[KNN & Ensemble](http://bayesanalytic.com/knn-and-ensemble-for-stock-price-prediction) to predict stock price movements.

I implemented the basic version of the KNN / Ensemble model described at http://bayesanalytic.com/knn-and-ensemble-for-stock-price-prediction to test it's ability to properly predict stock price corrections downward.

The initial results are promising with concentration ratios at 200% to 300% before running the optimizer.   This is running against what is supposed to be randomly moving price data so classification at this level should be pretty difficult.

Since this is before running an optimizer it cannot be over fitting the curve since it is doing no fitting at all.

I pushed the KNN in some different directions and have it produce both a probability and magnitude score. Not sure yet how accurate the magnitude will be.

To ensure we didn't cheat we filter all KNN data from less than goal + 1 days prior to day being ranked. This absolutely eliminates risk of cheating by looking into the future.

Exiting Model Show Promising Results

Better accuracy possible
with Daily Margin transaction Data.

Goal: 3% Drop within 8 trade Days.						
# Bars Scored	2,251		Number of Years			8.97
# Sucesses	419		Success Rate for Set			18.700%
			Jan-1-2005 to Jan-31-2014			
Prob Rank	# Rec	Percent of Set	# of Success	Percent Success at Goal	Percent Success 1/3 Goal	Accuracy Ratio
5%	4	0.2%	0	0.0%	0.0%	0.0
10%	45	2.0%	6	13.3%	40.0%	0.7
15%	251	11.2%	23	9.2%	42.2%	0.5
20%	466	20.7%	60	12.9%	43.8%	0.7
25%	503	22.3%	69	13.7%	40.4%	0.7
30%	351	15.6%	58	16.5%	43.6%	0.9
35%	238	10.6%	59	24.8%	53.8%	1.3
40%	136	6.0%	31	22.8%	51.5%	1.2
45%	59	2.6%	20	33.9%	59.3%	1.8
50%	55	2.4%	25	45.5%	74.5%	2.4
55%	28	1.2%	15	53.6%	75.0%	2.9
60%	25	1.1%	14	56.0%	80.0%	3.0
65%	20	0.9%	9	45.0%	55.0%	2.4
70%	21	0.9%	9	42.9%	71.4%	2.3
75%	17	0.8%	9	52.9%	70.6%	2.8
80%	11	0.5%	7	63.6%	63.6%	3.4
85%	12	0.5%	3	25.0%	33.3%	1.3
90%	6	0.3%	2	33.3%	50.0%	1.8
95%	3	0.1%	0	0.0%	33.3%	0.0

Sweet Spot (45% – 80% range)

Ran from raw data before optimizer is applied so no curve fitting was possible. Expect substantial increase in accuracy when optimizer is added.

At 45% to 80% confidence level high probability of Profit from Hedge Positions.

A market move of 1/3 of goal is sufficient for Hedge position to exit with Profit.

Over 50% win rate for 1/3 goal in sweet Spot range may allow low cost or net zero cost hedge.
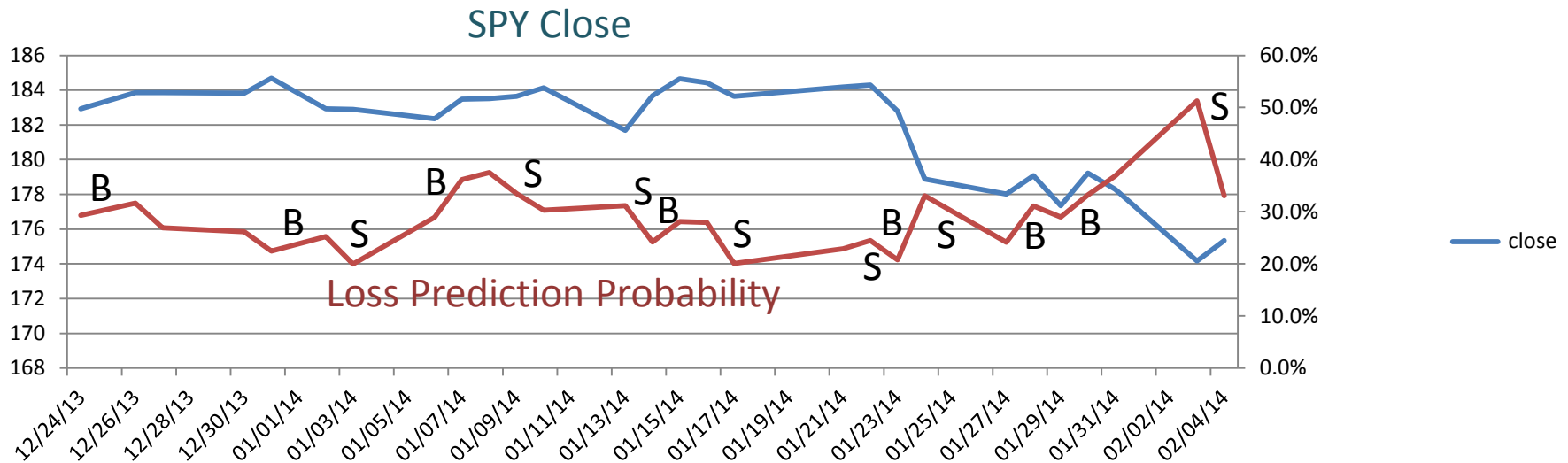
Example:

- Risk score spiked to 29% on 05/23/2013 with SPY close $165.45
- Market continued to rally through 5/28 $166.3.
- Then it fell to 161.27 on 6/5 for drop of 2.52%.
- A VIX-$20 8/21 call buy EOD 5/24 $1.75 with $2.03 sell EOD 6/5 yields 16% gain. Requires $1 hedge per $6.34 of long exposure.

- Risk score spiked to 40% on 6/18 close of 165.74 dropping to 157.06 on 6/24 a drop of 5.2%.

Over 140 distinct feature measurements per bar. Including Rel-SMA, Slope, Dist Rank, RSI, ROC, etc.

Example of Loss Score in Action

Candidates for Transactions / B = Buy Hedge,   S = Sell Hedge

This need fine tuning algorithm to improve entrance and exit conditions based on relative change compared to short and medium term levels.
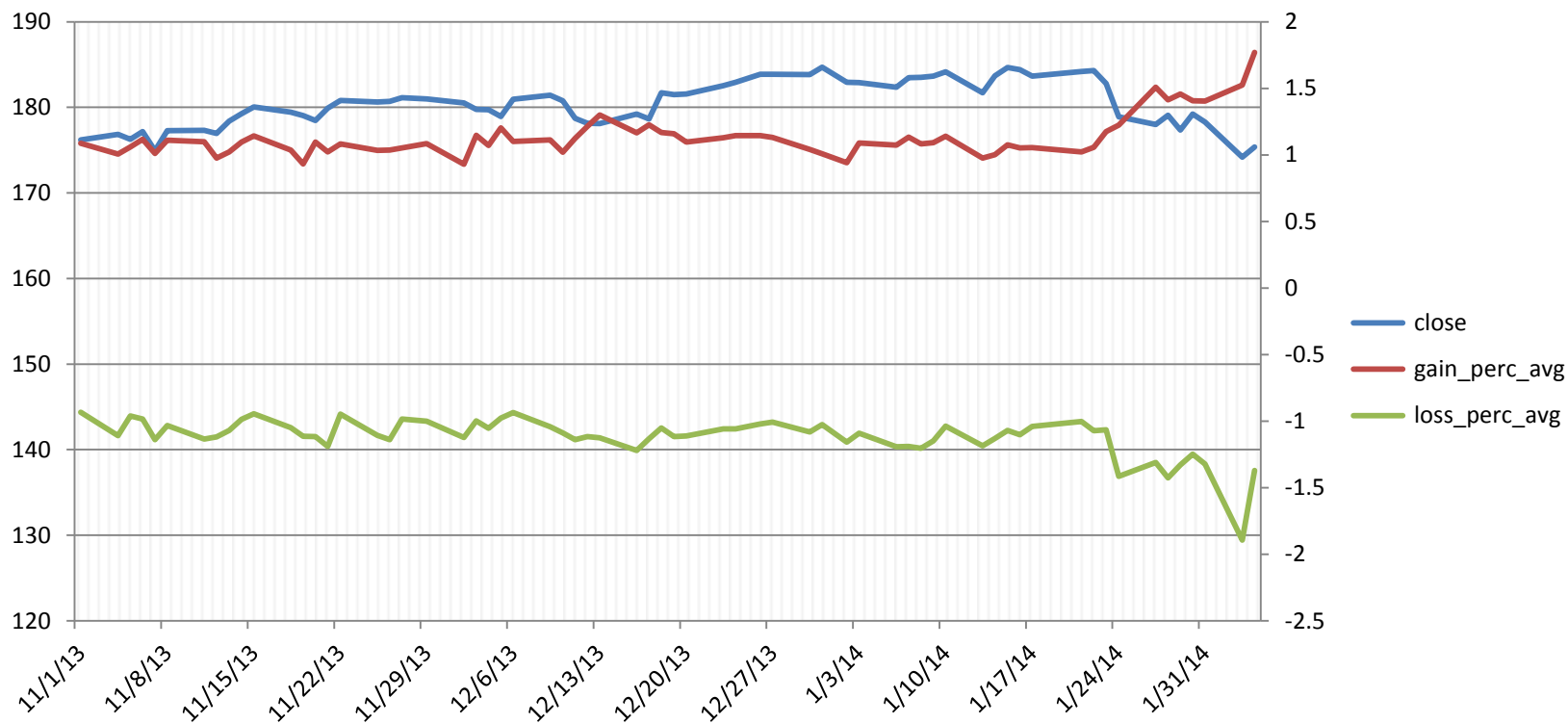
Need to improve relative risk to normalize out high risk periods from 2008, 2009 that can otherwise hide valid short term signals.

Predicting Price Movement Magnitude

When the engine is working you should see:
Red line moves Up before the Blue line moves Up.
Green line Moves Down before Blue line moves Down.

Blue line – Current Market Close
Red Line - Predicted Market Price move upward over next 8 days.
Green Line – Predicted market Price Move downward over next 8 days.