Developing strategies for the bidding card game 'Diamonds' with GenAI

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1 Introduction

GenAI tools like ChatGPT and Gemini are increasingly popular for handling daily tasks. However, teaching them about new topics can be tricky. In this report, I attempt to teach ChatGPT the rules of a bidding card game called 'Diamonds,' which was entirely unfamiliar to it. Rules of the Game:

- There is a banker who has the diamonds deck.

- Then each player is given a particular suite from the deck with all cards from 2 to Ace.

- The banker randomly shows one diamond card and the players bid their card and place it face down.

- Then their cards are flipped and the player with the highest bid wins the diamond card and the points of this are added to their scorecard.

- If two or more players bid the same card then the diamond points are divided between them.

- Once a card is used it cannot be used again.

- At the end the player with the highest points wins

The report analyzes how well ChatGPT understands the instructions and how it might steer off track without proper prompting. This exploration aims to understand the capabilities and limitations of GenAI when presented with novel information.

2 Problem Statement

The primary challenge addressed in this report is teaching GenAI the bidding card game 'Diamonds'. The problem statement revolves around explaining the GenAI tool the game, followed by engaging it in playing the game and correcting any errors it makes.Later it was asked to develop strategies to win the game.

3 Teaching GenAI the game

I started with explaining the rules of the game to ChatGPT and it understood them pretty well.
Prompt: I started with explaining it how to play with me. "okay so i will reveal a diamond card as the banker and then you will bid whatever card you want to bid from your suite as player 1 and then i will bid my card as player 2" and explained it how go calculate points. "the points for each card is the value on it 2,3,4,5,6,7,8,9,10, J(11), Q(12),K(13),A(14)"
Response: ChatGPT understood and played well, and correctly updated the scorecard.

Prompt: I then asked ChatGPT to write code for the game "I want to code this game in python. So please do that for me ... in short just code how we were playing the game so I can run it and do the same in google colab

Response: ChatGPT gave me a series of code which neglected various rules of the game. First it generated a game with only 4 round because when we played I only played 4 round with it. Then it neglected the rule of using one card only once. When told to correct that, it made error and removed each card from the deck, no matter who used it (the banker or the players). Also it gave 0 points when the bid was tied.

Prompt: I gave a clear example of what the rounds should look like with the banker and players.

Response: ChatGPT understood pretty well and corrected all the errors in it's code.

Prompt: I then asked it to modify the code so the computer becomes one of the players and plays the game.

Response: ChatGPT was not able to understand this and started skipping the turn for player 1.

Prompt: I explained it the game with another example with test cases as it understood better with that earlier.

Response: ChatGPT did understand my point and made code where the computer was playing but it was not displaying the card bid by the computer. After prompting it to do so it made a good game but apparently forgot the rules and started making the same errors with the rules.

4 Iterating upon strategy

While playing with ChatGPT I purposely bid incorrectly by bidding the same card twice. One more thing that I did was I placed high bids on small cards which is a bad strategy. **Prompt:** Then I asked ChatGPT if it noticed something wrong with my strategy.

Response: ChatGPT could only figure the same card error and was not able to pick up anything about the moves.

Prompt: So I asked it to think of a strategy "what do you think is the best strategy to win this game".

Response: ChatGPT did come up with some points - Observe Opponents' Bidding, Strategic Bidding, Avoid Repeating Bids. It came up with one strategy of lower and upper deck bidding where it reserved higher cards for higher diamond bids and lower for lower.

Prompt: I asked it to generate code for the strategy.

Response: While generating the code for this strategy ChatGPT made some errors as it started purposely bidding higher than me which is not possible as these are blind bids.

5   Analysis

Analysis after the conversation:

- GenAI tools face a little difficulty in understanding novel concepts

- Theys have potential to comprehend instructions, as we see ChatGPT's ability to understand the rules of the game and correct errors in its implementation.

- We also see limitations of GenAI tools in accurately implementing complex game dynamics and strategies, as seen in ChatGPT's errors and misinterpretations during the coding phase.

- ChatGPT was able to understand better with detailed exmples of how exactly the game would work.

- We also see how the prompts completely change the direction GenAI tools pick and they steer of track if prompted wrongly.

6   Conclusion

Teaching GenAI tools the rules of the bidding card game 'Diamonds' was a helpful way to see how well AI can learn new things. At first, ChatGPT understood the game rules pretty well, although it faced some issues. It made some errors while remembering the rules and putting it in code. It also wasn't able to come up with a good strategy to win the game. Overall, the GenAI tool showed potential in learning a novel idea but it still needs to get better at putting those ideas into code and strategic thinking.

7   Appendices

ChatGPT transcript/chat: `https://chat.openai.com/share/6b8629a6-f5ab-425f-99e7-686c6e56acf`
Colab link-code: `https://colab.research.google.com/drive/1cq-OR6usvHiHNyfbBP_`
`PPwW7kFzdLSJc?usp=sharing`