Fast National University of Computer and Emerging Sciences

Machine Learning

Assignment #03

Submitted to:

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Dated: 19th April, 2020

Question # 01:

What architecture and hyper parameters did you use for the final model? What other architectures did you try?

Explanation:

I tried grid search algorithm. Grid search cross validation for hyper parameter training. I have used the following parameters for Grid search:

```
params = {
   'lr': [0.01, 0.001, 0.0001, 0.1, 0.02, 0.002, 0.0002, 0.2, 0.05, 0.005, 0.0005, 0.5],
   'max_epochs': [1000, 3000, 8000],


}
```

And found that on 0.001 learning rate, 5000 epochs and for Adam optimizer is best so far. I have also tried the SDG optimizer as well.

Moreover, I used the Relu activation function between each layer, the model loss was decent and I noted that other activation funcs are not too good on this data.

Question # 02:

What was the cross-validation RMSE?

Note: Multiple training cycles in neural networks can result in different final model weights and hence different predictions. Take at least 5-runs and report the mean and standard deviation of the RMSE.

Explanation:

Mean and Standard deviation was below:

```
Mean_value_5 trials =  3.82868
STD_value_5 trials =  0.1941768719492617
```

The lowest root mean square was 3.46 and the highest was 4.04 during 5 trials of training.

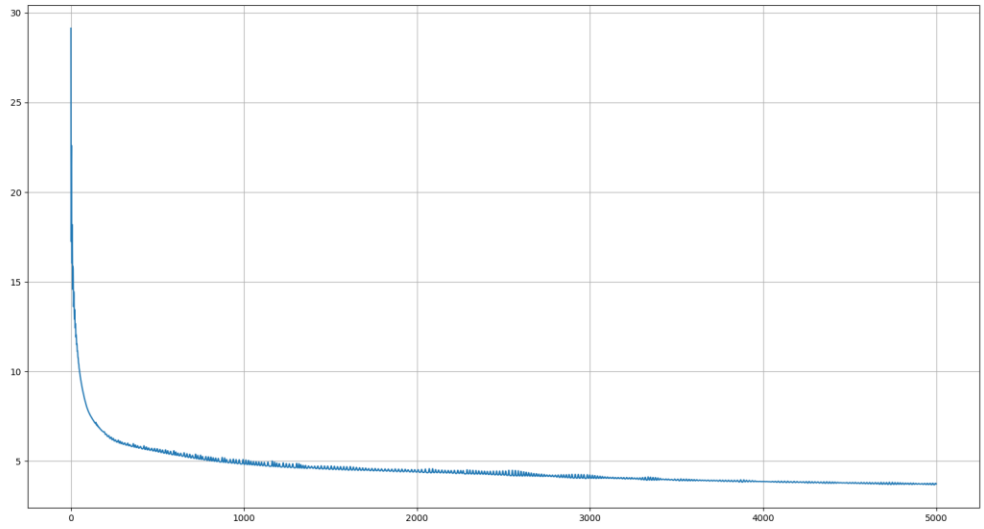

Figure 1- loss vs epochs

Question # 03:

What test RMSE are you expecting?

Explanation:

I expect RMSE to be 4 to 9 at least because the testing data is known. I can estimate but I have visualized the loss vs epoch and contradicted that the RMSE will be in this range. But this is tricky as well so we can use the true labels to check whether the is accurate or not.