

EE P 596 Mini Project 1  
Q2 Report

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## Introduction

This question of the mini project tasked us with creating a live trading implementation of our stock trading strategy. We ran the live trading code for 5 days and used our STL and LR strategies. In order to live trade at the end of the day (1 PM PST), we decided to simply run the code between 12:45 PM and 1:00 PM each day.

## Code Implementation

### STL Live Trade Code

The live trading implementation for the STL strategy is similar to the backtesting code, the difference is in the base strategy class. Rather than iterating over a list of prices, the live trading strategy reads in the current price and then executes a buy or sell through the Alpaca API based on the action suggested by STL.

A model was created for each stock of interest and the strategy was run for each stock every day at closing. The STL predictions were made using Prophet and were based on the last year of closing prices. The new price was compared to the predicted price and the action was evaluated by determining if the new price was outside of the predicted confidence bounds.

### Logistic Regression Live Trade Code

The live trading code implementation for the logistic regression trading strategy utilizes the `create_data` and `feature_stack` methods from the Q1 report/code. With the extra implementation of `get_q_buy`, `get_limited_q_buy` and `execute_paper_trade` which were implemented specifically for the LR live trading class.

In order to ensure that there were trades that took place during the 5 days of trading, we forced the algorithm to buy a limited number of shares of each stock on the first day. This code can be seen commented out under the else case of execute paper trade in the `ML_Strategy` class.

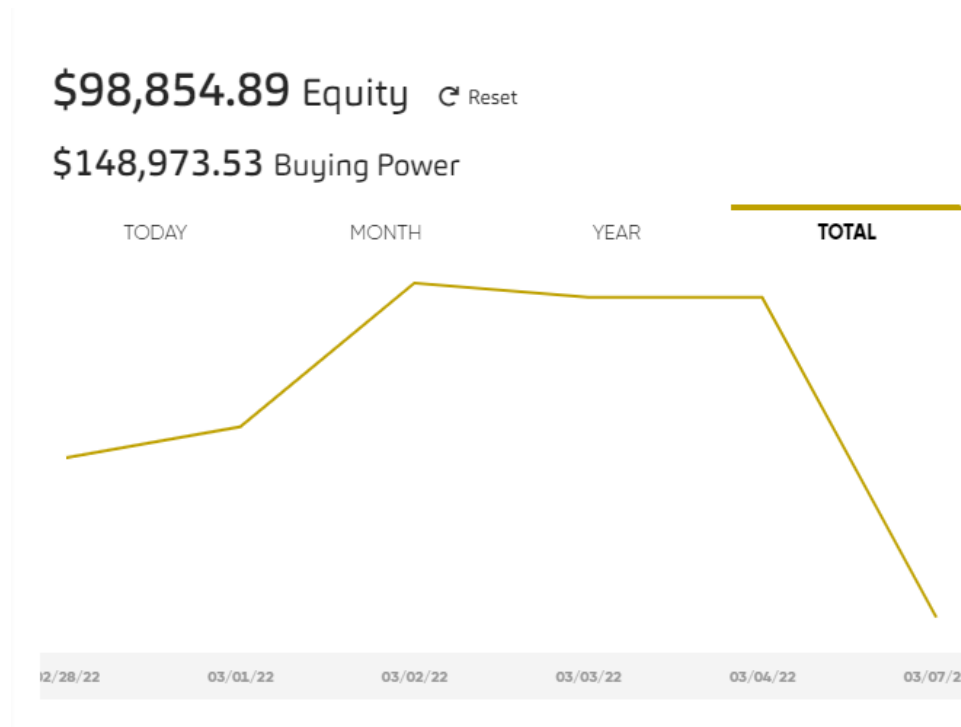
Similarly to backtesting, we generate a model for each stock, these models are all trained on 3 stocks closing prices and other calculated features over the past year. To generate data for the day, we run the code at the specified time each day and get the current price of each stock. In doing so we also generate a new data row with the updated sma, ema, std, etc values. This new data row is used as the prediction point for our model to determine whether to buy or sell each day.

## Live Paper Trading Results

### STL

Day #	AMZN	GOOGL	APPL	NVDA	AMD
1	Hold	Hold	Buy	Hold	Hold
2	Hold	Hold	Hold	Hold	Hold
3	Hold	Hold	Hold	Hold	Hold
4	Hold	Hold	Hold	Hold	Hold
5	Force Sell	Force Sell	Force Sell	Force Sell	Force Sell

The STL ending values were \$98,854.89 in equity and \$148,973.53 in buying power.



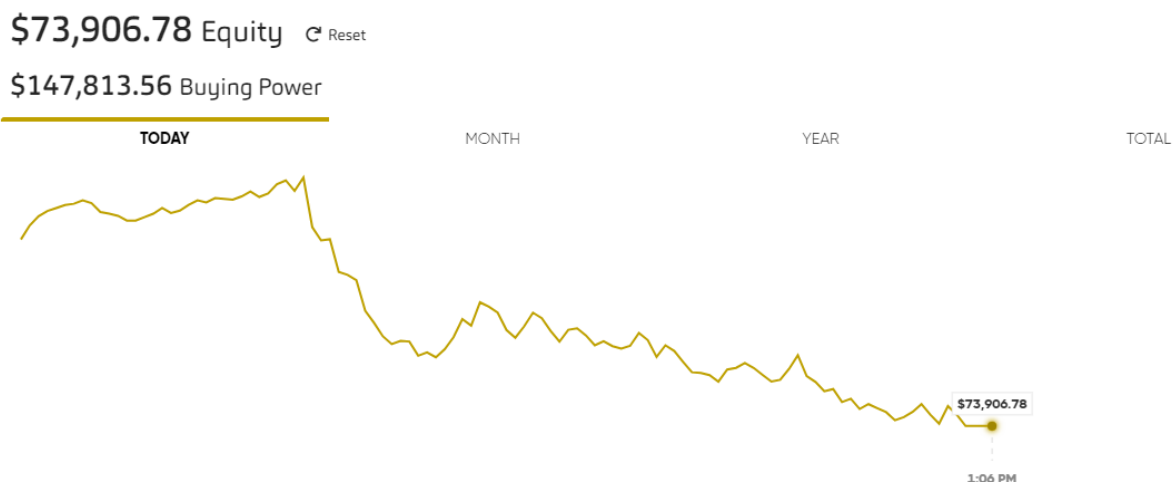
The graph above shows the trend over the 5 days of trading. The STL strategy only bought stock for AAPL on the first day and held for all other days. The strategy was looking pretty good until the large drop over the weekend resulted in a large ending loss of -1.46%.

### Logistic Regression

Day #	AMZN	GOOGL	APPL	NVDA	AMD
1	Buy	Buy	Buy	Buy	Buy
2	Hold	Hold	Sell	Sell	Sell

3	Buy	Buy	Hold	Hold	Buy
4	Buy	Hold	Hold	Buy	Buy
5	Force Sell	Force Sell	Force Sell	Force Sell	Force Sell

The Logistic Regression ending values were \$73,906.78 in equity and \$147,813.56 in buying power.



Example snippet of today's equity by hour

The snippet above was a common trend that we saw among the days of live paper trading. This also matches the backtesting trends that we saw at various points in the 5 months of back tested data. To circumvent losses in backtesting a more conservative, dollar cost averaging based strategy was deployed. Because of the short time frame for the live trading, we made the algorithm more aggressive and to simply buy when it says buy and sell when it says sell, if it was more than what it was bought for. In the previous report we saw that the LR algorithm predicts buy heavily when the closing prices are on a downslope, this is reflected here as well with buying heavily as the stock market dips into a valley. **Unfortunately because of this buying pattern and the limited duration for live testing we did end with a loss for Logistic Regression of 26.09%.**

## Discussion

### STL

The STL strategy showed promising results over the first few days, but there was a large decrease on the last day. Given a longer period of time for live trading this strategy likely would have produced better results more similar to those found during

backtesting. Many of the stocks showed decreasing trends over the few days of live trading making it more difficult to turn profits.

### Logistic Regression

An important note to be made about the results of the LR live trading is that in order to ensure that trades happened within the 5 days the algorithm was run, we decided to implement a more aggressive strategy than what was used to backtest. As a result of this we saw net losses instead of gains. We hypothesize that if the algorithm was run for a longer time and reverted back to a more conservative buy strategy as was used in backtesting, the resulting net would be gains instead of losses.