Making Sense of LLMs 🧐

Agenda

- What are LLMs?
- How to use them?
- Why be careful with them?
- Q&A

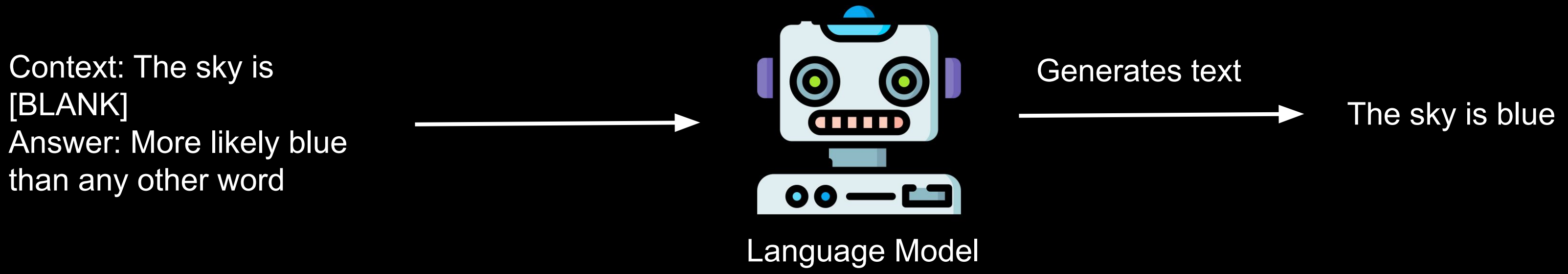
Let’s get started

What are Large Language Models?

> *“Large”* - Language Models

What are Language Models?

LMs assign probabilities to word sequences and find the *most likely next word.*



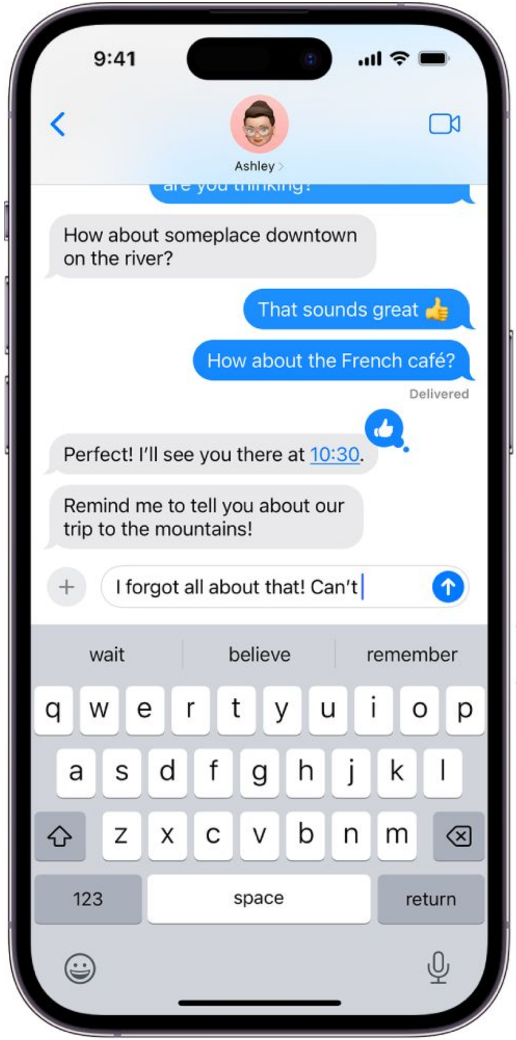
Context: The sky is [BLANK]
Answer: More likely blue than any other word

Language Model

Generates text

The sky is blue

You might be thinking…



are you thinking?

How about someplace downtown on the river?

That sounds great 👍

How about the French café?

Perfect! I'll see you there at 10:30.

Remind me to tell you about our trip to the mountains!

I forgot all about that! Can't

Predictive text; tap a suggestion to apply.

The difference is *scale.*

What do I mean?

An LLM is a *“large”* LM and is trained on *enormous* data.

An average person reads ~700 books in a lifetime. Chat GPT was trained on over **10 million** books in a few months 🤯

In short…

An LLM is a next ~~*word*~~ token predictor. A *very very* good one.

**token = part of a word*

Some Popular LLMs…

ChatGPT

Gemini

BARD AI

How do we use these things 🤔

Unfortunately…

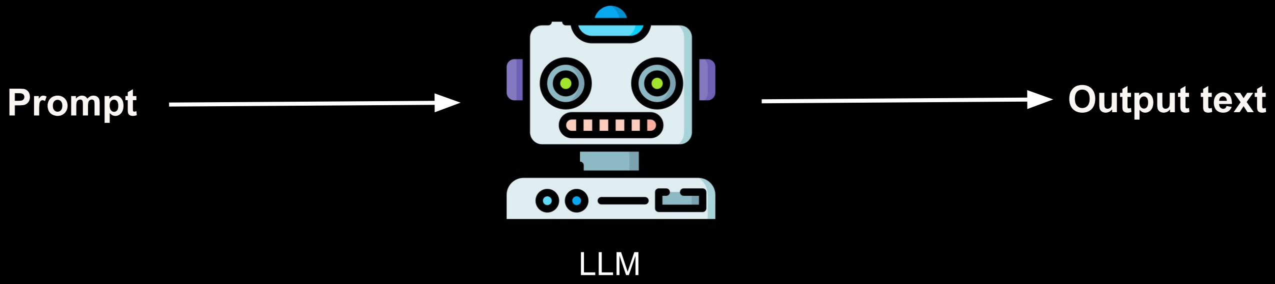
- They don’t come with a manual
- Getting them to do *“exactly”* what you want them to do is not easy
- More of an *art* than a science

For best results

- *Understanding* of how these models work
- *Domain knowledge* of the task you want to get done
- *Experience* gained by playing around with these models

Prompts

Inputs or *queries* to LLMs to do “stuff.”



Prompt

LLM

Output text

“Stuff”

- Summarization
- Sentiment analysis
- Translation
- Text classification
- Text generation
- …

Prompts can be

- Natural language sentences
- Questions
- Code snippets
- Commands
- Emojis
- …

...basically any text!

A *good* prompt comprises

- Instructions
- Context
- Input/question
- Output type/format

Example

Instructions: *Write a creative and engaging short story.*

Context: *You are a detective investigating a mysterious crime in a futuristic city.*

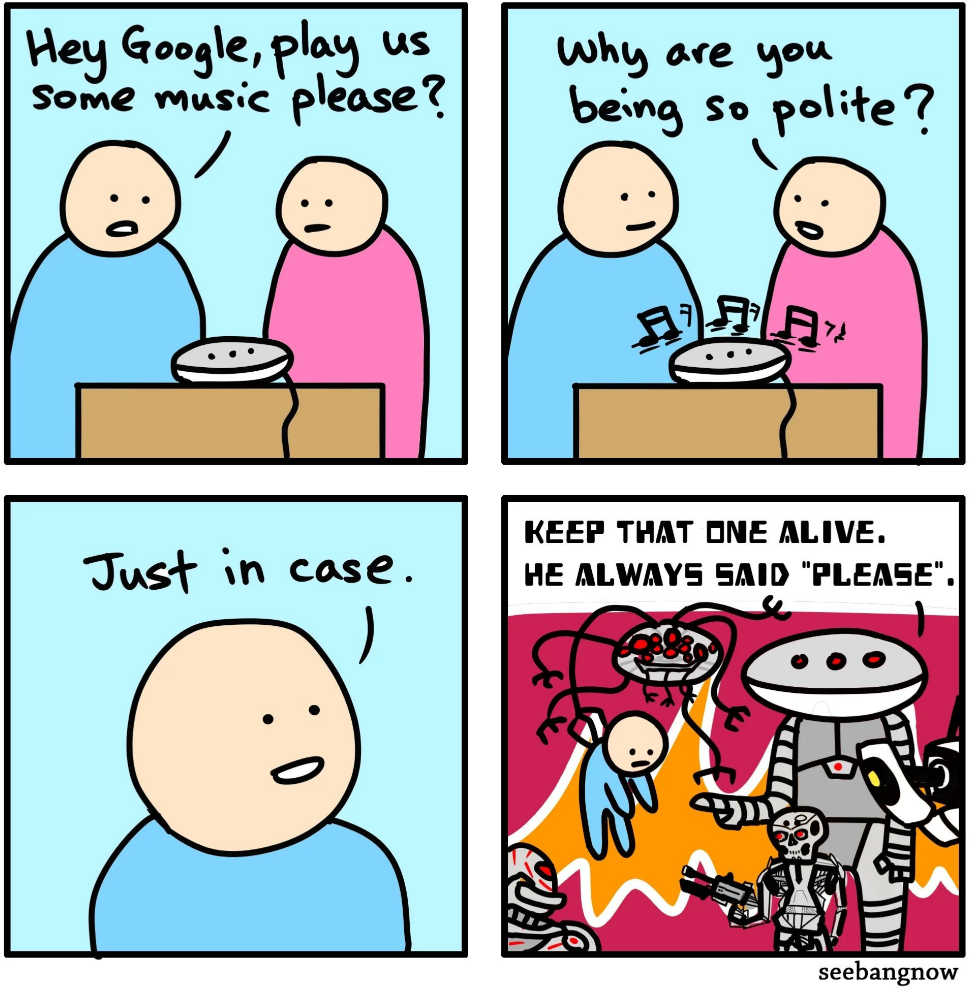
Input/Question: *Describe the initial scene of the crime and introduce the main characters. Include unexpected twists to capture the reader's attention.*

Output Type/Format: *A narrative paragraph with vivid details and plot development.*

Instead of…

Tell me a great crime story.

A few more tips…


Hey Google, play us some music please?
Why are you being so polite?
Just in case.
KEEP THAT ONE ALIVE. HE ALWAYS SAID "PLEASE".
seebangnow

~~Less is more~~, more is more

A well-thought out, articulate, clear, specific prompt - similar response.

A vague, sloppy, lazy prompt - similar response. *GIGO.*

Words you use *matter!*

Using the *“right”* word(s) for a specific task, more likely to give you a better response.

“Incantation” to do your task.

Don’t argue!

If you are not getting useful responses, try to *fix the prompt early* than continuing the conversation and arguing with the LLM.

Bad responses are more likely to be followed by similar responses.

Give *time* to think

Break down the task into multiple *steps* that the model can work on *incrementally*.

Step 1: …

Step 2: …

…

Step N: …

Use words like *step-by-step* that force the model to think incrementally.

Why should we be careful?

They *hallucinate!*

What do you mean?

> The generated content is *nonsensical* or *untrue* to the original data.

They are very good at generating a.k.a *making things up.*

Intrinsic vs. *extrinsic* hallucination

Intrinsic

Output contradicts the source.

Source:

The first Ebola vaccine was approved by the FDA in 2019, five years after the initial outbreak in 2014.

Output:

The first Ebola vaccine was approved in 2021.

Extrinsic

Cannot verify output from the source, but might not be wrong.

Source:

Alice won first prize in running last week.

Output:

Alice won first prize in running last week and *she was ecstatic*.

But *why?*

- Because of data that it is trained on, *non-factual* information, *duplicate* data…
- Just the *nature* of generative tasks, a *next token predictor* remember?

How to *mitigate?*

One approach is to *feed appropriate context* to the LLM before it answers.

Stay tuned for the *RAG (Retrieval Augmented Generation)* talk *next week.*

Let’s learn together

Q&A