HACETTEPE UNIVERSITY COMPUTER ENGINEERING DEPARTMENT

BBM 409 INTRODUCTION TO MACHINE LEARNING LAB

ASSIGNMENT 3

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1 INTRODUCTION

In this assignment, it is expected to implement a neural network with single layer and multi layer approach.

In the single layer, the algorithm need to have normalizing method, sum of negative log-likelyhood and mini batch gradient decent to minimize the cost. There are two layers in the network which are input and output layers.

In the multi layer, the algorithm need to have normalizing method, forward and backward propagations which is back-propagation algorithm to train. There are three layers which are input, hidden layer and output layer. The hidden layer has n element where the n is the number of nodes which will be given as parameter. [1]

2 ALGORITHM & RESULTS

2.1 Single Layer

- Reading the data
- Normalizing the data
- Instantiating random weight and bias values
- Putting data to activation function
- Putting data to loss function
- Putting into derivation function
- Finding the delta value which is will be added to the weight and bias
- After training finish with training data, I start working on validation data
- I compared the founded values with the validation label dataset and observed the accuracy.

2.2 Multi Layer

- Reading the data
- Normalizing the data
- Instantiating random weight and bias values

- Putting data to activation function
- Putting data to loss function
- While doing that, I worked on 3 layer which represents the input, output and hidden layers. The hidden layer gets hidden layer size parameter which is given by user.
- The given functions is used with both 3 layers.
- After training finish with training data, I start working on validation data

2.3 Visualization

- Setting an array for the image
- Reshaping the array
- Plotting the array as white – black image

3 ANALYSIS OF THE RESULTS

I used different kind of activation functions, but I got very similar results between 11 and 15 percent. This could be because of;

- Randomization of the weights and bias values
- Unsuccessfully deployed loss function
- Noises of the data

References

1. https://d1b10bmlvqabco.cloudfront.net/attach/j7vgdoadakn3ce/gzidzt3ksez1jd/j9tpuqt81tf7/pset3.pdf