ELG 5255 Applied Machine Learning Summer 2021

Assignment 5 (MLP)

Submission

You must submit your assignment on-line with Bright Space. This is the only method by which we accept assignment submissions. We do not accept assignments sent via email, and we are not able to enter a mark if the assignment is not submitted on Bright Space! The deadline date is firm since you cannot submit your assignment passed the deadline. It is student's responsibility to ensure that the assignment has been submitted properly. A mark of 0 will be given to any missing assignment.

Dataset

User Knowledge Modeling Data Set will be used in this assignment.

Dataset details:

Data Set Characteristics:	Multivariate	Number of Instances:	403
Attribute Characteristics:	Integer	Number of Attributes:	5
Associated Tasks:	Classification, Clustering	Number of Classes	4 (0~3)

Please use the provided dataset. Training and testing splits were reorganized and class names were changed to integer values.

- Training Set: DUMD_train.csv
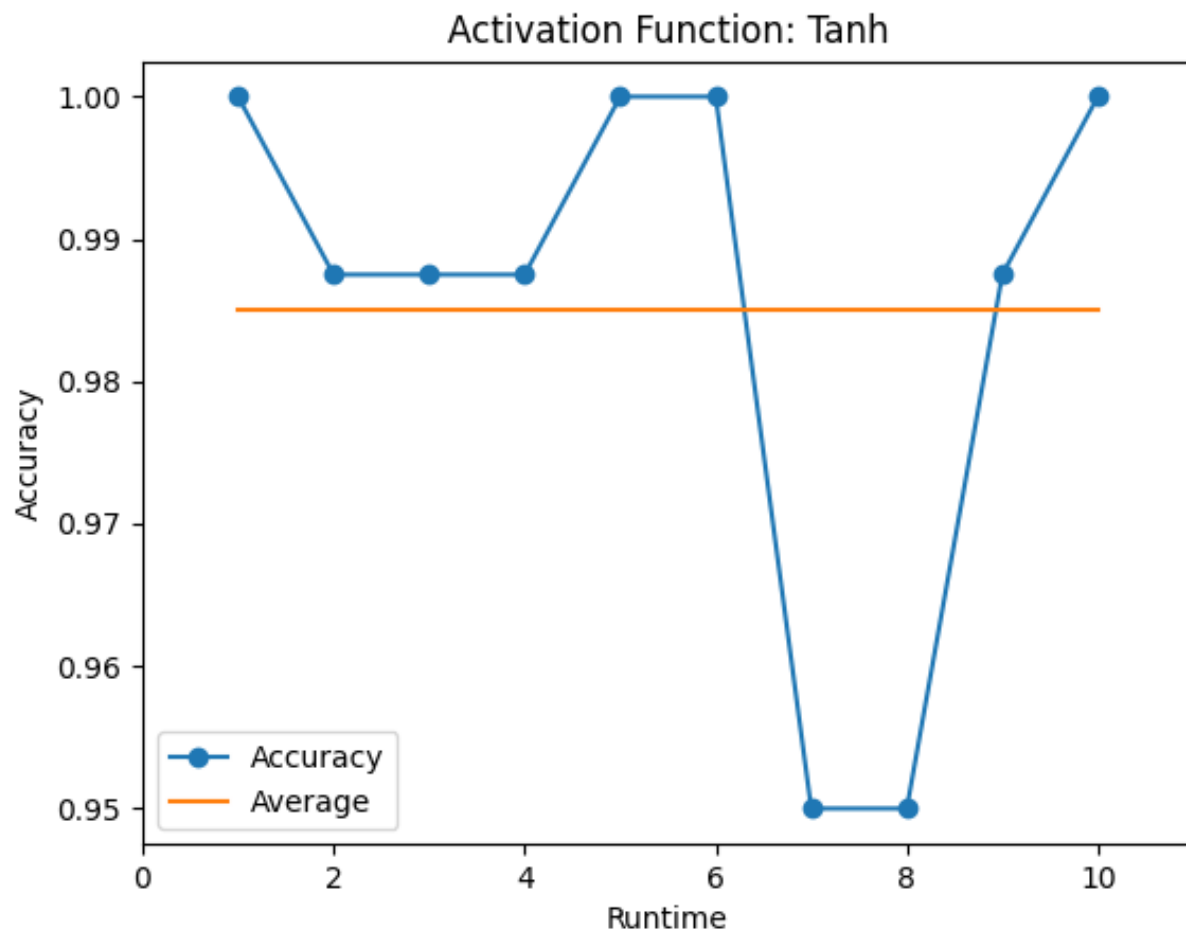- Testing Set: DUMD_test.csv
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Questions

Q1

Apply Multi Layer Perceptron (MLP) on the provided dataset by using activation functions listed below. Use the given parameters. Run MLP 10 times for each case, plot runtime vs. accuracy with average line as shown in below.

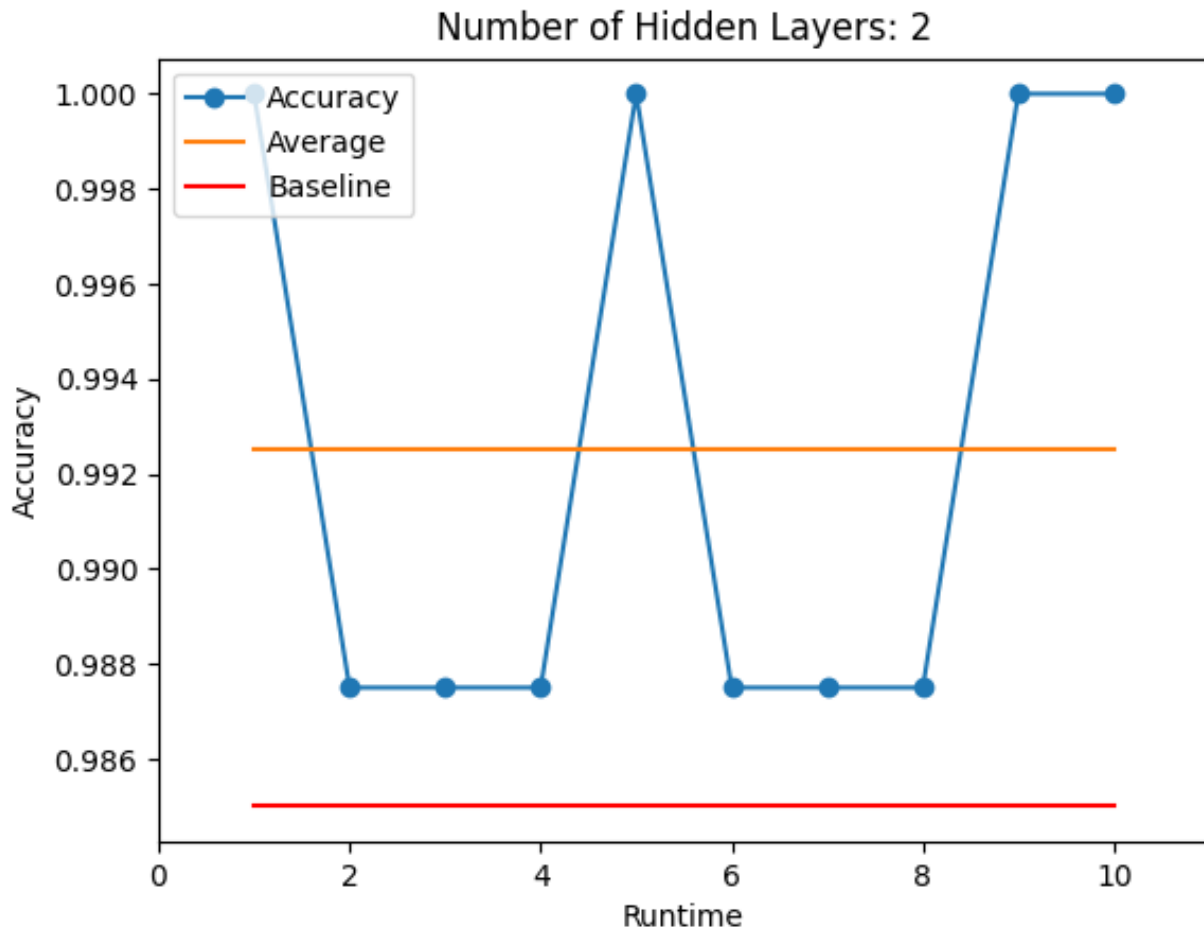(Number of hidden layer: 1, Learning rate: 0.1, maximum iteration:1000)

1. Relu
2. Sigmoid
3. Tanh

Q2

Choose the activation function that provides highest average accuracy value in Q1. Try different number of hidden layers as given below. Run MLP 10 times for each case, plot runtime vs. accuracy with average line. Plot the best average accuracy value from Q1 as baseline performance.

- Number of hidden layers: 1, 2, 3 and 4

Number of Hidden Layers: 2

Q3

Use the number of hidden layers that achieves highest average accuracy in Q2. In this step, try 3 different learning rate values from the given interval. Run MLP 10 times for each case, plot runtime vs. accuracy with average line and updated baseline performance.

1. Learning rate: 0.08 - 0.3
2. Train your model with final parameters. Display the training curve and confusion matrix with accuracy value.