Combinatorial Game - Summary-03

I think we should first implement the Alpha-Beta algorithm and try to optimize it with the null-windows test. Then learn the principles of CNN. Then design a new algorithm with the combination of CNN and search algorithm. At last, realize and verify it.

The following are the main components of this algorithm.

1> Attentions

The number of layers must be even. Since the odd-numbered nodes are AI and the even-numbered nodes are players, if the AI does not consider the player's defense, then this estimate is obviously problematic.

2> CNN

The convolutional neural network is used to extract picture features for image recognition. Isn't the board a small picture? And each pixel has only three values. It’s natural to recognize and evaluate pictures.

We should use a combination of search and neural network technology.

3> Alpha Beta

If we can arrange the nodes roughly in order, the efficiency of pruning will be greatly improved. Evaluate the certain position, not the whole board.

In addition, we can optimize the algorithm with the null-widows test.

4> Iterative Deepening

If you are going to win, choose the step with the shortest path. In contrast, if you are going to lose, choose the step with the longest path.

5> Zobrist

Many times there will be repeated searches. Zobrist is a fast hash algorithm, we can represent a game by a 64-bit integer.

6> Killing

When the normal search is completed and there are no steps for a winning situation. Then it is time to perform a larger depth killing.