



AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY
Department of Computer Science & Engineering

SOFT COMPUTING LAB
CSE - 4238

ASSIGNMENT 2

Deep Neural Network(Linear Layer).

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Contents

- [1 Introduction](#)
- [2 Experiment 1](#)
- [3 Experiment 2](#)
- [4 Experiment 3](#)
- [5 Lab Codes](#)

1 Introduction

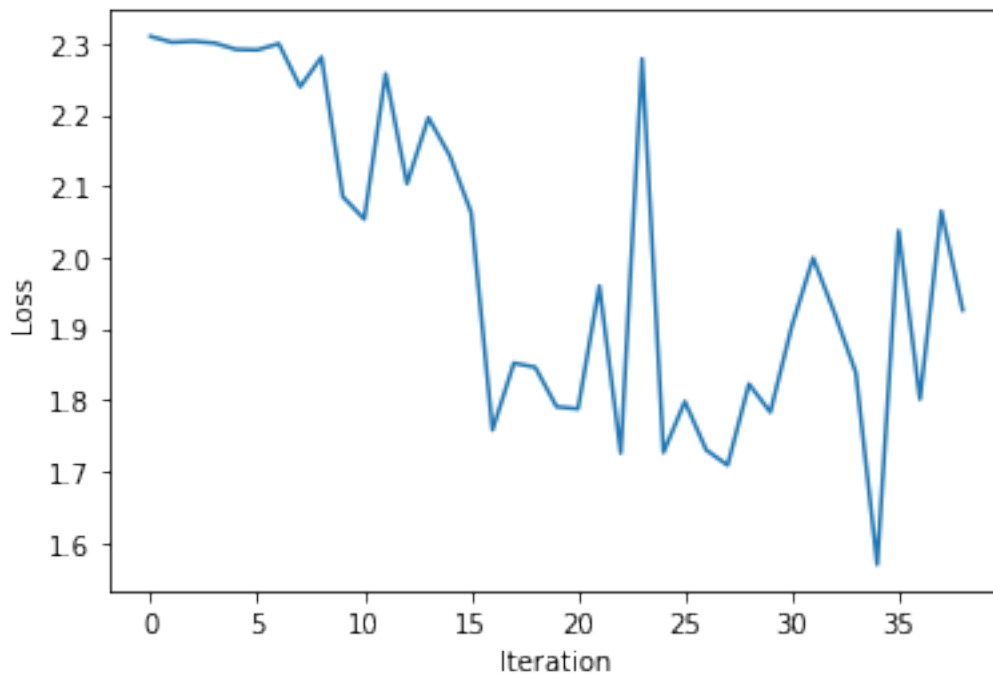
A deep neural network (DNN) is an artificial neural network (ANN) with multiple layers between the input and output layers. There are different types of neural networks but they always consist of the same components: neurons, synapses, weights, biases, and functions.

2 Experiment 1

Problem Statement There are two experiments on the first dataset which will be as follows. You have to find the accuracy and make predictions for each experiment. Keep 20 percent data for testing purposes from your dataset.

Table 1: Hyperparameters are fixed for experiment 1

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	20000	0.01	20	ReLU	18.0458	1.9225



3 Experiment 2

Problem Statement Make necessary adjustments to increase the accuracy of Experiment 01 upto 85percent or more.

Table 2: Hyperparameters were varied for experiment 2(Table1)

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	25000	0.05	200	ReLU	23.585	2.075

Table 3: Hyperparameters were varied for experiment 2(Table2)

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	40000	0.01	10	ReLU	23.585	1.50

Table 4: Hyperparameters were varied for experiment 2(Table3)

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	55000	0.01	200	RelU	42.085	1.72

Table 5: Hyperparameters were varied for experiment 2(Table4)

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	60000	0.05	200	RelU	42.82	1.617

Table 6: Hyperparameters were varied for experiment 2(Table5)

Num of hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
6	60000	0.01	500	RelU	89.358	0.278

From this experiment I got accuracy more than 85percent.This is how I tuning my hyperparameters.

4 Experiment 3

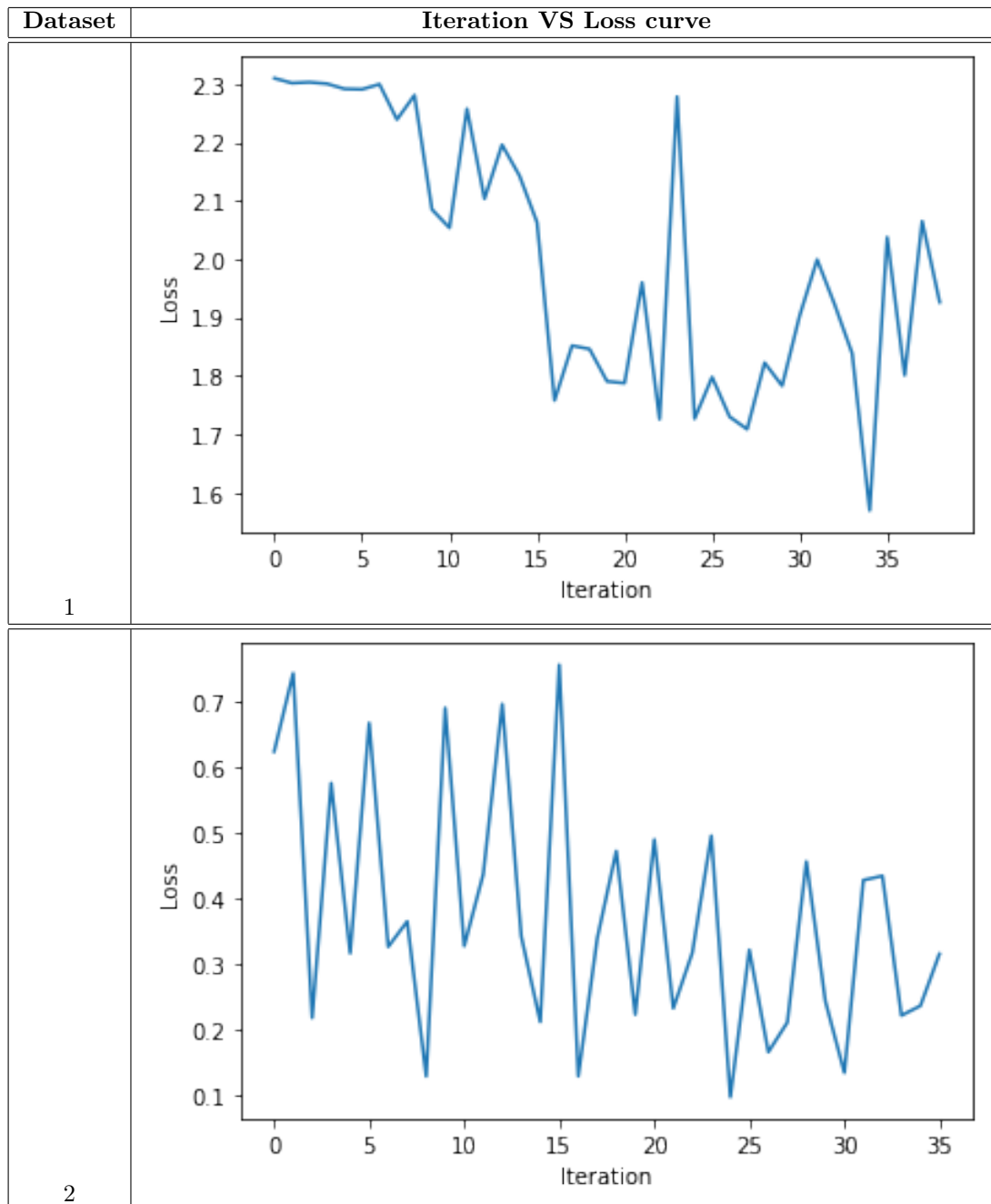
Problem Statement: You have to check both of your models'[i.e. Experiment 01 and Experiment 02] performance by using a second dataset. Make necessary adjustments for the dataset if needed. Observe the results if they vary from the first dataset's results.

Solution: With the same hyperparameter I check my model with two different dataset and it gives me two different result.They are given below:

Table 7: Comparing same Model with two different dataset.

Dataset	Hidden layer	Iteration	Learning rate	Batch size	Activation Func	Accuracy	Loss
1	6	20000	0.01	20	RelU	10.97623	1.875
2	6	20000	0.01	20	RelU	87.4985	0.03358

Table 8: Comparing same Model with two different dataset by plotting.



Second dataset has more accuracy with same hyperparameters than first dataset. Reason behind are given below:

1. Second dataset is processed. In our first dataset we use image with 128*128 pixel and in our second dataset we use numeric value.
2. Second dataset has more training value (60000) than first dataset (19500).
3. As we know with more training value we can get more accuracy from testing value.

5 Lab Codes

To see my assignment codes you can click [My github codes for assignment2](#) and get all my codes here. For experiment 2 I run so many test codes all are given here. To make it easy I gave my hyperlink parameters for each code in the name of the file.

For my report you can check [report of this assignment](#).