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CS229 - PS7 – part e

**Bagging**

Test error of overall classifier decreases with increase in number of trees. Bagging resamples the training set with replacement, therefore some instance are represented multiple times while others are left out. As a result, the classifier trained on a training which has multiple copies of a particular data sample, might obtain a higher test-set error than the classifier using all of the data. But as we consider more and more trees, we are trying to average out these multiple occurrence, thus test-error decreases.

**Bagging with Logistic**

Test error of overall classifier decreases with larger penalty term. In the plot it shows that when we have 0 penalty, none of the weak decision tree is penalty, therefore all weights as non-zero (number of decision trees). But as the penalty term increases, weights are adjusted such that it penalizes more bad feature (decision trees).

**Boosting**

Test error in bagging decreases to zero with increased aggregation of decision tree. This is because, tries to increase the confidence in the prediction (that are correct) by taking more number of tree. So margin close to -1 means high confidence (incorrect) and close to 1 means high confidence (correct) while close to 0 means low confidence.