Monte Carlo Tree Search with Konane

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Introduction

Our main goal is to implement Monte Carlo Tree Search (MCTS) with Konane, an ancient Hawaiian board game, and compare the performance of different simulations. We aim to identify the most effective MCTS by comparing purely random simulations with Alpha-beta pruning and Alpha-beta with Principal Variation Search or Transposition Tables.

Project Breakdown

1. Implement MCTS with random simulation and a default "c" value.
    - Assigned to: Name
2. Add Alpha-beta pruning as a simulation type.
    - Assigned to: Name
3. Add Alpha-beta with Principal Variation Search or Transposition Tables as another simulation type.
    - Assigned to: Name
4. Experiment with different "c" values to find the optimal balance between exploration and exploitation.
    - Assigned to: Name

Hypothesis

We expect that using Alpha-beta pruning will yield a more effective MCTS compared to purely random simulations. This is because these methods should provide more accurate evaluations of game states, leading to better decisions during gameplay.

Final Product

Our final product will be a fully implemented MCTS for the Konane. Also, we will analyze the performance of the different MCTS approaches, as well as a demonstration of the most effective MCTS in action. After this, we will have a written based on our findings and the ideal "c" value.

Conclusion

Our project is to try to find an effective MCTS approach for Konane by implementing MCTS with different simulations and exploring different values for the exploration-exploitation constant "c". By dividing tasks between us and focusing on our hypothesis, we will investigate the optimal MCTS approach for this game.