AIND-Isolation, Heuristic Analysis

Three custom heuristic functions were created and tested for performance:

1. Custom_score - the basic heuristic consisting of the difference between the player's own legal moves and the player's opponent's legal moves.

Heuristic 1 performance:

Match #	Opponent	AB_Improved	AB_Custom
		Won, Lost	Won, Lost
1	Random	8, 2	9, 1
2	MM_Open	6, 4	8, 2
3	MM_Center	7, 3	6, 4
4	MM_Improved	7, 3	7, 3
5	AB_Open	5, 5	5, 5
6	AB_Center	6, 4	6, 4
7	AB_Improved	6, 4	9, 1
	Win Rate:	64.3%	71.4%

This function performed better by 7.1%, making it the best heuristic.

2. Custom_score_2 - a heuristic which is the average of the player's own legal moves and the player's opponent's legal moves.

Heuristic 2 performance:

Match #	Opponent	AB_Improved	AB_Custom_2
		Won, Lost	Won, Lost
1	Random	8, 2	4, 6
2	MM_Open	6, 4	7, 3
3	MM_Center	7, 3	5, 5
4	MM_Improved	7, 3	7, 3

5	AB_Open	5, 5	5, 5
6	AB_Center	6, 4	4, 6
7	AB_Improved	6, 4	6, 4
	Win Rate:	64.3%	54.3%

This function performed 10% worse, making it the worst heuristic.

3. Custom_score_3 - a heuristic which attempts to make use of the strategy of choosing the center position and minimizes the distance from center with a position multiplier.

Heuristic 3 performance:

Match #	Opponent	AB_Improved	AB_Custom_3
		Won, Lost	Won, Lost
1	Random	8, 2	7, 3
2	MM_Open	6, 4	9, 1
3	MM_Center	7, 3	8, 1
4	MM_Improved	7, 3	5, 5
5	AB_Open	5, 5	4, 6
6	AB_Center	6, 4	5, 5
7	AB_Improved	6, 4	7, 3
	Win Rate:	64.3%	64.3%

This function had the same performance as AB_Improved.

Custom_score was used in the submitted agent because it performed the best. This heuristic was most consistent in performing better for a given match/opponent. Also, it is the best measure of the three in determining the relative success of the player to the opponent.