Project Proposal

Project Title: Reinforcement Learning and Financial Factor Integration for Maximizing Trading Returns

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Project Description:
Our project aims to develop a novel trading strategy that integrates reinforcement learning (RL) techniques, specifically A2C (Advantage Actor-Critic) and PPO (Proximal Policy Optimization), with financial factors to maximize returns in trading markets. Leveraging the Gym-anytrading framework, we will build and test RL-based trading algorithms within realistic trading environments. Additionally, we will incorporate financial factors such as economic indicators, market sentiment analysis, and fundamental analysis to enhance the effectiveness of the trading strategy. By combining RL with financial domain knowledge, we aim to create a robust and adaptive trading system capable of navigating dynamic market conditions and achieving superior returns.

Simulator/Dataset/Repository/Platform:
We will utilize the Gym-anytrading framework for building and testing our RL-based trading algorithms. Additionally, we will gather historical financial data from reputable sources such as Bloomberg, Yahoo Finance, and Kaggle datasets. This data will include historical price data, economic indicators, company financial reports, and other relevant financial factors. Version control will be managed using GitHub to ensure effective collaboration and code management.

Work Division:
Our team will divide the work based on our individual strengths and expertise. Suphakrit will focus on implementing the RL algorithms and integrating them with the Gym-anytrading environments. Zixiao will be responsible for researching and selecting relevant financial factors, as well as designing strategies to incorporate them into the trading algorithm. Safah will handle project management, documentation, and coordination among team members to ensure smooth progress. However, we will maintain open communication and collaboration to share insights and address challenges collectively.

Timeline:
Week 1:

- Research and select financial factors to be integrated into the trading strategy. Set up the development environment and gather historical financial data.
- Implement baseline RL algorithms within the Gym-anytrading environments. Begin experimenting with different combinations of financial factors.

Week 2-3:

- Fine-tune RL algorithms and optimize parameters. Conduct initial performance evaluation

using historical data.

- Integrate selected financial factors into the trading strategy and evaluate their impact on returns. Conduct backtesting and simulation to validate the effectiveness of the strategy.

Week 4:

- Prepare for the progress report, including summarizing findings, challenges encountered, and next steps for refinement.
- Present progress report, receive feedback, and incorporate suggestions for further improvement.
- Finalize the trading strategy, document implementation details, and prepare for the final presentation.

Targets for Progress Report:

By the progress report, we aim to have:

- Implemented RL-based trading algorithms integrated with Gym-anytrading environments.
- Selected and integrated relevant financial factors into the trading strategy.
- Conducted initial performance evaluation and backtesting of the trading strategy.
- Identified challenges and opportunities for refinement and optimization.
- Outlined next steps for further improving the trading strategy and maximizing returns.

Conclusion:

Our project proposal outlines our plan to develop a cutting-edge trading strategy that combines RL techniques with financial factors to maximize returns in trading markets. We are excited about the potential of our approach to revolutionize algorithmic trading and look forward to the learning opportunities and challenges ahead.