Team Members

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Problem statement

Providing a platform that helps in making the investment decisions, providing cutting edge data science solutions, in-depth capital market analysis, robust risk metrics, for investors that lack the resources to be able to utilize the platforms only accessible by the ultra-rich.

Literature Review

After searching through across there is no similar projects available like Quant solution. There are some features that similar to Quants but not able to find the similar products that Quant can able to offer in the market. Although there are some drawbacks. They are 1 - assumption: Past data is representative of future events. 2 - Probability vs Conditional Probability.3 - Sample size uncertain.

What are Quant's product solutions?

Quant-Solutions provide as **Alternative Hedge Fund**. Typically, hedge funds demand an initial investment ranging from $100,000 to $1 million. Secondly, **fighting against inflation protection** with current inflation rates fluctuating between 2.6% and 6.8% over the past two years CPI data and individuals need to secure at least a ~3% annual capital gain just to maintain their purchasing power. As Hedge funds, their high entry requirements and significant fees taken by mutual fund managers which diminish an average person's chances to outpace inflation effectively. Lastly, **as multi-service platform,** Quant platform delivers a variety of solutions designed not just to meet this basic financial need but to enhance and increase individuals' buying power, providing a comprehensive alternative to traditional investment avenues.

Model Benchmarking

Quant has trained a simple Transformer encoder model which **accuracy is ~ 70%.** But pre-trained model from hugging face is achieving a testing data **accuracy of ~ 98%.** LSTM model for time series data and that forecasted 5 time periods in the future with a look back period of 60 time periods.

Model Deployment

Quant's project initially developed in Python Notebooks for effective testing and data analysis, then transitioned into Python scripts to better integrate with web frameworks. Utilizing the FastAPI framework, we crafted a high-performance web service that supports RESTful API interactions. Dynamic content generation was facilitated through Jinja2 templates, which embed Python-like expressions within HTML. The architecture comprises two distinct Docker containers hosted on a Digital Ocean provisioned virtual machine with 2 CPUs and 8GB RAM. One container is dedicated to statistical model services and the other to machine learning model services. This setup not only boosts data processing efficiency and service delivery but also significantly augments application security and scalability by segregating operations into separate containers.

Machine Learning Canvas
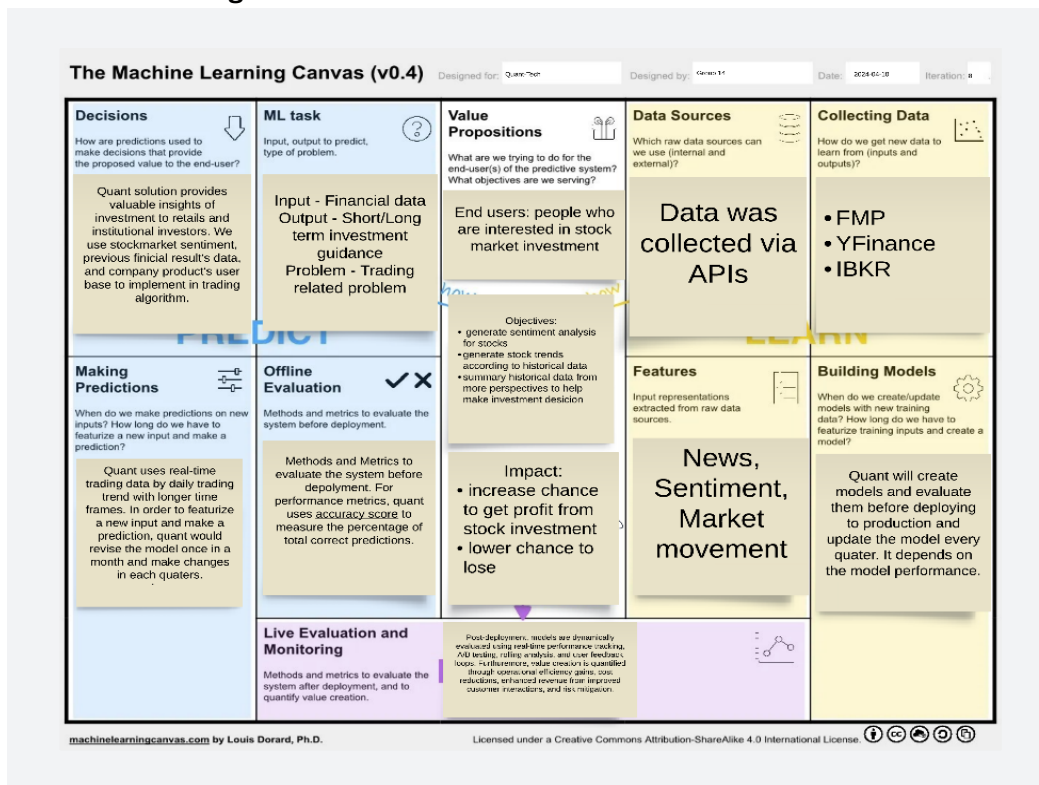
Challenges

Some of the challenges that Quant could encounter in future are **1 - Monetary Constraints** due to high costs for real-time financial data and computational infrastructure can strain budgets. **2 - Technical Resources** which requires significant processing power and expertise in data science and financial analysis, posing scalability challenges. **3 - Data Quality** which is ensuring unbiased and noise-free data is critical. Such as historical biases and overfitting can skew predictions, leading to inaccurate stock buy/sell recommendations.

Project Prototype

Quant project prototype can be found at http://165.22.235.205:8000/. This is just bare minimum prototype and Quan's Team Members are working days and night to upgrade both back end api, front end api, and data science solutions.

Reference

1.Yahoo finance: https://ca.finance.yahoo.com/

2.Financial Modelling Prep: https://site.financialmodelingprep.com/

3.Hugging Face: https://huggingface.co/models?other=finance

4.Interactive Brokerage : https://www.interactivebrokers.ca/en/home.php

5.Nasdaq: https://data.nasdaq.com/publishers/QDL

6.Investopedia.

7.Research Papers:

1.Two-Stage Sector Rotation Methodology Using Machine Learning and Deep Learning Techniques : Tugce Karatas et al.

2.Statistical Predictions of Trading Strategies in Electronic Markets