Thuan L Nguyen, PhD

Midterm Assessment

1. Overview: Large Language Models

In modern artificial intelligence, there is a fascinating breed of technology: large language models, commonly known as LLMs, a machine that not only grasps the intricacies of human language but also wields it like a seasoned writer, effortlessly crafting text, translating between tongues, and even summarizing lengthy passages. LLMs are magically created from a unique blend of massive datasets and advanced learning techniques.

One key secret to their prowess lies in "unsupervised learning," where LLMs feast on voluminous amounts of text, books, articles, and even informal chats to learn the nuances of human expression. Through this data-driven alchemy, they make their own understanding of language, able to generate contextually aware and surprisingly coherent prose.

The benefits of LLMs are as diverse as their abilities. They promise to boost our efficiency by automating tedious tasks like content creation and translation, freeing us to pursue more creative endeavors. Chatbots powered by LLMs can offer natural-feeling interactions, enhancing our user experience with technology. These models might even unlock new avenues for artistic expression, composing original music or crafting stories in the future.

Yet, with such power comes responsibility. Biases lurking within the data they consume can be unwittingly replicated by LLMs, necessitating careful vigilance against unfair prejudices. Factual errors can crop up in their creations, reminding us to approach their outputs with a discerning eye. The ethical implications of this powerful technology demand thoughtful consideration, ensuring its responsible use and minimizing potential negative impacts.

In summary, LLMs offer a glimpse into a future where language transcends its traditional boundaries, where machines and humans dance together in a captivating duet of understanding and expression. With responsible development and mindful application. They have the potential to reshape the landscape of technology, communication, and perhaps even creativity itself. As we peer into this exciting future, it is clear that the story of large language models is just beginning, brimming with possibilities yet to be explored.

2. Overview: Prompt Engineering

LLMs are marvels of machine learning thanks to being trained on mountains of text to mimic human-like language. However, they are prone to drifting off course, generating outputs that miss the mark without precise instructions. That is why we need prompt engineering to take the wheel, crafting clear and specific "whisperings" that guide LLMs toward the desired destination.

For example, a captain at the helm of a powerful ship is sailing in the vast ocean of language. The trusty vessel is a large language model (LLM), capable of producing stunning prose and insightful answers. Like any ship, an LLM needs directions guided by the art of prompt engineering so that it can get to expected destinations successfully and do not get lost.

Also, think of using an LLM like writing a musical score. A musician would not expect a symphony orchestra to produce harmonious music without meticulously guiding each instrument. Similarly, prompt engineering crafts the "score" for the LLM, influencing its every "note" to form a coherent and pleasing output.

Effective prompts go beyond simple keywords. They need narratives that set the scene, introduce characters, and hint at the desired story direction. They also require questions that frame the inquiry, providing context and guiding the LLM's reasoning. Furthermore, they even need examples and constraints to shape the creative style and ensure the generated text aligns with expectations.

Prompt engineering often requires iterations. The user gets the LLM's initial response, analyzes its strengths and weaknesses, and maybe needs to refine the prompt, like sharpening a pencil. The tasks may require adjusting the tone, introducing new information, or tweaking the question to elicit a more precise answer.

Prompt engineering requires a delicate interplay between human intention and machine capability, which can unlock the true potential of LLMs. It enables us to tackle complex tasks like language translation, text summarization, and even creative writing with an unprecedented level of finesse.

The possibilities are as boundless as the human imagination. With the artistry of prompt engineering, the user can transform LLMs from powerful but directionless engines into tools of remarkable versatility and creativity, ready to chart new courses in the vast ocean of language and push the boundaries of what is possible.

3. PART I: Prompt Engineering: Prompts and Responses (30 Points)

IMPORTANT NOTES:
*--) The student **must use** **the template** posted on Canvas to submit their prompts & responses summary*
*--) The template file name: **ADTA_5770_prompts_responses_summary_template_MIDTERM**.docx*
*--) The student must **rename** the file by **replacing** the text of "**ADTA_5770**" with the **student's name** and remove "template."*

- *For example: John Smith_ prompts_responses_summary_MIDTERM.docx*

IMPORTANT NOTES:
*--) The student **must use** the provided list of questions while working on **MIDTERM: PART I.***

- *File name: questions_medical_pharmaceutical_list_MIDTERM.pdf*

IMPORTANT NOTES:
*--) The LLM must be **Google Gemini 2.0 Flash Thinking Experimental.***

- *For the consistency and accuracy of the prompt response evaluation done in HW 3, the student **must use one LLM**, Google Gemini 2.0 Flash Thinking Experimental, for all the prompts.*

3.1 Prompt and Collect Responses

TO-DO
- Use the LLM: **Google 2.0 Flash Thinking Experimental**

- **Make 10 questions** to ask the LLM
    - Access the provided list of questions related to the medical field
    - Use the questions in each list (10 lists totally) as **examples**
    - **Make** a question like the example questions for each category

- For each question, design and create **a prompt of mixed prompting types**

- Use each created prompt to prompt the LLM and get a response

- Download and rename the Word document template properly
- **Document** each **prompt** and its **response** using the template

SUBMISSION REQUIREMENT PART I:
*--) Submit the required documents***: MS Word document**
- *John Smith_ prompts_responses_summary_MIDTERM.docx*

4. PART II: Prompt Engineering: Evaluate Prompt Responses (40 Points)

IMPORTANT NOTES:
*--) The student **must use** **the template** posted on Canvas to submit his/her work on **MIDTERM: PART II.***
*--) The template file: **ADTA_5770_prompts_responses_analysis_template_MIDTERM**.docx*
*--) The student must **rename** the file by **replacing** the text of "**ADTA_5770**" with the **student's name** and removing the word "template."*

- ***For example:** John_Smith_ prompts_responses_analysis_MIDTERM.docx*

IMPORTANT NOTES:
*--) The student **must use** **the template** posted on Canvas to submit his/her work on **MIDTERM: PART II.***
*--) The template file: **ADTA_5770_prompts_responses_evaluation_scores_template_MIDTERM**.xlsx*
*--) The student must **rename** the file by **replacing** the text of "**ADTA_5770**" with the **student's name** and removing the word "template."*

- ***For example:** John_Smith_ prompts_responses_evaluation_scores_MIDTERM.xlsx*

TO-DO
- Use the survey questionnaire included in the template to evaluate prompt responses
- For each pair [final prompt, response], evaluate the response based on the provided Lickert scale.
- For each prompt response, the student must provide **five scores** (five evaluation criteria), each score for one question of the questionnaire, a set of five questions.
- For the score (1 – 5) assigned for each criterion, the student must explain why such a score is assigned with adequately supported information.

- Collect all the evaluation scores and enter them as required in the Excel template.

SUBMISSION REQUIREMENT PART II:
--) Submit the required documents**: MS Word document** and **Excel file**
- *John Smith_ prompts_responses_analysis_MIDTERM.docx*
- *John Smith_ prompts_responses_evaluation_scores_MIDTERM.xlsx*

5. PART III: In Class (Monday 03/03/2025) (30 Points)

IMPORTANT NOTES:
*--) The student completes PART III of the MIDTERM in class on **Monday 03/03/2025**.*

6. HOWTO Submit

For **MIDTERM: PART I & II**, the student must submit the following documents:

1. *John Smith_ prompts_responses_summary_MIDTERM.docx*
2. *John Smith_ prompts_responses_analysis_MIDTERM.docx*
3. *John Smith_ prompts_responses_evaluation_scores_MIDTERM.xlsx*

The student must submit the above documents via email sent to the instructor (Thuan.Nguyen@unt.edu) as attachments. The subject of the email must be:

- "ADTA 5770: Midterm Assessment – Submission."

Due date & time: 11:00 PM – Sunday 03/09/2025