AI Trading in CN Market

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Abstract: A brief summary of the project including the purpose, the methods, the goal, and other important things.

1. Background (Review of Related Literature):

The summary of the related literature, presenting important information and knowledge such as the background of the topic and the current research state.

The profitable stock trading strategy is of great commercial value. Algorithmic trading is an important financial problem that is receiving increasing attention. There were several forecasting models based on statistical analysis and traditional machine learning technologies. However, financial time series data are extremely noisy. Stock prices could be largely affected by a wide variety of issues including political climate, management profile and economic fluctuations. Therefore, it is highly difficult to accurately predict a stock price [1].

In recent years, some researchers have deployed some state-of-the-art machine learning models on financial trading and achieved significant improvement. Previous studies can be roughly categorized into two types. First, machine learning algorithms are wildly adopted to recognize historical time series patterns and predict future trends [2]. [3] introduced a stock price movement prediction model based on long short-term memory (LSTM). Besides, inspired by the recent breakthrough of applying deep reinforcement learning on complex decision-making tasks, another approach to solving the stock trading problem is to model it as a Markov Decision Process and using reinforcement learning to predict optimal trading decisions [4, 5]. In another aspect, however, the research results on stocks selection from multi stock markets are very limited. Handling multiple stocks in real-time is a challenge for AI trading system design. Hence, further research is needed.

2. Introduction to the Project:

Inform how you are planning to investigate the topic in the project, including the methods to use and the goal to achieve.

The project is divided into several states including schema proposal, data acquisition, system structure design, algorithm research, algorithm realization, website design and demo producing. We will use neural networks and reinforcement learning as the main algorithms and focus on how to implement them into trading systems. The desired result is to provide an automatic trading system showing on the website supported by our sophisticated trading algorithms, where traders are able to trust the system to trade automatically to make a profit in a time period such as weeks or months, with only some basic settings added by traders at the start of periods.

3. Introduction to the Dataset:

Introduce the data source, the size, and the background. Also provide some related information such as the methods of getting data and the obstacles.

High-quality financial data for CN/HK market is hard to find, so we decide to create a large dataset containing historical daily price and volume. We plan to scrape data from online resources like Yahoo Finance stock API. We will extract information about most CN/HK-based stock data including daily open, close, high and low. To acquire large enough training data for our deep learning model, we face multiple challenges in web crawling including anti-scraping tools and network bandwidth.

4. Plan:

Milestone 1: project proposal

Progress: data acquisition, preprocessing and algorithm research design

Milestone 2: complete detailed designs for the data processing and algorithms

Progress: algorithm coding and testing

Milestone 3: finish all scripts related to data analysis and structural consistency

Progress: website design and coding

Final: finish website building and product visualization

Reference:

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3. Chen, Kai, Yi Zhou, and Fangyan Dai. "A LSTM-based method for stock returns prediction: A case study of China stock market." 2015 IEEE international conference on big data (big data). IEEE, 2015.
4. Deng, Yue, et al. "Deep direct reinforcement learning for financial signal representation and trading." IEEE transactions on neural networks and learning systems 28.3 (2016): 653-664.
5. Xiong, Zhuoran, et al. "Practical deep reinforcement learning approach for stock trading." arXiv preprint arXiv:1811.07522 (2018).