5.0 Technical Plan

Task 1: Sentiment Analysis Integration

Description: Financial news sentiment data will be processed and integrated into our existing Reinforcement Learning model. Tasks include training a sentiment analysis model on labeled financial datasets and validating its accuracy. We also need to ensure we have a reliable way to collect data from headlines and social media regarding the stocks we train the model on by subscribing to an API. Additional steps will involve preprocessing this data for consistency and ensuring it aligns with our stock universe.

Task 2: Reinforcement Learning Model Implementation

Description: We will refine and optimize the reinforcement learning model based on earlier research. This involves improving reward functions, tuning hyperparameters, and integrating inputs from the LSTM, XGBoost, and NLP components. The goal is to develop a fully functional RL model capable of generating actionable buy, hold, and sell signals. Particular attention will be given to stability during training and deep analysis on backtesting.

Task 3: Reinforcement Learning Model Backtesting

Description: Backtesting of the RL model will be conducted to assess its performance under real-world conditions. Historical stock data will be used to evaluate the model's ability to generate accurate recommendations. Tasks include defining evaluation metrics (e.g., profit/loss, Sharpe ratio), analyzing the model’s decision-making process, and comparing its performance to benchmarks developed from our LSTM and XGBoost model alone. Insights gained will be used for further refinement of the RL model.

Task 4: Web Application Development

- Task 4A: Backend Development
  Description: Develop the backend architecture and implement APIs to expose our Python models. This involves ensuring that the backend can handle real-time requests efficiently,

securing data transfer, and enabling seamless integration with the front-end. We will also evaluate and select a hosting service for the backend.

- Task 4B: Frontend Development
  Description: Develop an interactive front end to display stock recommendations with seamless API integration. This includes designing an intuitive user interface that gives access to the predetermined stocks we train the models on. Tasks also include planning for deployment and responsiveness for different devices.

Task 5: Trading Strategy Evaluation

Description: Develop and rigorously test custom trading strategies based on AI outputs. Backtesting will be performed using historical stock data to validate the effectiveness of the strategies. Metrics such as cumulative returns, drawdown, and risk-adjusted performance will be analyzed. We will also take into account transaction costs in the strategy. Based on these evaluations, we will pick our trading strategy.

Task 6: Final Testing and Optimization

Description: Perform system-wide functional testing and optimization to ensure the entire platform works cohesively. This includes testing real-time performance, user experience, and predictive accuracy. Specific tasks include debugging backend and frontend code, validating data flow, analyzing user feedback, and ensuring the system is production-ready.

Task 7: Report and Comparison

Description: After completing the project, the team will prepare a comprehensive report detailing the development process, performance metrics, error analysis, trading strategies, and the platform's profitability. The report will also let us compare our platform against industry-standard quantitative trading systems, showing how close we could get our returns in comparison to theirs.