Smartbots 2023

Team Mountbatten

Outline

- Initial Attempts
- Last Version
- Optimizations
- Trump reveal details
- Bidding details

Initial Attempts

Rule Based

- Both play and bid rule based
- Bid rules same as in started code
- Python
- ~40% score against bhoos bot

Initial Attempts

ISMCTS

- No optimizations
- Python
- 400 simulations
- ~50% score against bhoos bot
- Bid from starter code

Final Version

- ISMCTS
- C++
- ~60% score against bhoos bot
- Time based allocation for play instead of iterations
- Higher time period if larger number of cards remain

Final Version - ISMCTS Optimizations and Additions

- No search when only a single move is valid
- Distribute cards using inference from hand history
  - Exclude cards that are guaranteed to not be owned by a particular player
- Determination of opponent's trump card is based on the card the bid winner has in that determination

Valid Moves:

- Trump revealed is added as an additional valid moves during expansion
- Ignore consecutive(same value) cards during expansion and simulation

Final Version - ISMCTS Optimizations and Additions

- Score function
  - 1 if win
  - 0 if lose
  - 0.5 if nullified and would have lost otherwise
- UCB1 with exploration constant 0.7
- Play by rules if any team has achieved enough points to win

Final Version - Play other details (Revealing trump)

- If we’ve won and trump is not revealed, reveal trump when possible
- If we’ve lost and trump is not revealed, try to nullify the game

Final Version - Choose Trump

- Chose suit with highest number of cards
  - If tied, chose suit with highest sum of values of cards

Final Version - Bidding (Rule Based)

- Based on highest number of cards of same suit
- If single card: possible bids -> 0, 16 or 17
- If two cards: possible bids -> 16, 17
- If three cards: possible bids -> 17, 18
- If four cards: possible bids -> 18
- If first to bid, bid a bit more recklessly (bid 16 even when unlikely to win with this bid)
- If last to bid and highest bid is 16,
    - Highest bidder is first bidder -> Bid recklessly
    - Highest bidder is last bidder -> Bid less recklessly

Thank you