Generating an Investment Portfolio via Chatbot

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Product Roadmap

1 IDEATION:

Product ideation:

Generating a Investment Portfolio via Chatbot

(Extending Project 2)

2 CONCEPT:

Product concept:

Utilizing Python & Streamlit to develop chatbot

(streamlit-chat package)

3 TESTING:

Concept production and testing:

Re-run ML model (Facebook Prophet Model)

Generate Monte Carlo Simulation for Portfolio Evaluation

Choose assets for each portfolio type utilizing MPT

Test Chatbot UI & Functionality

4 RELEASE:

Product testing continued:

Final Product will generate a weighted Investment Portfolio based on the user's age, risk tolerance & investment amount.

https://github.com/Mun-Min/Project_3
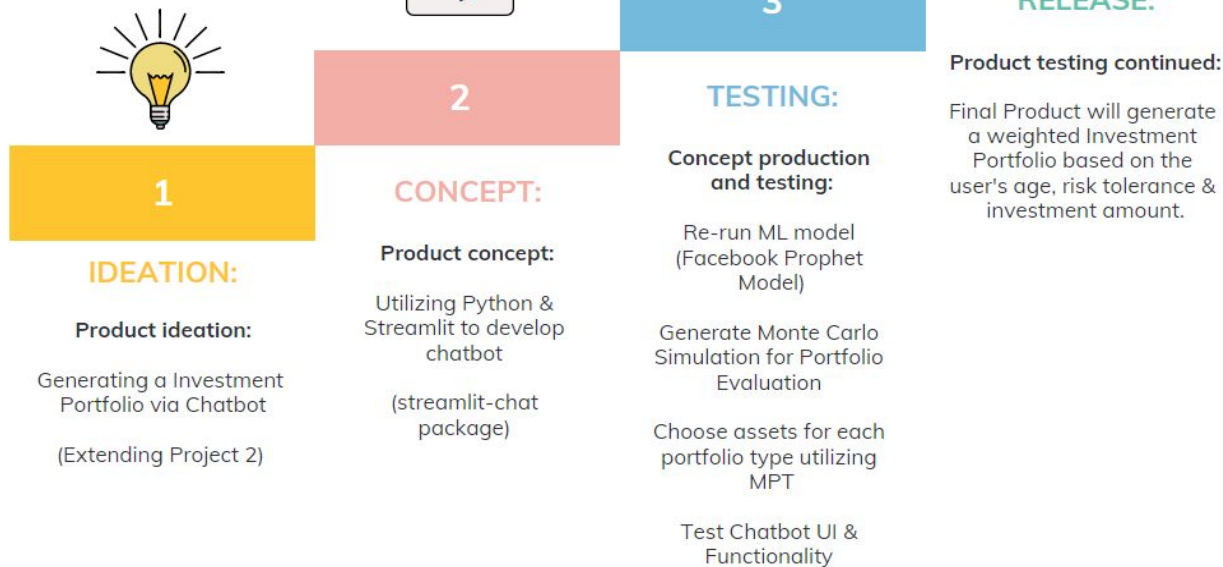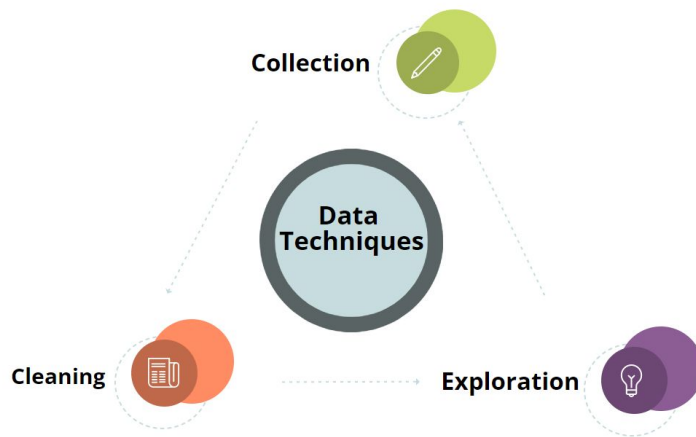
Data Techniques

- Yahoo Finance Python Package
  - Stocks [Top 25 SP500]
  - Bonds [10 yr & 30 yr Treasury Yield]
  - Crypto [BTC & ETH]
- Gathered 10 years of Historical Data

Portfolio Development

- Generated a weighted portfolio for the user utilizing the 110 rule.

- Picked assets for each portfolio type utilizing Modern Portfolio Theory, which is a traditional financial metric that is used to help investors choose investments that are likely to provide the best risk-return trade-off.

- Evaluating Prophet Forecasting Model utilizing RMSE scores.

  - Generally a low RMSE score indicates a better fit between the predicted values and the true values, however it may be difficult to obtain a low RMSE due to the inherent uncertainty in stock prices over longer time periods.

Evaluating Prophet Forecasts using RMSE from Days 1 to 30

Stock Picks	Day 1 of Forecasts	Day 30 of Forecasts
XOM	7.50	9.29
PFE	2.73	3.41
JNJ	5.22	6.38
AAPL	9.59	12.00
AMZN	16.47	18.80
GOOGL	11.45	7.7429
TSLA	36.21	46.47
10-yr Treasury Yield Bond	0.42	0.56
30-yr Treasury Yield Bond	0.34	0.46
BTC	8502.21	10885.83
ETH	472.82	711.13

CHATBOT DEMO

Next Steps

(Future Chatbot Version Updates)

1. Improve Chatbot UI

2. Add more functionality

    a. Incorporate NLP to provide better user to bot interactions

    b. Include more assets in each portfolio type

    c. Utilize different ML models or traditional financial metrics to generate more accurate forecasts

Q&A

Sources

- https://pypi.org/project/yfinance/ [y-Finance Python Package]

- https://docs.streamlit.io/ [Streamlit Documentation]

- https://pypi.org/project/streamlit-chat/ [Streamlit-Chat Python Package]

- https://pypi.org/project/fbprophet/ [FaceBook Prophet Forecasting Model]

- https://www.bls.gov/cpi/data.htm [U.S Bureau of Labor Statistics]