Advanced Machine Learning

Assignment 3

Multi-layer Feedforward Neural Network Report

Name: John Ehab

ID: 100-2096

1- What do you observe about increasing the number of epochs?

Increasing the number of epochs led to an increase in the accuracy. The number of iterations of training and weights updating increased, so the model was able to train better and go from underfitting closer to optimal solution.

2- What do you observe about the need for standardization?

Non standardizing the data led to a huge decrease in the accuracy. It seems that passing unnormalized inputs to the activation functions caused the algorithm to getting stuck in a very flat region in the domain and stopped learning from the data at all.

3- What do you observe about changing the learning rate?

Setting the learning rate to a large value can cause the model to converge too quickly not achieving the optimal solution, but also setting the learning rate to a small value can cause the model to get stuck and not learning well, so the learning rate has to be tuned according to the network to a value that gives the optimal solution. In our case the best accuracy was given with n = 0.0005 (the lowest chosen value), and the worst accuracy was given with n = 0.01 (the highest chosen value).

4- What do you observe about the speed of training one epoch with batch size 1? Explain the reason.

Decreasing the batch size led to a huge increase in the speed of training one epoch (4 seconds). This is because the batch size represents the number of samples that are processed in parallel on different worker nodes on my PC, so increasing the batch size will increase the amount of memory used, but it will decrease the computation time, thus it decreases the overall latency and speeds up the training process.