Home Work 2 due Sunday, Feb. 6, before 12:00am

1. Insert a column in the data set where the entries are 1 if the stock outperforms SPY in the earnings period and -1 if it underperforms or has the same return.

   Create a BaggingClassifier with a DecisionTreeClassifier with max_level = 6 and n_estimators = 40 and the new column as labels.

   Use the period 2007-2010 to train the model on the data set constructed above and construct a set of features that optimizes the profit of the long-short strategy on the quarter 2009-07-30 – 2009-10-30

   Backtest the performance of the model with the optimal features over the period 2010 – 2018.

   Compute Sharpe Ratio, Information Ratio and alpha for the strategy and for the buy-and-hold strategy for SPY

   Change hyper parameters for the BaggingClassifier and the DecisionTree and try at least 3 combinations of max_depth and n_estimators. Find optimal features and backtest with each of the combinations of hyperparameters.

2. Insert a column in the data set with entries: 2 if the stock return is more then 5% higher than the SPY return, 1 if it is more than 1% but less than 5% higher, 0 if it is between -1% and 1%, -2 if the stock underperforms the SPY by more than -5% and -1 if the performance is between -1% and -5%

   Same questions for this dataset as in problem 1 but where the strategy is to invest $x where x is the predicted label