

# Survey on Reinforcement Learning Approaches in Single Stock trading

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## Abstract

In this project, I plan to perform a survey of several reinforcement learning algorithms in the domain of Finance to tackle the problem of single stock trading.

**Keywords:** Reinforcement Learning, Finance, Single Stock Trading

## 1. Proposal

Stock trading is the transaction of a company's share in financial share market, and profit from such transaction is generated when company shares are brought in a lower price to sell at a higher price at a later date. With the advancement of machine learning to predict trends, there has been an uptake in application of various machine learning techniques in Stock trading to increase profit margin. In computational finance, reinforcement learning has become a considerable choice as a machine learning technique due to its decision sequence model, and prediction ability in stochastic environment with no supervision. Specially after AlphaGo [Silver et al. (2016)] - a RL-based agent beat human player in the game of Go, there has been a lot of interest in RL base ML approaches. Stock market has a stochastic nature as the market is affected by many factors such as company policies, natural disasters, emergencies [Li et al. (2022)]. As such, reinforcement learning can be a suitable choice for predicting stock prices, and making buy, sell or hold decision automatically.

In this paper, we limit the stock market prediction problem to single stock trading, and explore performances of several reinforcement learning algorithms to tackle this problem. Recently, AI4Finance has launched FinRL [Liu et al. (2020)] platform, which explores various financial markets including single stock tradings using state of the art Deep Reinforcement Algorithms. Along with this paper, I plan to explore [Hambly et al. (2021), Hao et al. (2022), Rao and Jelvis (2022), Wu et al. (2020), GE et al. (2022), Yang et al. (2020)] and other relevant papers in the area to discuss various reinforcement learning approaches on single stock trading and price prediction, and compare the relative strengths of each approach.

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