Kaitlyn Sandor
CPSC 290 Project Proposal
Advisor: Jay Lim
January 17th, 2023

Evaluating Heuristics and Strategies on "The Game"

Problem:

The Game is a 4 player game of number placement, communication, and collaboration towards one common goal. The basic goal of the game is to place all cards 2-99 in one of 4 piles. There are two piles starting with 1 and moving up, and two piles starting with 100 and moving down. Once a card is placed in a pile, the only cards that can be added to the pile must come after the preceding card. For example, if 88 is placed upon 100, only cards less than 88 can be played on that pile. The same is true in reverse. If a 30 is played upon a 1, only cards greater than 30 may be played on that pile. The only exception to this rule is a difference of 10. For example, if a pile starting at 100 and moving down is currently at 32 and someone has the card 42, the player may play the card 42 and the current value of that deck would move up to 42. The same would be true in reverse, a deck starting at 1 and moving up with a current value of 22 enables a player to play the card 11 and move the value of that deck down to 11.

All players must keep 6 cards in their hand at all times. On each turn, a player must play at least two cards out of the 6 in their hand. They may play more than two. Players are allowed to communicate a desire to play on a specific pile with a specific level of desire but not reveal which cards they have specifically. Players are allowed to see every card that has been played already in order to help make their decisions. Once all of the cards in the deck are in the hands of the players, players only need to play one card per turn. The game ends when the current player cannot play any cards in their hand. The game is scored as a group with the score of the group

being the number of cards remaining to be played. The closer the score is to 0 the better the players played.

Project:

I discovered this card game over winter break and instantly thought of CPSC 474, Computational Intelligence for Games. This game is very interesting for heuristic and communication analysis. I am interested in seeing what level of communication is needed for the computers to play optimally as well as what strategies perform best. I am interested in comparing minimax, monte carlo tree search, different communication strategies, and different heuristics to analyze different strategies for The Game.

Specific heuristics include always defaulting to the best player who has a play on a pile, always defaulting to your best cards to minimize your own risk, and a combination of the two. I am also interested in using different scales of communication for the players. One idea is to have the players rate how good their play on a pile is from 1-11 (1-10 being how close to the card they are and 11 being a 10 difference card (very very good play)). Another idea I had was to use plain english words to communicate the significance of their cards and then using sentiment analysis to evaluate how “good” that play might actually be. I also am curious with each of these methods how a human would play against a computer and how easy it is to collaborate with a computer with these specific communication types.

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Deliverables:

The deliverables for my project will be a complete python game that users can use to play online against each other, my final code base on github, and a written paper discussing my challenges, successes, methods, and outcomes from analysis.

Timeline:

Date	Goal	Completed?
1/20	Project Proposal	
1/27	Create game in Python command line (for all human players)	
2/3	Complete 1st strategy	
2/10	Complete 2nd strategy	
2/17	Complete 3rd strategy	
2/24	Add all communication strategies	
3/31	Evaluate effectiveness of strategies	
4/15	Create online game (website) to host with simple GUI	
4/30	Write final paper	