

Heuristics Analysis

Three different heuristics implemented in this project. They are tested with the tournament.py script to evaluate performance. Script looks into every heuristics player win and lost results and evaluate performance of each heuristics against against a baseline agent using alpha-beta search and iterative deepening called AB_Improved.

Custom_score:

heuristic coustom_score penalizes corners. Corners decrease the nubder of available move and decrease the oppportunity of winning a game. Because a player can be easily trapped by opponent in a corner.

This heurictic is the best heuristcic I have implemented because it is simple and penalizing improved winning rate.

Match	Opponent	AB_Improved	AB_Custom
		Won Lost	Won Lost
1	Random	9 1	10 0
2	MM_Open	8 2	8 2
3	MM_Center	10 0	8 2
4	MM_Improved	6 4	9 1
5	AB_Open	4 6	6 4
6	AB_Center	3 7	5 5
7	AB_Improved	4 6	5 5
	Win Rate:	62.9%	72.9%

Custom_score_2:

heuristic coustom_score_2 penalizes corners because corners limit directions a player can move and decrease chance to win the game. While penalizing corners for the player, rewards corners for the opponent.If the opponent is trapped in the corner, winning rate increase for the player.

This heuristic is the most complex heurictic which I expect to have the best win rate.

However, this heuristic has the worst win rate because being complex prevent to proceed deeper in the game tree resulting a worse win rate than simpler heuristics.

Match	Opponent	AB_Improved	AB_Custom_2
		Won Lost	Won Lost
1	Random	9 1	10 0
2	MM_Open	8 2	7 3
3	MM_Center	10 0	8 2
4	MM_Improved	6 4	7 3
5	AB_Open	4 6	5 5
6	AB_Center	3 7	4 6
7	AB_Improved	4 6	6 4
	Win Rate:	62.9%	67.1%

Custom_score_3:

Heuristic coustom_score_3 is the simplest heuristic which substracts opponent left moves from player left moves targetting player to win. Because this is the simplest heuristics, it is also the

fastest heuristics. This heuristic has a better win rate than more complex heuristics (custom_score_2) which can be because custom_score_3 allows the search to proceed deeper in the game tree.

Match	Opponent	AB_Improved	AB_Custom_3
		Won Lost	Won Lost
1	Random	9 1	9 1
2	MM_Open	8 2	6 4
3	MM_Center	10 0	8 2
4	MM_Improved	6 4	9 1
5	AB_Open	4 6	5 5
6	AB_Center	3 7	6 4
7	AB_Improved	4 6	5 5
	Win Rate:	62.9%	68.6%