Report on Game Simulation Results

Introduction

This report summarizes the results of simulations for two strategic games: Rock-Paper-Scissors and Prisoner's Dilemma. The simulations compare the performance of two algorithms, Fictitious Play (FP) and Q-Learning (QL), over 1000 episodes each. Key metrics include the number of wins for each algorithm and the number of draws.

Results

Rock-Paper-Scissors

- **Total Episodes:** 1000
- **Fictitious Play Wins:** 90
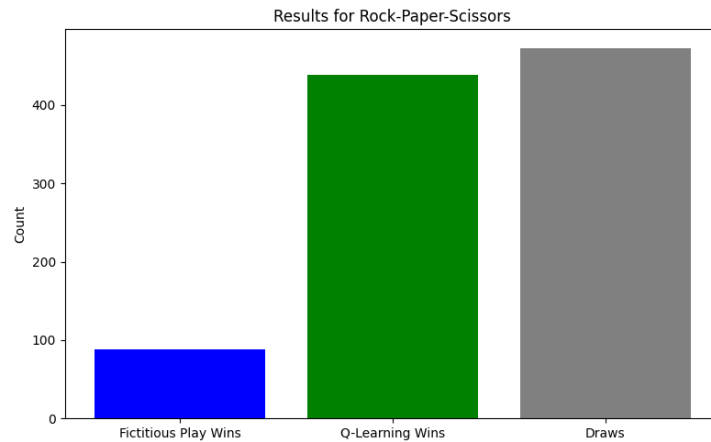- **Q-Learning Wins:** 389
- **Draws:** 521

Figure 1: Results for Rock-Paper-Scissors

Prisoner's Dilemma

- **Total Episodes:** 1000

- **Fictitious Play Wins:** 98
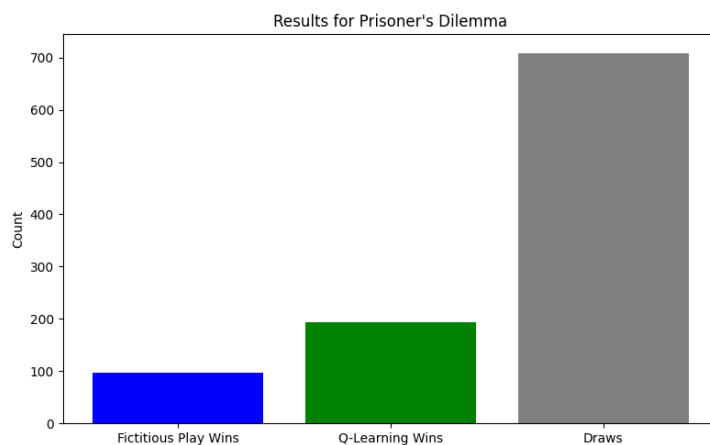
- **Q-Learning Wins:** 200

- **Draws:** 702

Figure 2: Results for Prisoner's Dilemma

Discussion

The results highlight key differences in the performance of the algorithms across the two games. In Rock-Paper-Scissors, Q-Learning significantly outperforms Fictitious Play, while in Prisoner's Dilemma, the difference is less pronounced. The number of draws is higher in the Prisoner's Dilemma, indicating potential equilibria between strategies.

Conclusion

These simulations provide insights into the behavior of Fictitious Play and Q-Learning in strategic games. Future work could involve extending the analysis to more complex games and incorporating additional metrics such as convergence speed.