

Deep Learning – Case Study

Dog Breed Identification using ResNet

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1. Introduction

This case study is designed to Classify the Dog Breed Identification. It uses the CNN and ResNet model for the images. The model built is able to grid the image and train model accordingly and then predict the Dog Breed from them.

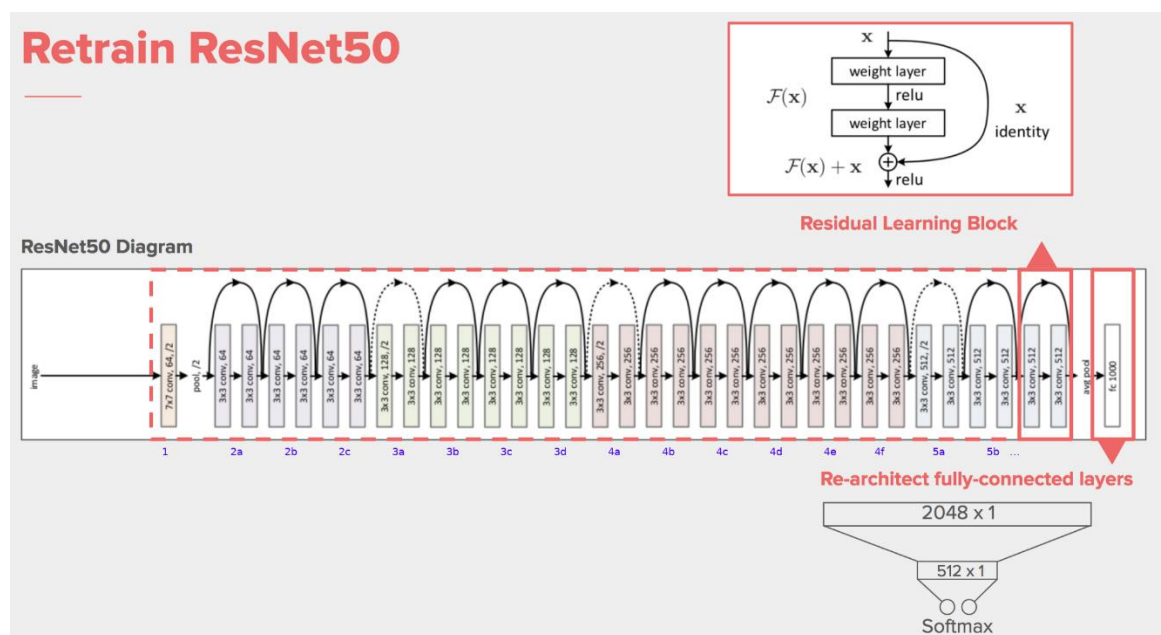
Once I went to a park and came across a very cute dog. I was unaware of its breed and was very curious to know that the dog belongs to which family? Are you also anxious to know about the varieties of dog breeds? Then you are at the right place. Let's together create a Deep Learning model for the dog's breed identification just by looking at its image.

2. Tools and Technologies

Tools and Libraries	Usage
Keras	This library is used for building the network architecture. It allows us to use several layers, callbacks, and InceptionResNetV2 model.
ResNet	Residual Network (ResNet) is a specific type of neural network which is used for many computer vision problems.
matplotlib	Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy.
Kaggle	Used as a platform to execute code as well as manage datasets and model weights

3. Model Explanation and Architecture

ResNet, short for Residual Networks is a classic neural network used as a backbone for many computer vision tasks. This model was the winner of ImageNet challenge in 2015. The fundamental breakthrough with ResNet was it allowed us to train extremely deep neural networks with 150+ layers successfully. Prior to ResNet training very deep neural networks was difficult due to the problem of vanishing gradients.



4. Working

The images we use contains multiple breeds of dogs. Which using TensorFlow backed. We have 120 breeds and 20580 images. We uses label strings and numbers mapping. We show some pictures. Then we crop and save pictures and Created 120 folders to store cropped images of the different breeds. Then prepare x and y . Then generate the images with augment. Train test split then keras pretrain densenet121 model. Then we only train our last 6 layers. Then we train all layers. Now we predict new images. That we successfully predicted.

5. Code

https://github.com/Rajvesetiya/dog_breed_identity/blob/main/dog-breed-classify.ipynb

** Code and Report is available in the GitHub repository.

6. Output

```
download_and_predict("https://cdn.pixabay.com/photo/2018/08/12/02/52/belgian-malinois-3599991_1280.jpg",
                    "test_1.jpg")
```

```
63.66% malinois
11.83% dingo
9.54% German_shepherd
8.42% dhole
5.04% kelpie
```



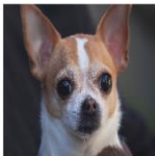
```
download_and_predict("https://cdn.pixabay.com/photo/2016/07/25/06/06/corgi-1539598_1280.jpg",
                    "test_2.jpg")
```

```
85.36% Pembroke
14.56% Cardigan
0.06% dingo
0.01% kelpie
0.00% German_shepherd
```



```
download_and_predict("https://cdn.pixabay.com/photo/2019/02/24/20/15/chihuahua-4018429_1280.jpg",
                    "test_3.jpg")
```

```
46.01% miniature_pinscher
35.69% Chihuahua
16.56% toy_terrier
0.74% Boston_bull
0.27% Italian_greyhound
```



```
download_and_predict("https://cdn.pixabay.com/photo/2018/03/31/06/31/dog-3277416_1280.jpg",
                    "test_4.jpg")
```

```
78.07% redbone
9.65% Rhodesian_ridgeback
3.49% vizsla
2.31% bloodhound
1.48% beagle
```

