ML4T PROJECT: Manual Strategy

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1. TECHNICAL INDICATORS

4 Indicators considered for the manual strategy

Indicators	The Reason For It Might Work
~~Momentum~~	* didn't use this for the final evaluation since it didn't return highest return with in sample data if used with others
Bollinger Bands	Standard Deviation used for Each Band could help avoid being influenced from untrusted movement would be less
Price/SMA ratio	With right amount of lookback days, it could show more acurate price movement with less noise which can be used to o indicate if the price is too high or to low for the moment
Volatility	Daily returns can tell deviation for each day which can indicate the price can be too high or too low

Windows Sizes

	Window For Price's Standard Deviation	Window For Price's Mean	Window For Momentum
Days	200	241	50
Indicators Used	Bollinger Bands	SMA Bollinger Bands	Momentum

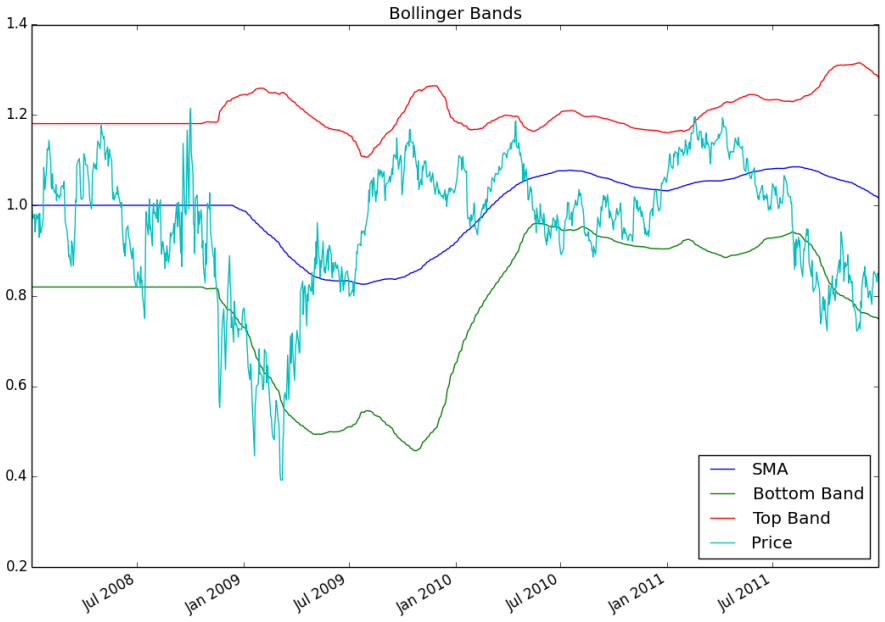
Thresholds

	Momentum	Bollinger Bands	Price/SMA ratio	Volatility
data reference	momentum value - price	top band, bottom band and price	sma ratio value	volatility value
overbought	> 0.06	When the price cross the top band line downward	> 1.03	> 0.11
oversold	< 0	When the price cross the bottom band line upward	< 1.02	< -0.09

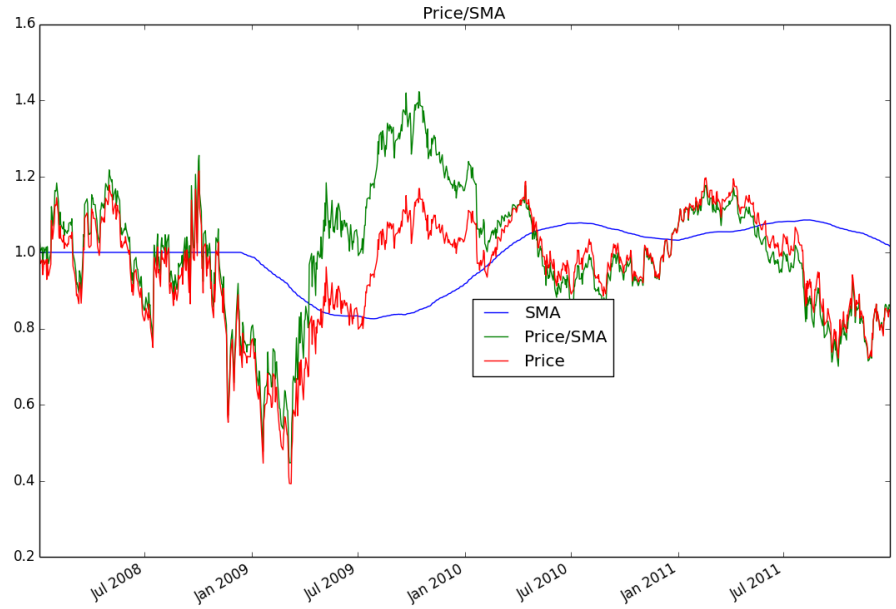
Process Order	* Return will be different depends on what order indicators called.(showing top 3)
Highest Return	1. Bollinger Bands - 2. Price/SMA ratio - 3.Volatility OR 1. Price/SMA ratio - 2. Bollinger Bands - 3.Volatility
2nd	1. Price/SMA ratio - 2. Bollinger Bands - 3. Momentum - 3.Volatility
3rd	1.Volatility - 2. Bollinger Bands - 3. Price/SMA ratio - OR 1.Volatility - 2. Price/SMA ratio - 3. Bollinger Bands

Charts

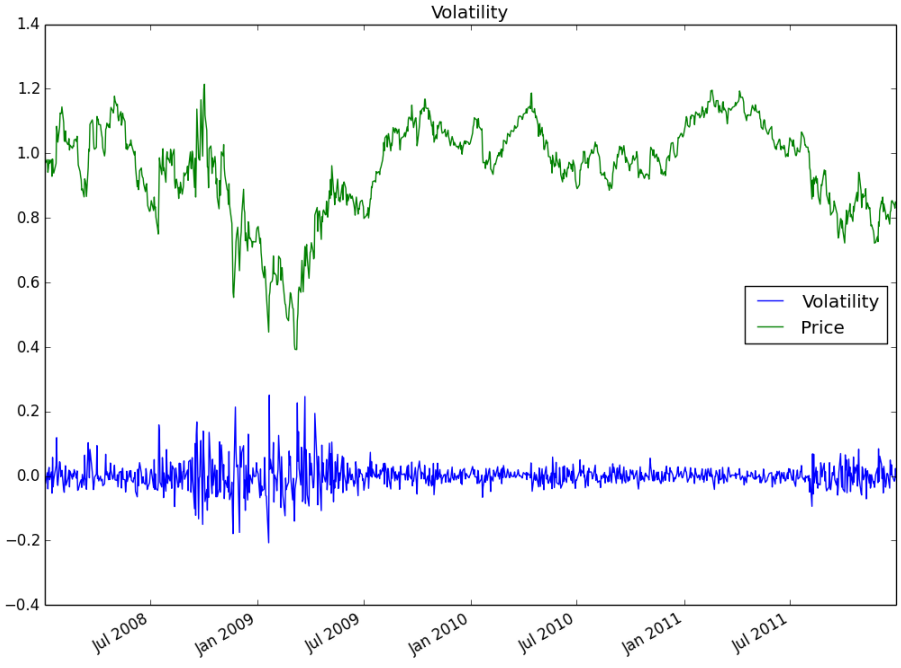
Bollinger Bands



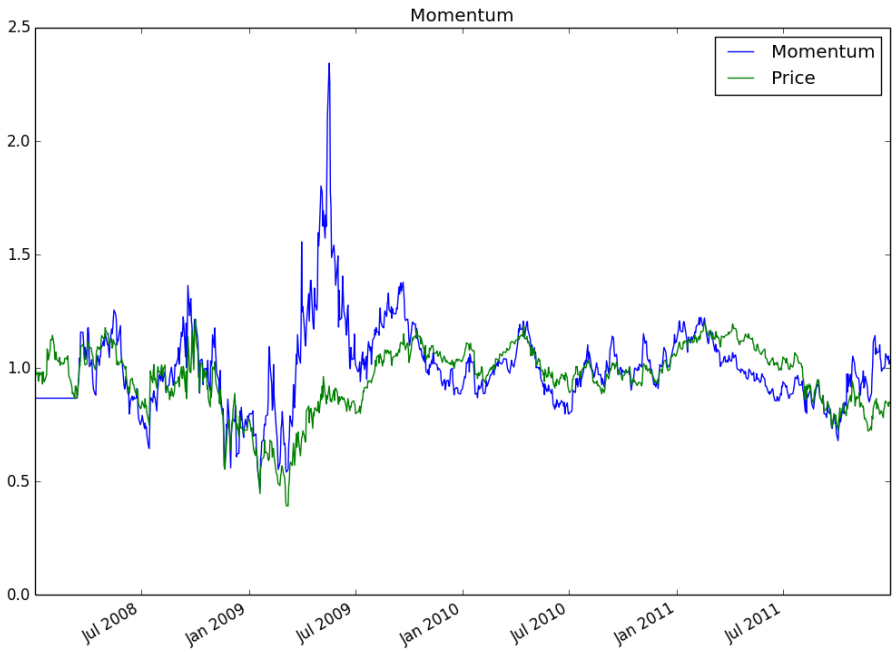
Price/SMA ratio



Volatility

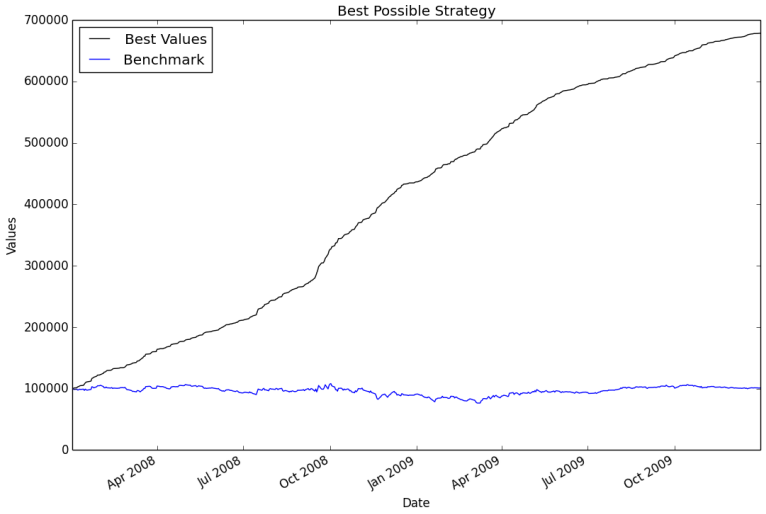


Momentum



2. BEST POSSIBLE STRATEGY

Summary	My assumption was that if Long Entry can be made everytime the price goes up and Short Entry everytime the price goes down, all trade can create profit and never lose so that I can get maximum benefit.
	Treated the Long Entry is the same as Short Exit with shares for 2000 so that the share holdings will be always +1000 or - 1000 except the first day where only allowed 1000 shares to trade. This is the same for Short Entry as Long Exit.
	The last day trade was dummy one so that the total return can be calculated.

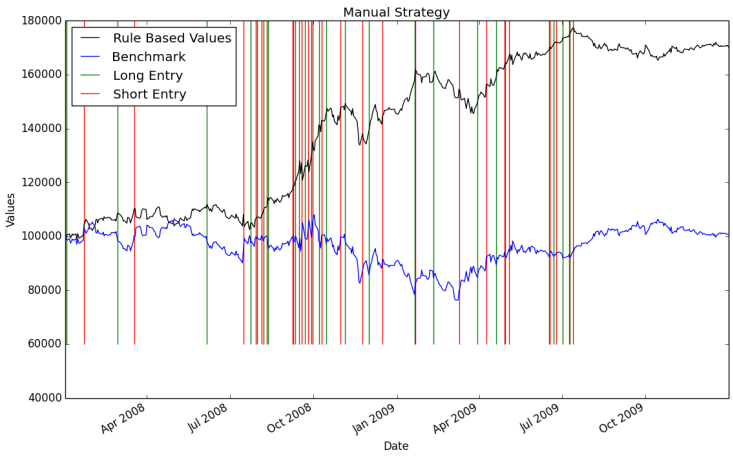


Date Range	Sharpe Ratio of Best Portfolio	Sharpe Ratio of Benchmark	Cumulative Return of Best Portfolio	Cumulative Return of Benchmark	Standard Deviation of Best Portfolio	Standard Deviation of Benchmark	Mean Daily Return of Best Portfolio	Mean Daily Return of Benchmark	Final Portfolio Value of Best Portfolio	Final Portfolio Value of Benchmark
2008-01-01 00:00:00 to 2009-12-31 00:00:00	13.32276985	0.1569184064	5.7861	0.0123	0.004547823198	0.01700436627	0.003816786151	0.0001680869782	678610	101230

3. MANUAL STRATEGY

Summary	At first, I expected that more indicators can give you better performance. so I was going to use 4 indicators, Price/SMA rate, Bollinger Bands, Volatility and Momentum. However, after I've tried many different conbination among the indicators as well as many different processing orders, I noticed that 3 indicators was showing better result than 4.
	Indicators are used in sequential that means, each indicator does full process after another.
	Later indicator has more priority than previous one. In another words, later decision can be respected than previous one to place order.
	Entry and Exit policy are the same as best strategy. Simply it comes alternately.
	Treated the Long Entry is the same as Short Exit with shares for 2000 so that the share holdings will be always +1000 or - 1000 except the first day where only allowed 1000 shares to trade. This is the same for Short Entry as Long Exit.
	Day of Window and Threshold for oversold and overbought were decided by experimenting manually to get the best result for each indicator one by one.

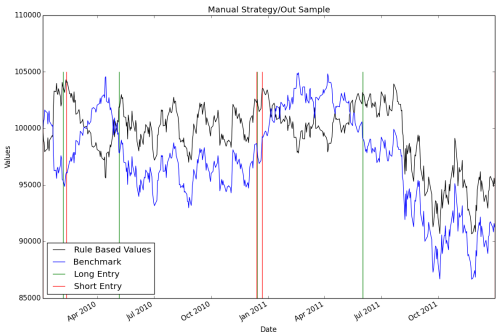
In Sample



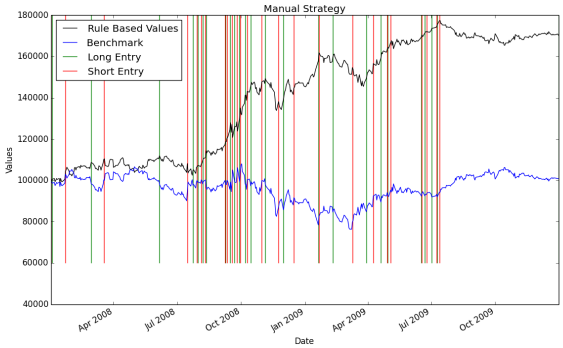
4. COMPARATIVE ANALYSIS

Date Range	Sharpe Ratio of Manual Portfolio	Sharpe Ratio of Benchmark	Cumulative Return of Manual Portfolio	Cumulative Return of Benchmark	Standard Deviation of Manual Portfolio	Standard Deviation of Benchmark	Mean Daily Return of Manual Portfolio	Mean Daily Return of Benchmark	Final Portfolio Value of Manual Portfolio	Final Portfolio Value of Benchmark
2008-01-01 00:00:00 to 2009-12-31 00:00:00	1.527534785	0.1533866908	0.7063384226	0.01023620785	0.01173642321	0.01704122568	0.001129344912	0.0001646600472	170288.65	100819.25
2010-01-01 00:00:00 to 2011-12-31 00:00:00	-0.1189370713	-0.2636172285	-0.04676421571	-0.08530881679	0.008216044682	0.008501283953	-6.16E-05	-0.0001411750798	95119.3	91273.1

Manual Strategy Out Sample



Manual Strategy In Sample



Summary	Overall, both In Sample and Out Sample have better performance with Manual Strategy than the benchmark.
	However, the Out Sample performance was really not great. While the In Sample values has never gone below the benchmark, the Out Sample values very often did.
	I beleive this was caused by overfitting to the data of the in sample.
	I have tried to get best possible return using the In sample data which has lead to making the indicator as very close to each data as possible.
	All the threshold I've set for each indicator only worked well with the In Sample data. The Out Sample couldn't have better decision pocess to tell where better entry points for both Long and Short were.