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Progress Report 1 - Implementation

So far we have completed most of the simulation of the market of our stock market agent. The first task was finding an appropriate data set. Our data set contains various intra-day info on most stocks going back multiple decades. Additionally we are currently pulling data from News API (https://newsapi.org/) in order to get general stock sentiment. To accomplish this, we used the NLTK library to measure the sentiment of each headline. This will let us combine both historical stock data and general stock perception to feed into our RL algorithm.

Our market function is able to take stock data in the form of a .txt file. Then it can go through the data day by day, updating the stock price at each step. We have also begun the initial implementation of the features that we plan to watch for our linear sarsa. This includes watching for general sentiment as well as some notable cyclical features of stock prices ie. 52 week average.

Finally, we have created our agent, it makes a choice to trade at the open of each day. We will use linear SARSA with multiple binary features. The agent will be allowed to choose between, selling its current stock and buying another, selling and holding onto its cash, or holding its current position.

Future Implementations

- Add more binary features to each stock
- Connect Linear SARSA with agent's decision making
- Implement reward function that ties in with linear sarsa
- Find a new way to obtain news article headlines

Notable Challenges

- We were able to fully implement sentiment analysis with google news API, however google news API will only let us review articles from up to a month ago with their basic package. To overcome this we plan to create a web scraper that google searches for our articles.
- Determining when and how to know what the reward is for each action, since the consequences for each decision may not be known for a long time.

Dataset: https://www.kaggle.com/borismarjanovic/price-volume-data-for-all-us-stocks-etfs/version/3
Here's our github repo: https://github.com/james-lubin/stock-market-agent