COMP4601 Team Name / Project Name: Tradesimple

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Introduction to the problem

You are a new investor with X amount of dollars to invest but you are not too familiar with the stock market. You don't want to lose all your money and you are not risk-averse to the point that you are better off opening a high saving account or investing in mutual funds only. You can do research to find which stocks would be a good investment, but you notice stock prices fluctuate every day due to demand and supply. That volatility affects our state of mind, provoking impulsive buying or selling. This means you need to constantly keep track of current trends and news for each company which can be difficult. Knowing what to pick can be tricky? How do we do it :

- **Users pick a set of stocks and the AI identifies how much to invest in each stock by:**
    - Identifying the constraints while maximizing the value of our portfolio in a timely manner
    - Using the current sentiment based on social media and news chatter to assign a weight to the stocks in the portfolio
    - Using historic data to predict trends in interested stocks contributes towards analyzing the risk vs return potential. (e.g. is the stock doing better/worse over time?)

We want our AI to assign the weights to each stock in our portfolio to find the optimal balance for risk vs return. These weights are highly dependent on positive and negative news/trends in the media as historic data is not representative of future outcomes. **Our goal is to maximize the confidence in the future return of our portfolio.** E.g. Double our investment the fastest.

The motivation for the problem

Identifying future prospects of a company is hard to grasp from past endeavors only. The earliest signs come in the form of chatter in the media and amongst individuals. As students in our early 20's, we can leverage the power of compounding. Though, investing in the stock market can be very intimidating for younger individuals just starting their careers. We are looking for assurance that the money we invest will be able to grow over the years.

Method(s) from artificial intelligence to be used

Sentiment Analysis

- Bag of Words model
- Supervised training
- Feature Weighting method

Decision Support System (DSS)

- Mean-Variance portfolio selection
- Reinforcement Learning
- ARIMA model based cross-validation (if time permits).

Specific expected deliverables

- Data Collection and Preparation with APIs and web scraping
- Using natural language processing to add features to our data models, that will be used to explore trade-offs (e.g. frequency vs positivity) from the media.
- Reinforcement Learning capabilities added to identify the optimal weights for our portfolio.