Heuristic Analysis of Isolation Playing Agents

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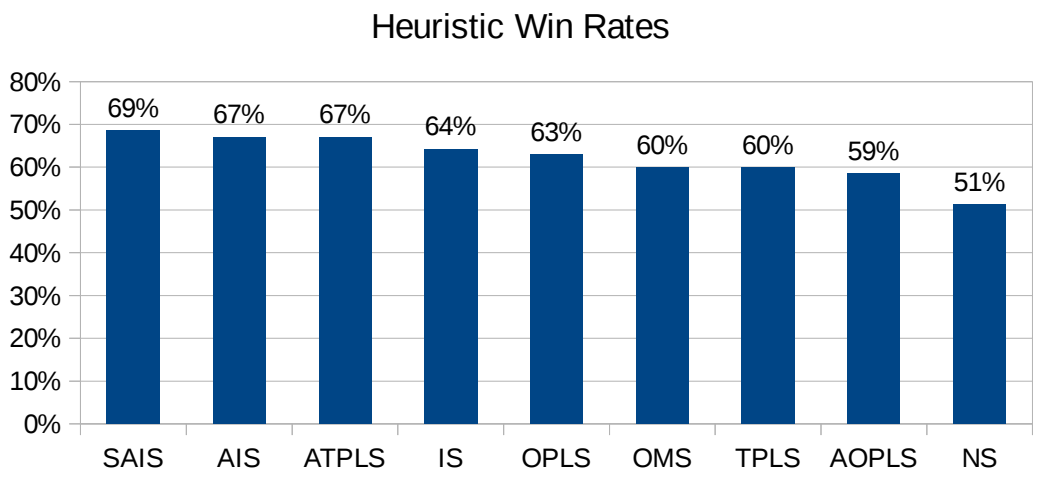
The following contains a high level analysis that drove the decision to choose the scoring heuristics used in the AI agents playing the game Isolation. Several scoring heuristics were analyzed, including:

- **Naive score (NS)**: the value one.
- **Improved score (IS)**: the difference between the number of current player moves minus current opponent moves.
- **Aggressive improved score (AIS)**: same as improved score with 2:1 ratio applied to the opponent's move.
- **Super aggressive improved score (SAIS)**: same as improved score with 3:1 ratio applied to the opponent's move.
- **Open move score (OMS)**: the number of current player moves.
- **One ply lookahead score (OPLS):** the sum of the number of moves in the first ply of the current player minus the same sum of the opponent.
- **Aggressive one ply lookahead score (AOPLS)**: the same as one ply lookahead score with 2:1 ratio applied to the opponent's move.
- **Two ply lookahead score (TPLS)**: the sum of the number of moves in the second ply of the current player minus the same sum of the opponent.
- **Aggressive two ply lookahead score (ATPLS)**: same as two ply lookahead score with 2:1 ratio applied to the opponent's move.

Below is a chart illustrating the win rates for the aforementioned heuristic scores.



As you can see in the chart above, the super aggressive improved score provided the best win rate. It's interesting to see that each type of improved score ranked in the very top along with the aggressive two ply lookahead score. Not surprising that the naive score ranked at the bottom as it doesn't include any information about the current game play. However, it is surprising that it was able to win more than half of the matches. These results show that exploring more "aggressiveness" factors for the improved score could show promise in further improving the win rate.