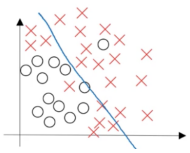
Deep Neural Networks Fine Tuning

Step1 - Diagnose

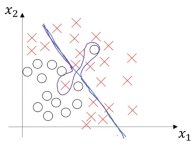
Check what are the weaknesses and how to proceed



High Bias/Underfitting

High train error (Ex: 20%)

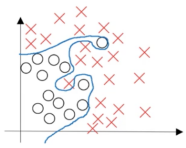
High test error (Ex: 19%)



High Variance & High Bias

High train error (Ex: 15%)

Very high test error (Ex: 30%)



High Variance/Overfitting

Low train error (Ex: 1%)

High test error (Ex: 10%)

Step2 - Basic actions

Reduce Underfitting and then reduce Overfitting

Reduce Underfitting

Try a bigger Network

Train the model longer

Change the Network architecture

Then

Reduce Overfitting

Get more training data

Apply Regularization (Step3)

Change Network architecture

Step3 – Regularization

Reduce Overfitting more

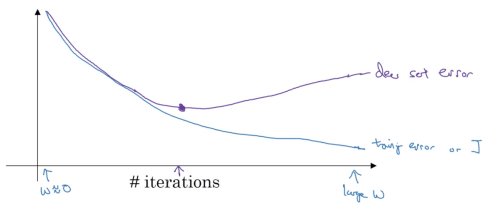
L2 Regularization - The most common

L1 Regularization - Less memory usage

Dropout - Uses random nodes removal

Data augmentation - *Ex: flipping images*

Early training stopping



Early training stopping

Step4 – Optimization

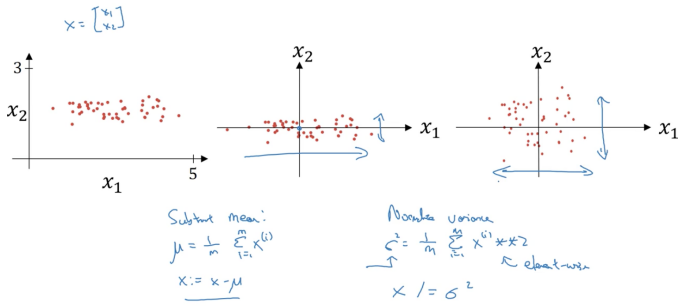
Reduce training time

Input normalization

Step1: Subtracting the mean

Step2: Normalizing the variance

Random weights initialization



Input normalization

Inspired from Andrew Ng course Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization.
https://github.com/slrbl

* Assuming that optimal error is 0.%