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**Introduction**

The game of Rock, Paper, Scissors is often frowned upon as a game of pure chance requiring no skill whatsoever. When playing human versus human, this may be a fair assessment. You and your opponent blindly choose Rock, Paper, or Scissors, and hope that you have produced the winning weapon. There is very little opportunity for strategy and most games are abandoned for a more engaging contest.

When pitting two programs against each other, however, the game becomes more interesting. The Nash Equilibrium states that playing randomly is the optimal strategy, and will yield even results of 1/3 wins, 1/3 ties, and 1/3 losses. This, however, assumes that both players play optimally (randomly). If this constraint is relaxed, it is possible to do significantly better than this even split between wins, losses, and ties. It is at this point that the game becomes a problem that can be exploited with a proper application of Artificial Intelligence. If your opponent is not playing randomly, their strategy can be exploited. In order to exploit it, however, you must open yourself up to being exploited. A clever strategy, then, will both attack and defend – that is, you will both try to predict your opponent’s moves and play in a way that is difficult for your opponent to predict.

Our strategy performed significantly better than the Nash Equilibrium when pitted against other programs from the class. Our program finished 2nd overall in the preliminary tournament, scoring a total of 36 out of 44 possible points, where 2 points are awarded for a win, 1 for a tie, and 0 for a loss.

**Background**

Our rock, paper, scissors bot implemented a famous algorithm, Iocaine Powder. First developed by Dan Egnor to compete in the First International RoShamBo Programming Competition, the bot employs a mixture of strategies to both exploit the opponent and remain unexploitable. The algorithm chooses between playing a random move, a move based on an analysis of the frequency of the opponent’s moves, or a move based on an analysis of the history of the opponent’s moves.

**Experiment**

**Results**

**Conclusion**