Criterion A: Planning

Word Count: 386

The Scenario

Client: Mr. U - Engineering Teacher

Mr. U enjoys teaching engineering to curious high school students. However, Mr. U has recently become interested in robo-advisors and personal investing. However, Mr. U does not know much about the fundamental/technical analysis required to analyze equities.

Knowing my interest in quantitative finance, Mr. U consulted with me about automated techniques to analyze equities so that he will not rely on self-proclaimed gurus or spend excessive money/time. Having taken multiple financial engineering courses, I suggested exploring machine learning. Mr. U has asked if I could successfully apply machine learning to forecast market performance using various models. Additionally, as Mr. U does have advanced knowledge of statistics, equity statistics and information regarding the stock should also be available.

Rationale

For this task, a high-level programming language is crucial for computing. This project will implement professional machine learning (ML) and data processing methods to forecast market performance via fundamental and technical analysis. As such, advanced ML and file management libraries are essential. Furthermore, ML and neural networks require extensive amounts of data for training. While a database such as SQL can store data, time-series data is better stored in json/csv format for this project. Additionally, this project will involve legibly visualizing stock data for Mr. U.

I have decided to use Python for this project as not only am I familiar with Python's semantics and data structures, but I also believe Python is best suited for financial analysis and ML. Python involves thorough ML libraries such as Scikit-Learn, Keras, and Tensorflow, data processing/manipulation libraries like Numpy and Pandas, and web-development tools like Flask, Requests, and Django. Additionally, Python and all the prior libraries are open-source and cross-platform. However, one possible drawback is Python's slower execution time as Python is dynamically typed rather than statistically typed (like C/C++ and Java).

Criteria for Success

- The project will successfully apply multiple machine learning models to historical data and make forecasts.
- The program will analyze financial news and use sentiment analysis to provide insight into market sentiment.
- Data will be visualized when possible for the client.
- Rather than complex technical software, the project will be aesthetically intuitive and straightforward
- The software will be responsible for identifying if a given stock ticker is valid or invalid.
- The software will provide updated market news through reputable data providers.