**Image Classification - Dogs Vs Cat**

There are 25000 images of dogs & cats. Our task is to teach the machine to understand the difference between two animals so that when new image was passed to machine it can classify that image without any human intervention.

Now training all these amount images at once need highly configured echo system with high performance GPU which is quite difficult for common people. At the same time not even that amount of data is not enough to feed the machine so that the machine can think like humans do.

Here we will walk through with a special & very useful technique **Transfer Learning**.

It gives us the privilege to work with a pre-trained model that is already built for any classification problem and based on that classification knowledge, the model already has, we can feed new information and get amazing output without training the model from scratch with less input data.

**Data Pre Processing:**

Load the Images from the files with keras Image load function.

Now while doing that for many cases I found EXIF issue while loading the images

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**EXIF**(Exchangeable Image File Format) : It includes a lot of metadata about the image at a time when it was captured e.g. shutter speed, exposure settings, camera band and many others related to image. With these features it blocks me to import the image because keras load image function expect a simple image without this meta data to process.

Created a function to extract those metadata and post extracting those information, removed it and saved images in different folder. Now, my image is clean and ready to process.

Splitted the data into train & validation set.

Training set : 2000

Validation set : 1000

Purpose behind that we will fit the model with training data and at the same time we will evaluate our model with validation set that how good it is to predict the response for unseen data.

**Model Building:**

Imported necessary keras library for DL model building

Now as I stated earlier, I will use Transfer learning to build my model.

Transfer learning : It is a process where we will get the leverage of already pre trained model available around world wide to build our custom model without building it from scratch.

Model Building from scratch require ample amount of data as well highly configured machine to run it. It consumes time for both developers and machine.

Here I used VGG model which is built on thousands and thousands of images to classify 1000 different objects. Now by looking at this information, we can assume that this model already learned how to classify and this knowledge will help us to build my own custom model with minimum number of input.

Almost all the DL model built in common way.

Convolution Layer with Input value - Max Pooling - Flatten - Repeat the process - Dense Layer - Dropout - Dense Layer - Output.

In this case we have to do 2 tasks:

1. Remove the input layer so that we can feed our input shape of images
2. Freeze the weights of layer so that it shouldn’t change over time.

That’s it rest process is add some dense layer and model is ready to fit with train data.

Got an accuracy of ~90%.

