# Prompt Engineering

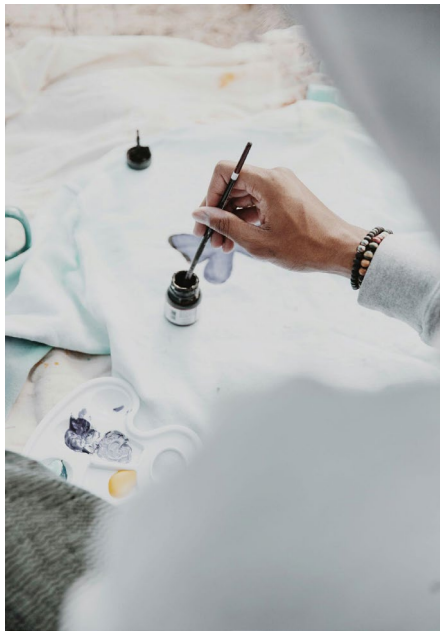
## Unleashing the Power of Gen AI

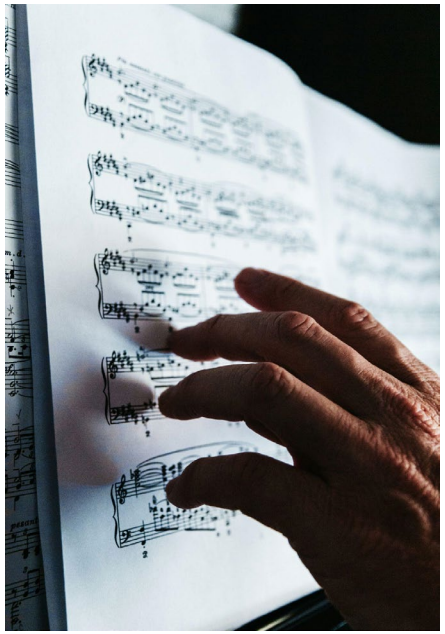
# Agenda

In this session, we'll discuss:

- Introduction to Generative AI and LLMs
- Basics of Prompt Engineering
- Components of a Good Prompt
- How to Write a Prompt?
- Advanced Prompt Strategies
- Common Prompting Errors
- Limitations of Generative Models
- Applications of Prompt Engineering

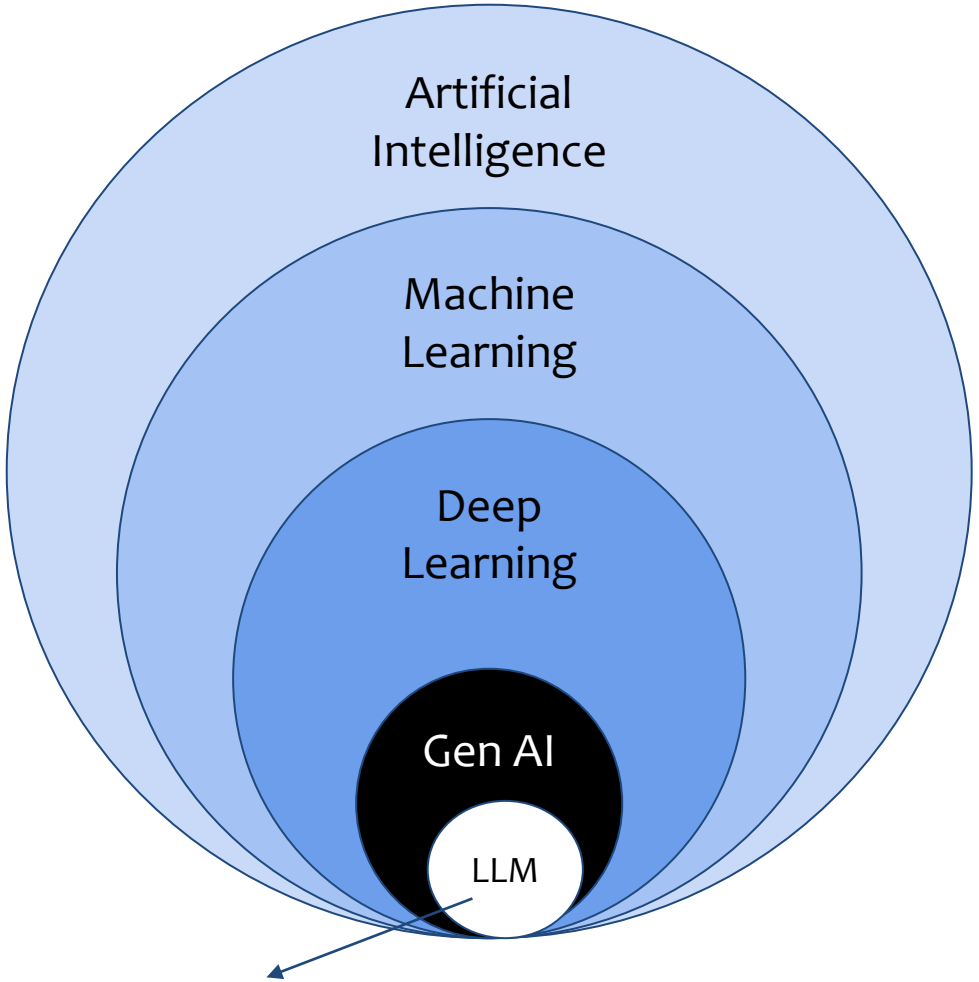
# Introduction to Generative AI (Gen AI)





Generative AI (Gen AI) refers to Artificial Intelligence that can generate content — be it text, images, or code — based on the input it receives from the user.

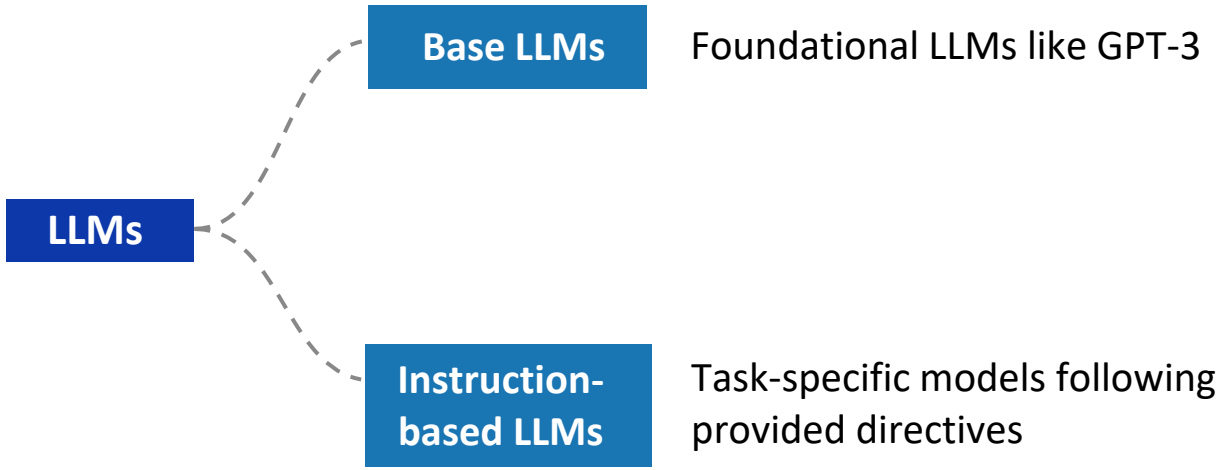
# Understanding Gen AI



# Introduction to Large Language Models (LLMs)

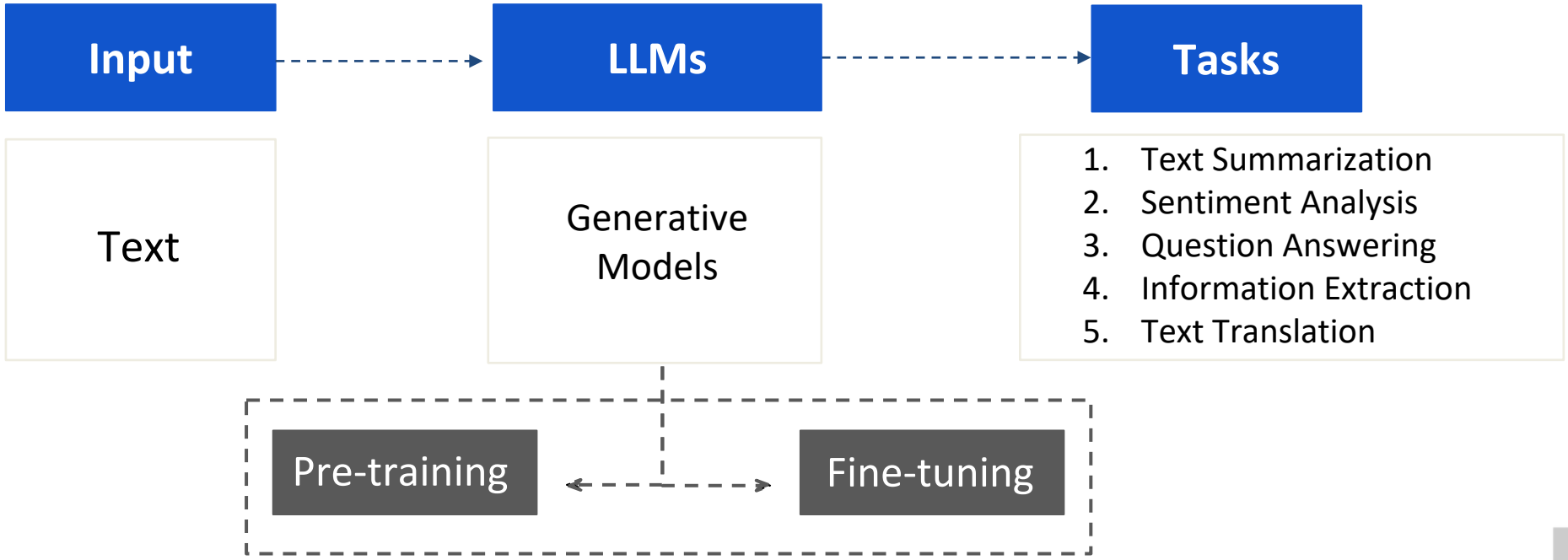
**What are LLMs?**

- **Large** – as it is trained on large amounts of data and billions of trainable parameters.
- **Language** – as it deals with text data.
- **Model** – as it predicts the next word/sentence/token.
- LLMs are language models made up of a neural network with billions of parameters that are trained by self-supervised learning on vast amounts of unlabeled text.



# Introduction to Large Language Models (LLMs)

## How do LLMs work?



# Popular LLMs

GPT by OpenAI


Mistral by OpenAI


Gemini by Google

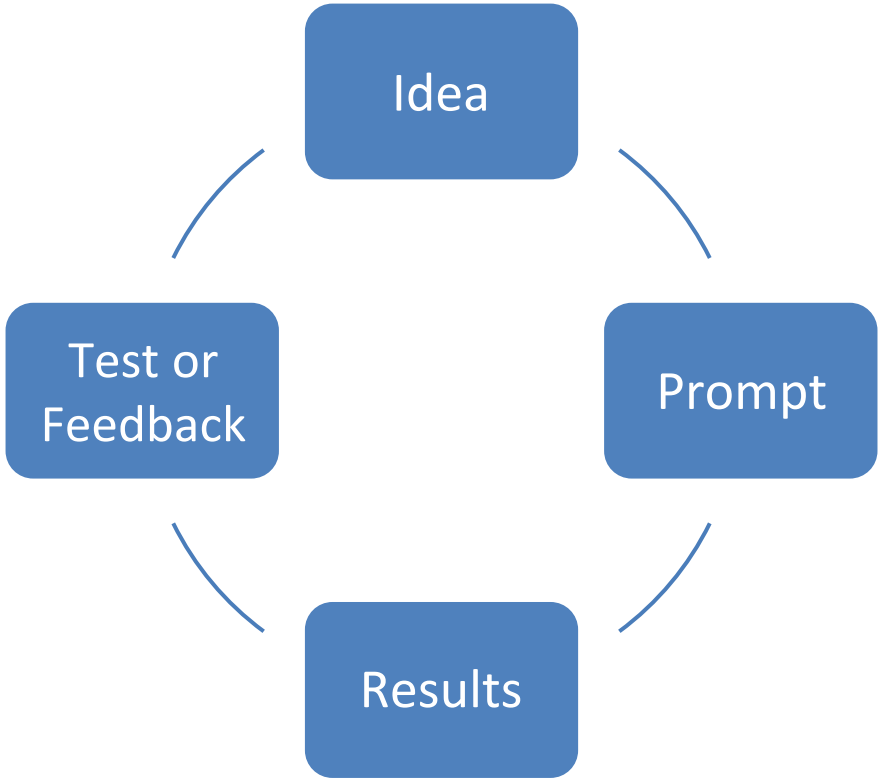
Llama by Meta

# Basics of Prompt Engineering

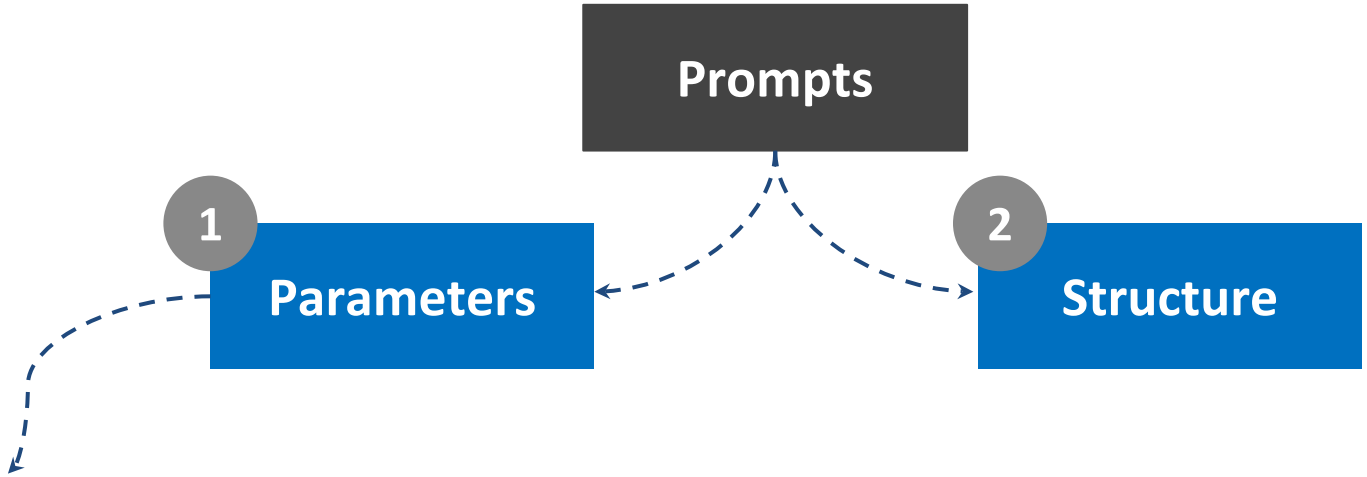
**Prompt engineering is as much an art as it is a science.**

**Prompt**: A detailed set of guidelines given to an LLM to do a task.
**Engineering**: Developing a task-specific prompt iteratively.

**Prompt Engineering is an iterative process.**



# Basics of Prompt Engineering




1. **Temperature:** Lower for creativity and deterministic results; Higher for diversity and factual QA.
2. **Top P:** Control model determinism; Low for factual, high for diverse.
3. **Max Length:** Manage response length.

# Let’s write a few prompts!!

# Components of a Good Prompt

## Context

Additional context that can steer the model to better responses.

## Instruction

A specific task or instruction you want the model to perform.

## Input Data

The input or question that we are interested in finding a response for.

## Output Indicator

The type or format of the output.

# Components of a Good Prompt

**Context**

Additional context that can steer the model to better responses.

**Context**

Act as an analyst working for an OTT platform. You will have to perform sentiment analysis based on the feedback provided by the consumers on the movies and series put on the OTT platform.

# Components of a Good Prompt

| Context | Instruction |
| --- | --- |
| Additional context that can steer the model to better responses. | A specific task or instruction you want the model to perform. |

**Instruction**

Classify the feedback as neutral, negative, or positive, where positive is promotor; negative means demoter, and neutral means neither will promote nor demote the content.

# Components of a Good Prompt

## Context

Additional context that can steer the model to better responses.

## Instruction

A specific task or instruction you want the model to perform.

## Input Data

The input or question that we are interested in finding a response for.

## Output Indicator

The type or format of the output.

**Example**

Feedback: I think the series was okay.
Sentiment: Neutral
Feedback: The acting of each character in the series was awesome.
Sentiment: Positive

**Input Data and Output Indicator**

Feedback: The storyline for the series was repetitive and abysmal.
Sentiment:

# Components of a Good Prompt

## Context

Act as an analyst working for an OTT platform. You will have to perform sentiment analysis based on the feedback provided by the consumers on the movies and series put on the OTT platform.

## Instruction

Classify the feedback as neutral, negative, or positive, where positive is promotor; negative means demoter, and neutral means neither will promote nor demote the content.

## Example

Feedback: I think the series was okay.
Sentiment: Neutral
Feedback: The acting of each character in the series was awesome.
Sentiment: Positive

## Input Data and Output Indicator

Feedback: The storyline for the series was repetitive and abysmal.
Sentiment:

Negative

# How to Write a Good Prompt?

Here's a checklist, to create the most effective prompt and get the best results.

- **Define the Goal** – Tell ChatGPT what you exactly want it to do.
- **Detail out the Format** – Specify the format in which you want your output. E.g., tables/paragraphs/lists, with or without a heading, listed in priority order if any, etc.
- **Create a Role** – Assign ChatGPT a role to let it process your request from that specific point of view. E.g., Act as X.
- **Clarify who the Audience is** – Specify the demographics for ChatGPT to help it tailor its response appropriately.
- **Give Context** – Provide every possible information to ChatGPT to help it understand the purpose of your request.

# How to Write a Good Prompt?

Here’s a checklist, to create the most effective prompt and get the best results.

- **Give Examples** – Share examples to let ChatGPT learn from it and produce more accurate results.
- **Specify the Style** – Outline the tone, the communication style, the brand identity and other details in your prompt for a suitable response.
- **Define the Scope** – Outlining a scope with further specifications besides giving a context and examples, will help ChatGPT operate within those parameters.
- **Apply Restrictions** – Constraints or restrictions applied in your prompt will create the right boundaries for ChatGPT to produce more relevant responses.

# Different Prompt Patterns

What are some of the most common Prompt Patterns?

1. **Persona Pattern** - Act as X. Do the task Y. (E.g., As a Yoga instructor, create a beginner-friendly routine for joint mobility.)

2. **Audience Persona Pattern** - Explain X to me. Assume I'm Y. (E.g., Explain the importance of eating greens. Assume I'm a skeptical child.)

3. **Visualization Generator Pattern** - Generate X that can be provided to tool Y for visualization. (E.g., While talking about the data around user engagement metrics on certain website, generate a CSV that I can use in Tableau to create a visualization.)

# Different Prompt Patterns

What are some of the most common Prompt Patterns?

4. **Recipe Pattern** - In order to do X, I need to perform steps a, b, c. Provide a complete sequence of steps for me while filling in any missing steps and removing redundant steps. (Eg: I want to travel from Bangalore to Darjeeling. I know I have to take a flight to Kolkata. And from there take train and a cab to Darjeeling. Complete the itinerary for me)

5. **Template Pattern** - I will provide a template, with placeholders for content. Fit the output with one or more placeholders that I list.

Eg: Generate a day-wise travel itinerary for visiting Paris.

My placeholders are -

- ❏ <Day> for the day of the travel plan
- ❏ <Location> for the place to visit
- ❏ <Activity> for what to do in that place
- ❏ <Time> for the best part of the day to visit

Template: For <Day> visit <Location> at <Time> for <Activity>

# Examples

# Advanced Prompt Strategies

Here’s a few instances of advanced prompt strategies:

- **Zero-Shot Learning -** Directly instructing the model to perform a task without any additional examples.
- **Few-Shot Learning** – Teaching with examples in the prompt.
- **Chain of Thought Process** – Asking to show its work or thought process.

# Common Prompting Errors

1. Vague or Ambiguous Prompts
2. Biased Prompts
3. Lack of Contextual Information
4. Insufficient Examples or Training Data
5. Complex or Confusing Prompts
6. Not testing prompts thoroughly

# Limitations of Generative Models

1. Hallucinations - produce imaginative and surreal responses
2. Token length - tokens available 4096 tokens for input & 2048 for output
3. Pricing - for better versions / increase in token size
4. Resource Intensive - computationally expensive and resource-intensive

# Applications of Prompt Engineering

## Content Generation

- Copywriting and Advertising
- Creative Writing
- Educational Content

## Customer Support and Engagement

- Chatbots and Virtual Assistants
- Instructional Guides

## Data Analysis and Science

- Data Cleaning and Preparation
- Statistical Analysis and Visualization

## Code Generation and Software Development

- Automating Code Writing
- Debugging Assistance
- Documentation Generation

## Research and Information Retrieval

- Text Summarization
- Question Answering

# Applications of Prompt Engineering

## Machine Translation

- Information Sharing
- Internal Communication

## Sentiment Analysis

- Consumer Feedback Analysis
- Brand Management
- Marketing

## Other Domains

- Healthcare
- Manufacturing
- Security
- Retail and Shopping

# Summary

Here’s a brief recap:

- The key to becoming a proficient prompt engineer is practice.
  - Experiment with different prompts.
  - Analyze the outcomes.
  - Refine your techniques.
- Keep practicing, stay curious, and explore various AI platforms to enhance your skills.