[DEEP LEARNING]

(Case Study)

AIM

Dog breed classify with CNN & RESNET50 from scratch.

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Aim:- Dog breed classify with CNN & RESNET50 from scratch.

Introduction: -

The model uses two model to predict the dog breed, first it uses

How do Stacked Pretrined Models work?

When you work on a classification problem you tend to use a classifier that majorly focuses on the max pooled features that mean it does take fine or small objects into account while training. This is why we use stacked models that help to easily classify the images based on both highlighted and fine object details.

For creating a stacked model you need to use two or more classification architectures like Resnet, Vgg, Densenet, etc. These classifiers take an image as input and generate feature matrices based on their architecture. Normally each classifier goes ahead with the following stages in order to create a feature vector:

1. Convolution: It is the process of generating feature maps that depict the different image-specific features like edges, sharpness, etc of an image.

2. Max Pooling: In this process highlighted features are extracted from the feature maps that are generating using the convolution process.

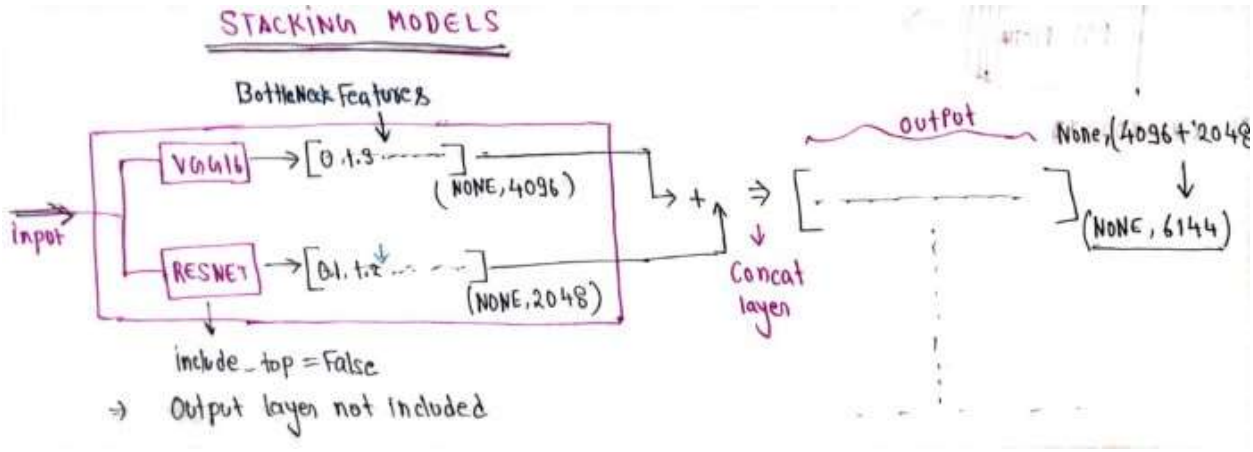
3. Flattening: In this process, final feature maps are converted into a vector of features.

after getting the feature vectors from different models we stack them together in order to come up with a feature matrix that is then used as an input for the final Neural Network model whose work is to classify these matrices into final classes of data.

Now that you know how a stacked model works let's design a stacked model using Vgg16 and Resnet architectures.

Designing Stacked Pretrained Models

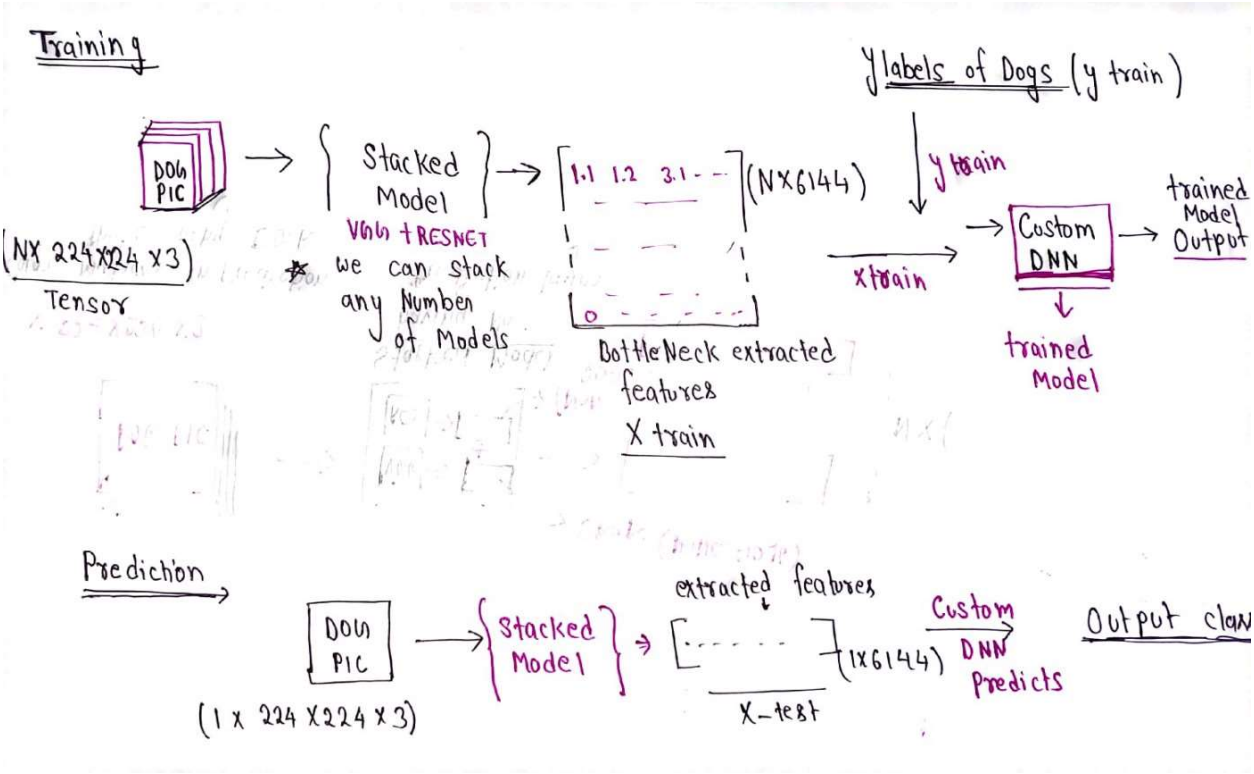
Before moving ahead let's have a look at how we stack models to get bottleneck features.



in the above image, you can clearly see that we have two classifier models VGG16 and Resnet which are used as feature extractors and then stacked together to come up with a final set of features used for classification.

Building Dog Breed Classifier Using Stacked Pretrained Models

Now that you know how you can create a stacked model we can go ahead and start creating a Dog Breed Classifier.



Extract Bottleneck Features in Stacked Pretrained Models

In this step, we will use the stacked_model that we have just designed for bottleneck feature extraction and these extracted features will become our X_train for our training. we are using batches so that we won't have any OOM (Out of Memory) issues.

Conclusion

In this article, we built a dog breed classifier using stacked (bgg16, resnet50v2) and got a validation accuracy of over 98%. nevertheless, we can even improve this model accuracy furthermore.