Project 1

Due: 11:59pm, february 18.

1 Introduction

In this project, you need to build a Multi-layer Perceptron (MLP) model for a specific dataset to do predictions.

Wine Data Set. These data are the results of a chemical analysis of wines grown in the same region in Italy but derived from three different cultivars. The analysis determined the quantities of 13 constituents found in each of the three types of wines. Specifically, the attributes are 1) Alcohol, 2) Malic acid, 3) Ash, 4) Alcalinity of ash, 5) Magnesium, 6) Total phenols, 7) Flavanoids, 8) Nonflavanoid phenols, 9) Proanthocyanins, 10) Color intensity, 11) Hue, 12) OD280/OD315 of diluted wines, and 13) Proline. Note that all attributes are continuous. For access to the dataset, please visit https://archive.ics.uci.edu/ml/datasets/wine. Given a list of attributes, your model should output a number in $\{1, 2, 3\}$ to indicate which type it belongs to.

Evaluation. To evaluate the effectiveness of your model, you need to compare with the baseline prediction model which just randomly outputs one type of wines given attributes. In this project, we suggest using 5-fold cross-validation. As a result, you should report two accuracies, one for each predicting algorithm.

5-fold Cross-validation. Randomly divide the training data D into 5 groups with the same size say $\{D_i\}_{i=1}^{5}$. During each iteration i for $i \in \{1, 2, 3, 4, 5\}$, select $D - D_i$ and D_i as training data and testing data independently. Finally, output the averaged testing accuracy as the output accuracy for a specific predicting model.

2 Submission

You only need to submit one notebook on Canvas before the due date. Fail to do so will make your final grade deducted. In the notebook, you should specify your model details. The final report will be judged based on the clarity of the report.

3 Collaboration

Note that this is an **independent** project, which means you are not allowed to make a group. However, discussion is allowed. If you have discussed with someone or got any help from others, you need to clearly specify their names in acknowledgement.