

Deep Learning Lab

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1 Learning Rate

Learning rate is the one of the important parameters for the deep learning projects. If the learning rate is low, training is more reliable. However, the optimization process takes much time because, our steps will progress slowly.

On the other hand, if the learning rate is high, the difference between our two steps can be too high thus, sometimes our training can not diverge or converge. Weight changes can be so big that the optimizer overshoots the minimum and makes the loss worse.

The optimum learning rate is between 0.1 and 0.001. I tested different learning rates for my assignment too. These are, 0.002, 0.001, 0.05 and 0.07. The best result I had is 0.05, That's why I used 0.05 as a learning rate.

2 Gradient Descent

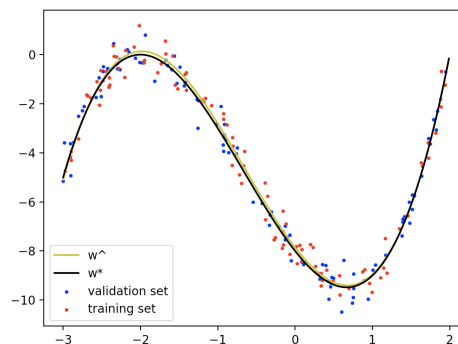
Gradient descent is an algorithm to find the function's minimum. In deep learning this algorithm is used for the decreasing the loss/error.

Gradient is the tangent of the function and makes the function maximum. That's why gradient descent is the opposite of the tangent.

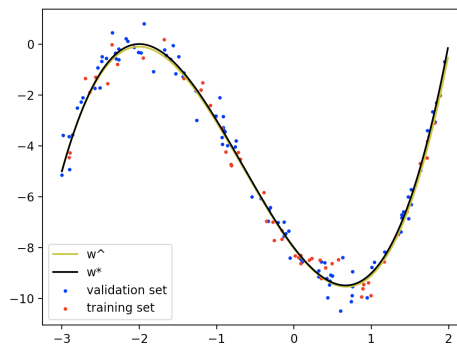
3 Reducing Dataset

Dataset used for training the network. With more data, it is easier to reach the targets. Below, there are some pictures with the different datasets.

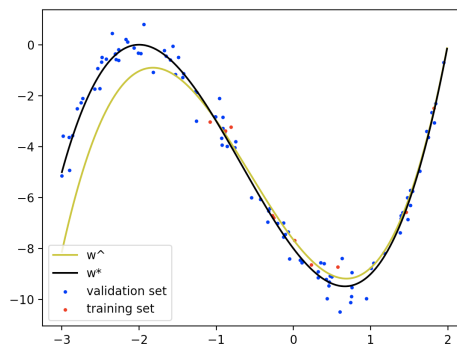
This is the my output with 100 dataset;



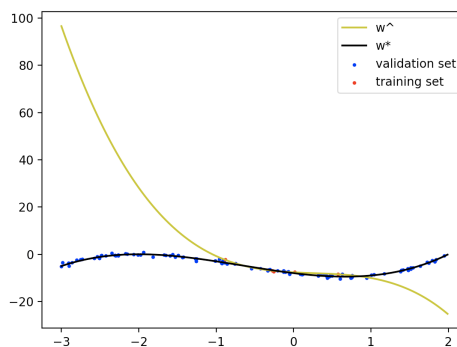
This is the my output with 50 dataset;



This is the my output with 10 dataset;



This is the my output with 5 dataset;

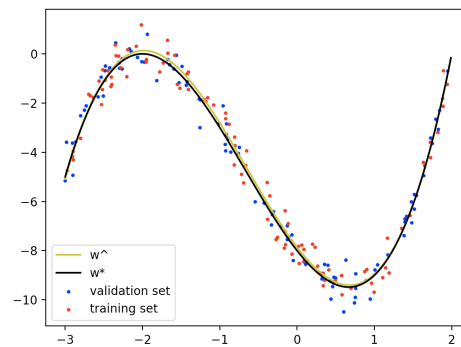


4 Increasing Sigma

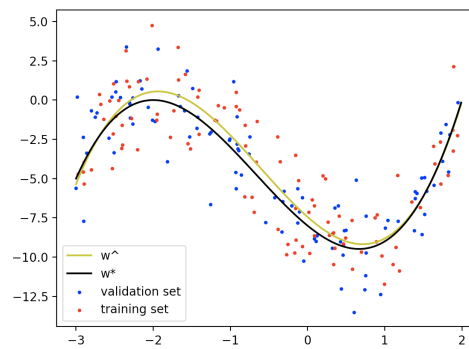
Sigma is the standart deviation.

A low standard deviation indicates that the data points tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. Below, there are some pictures with the different datasets.

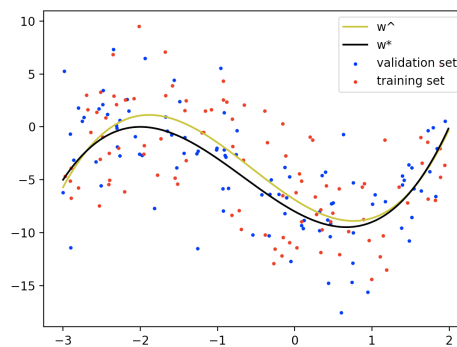
This is the my output with sigma equals to 0.5;



This is the my output with sigma equals to 2;



This is the my output with sigma equals to 4;



This is the my output with sigma equals to 8;

