

CS 539 - MACHINE LEARNING

ASSIGNMENT NO. 2

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1 PART 2

The values for different epochs,alpha and their losses are provided in the table mentioned below. Here I tried to check the value of train loss and test loss and different epochs for the same alpha value and then repeated this process for multitude values of alpha.

| For ALPHA 0.001 | | |
|-----------------|---------------|--------------|
| NO OF EPOCHS | TRAINING LOSS | TESTING LOSS |
| 100 | 4963.962 | 5232.868 |
| 500 | 2514.531 | 2723.916 |
| 1000 | 1102.021 | 1223.404 |
| 2000 | 223.354 | 255.541 |
| 4000 | 255.541 | 12.461 |
| 8000 | 0.034 | 0.044 |
| 10000 | 0.002 | 0.0029 |
| 15000 | 0.000 | 0.000 |
| For ALPHA 0.005 | | |
| 100 | 2510.855 | 2720.309 |
| 500 | 101.854 | 117.7596 |
| 1000 | 2.383 | 2.876 |
| 2000 | 0.002 | 0.003 |
| 4000 | 0.000 | 0.000 |

| For ALPHA 0.01 | | |
|----------------|---------------|--------------|
| NO OF EPOCHS | TRAINING LOSS | TESTING LOSS |
| 100 | 1095.245 | 1216.404 |
| 500 | 2.351 | 2.839 |
| 1000 | 0.002 | 0.003 |
| 2000 | 0.000 | 0.000 |
| For ALPHA 0.05 | | |
| 100 | 2.105 | 2.550 |
| 200 | 0.002 | 0.002 |
| 300 | 0.000 | 0.000 |
| For ALPHA 0.1 | | |
| 50 | 1.824 | 2.218 |
| 100 | 0.001 | 0.002 |
| 150 | 0.000 | 0.000 |
| For ALPHA 0.5 | | |
| 5 | 37.553 | 44.775 |
| 10 | 0.445 | 0.568 |
| 20 | 0.000 | 0.000 |
| For ALPHA 0.9 | | |
| 1 | 479.147 | 597.214 |
| 3 | 6.337 | 8.513 |
| 5 | 0.146 | 0.205 |
| 10 | 0.000 | 0.000 |

2 Inference

The above data gives us an clear indication that the **alpha** and **no of epochs** are **inversely proportional** to each other as higher the alpha value we consider, lesser epoch we need and vice versa. For maintaining the loss below standard with high value of alpha we might need much less epochs compared to that of when the alpha value is low.