Choosing a Heuristic to an Isolation Game-Playing Agent

Uirá Caiado

As explained by [2], in this project we had to develop an adversarial search agent to play the game "Isolation". Isolation is a deterministic, two-player game of perfect information in which the players alternate turns moving a single piece from one cell to another on a board. Whenever either player occupies a cell, that cell becomes blocked for the remainder of the game. The first player with no remaining legal moves loses, and the opponent is declared the winner.

According to [1], games like this one have been engaging many AI researchers due its abstract nature. The state of a game is easy to represent, and agents are usually restricted to a small number of actions whose outcomes are defined by precise rules. However, those games are often too hard to solve by simple search. For instance, chess has a search tree with 35^{100} nodes.

To complete this project, I implemented two strategies: minimax algorithm and alpha-beta prunning. As explained by [1], the first one performs a complete depth-first explporatiom of the game tree and its time cost in real games is impractical.

explains that heuristic evaluation functions allow us to approximate the true utility of a state without doing a complete search.

References

[1] Stuart Russel and Peter Norvig. *Artificial Intelligence: A Modern Approach, 2003.*

[2] Udacity. Build a game-playing agent. `https://goo.gl/ND8wPY`, 2017.