
National AI Student Challenge 2024
Track 3: Centre for Strategic Infocomm Technologies
February
2024
AI SINGAPORE

Open-sourced or Close-sourced

YOUR MISSION

Develop a Large Language Model (LLM)-powered application using prompt engineering that addresses a real-world problem statement.

No fine-tuning

Problem you experienced yourself or from your observation from others

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1920 x 1080 pixels or 13.3″ x 7.5″
(16:9 aspect ratio)

Impress us!

YOUR DELIVERABLES

- One slider of the developed LLM-powered application, including description real-world problem statement
- Video demonstration of the LLM-powered application

Make such it is playable!

EVALUATION (based on the Deliverables)

- Impact of the solution (15%) → Justification of the chosen problem statement
- Novelty of the solution (15%) → Why existing solutions do not address the identified problem statement?
- Presentation (20%) → Readability of the One-slider and Clarity of the Video
- Performance and efficiency of the solution (50%)
    - ➔ Code base evaluation, including Code Reusability, Code Readability and Self Explanatory Code
    - ➔ Based on quantifiable evaluation metric, how well does your solution address the identified problem statement?

MODE OF SUBMISSION

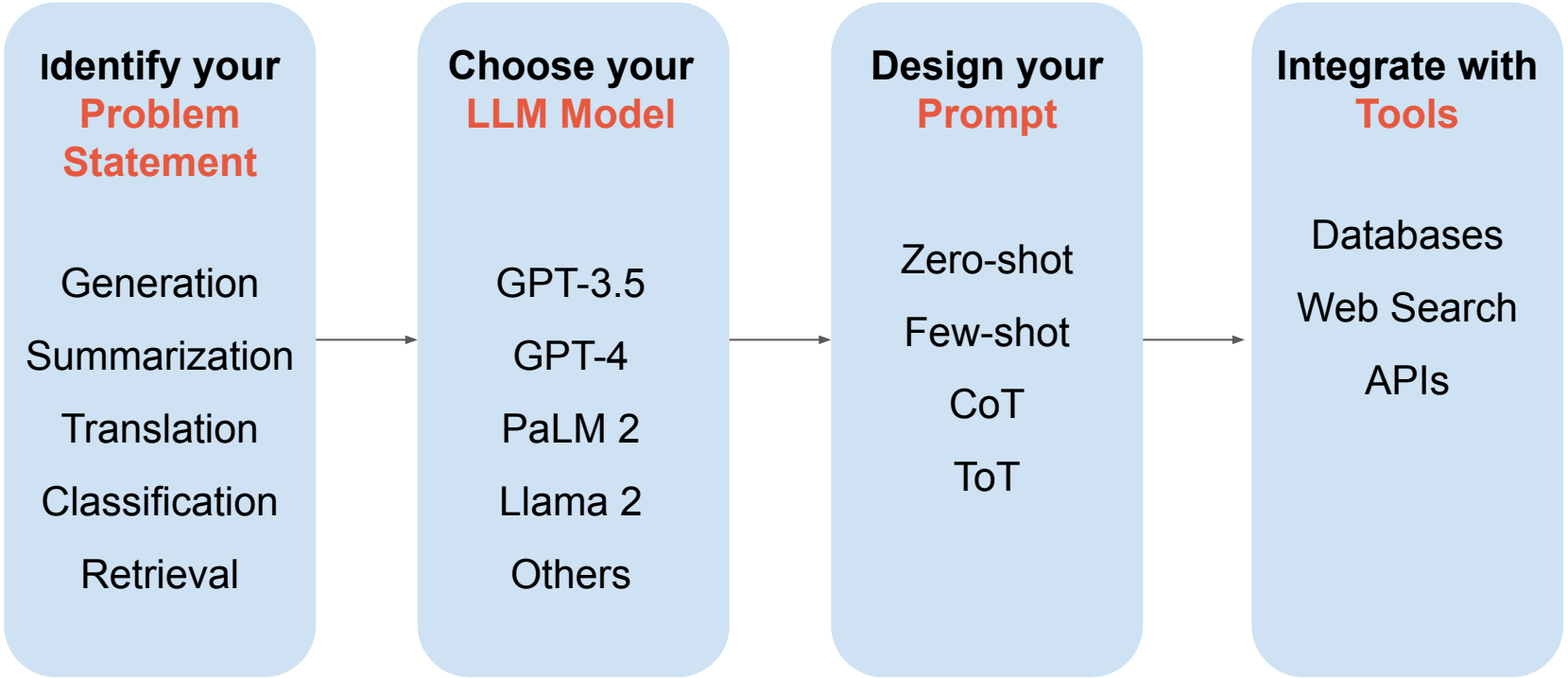
Complete the Submission Form: https://forms.gle/7nkzWZtcuRWK1maj9

➔Members' Particulars

➔Submission Folder (zip) which includes:

- One slider in *PDF file format*
- Video file or Video link store in a *text file*
- Code Base, with a README.md file
    - Describing the code base

4 Steps to a LLM-Powered Application



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Crafting a Problem Statement

Before you even think about coming up with an LLM-powered application…

Craft your Problem Statement!

- Who is your target audience?
- What are their current pain points?
- How does your solution (LLM-powered application) solve these pain points?

- Extra: What differentiates your solution from other non-LLM solutions?

Crafting a Problem Statement

What **NOT** to do!

Inventing the solution, then retrofitting a problem

- Buying a pair of shoes, then growing your feet to fit the shoes

Vague problem statements

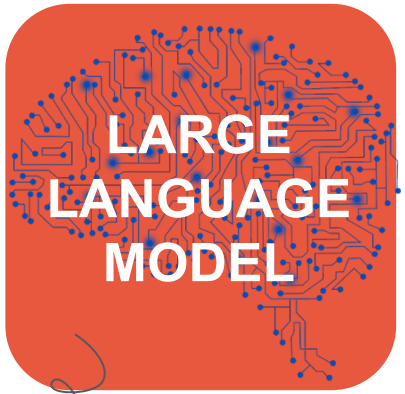
- Stuff needs fixing because it’s not good

What is a Large Language Model?

Very Important!

Prompt (Text Input)

Describe a sunset in winter like a poet.



Text Output

Cold sky ablaze, night whispers softly.

- Internet-scale dataset
- Billions of parameters

Use Cases

- Content Generation
- Summarization
- Translation
- Classification
- Chatbots

Leveraging LLM Abilities through Prompt Engineering

Example 1: Can lah → Yes
Example 2: Can meh → Are you certain?
Example 3: Can bo → Can or not?

Kevin, do my homework can bo?

Can!

Large Language Model

Prompt Engineer (You)

Few shot prompting

Effective Prompt Engineering Techniques

- Be Clear & Specific
- Provide Context
- Give Examples!
  - Zero-shot prompting
  - Few-shot prompting
  - Chain of Thought
- Experiment & Iterate

Effective Prompt Engineering Techniques

- Be Clear & Specific
  - Topic
  - Length of response
    - no. of sentences, words, or characters
  - Tone / Style
    - formal or informal, US or SG
  - Structure
    - essay, blog, song, etc
  - Intent
    - roleplay, who is your audience?
  - Output format
    - a bulleted list, paragraph, table

Effective Prompt Engineering Techniques

- Provide Context
  - **Less effective example:**

    “Write me a remediation strategy for a control failure.”

  - **More effective example:**

    “You are a governance, risk, and compliance (GRC) analyst. The GRC analyst works closely with other security analysts on projects associated with risk assessment and mitigation and tools and controls selection, and contributes with efforts that pertain to risk. Write me a detailed remediation strategy for an accounts payable control failure and how to mitigate this control failure.”

Effective Prompt Engineering Techniques

- Give Examples!
  - Zero-shot Prompting

Prompt:

```
Classify this text into neutral, negative or positive.

Text: Today's weather is fantastic!
Sentiment:
```

Output (a.k.a. "completion"):

```
Positive
```

Effective Prompt Engineering Techniques

- Provide Context & Give Examples!
  - Few-shot Prompting

Prompt:

```
A "whatpu" is a small, furry animal native to Tanzania.
An example of a sentence that uses the word whatpu is:
We were traveling in Africa and we saw these very cute
whatpus.

To do a "farduddle" means to jump up and down really
fast.
An example of a sentence that uses the word farduddle is:
```

Output:

```
One day when I was playing tag with my little sister, she
got really
excited and she started doing these crazy farduddles.
```

Effective Prompt Engineering Techniques

- Provide Context & Give Examples!
  - Few-shot Prompting

Prompt:

```
A "yalubalu" is a type of vegetable that looks like a big pumpkin.
An example of a sentence that uses the word yalubalu is:
```

Output:

```
I was on a trip to Africa and I tried this yalubalu vegetable that
was grown in a garden there. It was delicious.
```

Prompt:

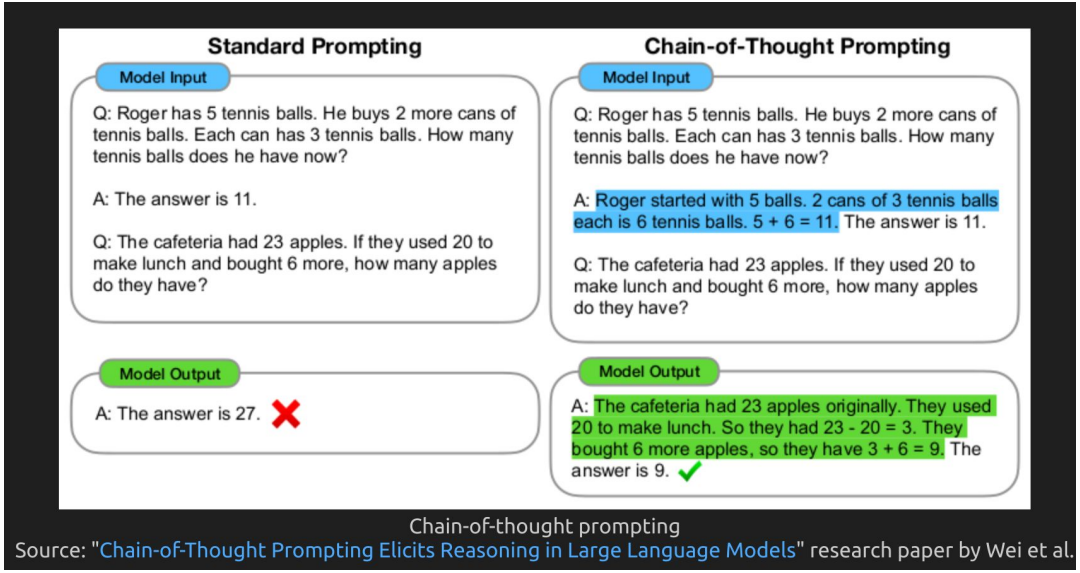
```
A "Burringo" is a car with very fast acceleration.
An example of a sentence that uses the word Burringo is:
```

Output:

```
In our garage we have a Burringo that my father drives to work every day.
```

Effective Prompt Engineering Techniques

- Provide Context & Give Examples!
  - Chain of Thought: “Let’s think step by step…”



Chain-of-thought prompting
Source: "Chain-of-Thought Prompting Elicits Reasoning in Large Language Models" research paper by Wei et al.

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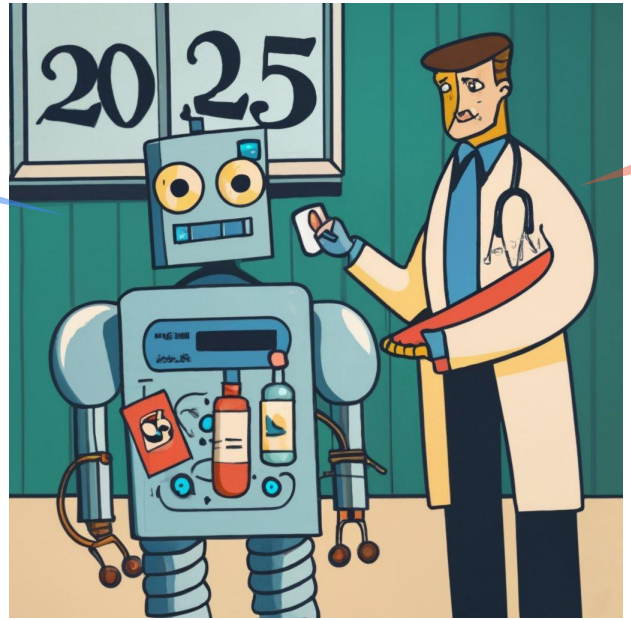
Hallucination in Large Language Models

A behavior in that the Large Language Model speaks false knowledge as if it is accurate

Halimah Yacob



Who is the president of Singapore?

Remedy using Additional Tools

- Augmenting with Databases
- Provide access to the Web Search
- Connect to other APIs

LLM-powered Application Demonstration

Profile

Name: John

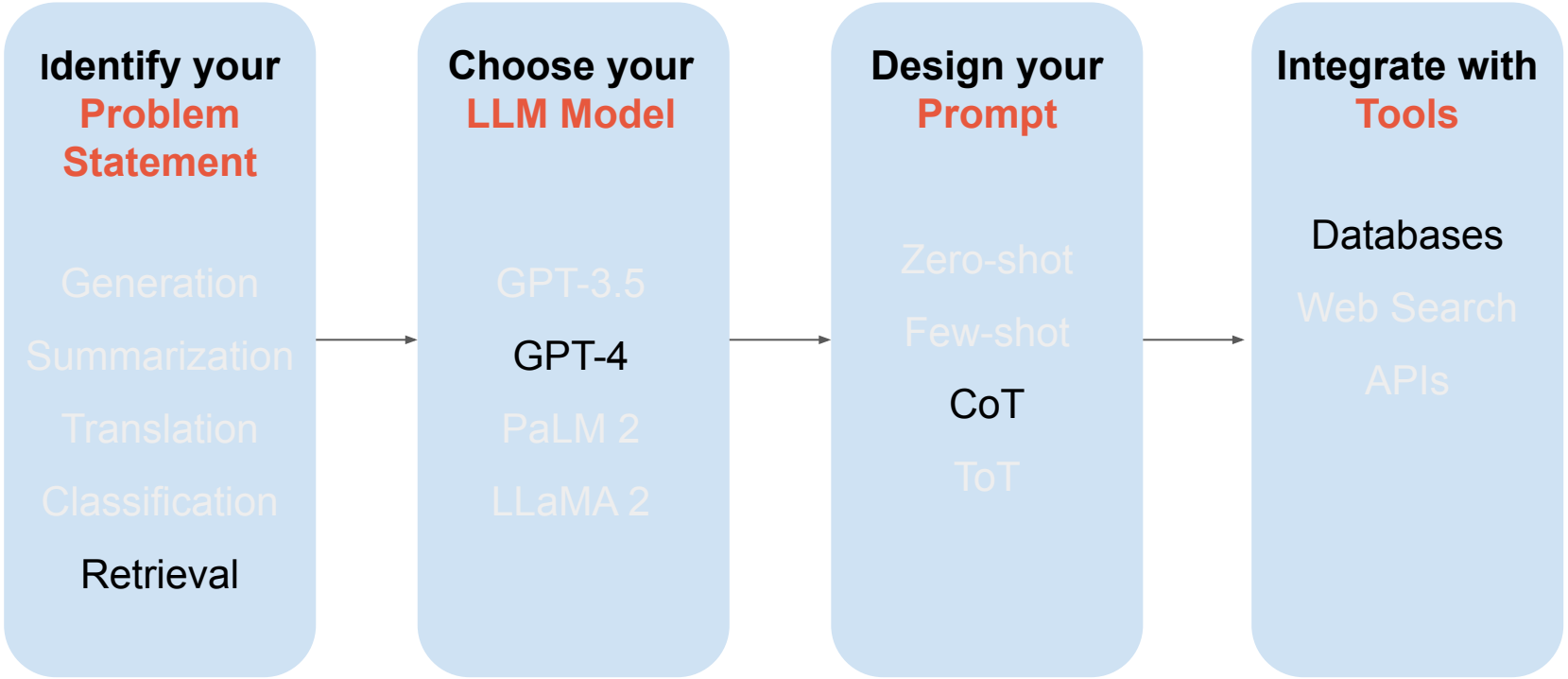
Job Title: AI Engineer

Experience: 1 month

Job Scope: Deliver AI projects

Challenges: Consolidating the sea of information

4 Steps to a LLM-Powered Application



Common LLM Technology Stack

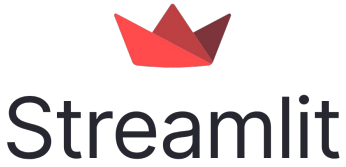
Common **libraries** for working with LLMs:

- LangChain
- LlamaIndex
- Semantic Kernel
- Haystack
- AutoGen

Common LLM Technology Stack

Common front-end libraries:

- Streamlit
- Gradio
- Taipy



Common LLM Technology Stack

Free **Open-Source** Models Running Locally On Your Laptop

Ollama library:

- Gemma
- Llama 2
- Mixtral

And many more…

Get up and running with large language models, locally.

Questions and Answers

For follow-up questions, contact us at:
kevinchng@aisingapore.org