

CSE410 Report

Our project focused on facilitating a collaborative and interdisciplinary learning environment where we could each bring our individual strengths and perspective to study the market and its behavior. We began working both individually and while meeting as a group, bouncing ideas off each other, to spark creative discussion and to foster thinking outside the box. This was beneficial because it allowed us to work together while focusing on what we, individually, wanted to study and helped to give our team a holistic view of how to use computational methods to study the market. This project contains three perspectives: a finance section, written by Nick; a computer science section, written by John, and a statistics section, written by Spencer.

Nick:

My approach to this project was to give an overview of the stock market within the time frame we had initially set for our code which were the years 2008 when the market crashed to present day 2019. I wanted to provide charts that analyzed the return of the S&P 500 which is an index of the top 500 stocks. We wanted to use the S&P as a benchmark for the stocks we analyzed and try to prove if Charlie's method really worked and would maybe perform better or as well as the S&P. What we found out was that from 2008 to 2018 the S&P returned a staggering 255% which meant that if investors held or bought during this time, they would have made some handsome returns. Additionally, I created a table that showed annualized returns for every year from 2008 to 2018, and the only down year was 2008. Every other year showed double digit returns from the stock market. Finally, I compared US treasury's, more specifically the 10 year against the 2 year and 3 month. US treasury's are a great economic indicator that allows investors to gauge investment risk and appetite. Since investors can use the yield curve to analyze the current state of the economy, my group noticed that during 2008 the 10-year yield was extremely high, yielding at around 4% compared to 2.5% present day. This meant that because the market was tanking, investors were pulling their money out of the stock market and putting it in US treasury's because they were afraid of losing their money, so they parked their money in a less risky asset, US treasury's. Overall, Charlie's method for the most part is effective, but if an investor really wanted to make some gains in the market, the best way to do that is to invest in the market.

John:

The objective of the tool made for this project is to automate the WOO rating system process. Normally, if one wants to check the WOO ratings of various stocks, it can be tedious to manually check every graph and discern the rating. But with this tool, now you can simply input any stocks you wish to find a rating for. You will then get a point and figure chart rating as well as an SMA chart rating for every day from your entire dataset.

The point and figure rating was calculated based on the traditional setting on stockcharts.com. This consists of using the High/Low method, a three box reversal, and using a traditional scaling method that relates box sizes to the high/low of that day. To view the table of box sizes relating to price, you can find this at <https://stockcharts.com/docs/doku.php?id=other-tools:pnf-charts>.

Another small tool was developed which can be used as an add-on to the WOO rating system tool. This tool can be used for simulating buys and sells based on the ratings. Once the ratings have been calculated, one could buy a certain number of stocks and include a buying fee, if needed. Then, it is possible to choose which ratings one would want to buy and sell on.

There are also extra simple tools that can be used to get the total sum earnings, as well as the percentage of gains/losses. Another feature is that one can specify which years they would like to buy and sell the stocks, although this function is still in beta mode.

Spencer:

As Nick was studying the finances of 2008 and 2018 and John was automating parts of the WOO rating system, I saw an opportunity to use my statistical training and the background work done by Nick and John to fit a model to study the market behavior of those time periods. The tool John created was able to output two factors, the SMA and PF rating, along with the daily returns as a percentage. I then fit a general factorial model using the SMA and PF ratings as the factors and the daily returns as the response variable. This method was useful for exploratory analysis, and getting visibility into the market during those times, but, upon analyzing the residuals, I saw the model did not fit well enough to give us any practical predictive power. The primary conclusions were that during 2008 and 2018 the SMA ratings of 1, 5, 6 correlated with the largest daily returns and the PF ratings were inconsistent during the two time periods.

In conclusion, our project, while not the most well-defined project, allowed us all to bring our individual strengths to an interdisciplinary environment and help each other see different perspectives and possibilities in using computational methods to study the market. Additionally, we have only begun to scratch the surface of what is possible with the tool John created. The next steps could be to use John's tool to continue refining the factorial model created by Spencer to look at different time horizons, instead of daily return we could do weekly, monthly, or yearly.