Rummy 500 With Symbolic AI Opponent (Draft 1)

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Abstract

This paper details the construction and performance of a text based rummy 500 game with a symbolic AI opponent. The program is written in Prolog and plays random moves, and/or applies heuristics to make its moves. The goal of the program was to create a program which could successfully play Rummy 500 against a human. In judging the performance of the program, we will tell if this goal has been met.

This is a preliminary version of the final paper. This paper will be added to as more research is done and as more progress commences on the Rummy 500 game. By the time the program is complete, this paper will have most of its sections extended and updated.

Contents

1 Introduction

This, bluntly put, is a computer program that can play a human in the classic card game Rummy 500. To give an idea of how the program should work, one must know how Rummy 500 is played. Rummy 500 is a classic card game played by 2 – 8 people. Each person is dealt 13 cards to start. On each person's turn, they start by picking a card from either the deck or the discard pile. When drawing from the discard pile, you are allowed to draw multiple cards. In order to legally draw from the discard pile, a person must be able to use at least one of the cards he/she draws. At this point, the person will look for a meld, or combination of cards, to play on the board to earn points. A legal meld in Rummy consists of at least three cards. The first type of move is having three cards of the same face value (i.e. three kings), or, to use poker terms, a straight flush (i.e. 2, 3, 4 of hearts). Once a player has either produced a meld, played on another opponent's meld, or realizes he/she can not make a meld, they put a card in the discard pile and their turn is over.

Rummy is split into multiple rounds. A round starts once cards are dealt and ends when a player runs out of cards. Next, points are calculated based on the melds each person played and based on the board. Cards 2 – 10 are worth 5 points; jacks, queens, and kings are worth 10 points; and Aces are worth either 5 points if played low, or 15 points if played high. A player's score is the points from their melds, minus the sum of the cards left in their hand. Once a player reaches 500 points, the game is over and that player has one the game.

There are multiple decisions to be made in Rummy 500. From where to draw a card, to which melds to play on the board, which card to discard at the end of a turn, and more. Since humans normally play this game, there is a set of heuristics that define a strategy to play the game. It is also possible to play this game randomly, where decisions about which melds to play. The program progressed from a random Rummy player, to a rule based symbolic AI player in the following fashion:

1. Representing the deck and discard pile
2. Representing the players
3. ...

2 Approach

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3 Knowledge Representations

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4 Game Playing Framework

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5 Statistics and Assessment

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6 Possible Extensions and Elaborations

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7 Conclusion

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8 References

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