


Blackjack AI

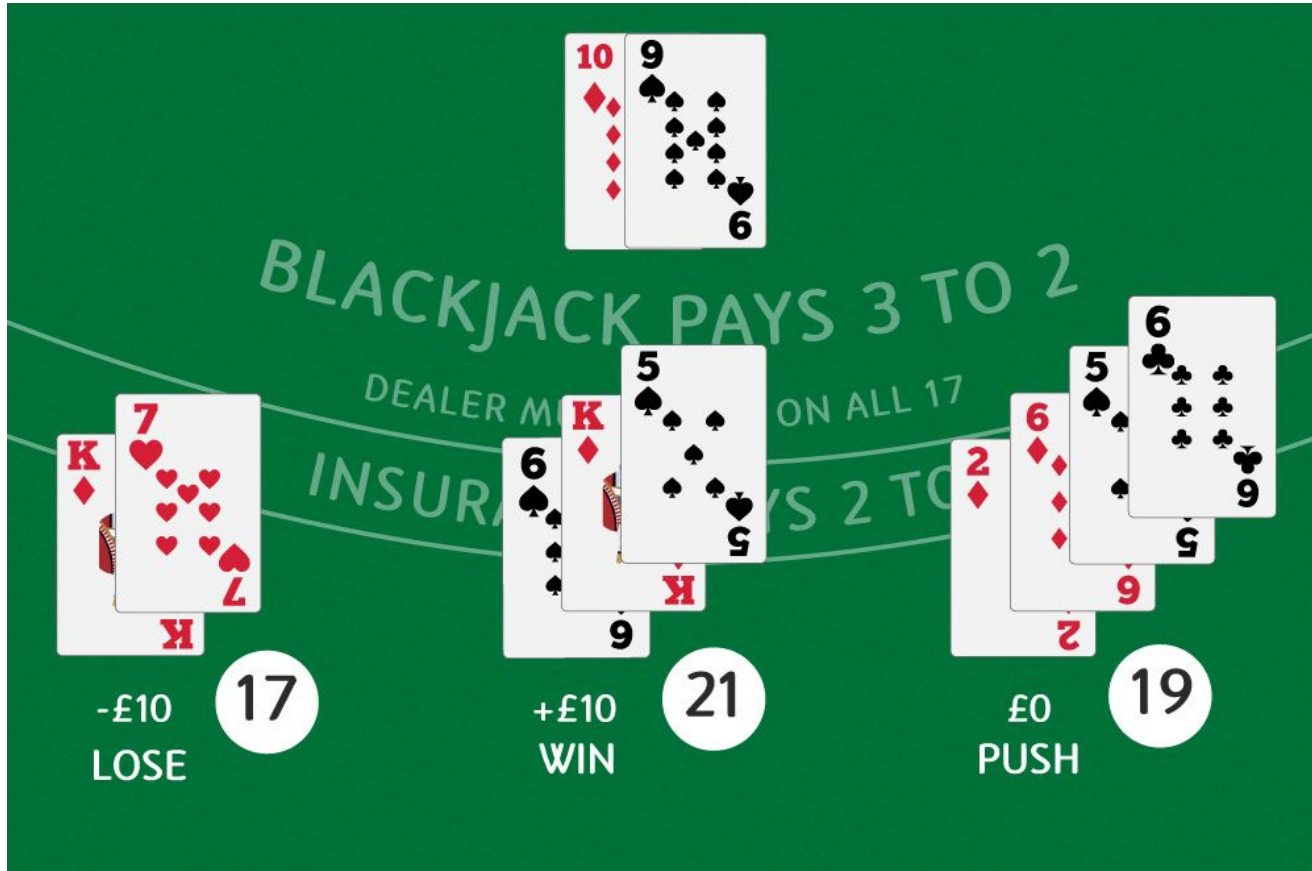


Joseph Westerlund, Parsa Nikpour, Ryan Clarke

Problem Statement and Analysis

- Blackjack is one of the most popular casino games and has always been a topic of interest for mathematicians & gamblers
 - Blackjack card counting strategies adjust bets based on the true count to improve odds against the house (dealer).
 - Optimal bet size determination is complex, influenced by deck usage, specific casino rules and player psychology
 - This project aims to develop an AI tool to assist players in making data-driven betting decisions, optimizing their strategy against the casino
- 

Basic Explanation of Blackjack

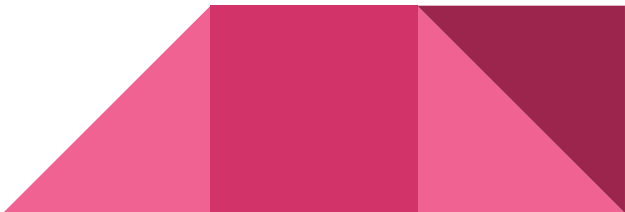


Use-Case Scenarios

Target Audience: Blackjack players looking to optimize strategy and people interested in the application of AI in game theory

Example Use-Case:

John is a blackjack player who wants to maximize profits and minimize losses. As he plays the AI system keeps track of the cards dealt and calculates the true count. Whenever he goes to bet, the AI recommends the optimal bet size based on the current true count and other variables in the game.



AI Algorithm and Model

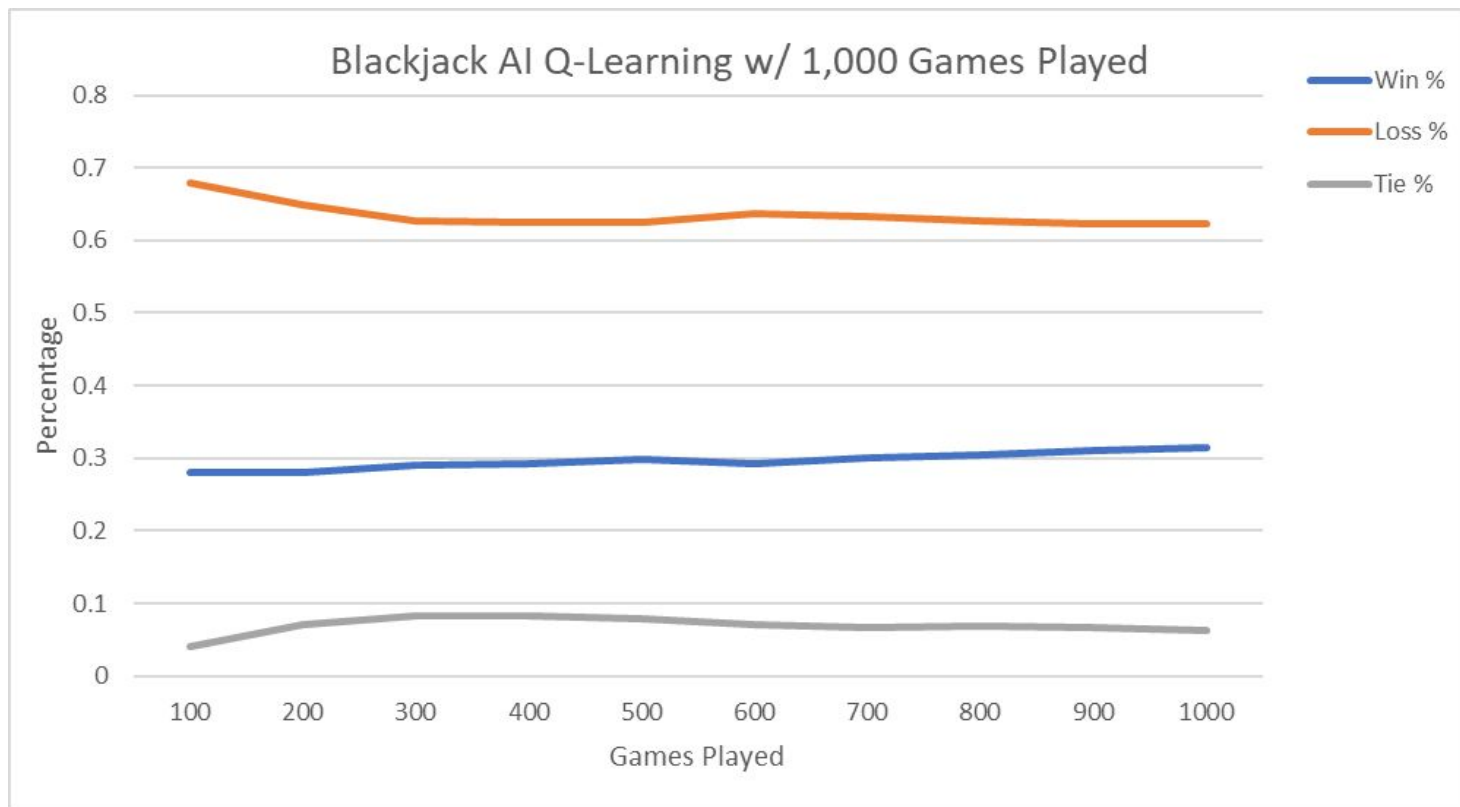
Q-Learning:

- Exploration-Exploitation
 - Chooses a random action with probability ϵ , else selects the best-known action
- Q-Table Update
 - Updates the Q-table based on the reward and future rewards (discounted by γ)
- Epsilon Decay
 - Reduces exploration over time to favor exploitation

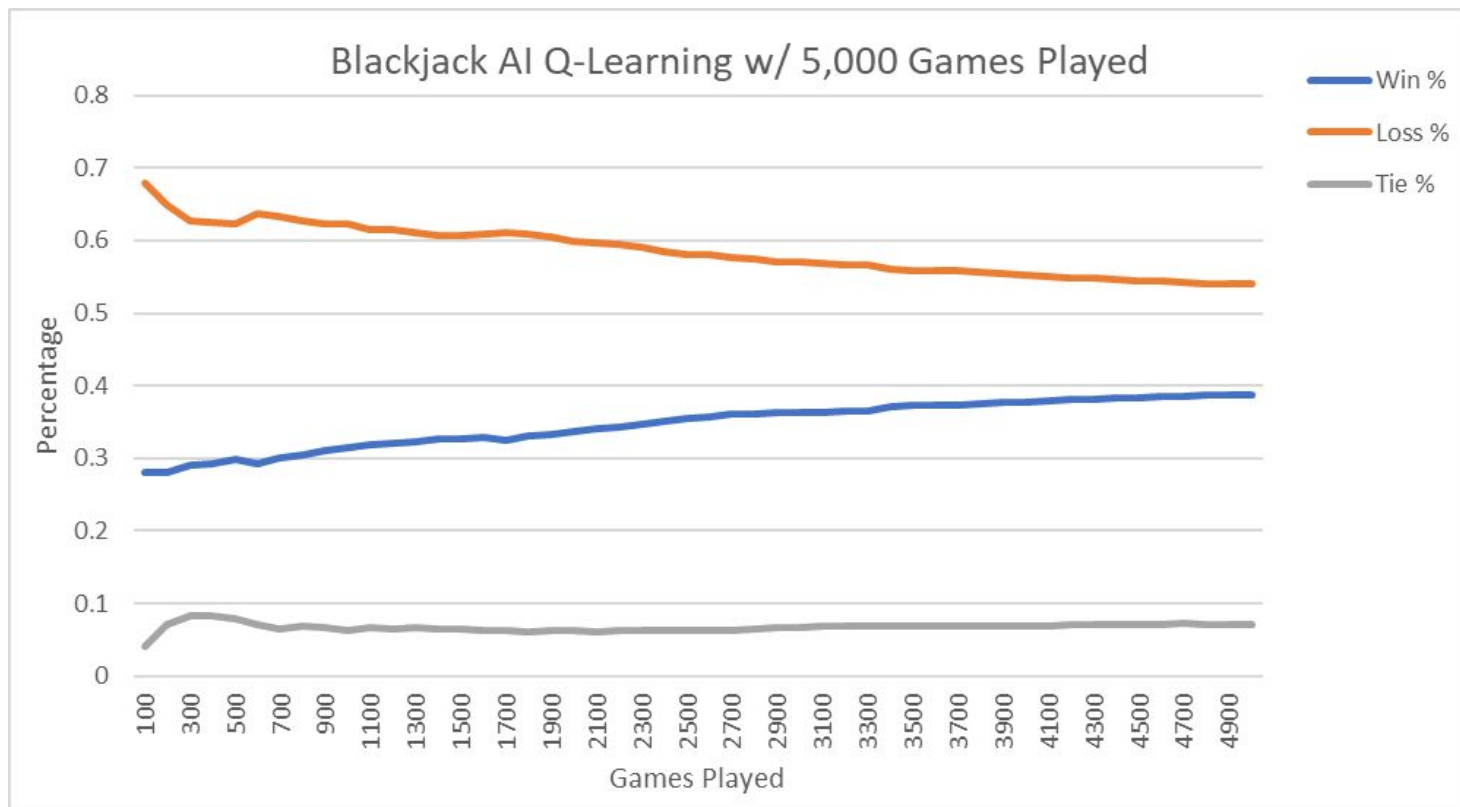


Demonstration

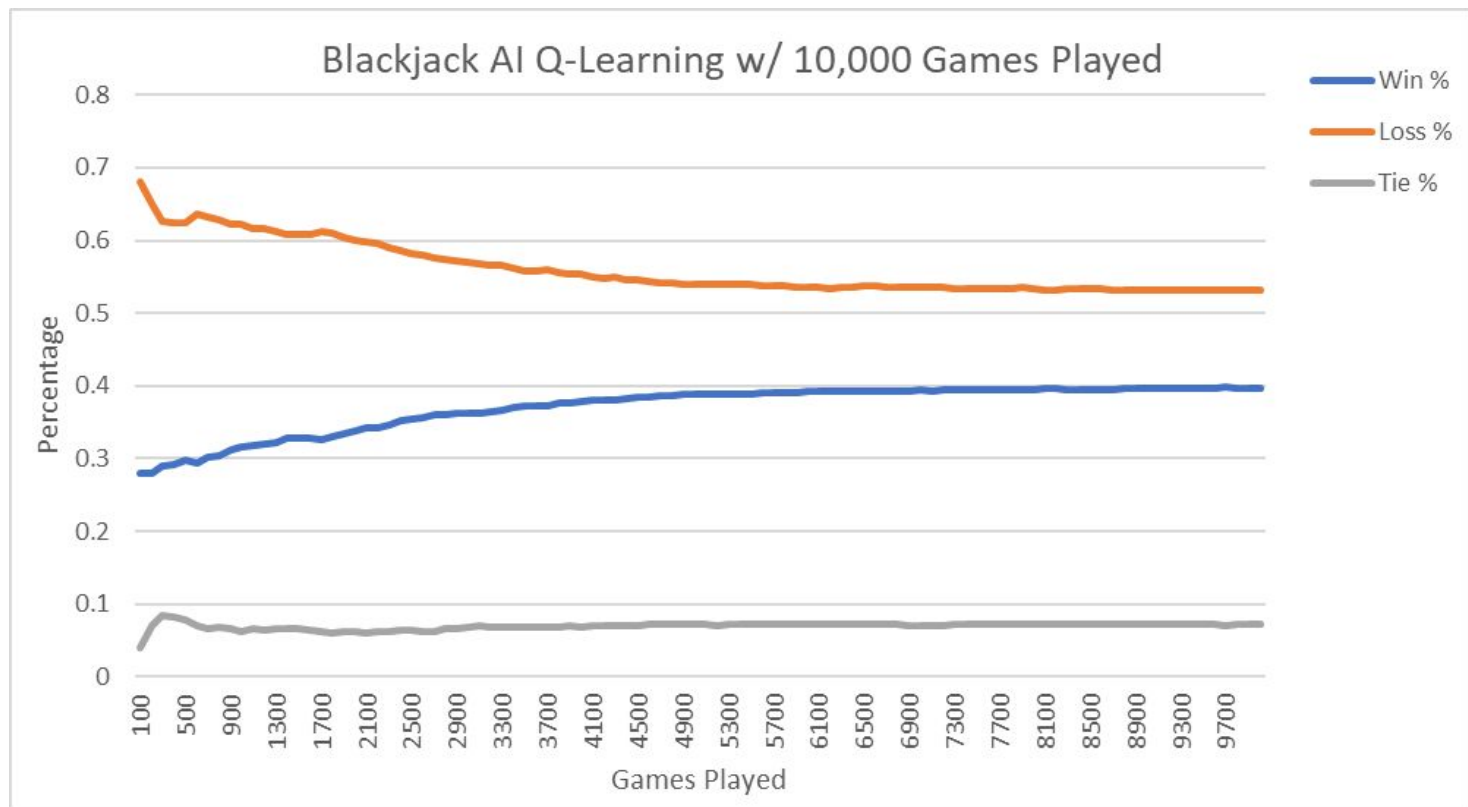
Results



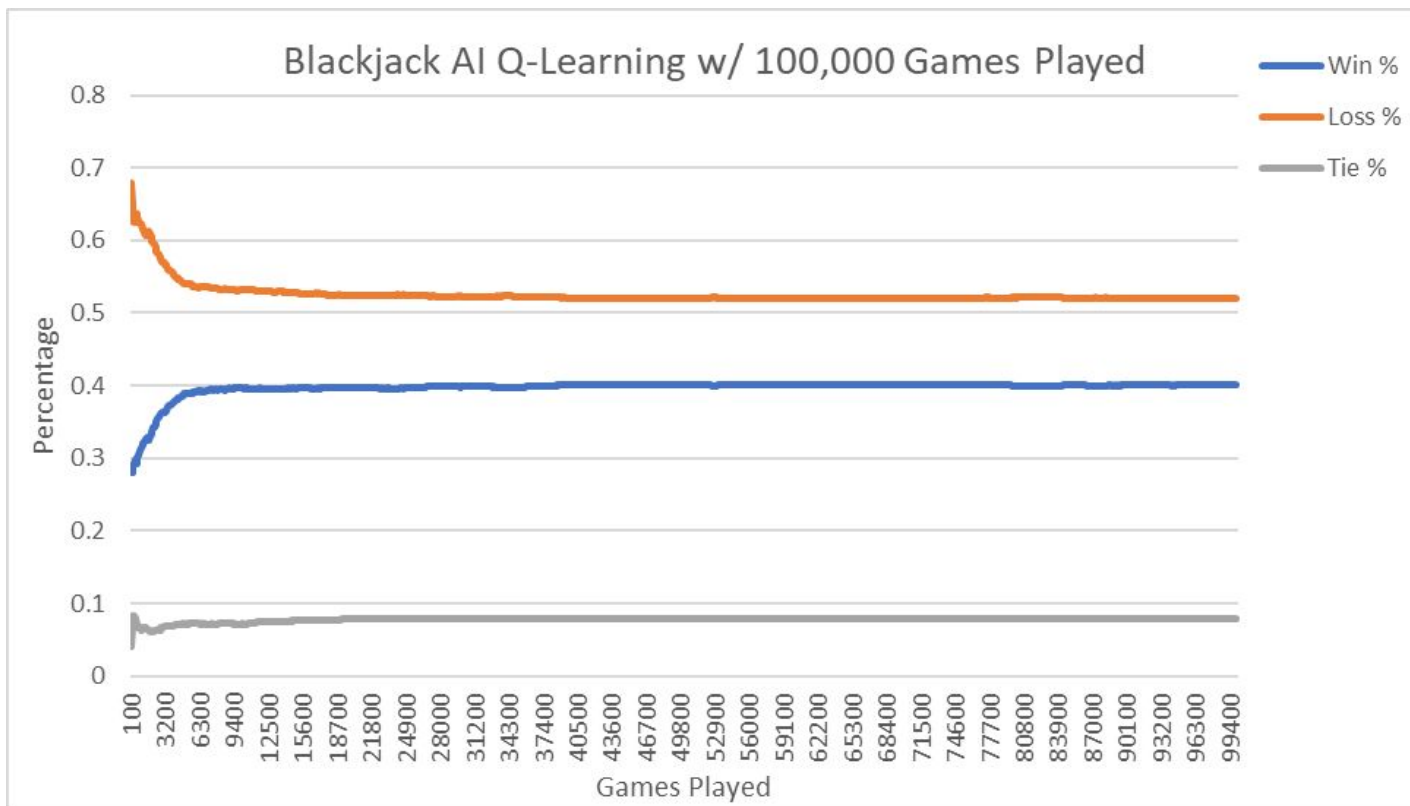
Results



Results



Results



Lesson Learned

- Realistically will never be able to beat the house, more about reducing their edge
 - Casino would never have a game where the player has an equal chance of winning long-term
- Increasing reward value for winning improves win percentage to a certain extent
- Decreasing reward value for losing does not have the same effect





Questions?