

Stock Trading with Microblog Sentiments

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CS 4624: Multimedia, Hypertext, and Information Access, Spring 2017

May 2, 2017

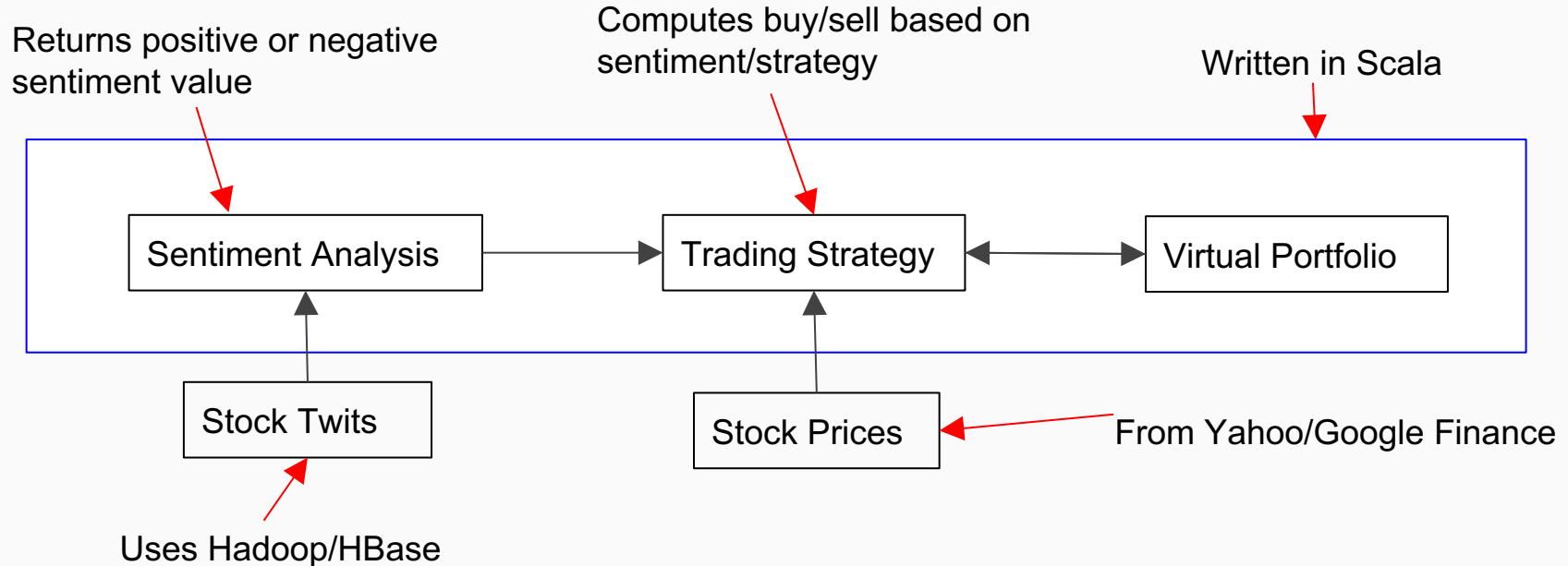


Project Overview / Goal

- Implement multiple trading strategies
- Maximize profit over the course of one year
- Data sources:

| | |
|---|----------|
| Stock Twits (Tweets) | Provided |
| Yahoo/Google Finance (Daily stock price data) | Found |
| Wharton Research Center Data Services (Intraday stock price data) | Found |

Trading Simulation Software



Plan

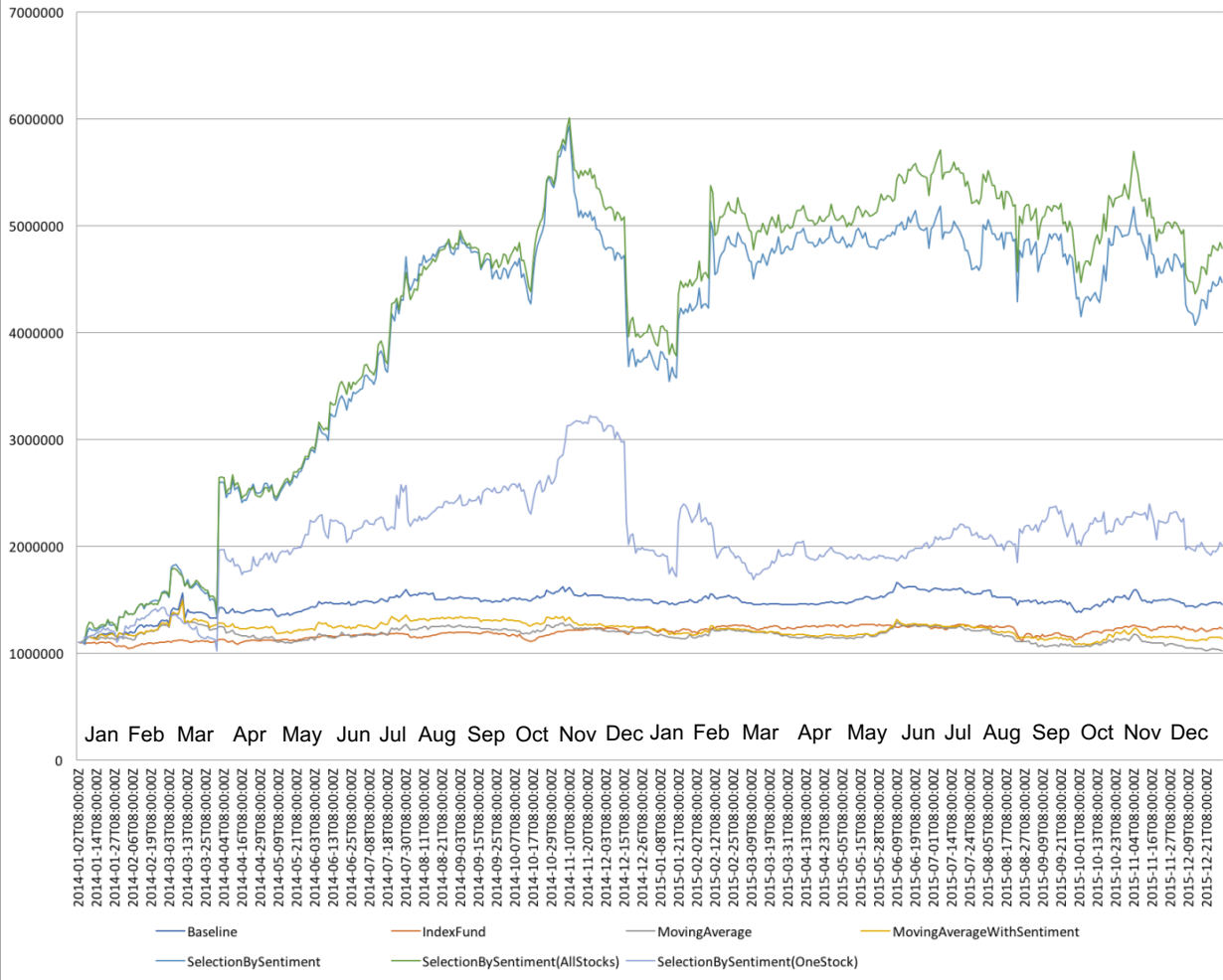
- We chose 11 stocks to watch:
 - AAPL, FB, GILD, KNDI, MNKD, NQ, PLUG, QQQ, SPY, TSLA, VRNG
- Set up the following strategies:
 - Baseline
 - S&P 500 (buy and hold the S&P 500 index)
 - Moving Average
 - Moving Average with Sentiment
 - Selection by Sentiment (One Stock): $n = 1$
 - Selection by Sentiment: $n = 3$
 - Selection by Sentiment (All Stocks): $n = 11$

Trading Strategies

| Strategy | Stocks/Portfolio | Decision-Making |
|-------------------------------|---------------------------------|--|
| CrowdIQ Strategy | 1 portfolio for each 11 stocks | Based on bullish/bearish sentiment |
| Moving Average | 1 portfolio for each 11 stocks | Based on 5 and 10 day price trends. |
| Moving Average with Sentiment | 1 portfolio for each 11 stocks | Based on 5 and 10 day price trends and sentiment |
| Selection by Sentiment | 1 portfolio shared by 11 stocks | Based on bullish/bearish sentiment |
| Buy and Hold | Only uses 1 Stock - S&P 500 | Control: buys once at start then hold for entire year. |

Portfolio Value over Time for All Strategies from 2014-2015

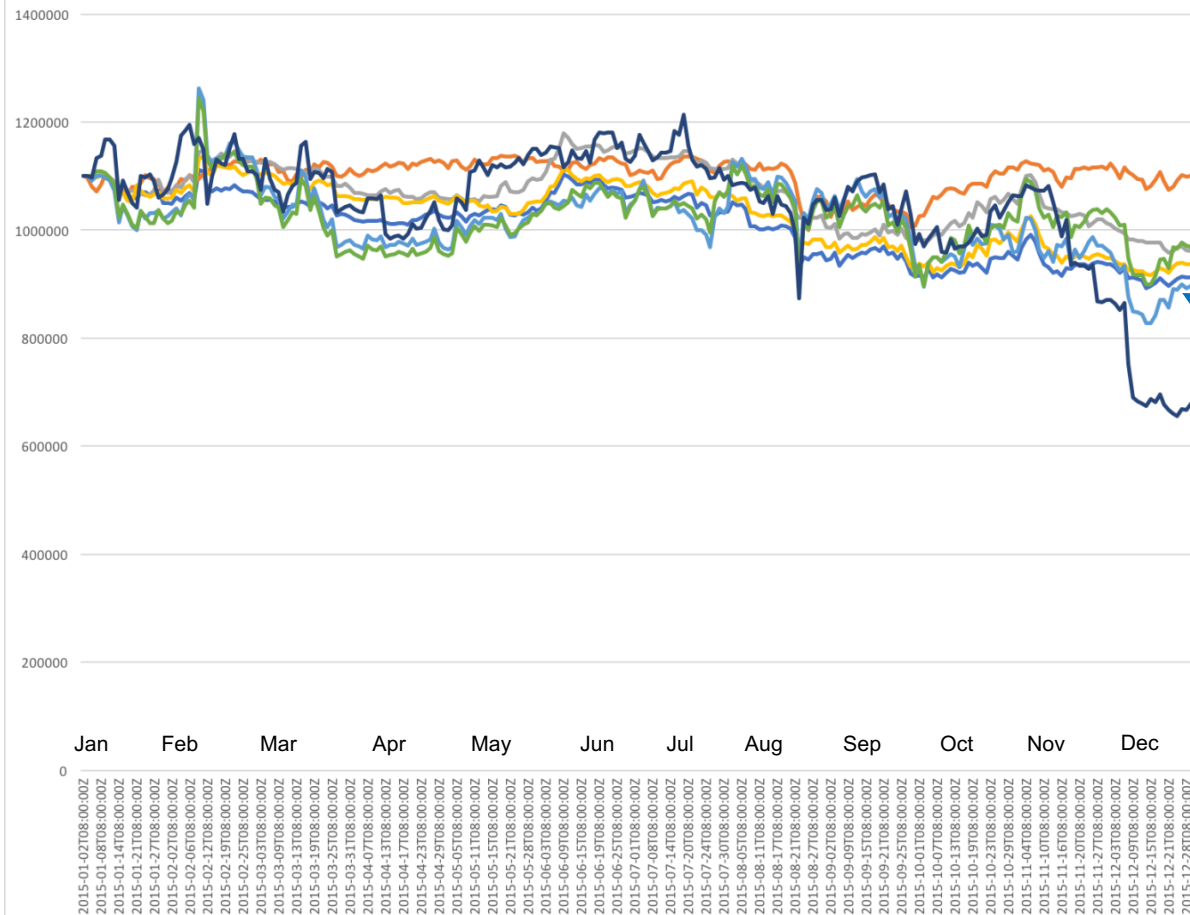
\$7 million
 \$6 million
 \$5 million
 \$4 million
 \$3 million
 \$2 million
 \$1 million



SelectionBySentiment(AllStocks)
 SelectionBySentiment
 SelectionBySentiment(OneStock)
 Baseline
 IndexFund
 MovingAverageWithSentiment
 MovingAverage

Portfolio Value over Time for All Strategies in 2015

\$1.4 million
 \$1.2 million
 \$1 million
 \$800,000
 \$600,000
 \$400,000
 \$200,000



IndexFund
 SelectionBySentiment(AllStocks)
 MovingAverage
 MovingAverageWithSentiment
 Baseline
 SelectionBySentiment
 SelectionBySentiment(OneStock)

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

2015-01-02T08:00:00Z
 2015-01-08T08:00:00Z
 2015-01-14T08:00:00Z
 2015-01-21T08:00:00Z
 2015-01-27T08:00:00Z
 2015-02-04T08:00:00Z
 2015-02-11T08:00:00Z
 2015-02-18T08:00:00Z
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 2015-03-03T08:00:00Z
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 2015-03-30T08:00:00Z
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Baseline IndexFund MovingAverage MovingAverageWithSentiment
 SelectionBySentiment SelectionBySentiment(AllStocks) SelectionBySentiment(OneStock)

Issues

Unreliable data caused our day trading strategies to perform unreasonably well, so those results have been omitted.

2014-01-06T09:42:00Z VRNG 3.15
2014-01-06T09:43:00Z VRNG 3.12
2014-01-06T09:44:00Z VRNG 3.11
2014-01-06T09:45:00Z VRNG 3.11
2014-01-06T09:46:00Z VRNG 3.12
2014-01-06T09:47:00Z VRNG 1.09
2014-01-06T09:48:00Z VRNG 3.11
2014-01-06T09:49:00Z VRNG 3.13
2014-01-06T09:50:00Z VRNG 3.13

Future work

- Use accurate source of high-resolution bid/ask quotes for day trading
- Obtain data for 2013 and 2016, testing on each
 - Will help to explain the difference between our 2014 and 2015 results
- Test with live data (and integration with real trading platforms)
- Implement slippage models in simulation software which factor in trading volume
- More robust sentiment analysis with advanced text normalization techniques
- Experimentation with Machine Learning-based strategies that factor in more than just aggregated sentiment

Acknowledgements

- Saurabh Chakravarty
 - Client
 - saurabc@vt.edu
- Eric Williamson
 - Created sentiment analysis
 - ericrw96@vt.edu
- Dr. Weiguo Fan
 - StockTwits Data
 - wfan@vt.edu