

Introducing The Trading Risk Profiler: Find Your Algorithmic Match

A personalized approach to algorithmic trading based on your unique risk tolerance and goals

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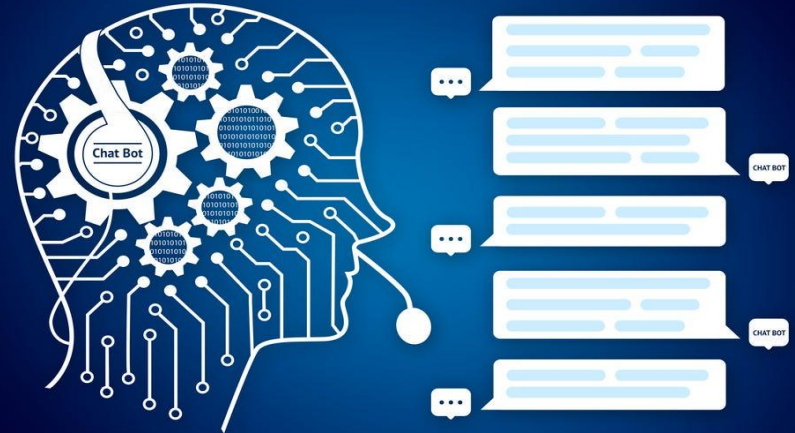
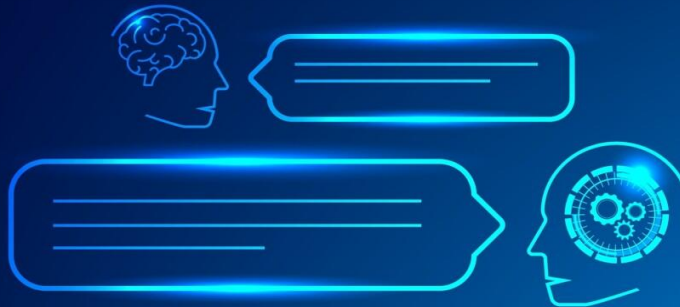
Algorithmic trading revolutionizes the finance sector by using advanced algorithms for swift and precise trade execution. This technique enhances market efficiency and reduces costs, enabling strategies that optimize returns while minimizing human emotional biases. It's key in today's fast-paced markets, offering quick responses to changing conditions and broadening access to sophisticated trading strategies for all investor types.



Personalized trading strategies cater to individual risk tolerances and goals, crucial for effective investing. Aggressive traders and conservative investors have different needs, and tailoring strategies ensures decisions align with each investor's unique financial objectives and risk comfort.



The Trading Risk Profiler is an innovative chatbot tool designed to personalize algorithmic trading. By analyzing responses to specific questions about financial goals and risk appetite, it matches traders with the most suitable algorithmic strategies. This tool bridges the gap between complex trading algorithms and individual investor profiles, ensuring that each trader's strategy aligns seamlessly with their personal trading objectives and risk tolerance.



How the Questionnaire Works

As a group we created five questions that we thought best determined an individual's risk tolerance and goals for investing. We then used $\text{answer.score} * \text{question.weight}$ to determine the individual's total risk score. Lastly, we used the individual's risk score to determine which investment strategy best fit their risk tolerance.

Libraries used for the risk questionnaire:

- Pandas
- Pywebio/ Builtins

The Three Algorithms

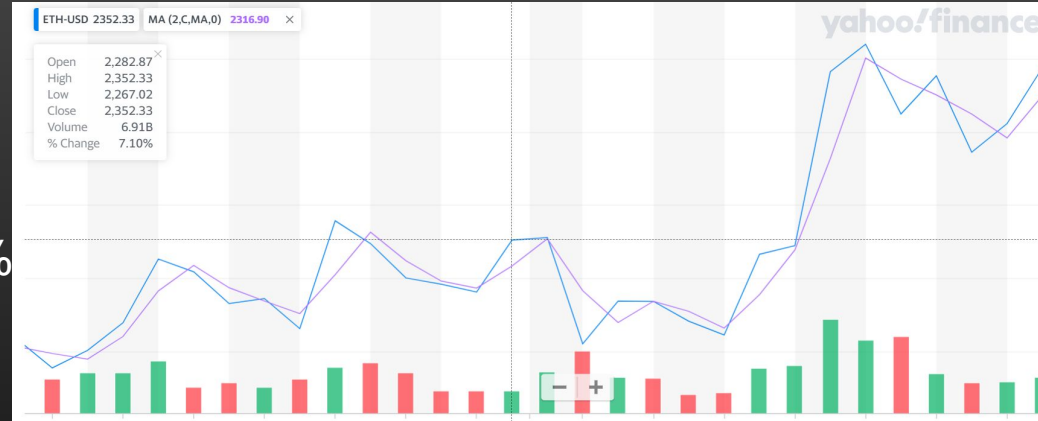
Based upon results of the risk tolerance questionnaire, the Robo-Advisor recommends one of the three trading strategies, with risk being measured by the strategies sharpe ratio.

- Bollinger bands trading strategy
- Relative Strength Index (RSI) Crossover strategy
- Price SMA Crossover strategy



The Outcome of the Algorithms

- Bollinger bands trading strategy
 - Sharpe Ratio: 0.00
 - Max Drawdown: -7.00%
 - Backtest Performance: 27.51%
- SMA Crossover strategy
 - Sharpe Ratio: 1.21
 - Max Drawdown: -65.80%
 - Backtest Performance: 53.22% (CAGR)
- Price SMA Crossover strategy
 - Sharpe Ratio: .899
 - Max Drawdown: -28.00%
 - Backtest Performance: 47.41% (CAGR)



Backtesting

- To backtest our strategies we used Backtest.py, a new python library.
- Backtest.py can take data from any API source making it the most optimal way to import data without the headache of formatting.
- Built into this library is an optimize function, which we used to change our parameters to best suit our algorithms returns.
 - This was done by changing the fast and slow SMA windows within certain ranges and constraints
- We also used a Quantconnect as a backtesting and papertrader

Demonstration







Machine Learning Application

- For our new machine learning library, we chose to use Pytorch.
- Our model used the *ensemble learning* technique
- In our Pytorch model, we used yfinance API to gather data used in our model to predict future price movements.
 - This allows for a greater possibility of optimal buys and sells.
- With machine learning implicated:
 - Returns: 27.51%
 - Max drawdown: -7.00%