

CS 422: Project 2 Write-up

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November 3, 2022

This is the link of my write-up: <https://www.overleaf.com/read/vjpqhpztfpmc>.

1 Adaboost Implementation

Question: What is the reason for using a decision tree stump rather than a decision tree with a greater depth? How does this differentiate adaboost from a random forest ensemble method?

A decision tree stump is weaker than a decision tree with a greater depth, so using a decision tree stump leaves more space for improvement with the adaboost. The adaboost is different from a random forest ensemble method because the tree stumps created by the adaboost improve upon one another and are weighted, while the random forest ensemble is, well, random. Also, the adaboost uses all the data, while the trees in the random forest ensemble randomly select data from the data set to use.

Question: What would need to change to run an adaboost algorithm with a perceptron rather than a decision tree?

The overall algorithm of the adaboost won't change (adaboost would be pretty bad at boosting if it changed based on what function we plugged in). However, the f that we used in `adaboost_train` would need to be changed to a perceptron rather than a decision tree stump. Also, the perceptron only works really well if the data is linearly separable, which is another thing that should be taken into account when doing this algorithm.