

SEG4300 - Assignment 9 Report - Anthony Nasr - 300170809

Prompt Design:

The prompt design follows the three main techniques outlined in the instructions to effectively guide the LLM to a proper output. The techniques include : instruction-based prompting, example-based prompting, and CoT prompting.

- **Instruction-Based Prompting:**

The prompt explicitly instructs the model to generate a recipe that adheres to the user-input specifications of dietary preferences and allergens to avoid. The LLM is given a predefined role of an expert chef and is given a clear task. Relevant section of the prompt: “You are an expert chef specializing in personalized recipe creation. Your task is to generate a unique, delicious dinner recipe based on the user's preferences.”

- **Example-Based Prompting:**

- Embedded within the prompt is an example that the LLM should base its answer on. The example is structured and should help the model better understand the expected output format and style. Relevant section of the prompt:

****Recipe Name:** Creamy Tomato Basil Pasta (Dairy-Free)**

****Ingredients:****

- 2 cups gluten-free pasta
- 1 can (14 oz) crushed tomatoes
- 2 cloves garlic, minced
- 1 tbsp olive oil
- 1/2 tsp salt
- 1/4 tsp black pepper
- 1/4 cup fresh basil, chopped

****Instructions:****

1. Boil the pasta according to package instructions. Drain and set aside.
2. In a saucepan, heat olive oil over medium heat and sauté garlic until fragrant.
3. Add crushed tomatoes, salt, and pepper. Simmer for 10 minutes.
4. Stir in fresh basil and mix well.
5. Toss the cooked pasta with the sauce and serve warm.

- **Chain-of-Thought (CoT) Prompting:**

- It is explicitly stated within the prompt that the LLM should use the CoT strategy to generate the output. This helps the model reason through ingredients and proper selection before passing the final recipe to the output.

Key Challenges and Observations:

Some of the main challenges while completing this assignment include:

- **Model Selection:**
 - Initially, I attempted to use an API-based approach through OpenAI. Credit limitations and paywalls were the main deterring factors for this approach. So I had to download and use a local LLM which was funnelled through the GPT4All library.
- **Speed and Performance:**
 - The performance and response time of the model is very slow as it is running on the CPU. Even though I have CUDA setup and the proper dependencies to help run the model on the GPU, it seems that GPT4All doesn't yet support loading the model on the GPU. So speed is heavily reduced through my approach.
- **Building the Prompt:**
 - This process took some trial and error, as my initial prompts were a bit too basic and didn't allow the LLM to fully utilise all the prompting techniques required for this assignment.

But overall, I observed that the LLM outputs adhere well to the user's specifications and original prompt. It is slow, but delivers accurate and quality results.

Use Cases and Applications:

This program can be used to create personalized meal plans based on various user specific dietary restrictions and preferences. For example, it could be used as part of a larger application that offers AI-assisted cooking tutorials. It can help provide a baseline for dietitians to recommend recipes to customers/clients. It could also be further enhanced to use specific ingredients if the original prompt is restructured/refined further. Perhaps a new restaurant can open and serve only AI-generated recipes on their menu.