Checkmate with AI

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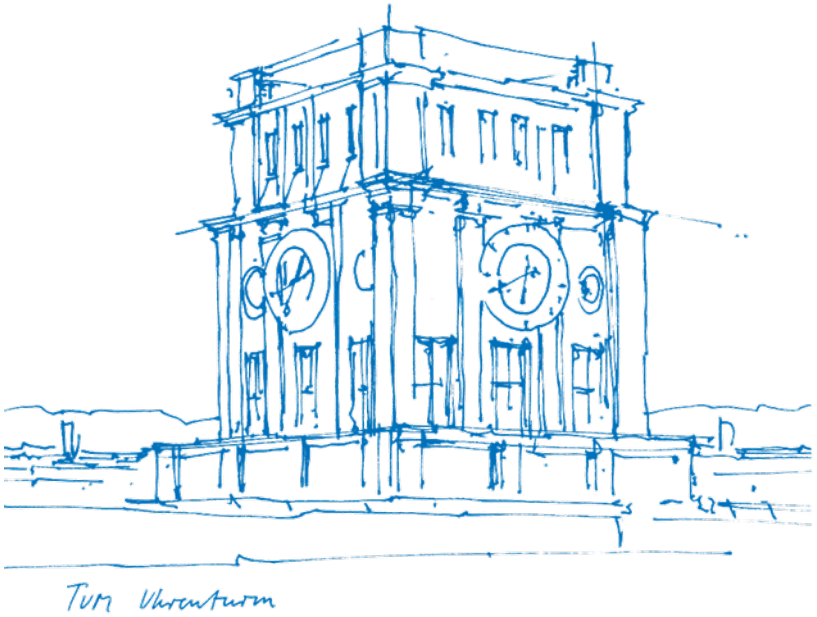


Agenda

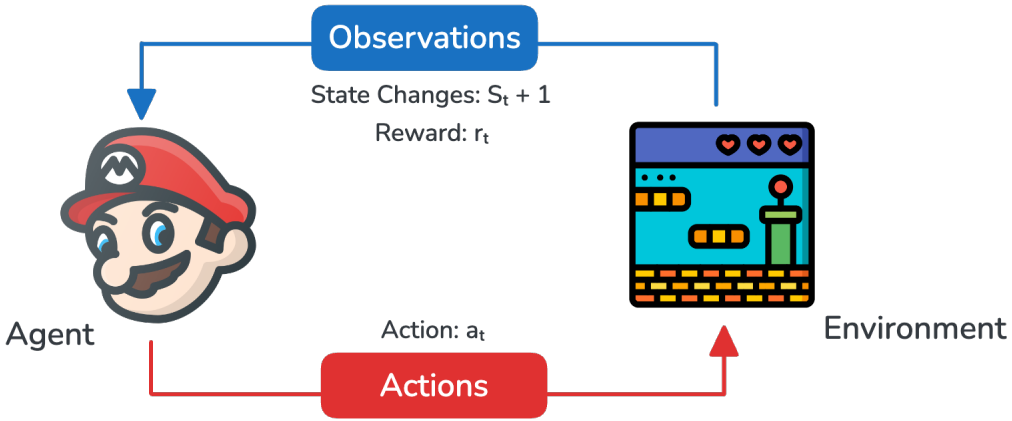
1. Introduction
2. Model Overview
3. Algorithm Explanation
4. Code Structure & Implementation
5. Algorithm Performance & Results
6. Implications & Limitations
7. Conclusion & Q&A

Introduction - Background

- Problem Statement: Implement an AI, which can play checkers against the player
- Why is reinforcement learning important?
- Project Goal: Train a RL gent, which can play checkers

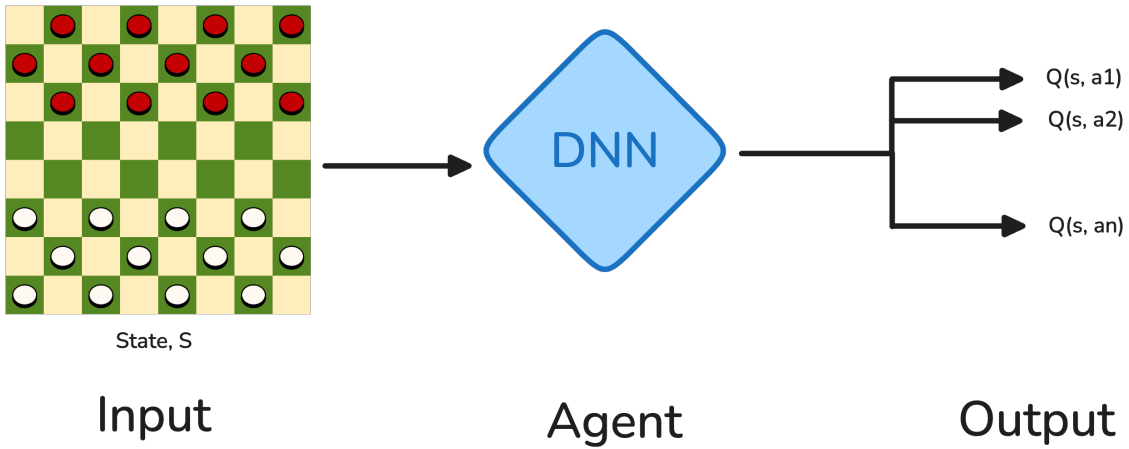
Model Overview

- What is our RL model trying to achieve?
- Type of RL Model: Q-Learning & Deep Q-Network (DQN)
- High-Level Concept: Interaction between Agent and Environment



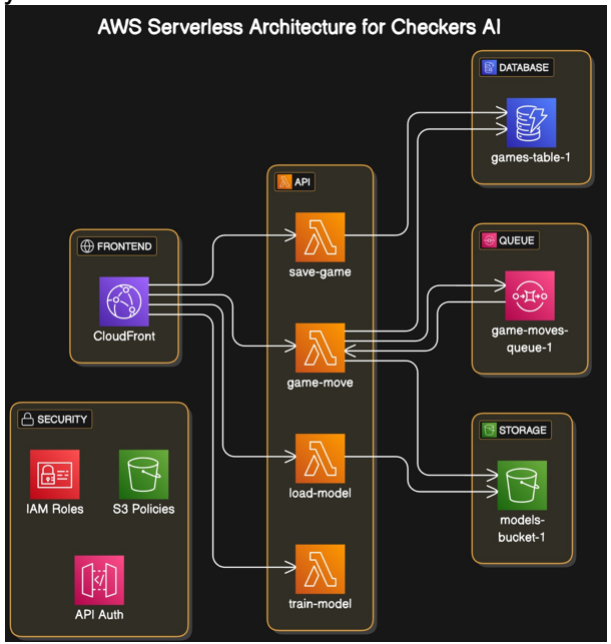
Algorithm Explanation - Deep Q-Learning

- Reinforcement learning technique to find optimal action-value function $Q(s, a)$
- Uses a neural network instead of a Q-table
- Action Selection: ε-greedy policy for exploration vs exploitation
- Experience Replay to improve stability



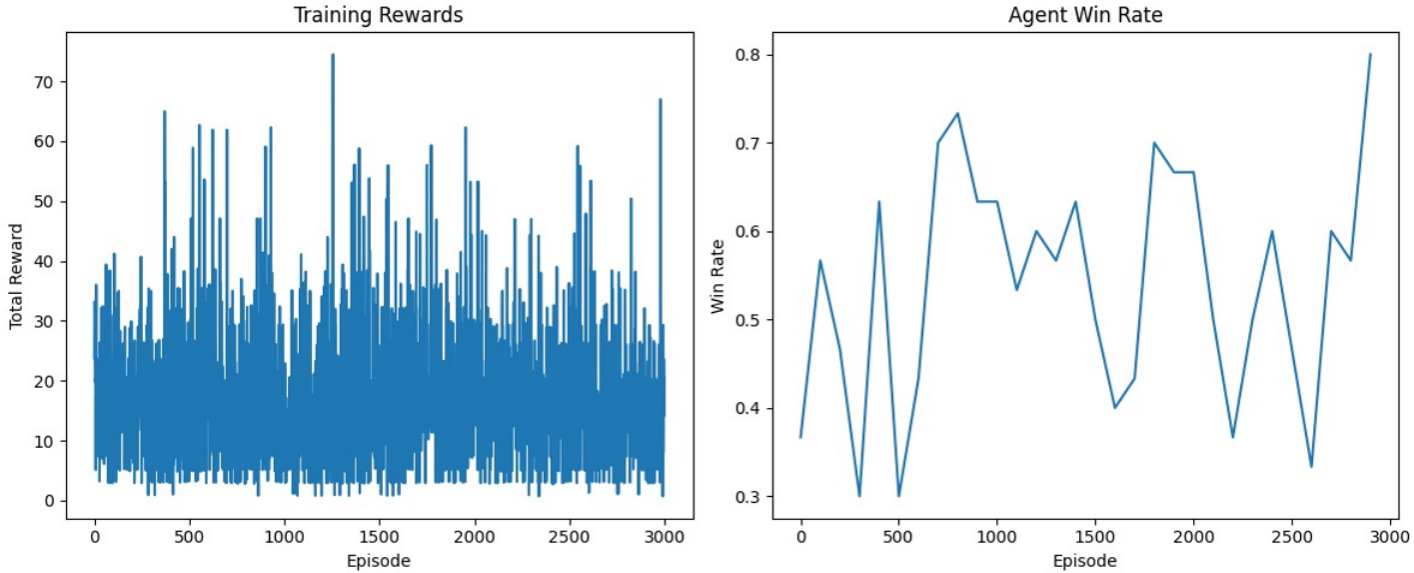
Code Structure & Implementation

- Overview of Repository Structure
- Key Libraries: Python, PyTorch, NumPy
- Training and Evaluation Pipeline



Algorithm Performance & Results

- Performance Metrics: Reward over Episodes



Implications

- Application in Finance, Robotics, Gaming, and Cloud Optimization
- Enhancements for real-world decision-making
- Future research directions: Combining RL with Transformer models

Limitations

- High computational cost (even with latest GPUs)
- Inefficiency
- Generalization issues across different environments

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Conclusion & Summary

- Key Takeaways: Insights from Model Performance
- Challenges & Future Work

Conclusion & Summary

- Key Takeaways: Insights from Model Performance
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Any Questions?

Thank You

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