Algorithmic Trading Using Sentiment Analysis and Reinforcement Learning

Objective: This project aims to explore and compare two different trading strategies: a traditional statistical model that uses well-known technical indicators; an AI-driven approach that combines reinforcement learning with sentiment analysis. The goal is to understand how adding sentiment analysis into AI models can influence decision-making, profitability, and risk management, especially when compared to the more conventional statistical methods. The study will use data from the UK stock market, focusing on individual stocks and indices over a 5 - 10 year period, including the COVID-19 pandemic years. By comparing the outcomes of these two approaches, the project hopes to shed light on whether AI-driven techniques can offer a smarter, more adaptive way of trading in complex market conditions.

Scope: This project focuses on developing and testing two trading strategies—a traditional statistical model and an AI-driven approach—using data from the UK stock market. It looks specifically at high-frequency trading, working with minute-by-minute or hourly data to see how reinforcement learning combined with sentiment analysis can improve decision-making and performance. The analysis will cover five years of historical data, including the COVID-19 period, to understand how these strategies perform in both stable and volatile market conditions.

- What's Included:
    - Building and testing statistical and AI-driven trading models.
    - Exploring the impact of sentiment analysis on AI-based trading decisions.
    - Using UK stock market data, focusing on individual stocks and indices.
    - Emphasis on high-frequency trading strategies with shorter timeframes
- What's Not Included:
    - Long-term investment strategies or markets outside the UK.
    - Using alternative data sources, like social media sentiment.
    - Live trading or real-time implementation of the models.

The question I am trying to answer is "Does adding sentiment analysis to AI models improve profitability and risk management compared to traditional statistical methods?

And Maybe: How does market volatility, such as the disruptions caused by the COVID-19 pandemic, affect the performance of these trading strategies?