

### **Abstract**

**In recent years, stock trading has become increasingly popular due to its potential for substantial profits. However, many individuals overlook the inherent risks of trading stocks without adequate analysis, often leading to significant losses. To mitigate these risks, some have turned to automated and pre-programmed trading systems, commonly known as Expert Advisors. This research investigates the application of Deep Reinforcement Learning (DRL) as an automated trading assistant to enhance decision-making in stock trading, exploring the application of Deep Reinforcement Learning (DRL) aiming for high asset returns while minimizing risks. Specifically, this study utilizes DRL methods such as Advantage Actor-Critic (A2C) and Proximal Policy Optimization (PPO). Through systematic testing, the A2C approach achieved a Sharpe Ratio of 1.6009 with a cumulative return of 1.4468, while the PPO method reached a Sharpe Ratio of 1.7628 with a cumulative return of 1.4767. These methods were fine-tuned for optimal learning rates, cut loss, and take profit ratios, demonstrating their potential in refining trading strategies and improving trading outcomes. By leveraging these DRL techniques, the research aims to develop more effective trading strategies that balance profit and risk, underscoring the promise of advanced algorithms in the realm of automated stock trading.**

**Keywords: deep reinforcement learning, stock trading, automated trading systems, advantageactor-critic, proximal policy optimization**