



Machine Learning Trading Bot

FinTech Bootcamp Project 2 by Duke Boger

Manual Trading



- Manual trading is a method that involves human decision-making for entering and exiting trades
- In manual trading, a human places the buy and sell orders.
- Styles of manual trading include day trading, buy-and-hold, and swing trading
- Let's look at the styles of manual training individually

Day Trading

- Day Trading is defined as a strategy where an individual buys and/or sells the same security, in a margin account, on the same day in an attempt to profit from movements in the price of the security.
- A Day Trader is someone who executes four (4) or more “day trades” within five (5) business days - provided that the number of day trades represents more than 6 percent of the total trades in the margin account for the same 5 business day period.

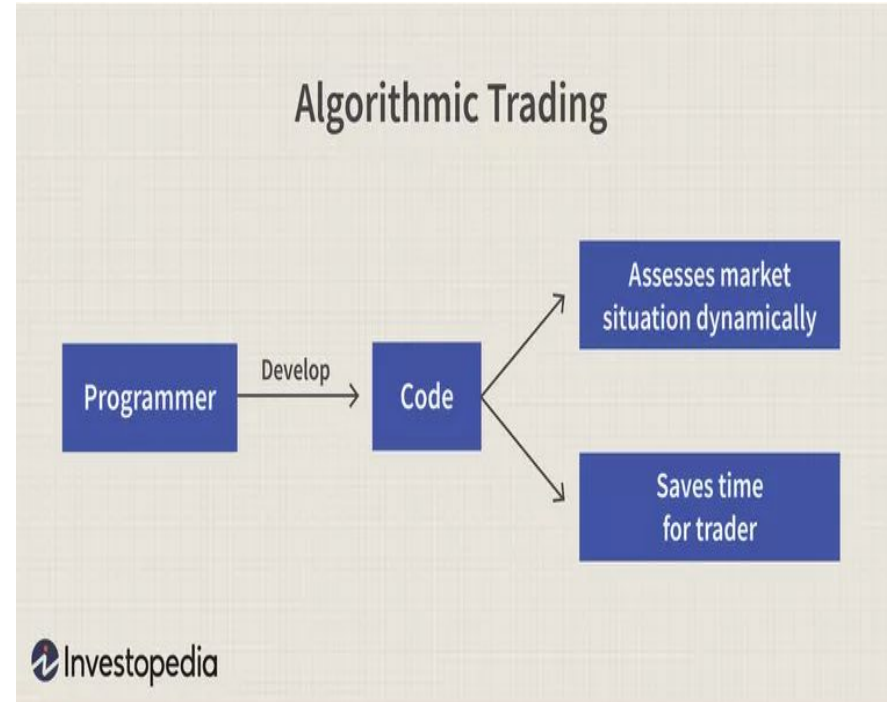


Buy-and-Hold & Swing Trading

- Buy-and-Hold Trading is a long term investment strategy.
 - Investor will purchase securities/investments that they believe will appreciate in value over a long time period.
 - These trades are often done infrequently, therefore they are placed manually when the opportunity arises.
 - Investors may buy or sell at a predetermined price or when a technical indicator shifts to indicate its time to act.
- Swing trading is a style of trading that attempts to capture short to medium-term gains in a given financial instrument over a period of a few days to several weeks.
 - General principle is to capture the bulk of an expected price move, during a trend or price range, and then get out and move on to the next opportunity.
 - Swing trading also exposes the investor to overnight and weekend risk, where the price could gap and open the next market session at a substantially different price.

Algorithmic Trading

- Algorithmic trading consists of an established set of rules that first tell a system when to buy or sell an asset and then execute that trading strategy.
- Algorithmic trading uses a computer program that follows a defined set of instructions to execute the trading strategy.
- In theory this method of trading can generate profits at a speed and frequency that is impossible for a human trader to accomplish.
- Defined sets of instructions are based on timing, price, quantity, or model.



Trading Signals


- The trading algorithm requires trading signals to run properly.
- Trading signals are point in time indications of when to buy a stock, or sell the stock
- These signals are related to price of the stock.
 - Example: A trading signal could be to buy BRK-B stock when the price of the current day was less than that of the previous day.
- This strategy can be appropriate when stock prices continue to fluctuate each day.



Fundamental vs Technical Analysis

- Fundamental Analysis focuses on long term health of a company.
- This includes historical cash flow, D/E ratio, and management quality.
- Implementing fundamental analysis usually requires analyzing three financial statements from the company, income, balance sheet and cash flow.
- Technical Analysis focuses on the action of the price of a company's stock.
- This includes the behavior of the price as shares are bought and sold.
- Due to the quantitative nature of technical analysis, many algorithmic trading models lean towards this philosophy when determining buy or sell action.

Technical Indicators

- Stock traders have developed a number of technical indicators that signal when to buy or sell.
 - Indicators vary on a wide array of factors which involve differing amounts of complexity, historical pricing information and computing power.
 - Indicator focused on for this project is Simple Moving Average (SMA)
 - SMA calculates the average price of a stock for a rolling period of a specific number of days. These periods can include 30, 50, 100, and 200 days.
 - The shorter the number of days, would result in a short window SMA and longer days would result in a Long window SMA.
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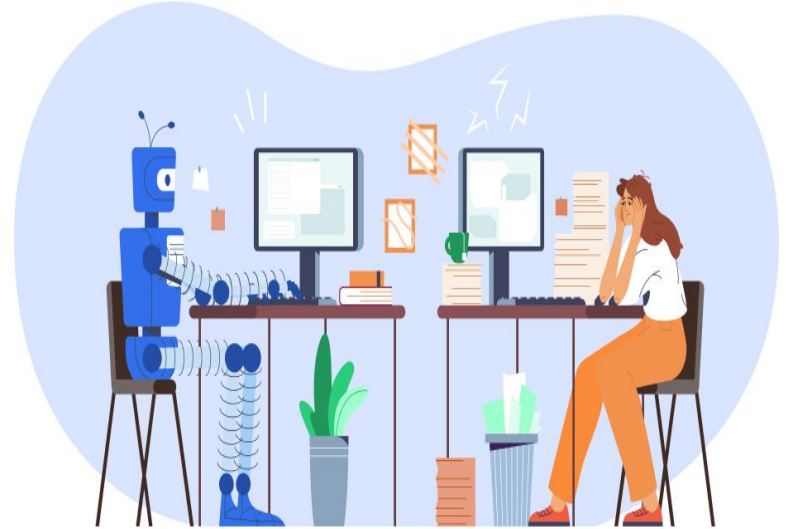
Technical Indicators Used

- SSMA: Smoothed Simple Moving Average, is a simple moving average that adds weights to data points over a long period.
- EMA: Exponential Moving Average: Simple moving average that places greater weight and significance on more recent data points
- DEMA: Double Exponential Moving Average: A technical indicator devised to reduce the lag in the results produced by a traditional moving average
- TEMA: Triple Exponential Moving Average: uses multiple EMA calculations and subtracts out the lag to create a trend following indicator that reacts quickly to price changes.
- TRIMA: Triangular Moving Average: shows the average price of an asset over a specified number of data points.



Manual Trading vs. Algorithmic Trading

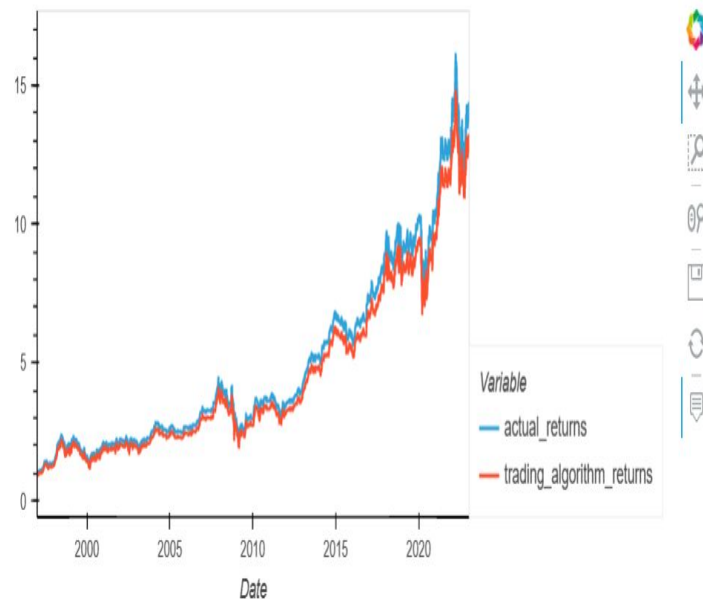
- Algorithmic or automated trading allows traders to establish specific rules for both trade entries and exits that can be programmed to execute automatically via computer.
- Algorithmic trading typically reduces the amount of errors found more prevalent in manual trading.
- Manual trading is less efficient due to the process of order entry to be placed by a human
- Manual trading can result in missing returns or entry/exit points due to research aspect



Automated Vs Manual Forex Trading

Overview of Code

- Import data from Berkshire Hathaway stock using Yahoo Finance (yfinance)
- Create Technical indicators and generate input functions
- Split data into training and test datasets
- Use machine learning to train and generate trade predictions for Berkshire Hathaway
- Backtest trading algorithm against the machine learning model
- Calculate and plot trading returns generated from machine learning model



Resources

- <https://theconversation.com/humans-v-ai-heres-whos-better-at-making-money-in-financial-markets-174937>
- <https://www.investopedia.com/terms/d/daytrader.asp>
- <https://www.finra.org/investors/investing/investment-products/stocks/day-trading>
- <https://www.investopedia.com/terms/m/manual-trading.asp>
- <https://www.investopedia.com/articles/active-trading/101014/basics-algorithmic-trading-concepts-and-examples.asp>
- UNCC FinTech Bootcamp Module 14
- <https://www.investopedia.com/terms/m/manual-trading.asp#:~:text=What%20Is%20Manual%20Trading%3F,algorithmic%20or%20human%2Dinstructed%20criteria>
- <https://pypi.org/project/finta/>