Pausetta Briscola?

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Abstract

For our final project **Pausetta Briscola?** we would like to create an agent able to play the card game *Briscola*.

1   Introduction

Briscola is a very popular Italian game that is played with a deck of 40 cards, the deck is composed of 4 different suits – *denari, spade, coppe and bastoni* – and 10 cards for each of the suits:

The cards										
Card name	Ace - *Asso*	2	3	4	5	6	7	Jack - *Fante*	Knight - *Cavallo*	King - *Re*
Value - Points	11	0	10	0	0	0	0	2	3	4

In total in the deck there are 120 points, whoever make the higher number of poits wins.

As clearly described in Wikipedia, the game procedes as follows:

After the deck is shuffled, each player is dealt three cards. The next card is placed face up on the playing surface, and the remaining deck is placed face down. This card is the Briscola, and represents the trump suit for the game. Deal and play are anti-clockwise.

The player to the right of the dealer leads to the first trick by playing one card face up on the playing surface. Each player subsequently plays a card in turn, until all players have played one card. The winner of that trick is determined as follows:

- if any briscola (trump) has been played, the player who played the highest valued trump wins.

- if no briscole (trumps) have been played, the player who played the highest card of the lead suit wins.

Unlike other trump card games, players are not required to follow suit, that is, playing the same suit as the lead player is not required.

Once the winner of a trick is determined, that player collects the played cards. Then, each player draws a card from the remaining deck, starting with the player who won the trick, proceeding anti-clockwise. Note that the last card collected in the game should be the up-turned Briscola.

Once all the cards have been played, to determine the winner of the hand, all the players should count the amount of points that have scored summing together the value of the cards they have collected throughout the game.

The player/team with the higher score wins.

2   Description

The objective of this project is to leverage Deep Reinforcement Learning (DRL) techniques to enhance the playing strategy of the traditional Italian card game, Briscola. Briscola is a complex game that involves both chance and skill, making it an ideal candidate for exploring the capabilities of DRL.

For the project then we aim to:

- Develop a DRL model capable of learning strategies for playing Briscola.

- Evaluate the trained model against human players and traditional rule-based agents.

- Using frameworks such as OpenAI Gym, model the Briscola environment. Define the game state, actions, and rewards to enable the learning process.

Relevant material

- Hearts Reinforcement Learning with MDP model

- Deep Reinforcement Learning Approaches for the Game of Briscola — Master Thesis

- deep-briscola — GitHub

- BriscolaBot — GitHub

- Beating Blackjack - A Reinforcement Learning Approach

- Briscola-Project — GitHub