir
from os.path import isfile, join
import matplotlib.pyplot as plt
from tensorflow.keras.models import Sequential
from tensorflow.keras.applications.resnet50 import ResNet50, preprocess_input, decode_predictions
from tensorflow.keras.preprocessing import image
from tensorflow.keras.layers import Dense, Conv2D, MaxPooling2D, Flatten
```

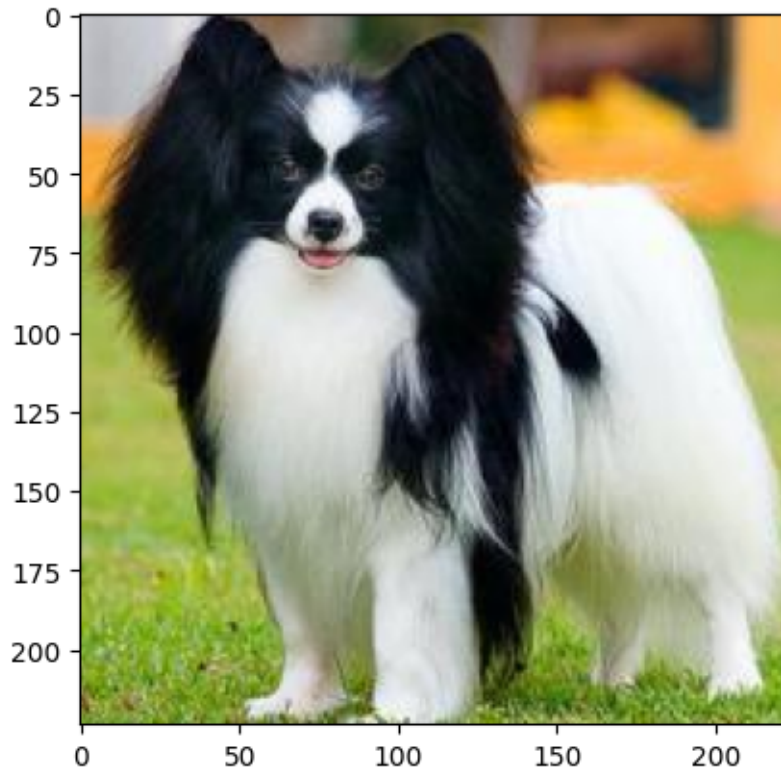
```
[2]: res_net = ResNet50(weights="imagenet")
```

```
[3]: #resnet.summary()
```

```
[4]: total_layers = res_net.layers
print(f'Total Layers: {len(total_layers)}')
```

Total Layers: 177

```
[5]: img = "./Dog_Dataset/n02086910_334.jpg"
photo = plt.imread(img)
plt.imshow(photo)
plt.show()
```



vgg16.preprocess_input will convert the input images from RGB to BGR, then will zero-center each color channel with respect to the ImageNet dataset, without scaling.

```
[6]: img_load_size = image.load_img(img, target_size=(224,224))
     x = image.img_to_array(img_load_size)
     x = np.expand_dims(x, axis=0)
     x = preprocess_input(x)
     #x
```

```
[7]: modelPredictions = res_net.predict(x)
     #modelPredictions
```

```
1/1 [=====] - 2s 2s/step
```

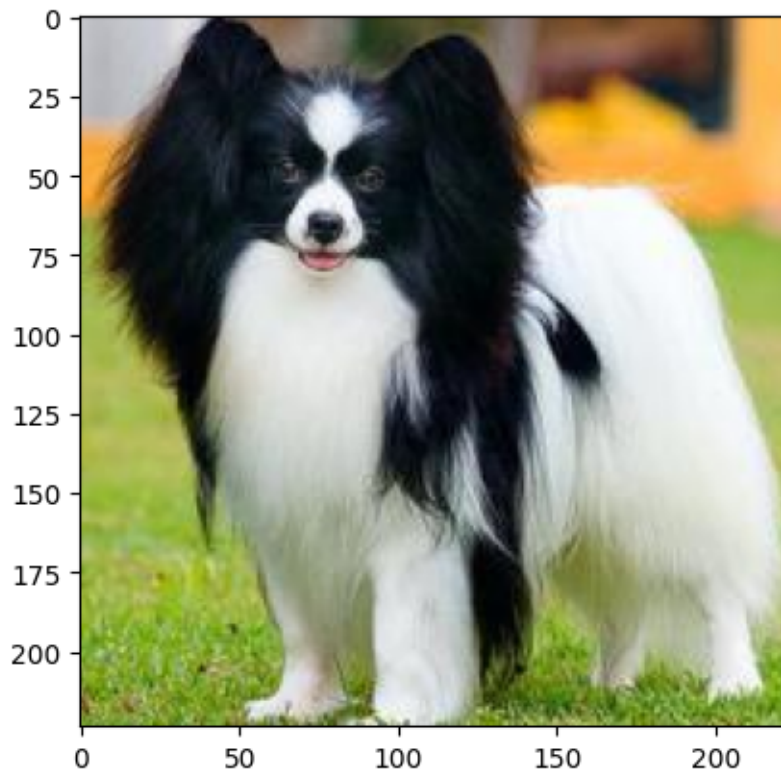
```
[8]: decode_predictions(modelPredictions, top=3)
```

```
[8]: [(('n02086910', 'papillon', 0.8612672),
       ('n02085782', 'Japanese_spaniel', 0.12663653),
       ('n02102480', 'Sussex_spaniel', 0.0025979916))]
```

```
[9]: _, classname, accuracy = decode_predictions(modelPredictions, top=3)[0][0]
     print("Predicted Class: {} \nAccuracy: {:.2f}%".format(classname.replace("_", '␣↵'), accuracy*100))
```

Predicted Class: papillon
Accuracy: 86.13%

```
[10]: plt.imshow(photo)
plt.show()
print("Predicted Class: {} \n Accuracy: {:.2f}%".format(classname.replace("_", ' '),
↪), accuracy*100))
```



Predicted Class: papillon
Accuracy: 86.13%

```
[11]: def textOnImage(name, predictions, input_image):
    backgroundColor = [0, 0, 0]
    expandImage = cv2.copyMakeBorder(input_image, 0, 0, 0, input_image.
↪shape[1]+300, cv2.BORDER_CONSTANT, value=backgroundColor)
    image_width = input_image.shape[1]
    for (i, prediction) in enumerate(predictions):
        imageStrings = str(prediction[1]).replace("_", ' ') + " " +
↪str(prediction[2])
        cv2.putText(expandImage, str(name), (image_width+50, 50), cv2.
↪FONT_HERSHEY_COMPLEX_SMALL, 1, (255,255,255), 1)
```

```

        cv2.putText(expandImage, imageStrings, (image_width+50, 50 + ((i + 1) * 50)), cv2.FONT_HERSHEY_COMPLEX_SMALL, 1, (255,255,255), 1)
    plt.imshow(expandImage)
    plt.show()

```

```

[12]: path = "./Dog_Dataset/"
      fileName = [f for f in listdir(path) if isfile(join(path, f))]
      fileName

```

```

[12]: ['n02085620_4919.jpg',
      'n02085782_267.jpg',
      'n02085936_426.jpg',
      'n02086079_884.jpg',
      'n02086240_306.jpg',
      'n02086646_117.jpg',
      'n02086910_334.jpg',
      'n02087046_2058.jpg',
      'n02087394_381.jpg',
      'n02088364_852.jpg',
      'n02088466_9697.jpg']

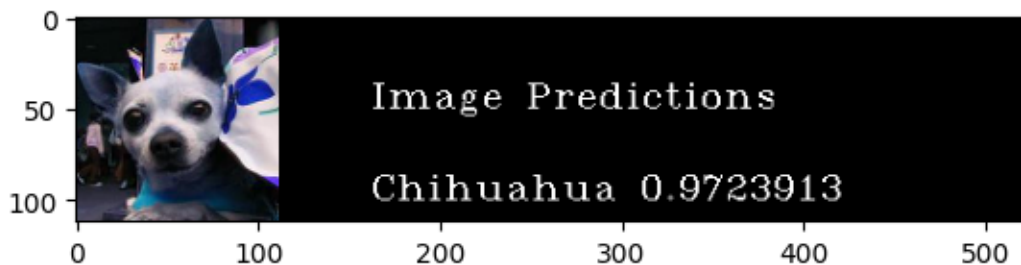
```

```

[13]: for i in fileName:
      img_load_size = image.load_img(path+i, target_size=(224,224))
      x = image.img_to_array(img_load_size)
      x = np.expand_dims(x, axis = 0)
      x = preprocess_input(x)
      update = cv2.imread(path+i)
      resize = cv2.resize(update, None, fx = 0.5, fy = 0.5, interpolation = cv2.
      ↪INTER_CUBIC)
      predict = res_net.predict(x)
      predict = decode_predictions(predict, top = 3)[0]
      textOnImage("Image Predictions ", predict, resize)

```

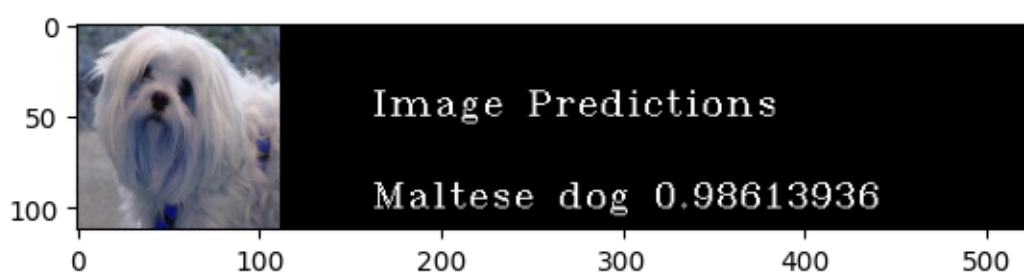
1/1 [=====] - 0s 272ms/step



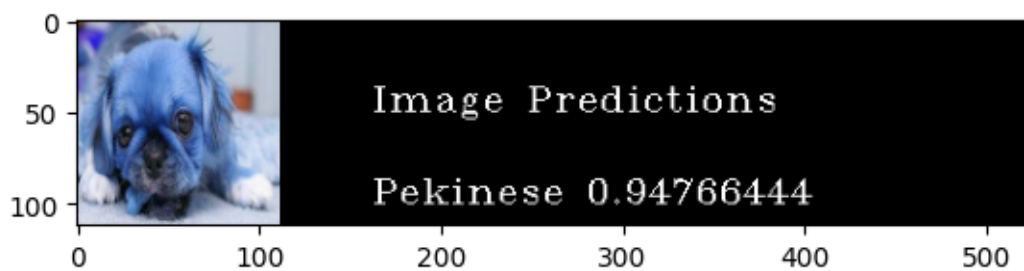
1/1 [=====] - 0s 284ms/step



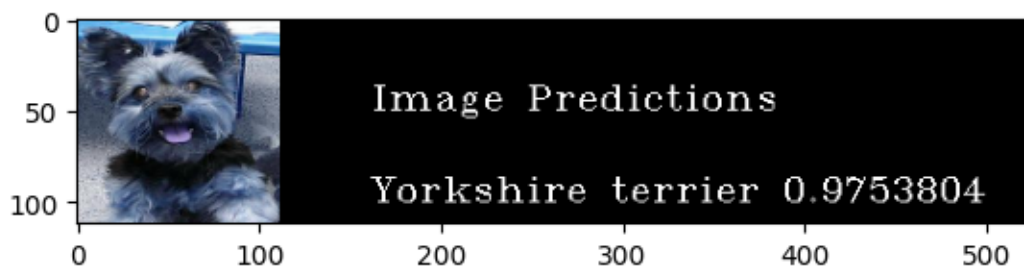
1/1 [=====] - 0s 270ms/step



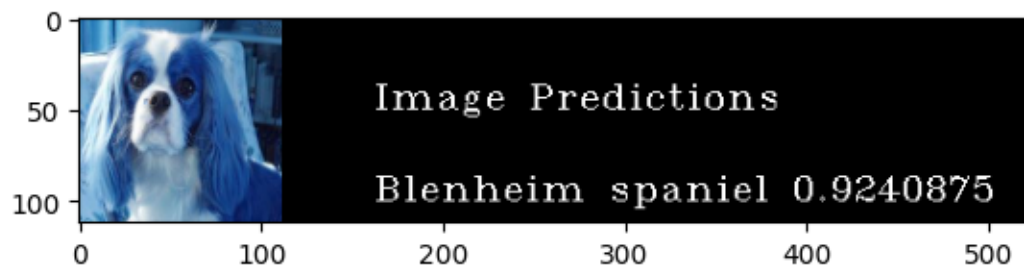
1/1 [=====] - 0s 272ms/step



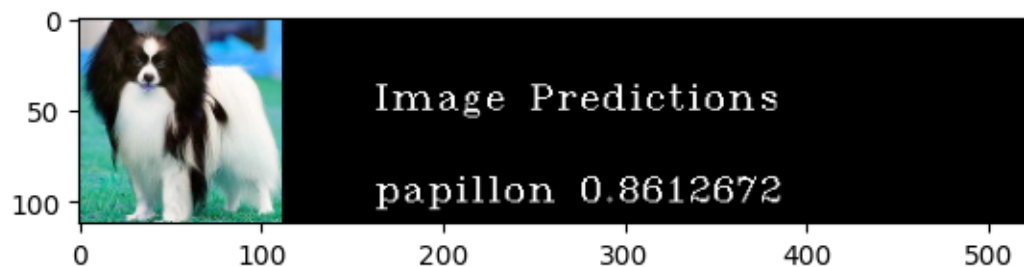
1/1 [=====] - 0s 303ms/step



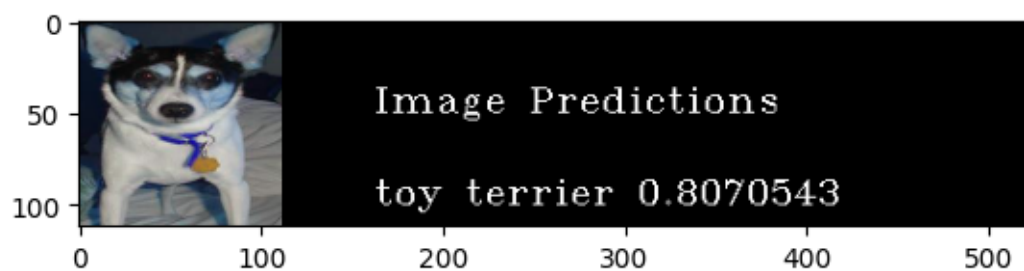
1/1 [=====] - 0s 304ms/step



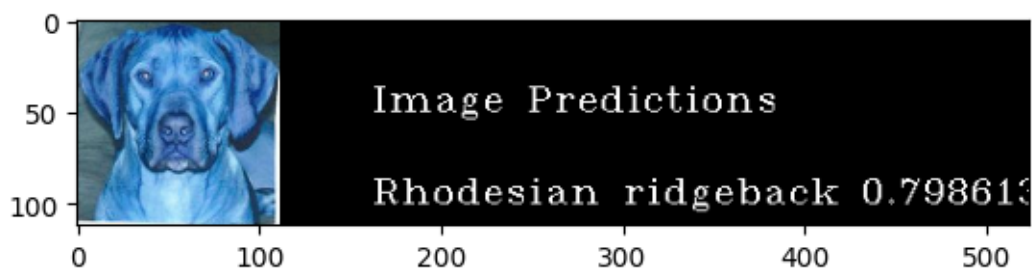
1/1 [=====] - 0s 363ms/step



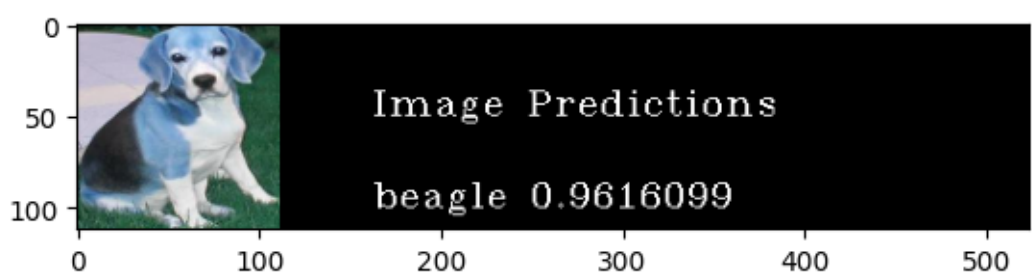
1/1 [=====] - 0s 292ms/step



1/1 [=====] - 0s 248ms/step



1/1 [=====] - 0s 257ms/step



1/1 [=====] - 0s 245ms/step

