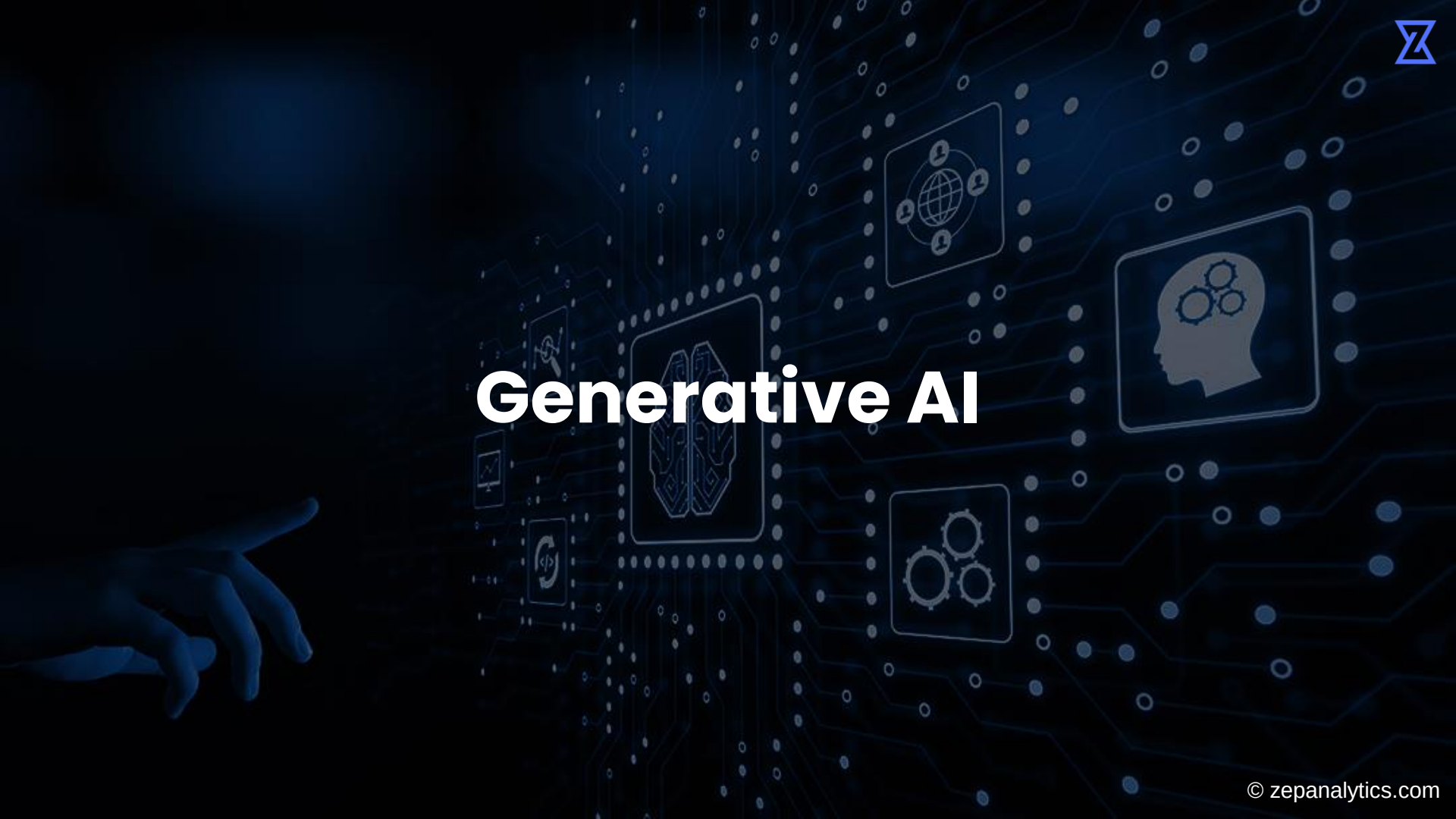


Agenda

- Introduction to AI and Generative AI
- Prompting and Prompt Engineering
- Applications of Generative AI
- Ethical Considerations and Limitations

Introduction to Generative AI

Understanding the World of Human Language and Computers

Generative AI

Generative AI is a type of artificial intelligence technology that can produce various types of content, including text, imagery, audio and synthetic data.

Generative AI refers to deep-learning models that can generate high-quality text, images, and other content based on the data they were trained on.

Overview of GEN AI Applications

01

Create Text - NLP enables computers to translate text or speech from one language to another, facilitating cross-language communication and accessibility.

02

Image-to-Image Conversion - It involves changing the external components of an image while maintaining its internal components, such as colour, media, or shape.

Such a transformation may involve changing the daytime image into the night-time image.

03

Increase Image Resolution - While creating new documents from existing content, generative AI employs various techniques. One such technique is called a Generic Adversarial Network (GAN).

The generator and the discriminator form a GAN, which generates new data and ensures that it is factual.

Basics of LLM

Tokens

Words, part of word used to break down natural language to manageable ‘chunks’

Here’s a fragment of text:

I want to upload file to s3 bucket, write me the python code for the same using boto3 client.

Here, the tokens could be:
“I”, “want”, “to”, “upload” and so on..

“running” can be single token like “running” or two tokens like “run” and “ing”

How Generative AI works (admittedly oversimplified)

We can ask it questions – but a very specific type of question known as **prompts**, following this structure

Here's a fragment of text:

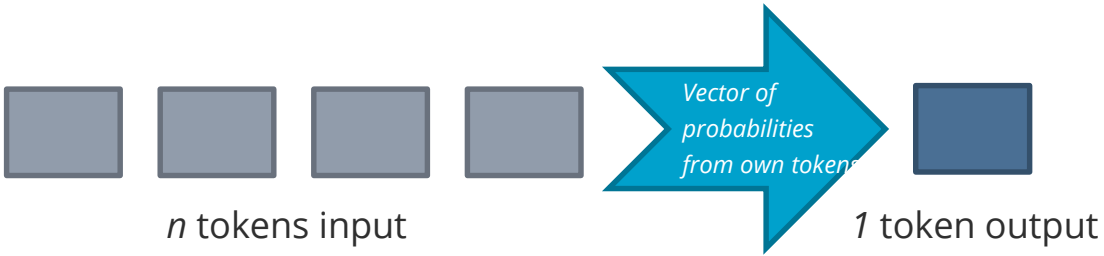
> I want to upload file to s3 bucket, write me the python code for the same using boto3 client.
>
> I am delivering a 1-hour lecture on Gen AI and LLMs, please create a content outline

How Generative AI works (admittedly oversimplified)

The prompts are converted into tokens (= “chunks” of words, punctuation marks, pixels etc), then the system analyzes what is likely to come next, based on the tokens in its own dataset (as many as 32,000 in GPT-4).

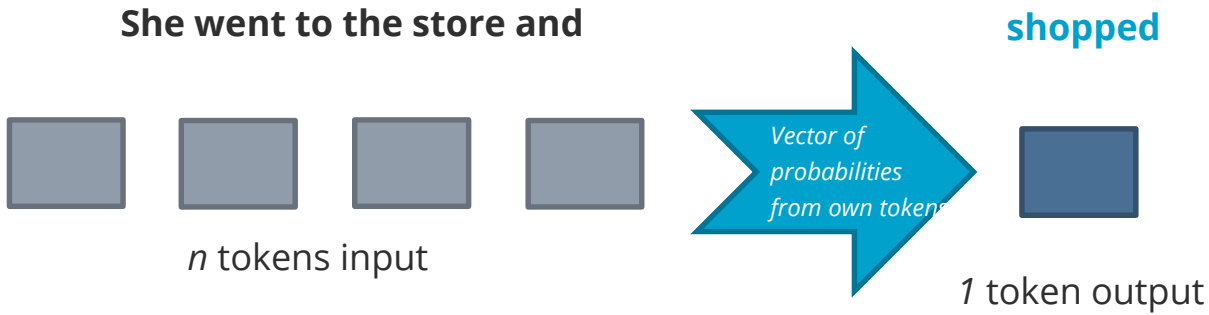
It relies on patterns & statistical associations in the training data to generate responses.

It then generates a tokenized output



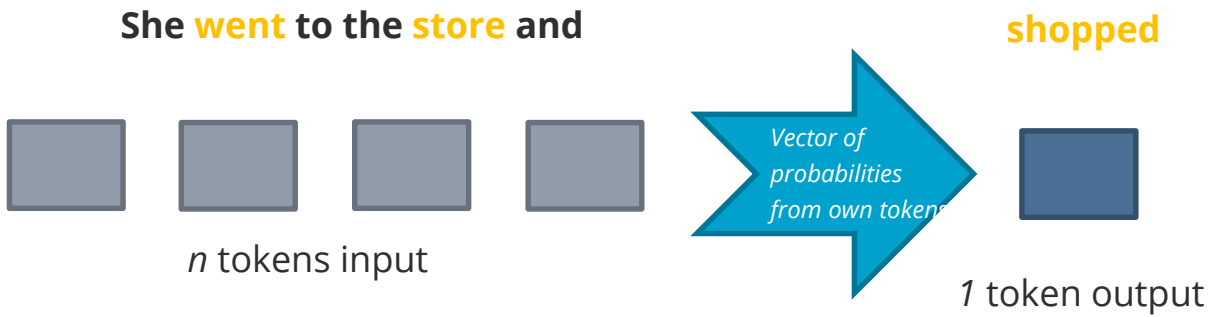
How Generative AI works (admittedly oversimplified)

With each output, it keeps re-analyzing the probabilities to decide the next tokens



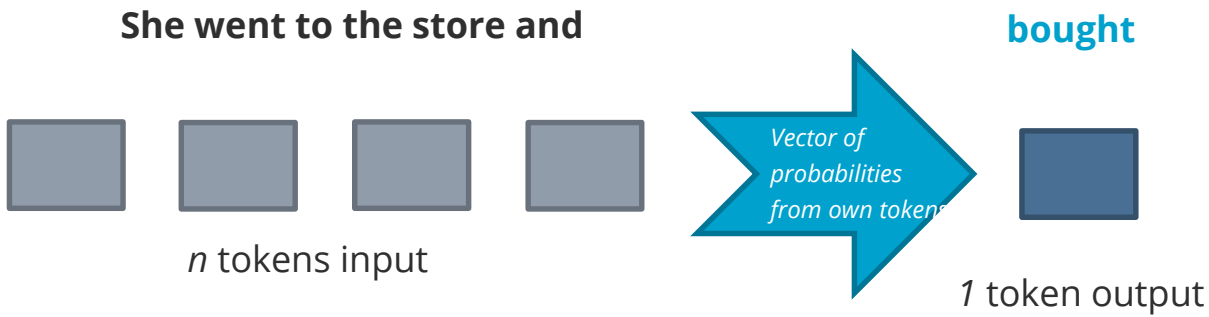
HERE'S THE REALLY COOL PART!!!

Transformers (the "T" in "GPT") know how to **direct attention to specific parts of the input** to guide their selection of the output – such as verb tenses, objects.



How Generative AI works (admittedly oversimplified)

The system can give you different answers to the same inputs:



How Generative AI works (admittedly oversimplified)

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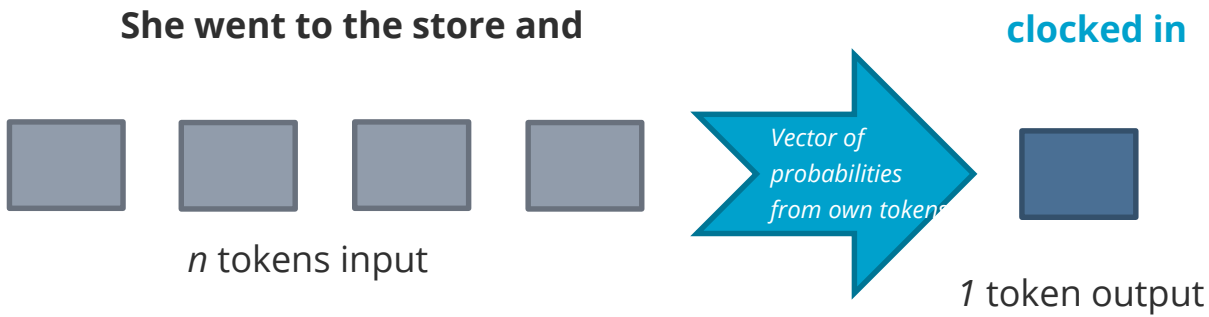
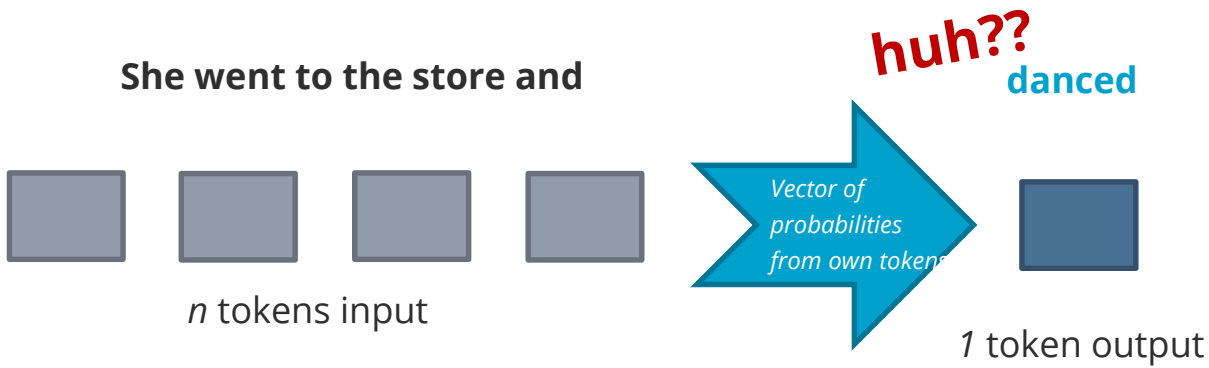


How Generative AI works (admittedly oversimplified)

“Hallucinations” – when the output doesn’t seem to make sense – are why it is important not to accept everything it outputs at face value.



It's important to approach the responses generated by the Gen AI LLM (let say ChatGPT) critically and verify information from reliable sources when needed. While it can provide helpful insights and engage in meaningful conversations, it's always a good idea to fact-check information independently.

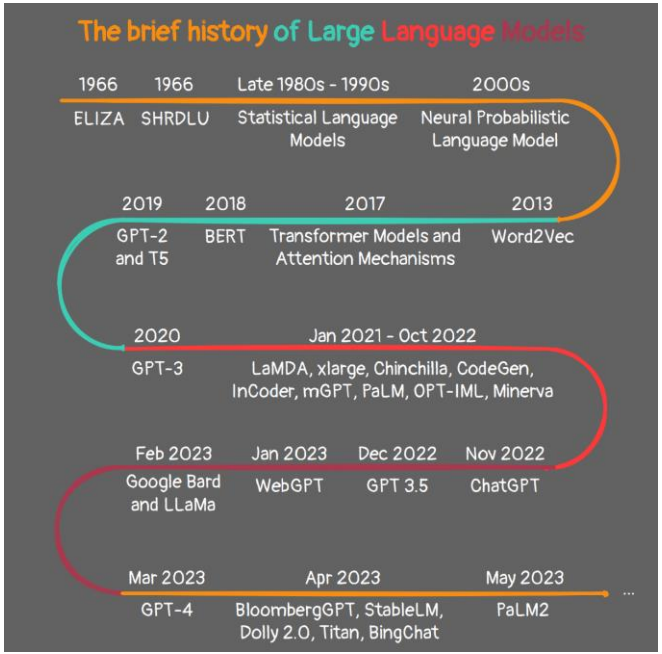
Examples of publicly available Generative AI tools

Text Generation	Code Generation	Image/Video Generation	Other Gen AIs
ChatGPT	GitHub Copilot	DALL·E 2	VALL-E
Bard	CODACY	starryai.	tome
AI	tabnine	Midjourney	Gamma
cohere	ACODE	Stable Diffusion	MURFAI
	replit	synthesia	Loudly
		Adobe	

Crowdsourced list of available AI tools

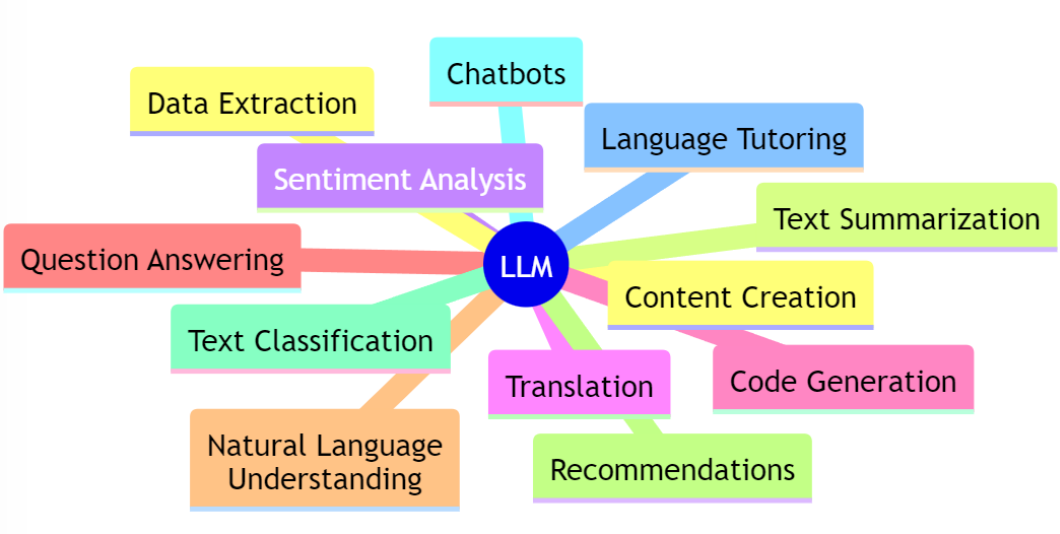
What are LLMs?

- Large Language Models (LLMs) are type of AI model that is developed to understand and generate human like data.
- These large models are trained on vast amounts of data and they learn the patterns, structures and semantics of the language.
- They are capable of generating contextually relevant text by understanding the relationships between words and phrases.



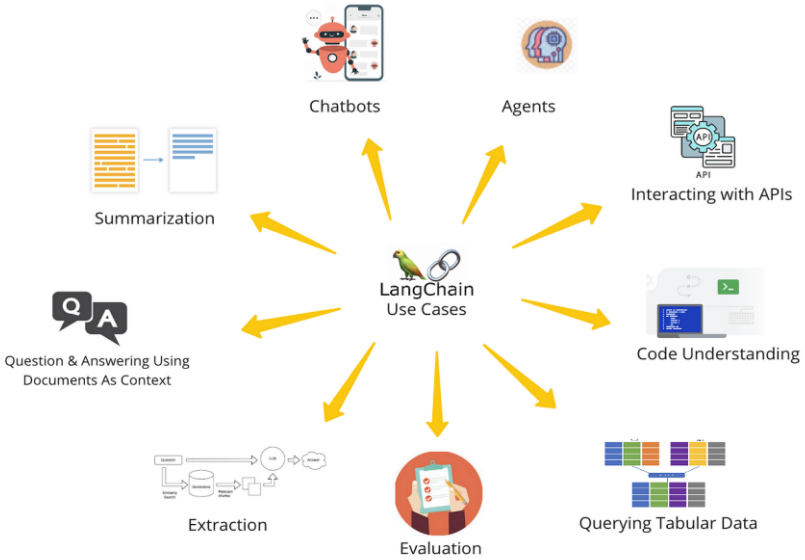
LLMs can be used for variety of tasks

LLMs can be used for a variety of tasks like translating, generating texts, answering question, summarizing and more



Combining Gen AI & LLMs

- GenAI can be combined with LLMs to create tools for several use cases.
- These tools can be used for several tasks like text completions, code generation, summarization, creating images from texts, generating image captions, question answering.
- Frameworks like langchain can be used to developed applications based on GenAI and LLMs for several usecases



Combining Gen AI & LLMs

Several tools have been developed to leverage the features of GenAI and LLMs

TOOLS	PURPOSE
ChatGPT Bard Llama	Text completion, text generation, code completion etc
Dall-E Stable diffusion Mid journey	Text to image generation
Synthesia Deepbrain Imagen Video	Text to video generation.

Combining Gen AI & LLMs

Example: Dall-E takes a prompt as input and generates image based on the prompt.

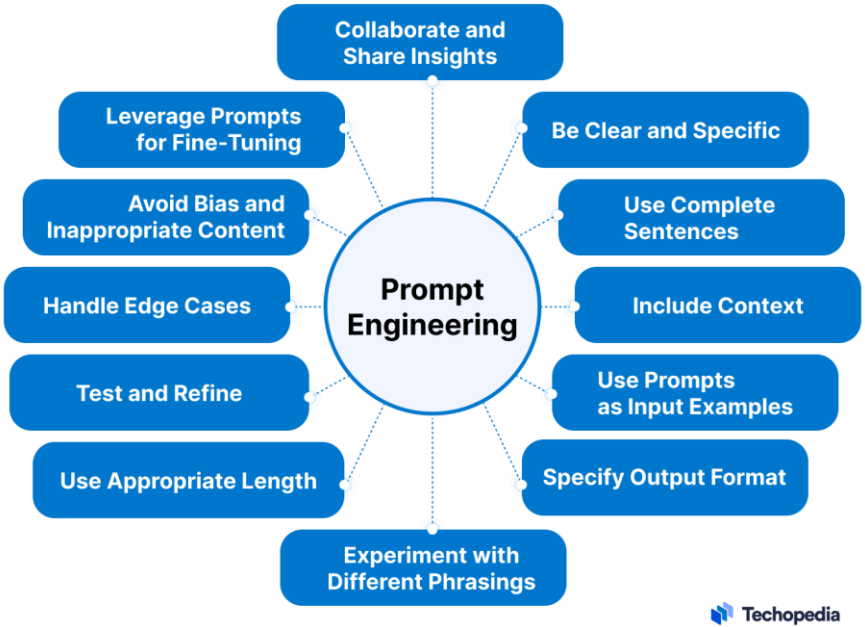
Text Prompt: a store front that has the word 'openai' written on it. . . .

AI Generated images:

Prompt engineering

Prompt Engineering

- Prompt engineering is a technique that involves structuring text that can be interpreted by a generative AI model.
- It involves crafting precise instructions to get desired response from language models. These instructions act as guidance to the model.
- The output from the system can be altered by giving different prompts as inputs

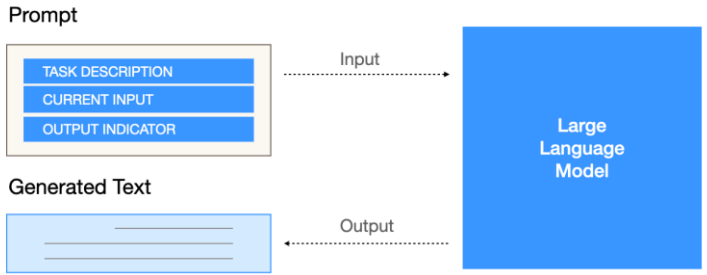


What is a prompt?

A prompt can contain the following components:

- **Instruction** - a specific task or instruction you want the model to perform
- **Context** - external information or additional context that can steer the model to better responses
- **Input Data** - the input or question that we are interested to find a response for
- **Output Indicator** - the type or format of the output.

Based on the types of prompt there can be 3 techniques of prompting - zero shot, one shot and few shot prompts



Prompt Engineering

Zero Shot Prompting - Straight away write prompt with no reference.

Write a youtube script for my data science youtube channel

Prompt Engineering

One Shot Prompting - Using this example 1 as reference, then **[Prompt]**

Here's how I wrote my previous script on "Introduction to Gen AI"
Hello All, This is Satyajit Pattnaik and today we shall be talking about Generative AI which is revolutionizing the world today.....
Write a youtube script for my data science youtube channel related to "How Generative AI is different from Predictive AI"

Prompt Engineering

Few Shot Prompting - Using these examples 1,2,3 etc as reference, then **[Prompt]**

Give more examples:

Write a 5-min youtube script on different types of feature encoding with showing examples and python code for my data science youtube channel. Start with a 10 second hook line and end the conclusion with a question mark

AI Hallucinations

An AI-Hallucination is when a large language model (LLM) generates false information

Applications of Generative AI

Applications

Predictive Analytics

Scenario Analysis

Automated Insight Gathering

Automated Reporting

AI-Driven Dashboarding