

Basic Stock Bot Back Testing Simple Algorithms

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Introduction

In the landscape of the stock market, algorithmic trading methodologies have an important role in making trade decisions as they are unbiased, considering they make trade decisions based on data instead of emotions. This paper explores methods in algorithmic trading techniques, focusing on the development and assessment of three distinct trading methods: RSI and Heuristic Trade Evaluator, Buy and Hold, and RSI and Moving Average. The objective is to weigh their efficacy in conquering the complexities of the stock market and ultimately lead to potential portfolio gains.

Algorithmic trading stands as a solution to the emotional biases inherent in humans. With its roots in data-driven analysis, these methodologies navigate the stock market. The main objective of this paper is an exploration of these trading methods, seeking to assess their efficacy in the dynamic and sometimes unpredictable environment of the stock market, with a primary goal of enhancing portfolio gains. By using simulations and comparing the performance of RSI and Heuristic Trade Evaluator, Buy and Hold, and RSI and Moving Average, this study explores which of these methods show the most promise.

Abstract

This project introduces and evaluates three algorithmic trading methods applied to historical stock data and is tested using a simulation. The stock data contains 250 days of trades with the statistics of the market. Including open value, closing value, data, high and low. The algorithms created and discussed in this paper make use of many different heuristics available in stock market trading. Such as, The Relative Strength Index (RSI) coupled with a heuristic trade evaluator, a traditional Buy and Hold strategy, which will buy on the first day we have data and sell on the last day of the simulation, and the integration of RSI with Moving Average are investigated. The study quantifies the impact of these strategies on the net worth of a \$10,000 initial investment over a specified trading period of 250 days, displaying the algorithms respective strengths and weaknesses.

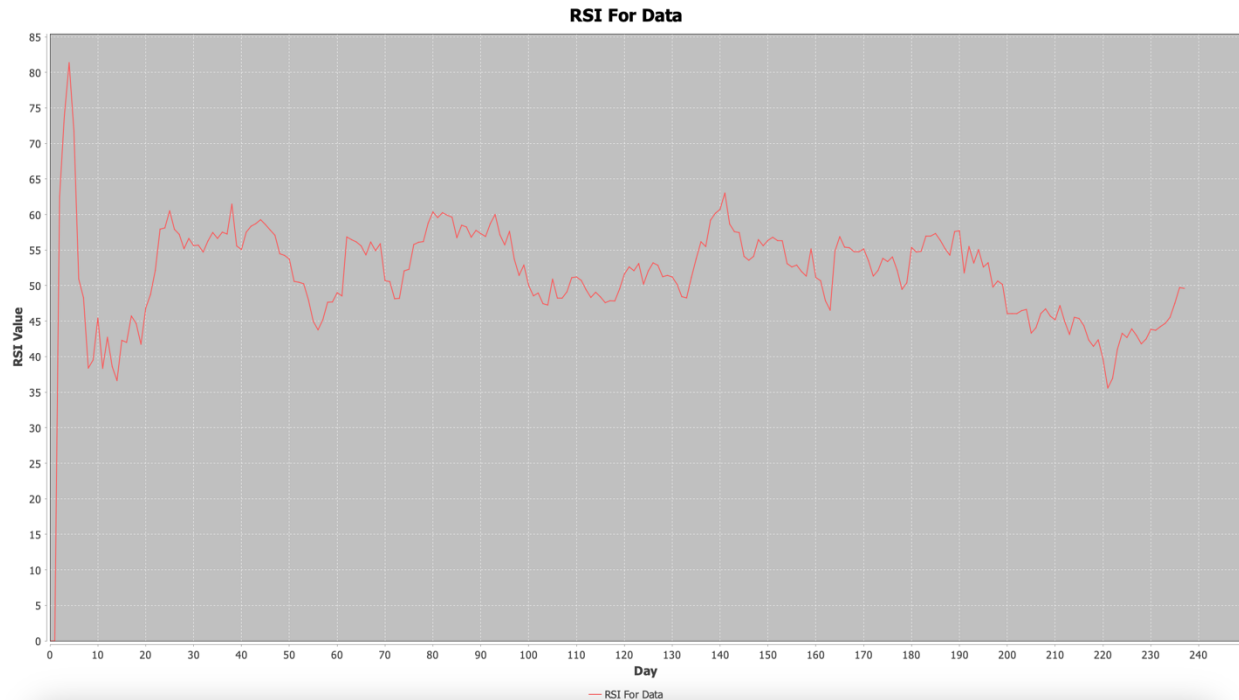
Results



Using JFreeChart a visual depiction of the smoothed stocks was able to be displayed. This graph displays the smoothed open values for all days in the simulation.

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Using JFreeChart a visual depiction of the RSI for all days in the simulation was generated. This RSI skips the first 14 day as skipping 28 skipped an important time period that made the data more compelling.

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With a starting value of $10000 the finalized net worth after using rsiAndHeuristicTradeEvaluator trade method is $11002.909742000002  
With a starting value of $10000 the finalized net worth after using buyAndHold trade method is $14736.160103999999  
With a starting value of $10000 the finalized net worth after using rsiAndMovingAverage trade method is $8994.669998000001
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The result of the individual portfolio net worth's after all simulations were performed for all 3 algorithms.

The evaluation of the trading methods yields interesting results, providing a look at the 3 trading algorithms and how they performed in the simulations. With an initial investment of \$10,000, the RSI and Heuristic Trade Evaluator method concludes with a finalized net worth of \$11,002.91. In comparison, the Buy and Hold strategy achieves the highest net worth of \$14,736.16. On the other hand, the RSI and Moving Average method results in a lower final net worth of \$8,994.67.

Discussion

The observed outcomes showcase the diverse nature of algorithmic trading strategies and their impact on portfolio growth. The RSI and Heuristic Trade Evaluator, while showing positive returns, requires further investigation into the heuristic parameters and their adaptability to handle market fluctuations. As this was a simulation with limited information and trading days available this is not a good indication of how the algorithms will perform when used in real portfolio trading. The Buy and Hold strategy, with its higher final net worth, emphasizes the importance of long-term investment approaches even though this could have ended up with a negative value this was essentially a 50 percent chance either way. With more heuristics considered this could be a very attractive strategy to consider in algorithmic trading.

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However not all algorithms performed positively in the simulations, the RSI and Moving Average method's comparatively lower performance raises questions about its performance in certain market conditions. This could be accredited to the fact that this method uses the RSI values when there were not enough days in the simulation to do so. For example, if $n = 14$ anything before the 15th simulated training day would return an RSI of zero. Making this strategy unreliable when there are not enough prior days. Though this is not a problem observed outside of simulations.

The evaluation of the trading methods yields interesting results, providing a look at the 3 trading algorithm's performance. With an initial investment of \$10,000, the RSI and Heuristic Trade Evaluator method concludes with a finalized net worth of \$11,002.91. This can most likely be accredited to its function in which it establishes a portfolio on the first day using a percentage of the net worth and waits to use RSI until there are enough data points. In comparison, the Buy and Hold strategy achieves a net worth of \$14,736.16, displaying its potential for capital appreciation by holding on to stocks for a long period of time though in future iterations this should be paired with a strong heuristic so random trading is not being performed. On the other hand, the RSI and Moving Average method results in a net worth of \$8,994.67, highlighting the need for an accurate RSI value and an established portfolio to yield better returns.