FinVision: A Multi-Agent Framework for Stock Market Prediction

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INTRODUCTION

The research paper presented an innovative approach for financial trading using a multi-modal, multi-agent system. This framework leverages LLM specialized in processing and interpreting various forms of financial data, such as text reports, candlestick charts and trading signal charts. The study introduces a reflection module to enhance decision-making based on historical trading signals and its outcome.

SUMMARY

The paper explores the limitations of traditional stock prediction models that use rule-based to Reinforcement Learning based agent, which often requires largen textual or numerical data but fail to integrate multiple modalities. So, FinVision enabled the LLM-based agent that can handle multi-modal data which can execute complex multi-step decision-making tasks.

The author has introduced four primary components of multi-modal multi-agent frameworks

Summary Module [Textual]: Summaries the textual news data.

Technical Analyst Module [Visual]: Analyses the technical indicators for next-day strategies.

Reflection Module: Evaluate past predictions and outcomes to improve future decision-making

> **Prediction Agent:** Forecast trading actions and provide detailed explanation of the decision.

> **Reward Agent:** Executes trades and calculates performance metrics

Final Decision Module: Generates trading recommendations.

The author has examined three major technology stocks (Apple, Amazon and Microsoft) for over 9 months (April 1,2023 to December 29, 2023), 2 months of trading period and 7 months of testing period.

The author has examined some technical indicators like **Simple Moving Average, RSI (Relative Strength Index), MACD (Moving Average Convergence Divergence), Trading volume, Bollinger Bands.**

To evaluate the performance of the multi-agent trading system author follows these key metrics

Annual Rate of Return (ARR): Measures annual portfolio growth

Sharpe Ratio (SR): Measures risk-adjusted return of portfolio

Maximum Drawdown (MDD): Measures the largest percentage decline from a historic peak in portfolio value.

The paper has compared the performance of multi-agent trading framework against other strategies.

Traditional strategies include **Buy-and-Hold, MACD, KDJ with RSI Filter.**

RL strategies include **Proximal Policy Optimization (PPO), Deep Q-Network (DQN).**

LLM-based strategies include **comparing with FinAgent**

CRITICAL REVIEW

The framework implements a **risk-controlled investment approach** which achieves competitive returns while maintaining effective risk management. **The multi-agent** framework provides detailed visibility and provides an explainable approach for decision-making processes. Framework has **ability to suggest** by providing clear reasoning for its recommendations. Reflection modules improve performance by using **adaptive learning mechanisms**.

The multi-agent framework may require **huge computational** resources. The paper does not discuss the system's **latency** in real-world trading scenario. The framework relies on historical market patterns which could lead to **overfitting** and could not adapt to sudden market change. In context of Nepal where technical indicator is not commonly used and it neglect the impact of political changes and other social factors that influence the stock market movement.

The author suggests that if the training time is increased with further tuning the model can outperform any financial agents. For future the framework is extended by reinforcement learning and fine-tuning the policy using verbal prompt.

CONCLUSION

The paper concludes that a multi-modal multi-agent framework for financial trading tasks outperformed traditional rule-based and reinforcement learning models. We can achieve competitive returns while maintaining effective risk management by using LLM based multi-model multi-agent.