Advance Machine Learning Assignment 2

1. Consider the Cats & Dogs example. Start initially with a training sample of 1000, a validation sample of 500, and a test sample of 500 (like in the text). Use any technique to reduce overfitting and improve performance in developing a network that you train from scratch. What performance did you achieve?

Following are the parameters of the first model which I have trained. The sample size is 1000 with validation size of 500 and test size of 500. The filter size in the model is 32,64,128,256,256, the following activation model Relu and Sigmoid are used. Binary Cross Entropy and Adam are the loss function with the Epoch size of 30. After running the model with the above-mentioned parameters, I got the test accuracy of 72.8%!

1. Increase your training sample size. You may pick any amount. Keep the validation and test samples the same as above. Optimize your network (again training from scratch). What performance did you achieve?

Following are the parameters of the second model which I have trained. The sample size is 1800 with validation size of 500 and test size of 500. The filter size in the model is 32,64,128,256,512, the following activation model Relu and Sigmoid are used. Binary Cross Entropy and Adam are the loss function with the Epoch size of 50. After running the model with the above-mentioned parameters, I got the test accuracy of 56.3%!

1. Now change your training sample so that you achieve better performance than those from Steps 1 and 2. This sample size may be larger, or smaller than those in the previous steps. The objective is to find the ideal training sample size to get best prediction results.

Following are the parameters of the second model which I have trained. The sample size is 2500 with validation size of 500 and test size of 500. The filter size in the model is 32,64,128,256,256, the following activation model Relu and Sigmoid are used. Binary Cross Entropy and Adam are the loss function with the Epoch size of 30. After running the model with the above-mentioned parameters, I got the test accuracy of 77.0%!

Output and observation

1. Repeat Steps 1-3, but now using a pretrained network. The sample sizes you use in Steps 2 and 3 for the pretrained network may be the same or different from those using the network where you trained from scratch. Again, use any and all optimization techniques to get best performance.

Using Pretrained Network with the following parameters loss function – binary crossentropy and r RMSprop optimizer with Epoch size of 40 I got the following test accuracy 97.7%

1. Fine tuning the model with the following parameters, loss function - binary crossentrop, Optimizer – RMSprop with a learning rate =le-5 and Epoch size of 20. I got test accuracy of 98.1% which is the highest among all models trained.