Heuristic Analysis for the game of Isolation

Custom Heuristic 1:

if own\_moves + opp\_moves == 0:

return float("inf")

else:

return float(own\_moves / (own\_moves + opp\_moves))

This heuristic returns the fraction of the number of player's moves over total number of moves on current board. It outperforms Random, does well against MMs, and okayish against ABs.

Custom Heuristic 2:

return float(own\_moves - opp\_moves)

The simplest heuristic among the three customs. Similar performance profile as in the case of Custom Heuristic 1, it does a little better against ABs.

Custom Heuristic 3:

if opp\_moves == 0:

return float("inf")

else:

return float(own\_moves / opp\_moves)

Modified version of Custom Heuristic 1, which only calculates the fraction of the number of player's moves against that of the opponent's. Overall, an inferior CH1.

Overall, Custom Heuristic 2 is recommended. It is simple to implement, that makes it fast. It also achieves close to 70% win rate on average against its opponents.

Raw data (games = 50)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Heuristic | I | | C1 | | C2 | | C3 | |
| Opponent | W | L | W | L | W | L | W | L |
| Random | 46 | 4 | 47 | 3 | 47 | 3 | 44 | 6 |
| MM\_Open | 39 | 11 | 34 | 16 | 36 | 14 | 36 | 14 |
| MM\_Center | 40 | 10 | 41 | 9 | 42 | 8 | 41 | 9 |
| MM\_Improved | 39 | 11 | 35 | 15 | 37 | 13 | 36 | 14 |
| AB\_Open | 25 | 25 | 27 | 23 | 28 | 22 | 26 | 24 |
| AB\_Center | 26 | 24 | 24 | 26 | 28 | 22 | 24 | 26 |
| AB\_Improved | 25 | 25 | 25 | 25 | 25 | 25 | 24 | 26 |
| Win Rate | 68.6% | | 66.6% | | 69.4% | | 66.0% | |