Predicting Stock Price using Actor-critic methods
&
Time-series Analysis

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Abstract

For a society to thrive, a strong financial system is crucial. With COVID sending people out of job or making people work from their homes, there has been a surge in people looking for investing in stock markets as a secondary source of income. Adding to this there are many companies adopting ML methods to ease people into the world of stocks & bonds. For these companies, time-series analyzing models are crucial for their operations. So, the project is to focus on combining ML models for algorithmic trading (time-series analysis) & automating trading process (actor-critic method), which can predict the price of stocks based on real life data.

1. Premise

The aim of the forthcoming work is to combine the actor-critic reinforcement learning ,methods & time-series analysis to predict the best policy based on the prevailing stock price. The interacting networks to be implemented, the actor part, will compute the best action (i.e.) the policy that refers to probability distribution over actions. And the second part, the critic part, will evaluate the policy computed by the critic.

The actor will predict one of the following actions: Buy, Wait, & Sell. The actions will be selected based on the expected profit & the actual stock price.

2. Dataset

The dataset chosen is the S&P 500 (Standard & Poor's). It is one of the commonly followed equity (captalization-weighted) indices as it measures the performance of the listed top 500 companies in the United States.

Figure 1: Standard & Poor's 5-year data

3. References

- Reinforcement Learning - An Introduction by Richard S. Sutton & Andrew G. Barto [Chapter].

- Berkley's Deep RL Course - Actor-critic algorithms.

- Standard & Poor's historical 10-year dataset.