Exam 3 Written

Benny Chen

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Problem 1

Alan recently came across the concept of ensemble methods in a data mining class and decided to apply it to stock market prediction. In order to predict whether the stock market will rise or fall on a given day, he decided to flip a coin 1000 times and predicted the stock market to go up if heads turn up in majority and vice-versa. He thinks that this approach could get him a better prediction of the stock market because an ensemble of independent classifiers could potentially obtain a better prediction. Do you agree with him? Give a brief justification.

I disagree with Alan as a coin flip to predict the stock market is not a reliable method for predicting financial markets. Coin flips are independent events and do not have any correlation to the stock market. Coin flips are a random binary process of being heads or tails. Ensemble methods would help as it uses multiple algorithms to output and combinine their outputs to produce a more accurate overall prediction. For a ensemble method to have better predictions there needs to be diversity and quality of the individual classifiers used. Overall I think ensemble methods can be great for predicting stock markets but for this purpose simply flipping a coin would not work.

Problem 2

Consider running a single iteration of AdaBoost on three sample points, starting with uniform weights on the sample points. All the ground truth labels and predictions are either $+1$ or -1. In the table below, some values have been omitted.

	True Label	Classifier Prediction	Initial Weight	Updated Weight
X_1	-1	-1	1/3	?
X_2	?	+1	1/3	$\sqrt{2}/3$
X_3	?	?	1/3	$\sqrt{2}/6$

Is X_2 misclassified? Is X_3 misclassified?
Yes both X_2 and X_3 are misclassified.