Poker Bot

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Summary of project

Create an agent that is capable of playing poker. With two modes essentially. The first and how it will always start out is in a semi safe state where it is trying to play as close to game theory optimal as we can get it. The problem with that is that it makes very small amounts of money over the long term and will be hard to verify/prove it has a slight edge over the average player. The second mode is more fun and really our goal. To be able to recognize a weak or dull opponent and take advantage of their mistakes by adjusting its estimated value equations at each spot. We will probably feed it preflop ranges and then tell it a flop and what the actions of the other players are, how many players are left to act, everyone stack sizes, and probably some other variables. It is then going to look at its hand and compare it to that other variable to create an estimated value or ev for its moves in that situation. If that rating is high enough it will make a small bet and if it is way above that line, it might do a larger raise size. It will also have thresholds for checking and folding. Our plan is to make it to play against one player also knows as heads up. Even in tables with 8 people playing preflop it is most common for there to be 2 people at the flop or maybe 3 in outside cases. It is too complicated to create one that can handle playing against multiple opponents so our goal is to make one that can play well against one. We will probably level it up to have two strategies, a safe one where it guarantees it makes a small amount of money net or one that is exploitative and takes advantage of an opponent that clearly doesn't understand the game.

Implementation Strategy

- State features: street, stacks, pot, position, bet size as % pot, last N actions, public cards, your hole-card category (pair/suited/offsuit + rank bucket).
- Action set: {fold, call, raise 33%, 75%, 150%, jam}. (Discretize so learning isn’t impossible.)
- Equity engine: Monte-Carlo simulate showdown equity vs. an opponent range

- Decision rule: EV(call/raise) from equity, pot odds, and simple fold-equity model (logistic on your line + villain “fit-or-fold” tendency).
- Opponent model: Track per-street frequencies (open %, 3-bet %, c-bet %, XR %, fold-to-c-bet, etc.). After ~100 hands, bias the action selector to exploit (e.g., over-fold vs. under-bluffers; value-bet larger vs. calling stations)

Expected Outcome

We expect to be able to create a poker bot that plays semi competently in a heads-up game. We think it will be very difficult to create one that can succeed against players that really understand the inner workings of the game. However, we do think we could make one that won’t lose money against decent players and hopefully dominate beginners or people with little understanding of the game. We hope to demonstrate how much of a statistical game poker is to the audience and show that even a robot incapable of reading its opponent can make the right moves, hold its money and even be lightly profitable. And given a weak opponent can use its calculations to dominate them over the long run and truly make money.