Deep Learning for Computer Vision

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Problem Statement 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?

Result

Sample Size - 1000

Validation Size - 500

Test Size - 500

Filter Size = 32,64,128,256,256

Activation Model used - Relu and Sigmoid

Loss Function - Binary Cross Entropy and Adam

Epoch Size - 20

Test Accuracy - 69.1%

Problem Statement 2

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?

Result

After training the model again from the scratch we received the following results.

Sample Size - 2000

Validation Size - 500

Test Size - 500

Filter Size = 32,64,128,256,512

Activation Model used - Relu and Sigmoid

Loss Function - Binary Cross Entropy and Adam

Epoch Size - 90

Test Accuracy - 51.8%

Problem Statement 3

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.

Result

Sample Size - 3000

Validation Size - 500

Test Size - 1000

Filter Size = 32,64,128,256,256

Activation Model used - Relu and Sigmoid

Loss Function - Binary Cross Entropy and Adam

Epoch Size - 20

Test Accuracy - 71.6%

Problem Statement 4

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.

Result

1. Activation Model used - Sigmoid
2. Loss Function - Binary Cross Entropy and RMS Prop
3. Epoch Size - 30
4. **Test Accuracy - 97.7%**

Fine Tuning the Model

Result

1. Loss Function - Binary Cross Entropy
2. Epoch Size - 15
3. **Test Accuracy - 98.7%**