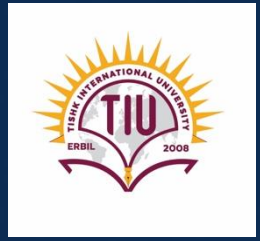
SEVEN PEAKS



Introduction to Generative AI

introductory level lecture aimed at explaining what Generative AI is, how it is used, and how it differs from traditional machine learning methods.

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Presented by: Mohammad Salim @ IT dept. of TIU

AI

AI is a computer system that can be smart in a way similar to humans, intelligence agents know as Abilities

01

Reason

Think & Solve Problems

02

Learn

Improve their knowledge and skills from experience

03

Act Autonomously

Make decisions and take actions independently

What is difference AI vs ML

Artificial Intelligence

is a discipline

Machine Learning

Subfield of AI

Artificial Intelligence

- is a discipline
- Do with theory and methods to build machines
- Think and act like humans

Machine Learning

- Subfield of AI
- Trains a model from input data
- Gives computer ability to learn without explicit programming

Most common classification of ML Models

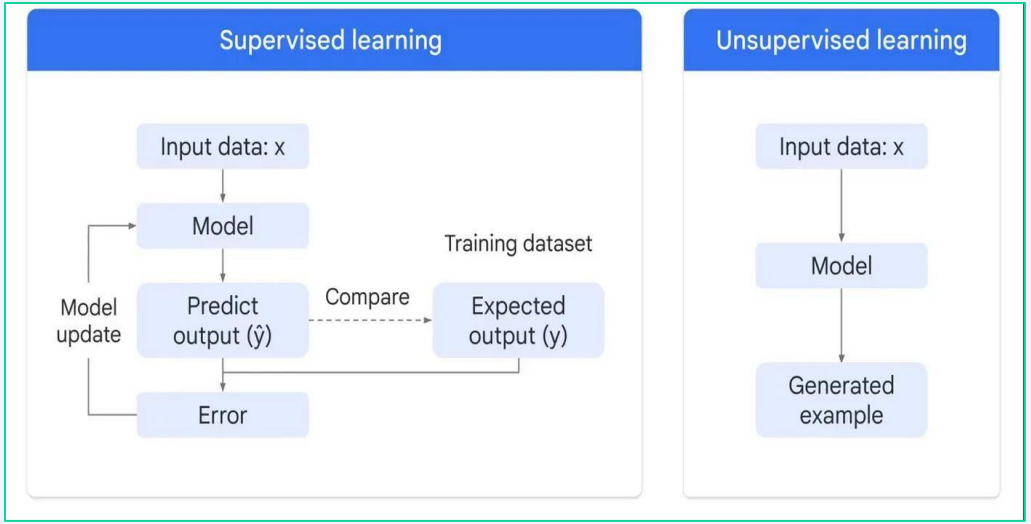
1. **Supervised Machine Learning**

   Trained On Labelled data.

2. **Unsupervised Machine Learning**

   Trained On Unlabelled Data

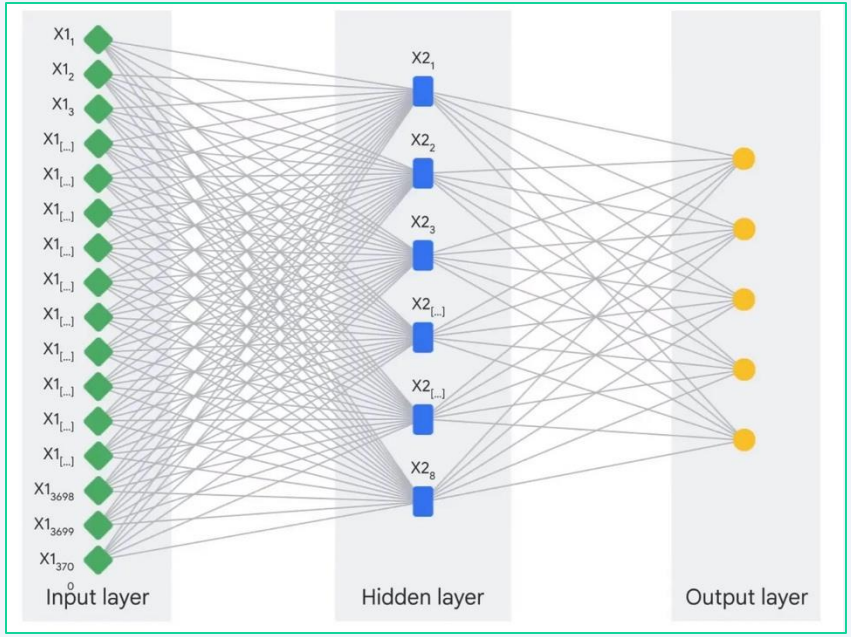
3. **Deep Learning** — uses artificial neural networks to process more complex patterns than traditional machine learning.



Deep Learning

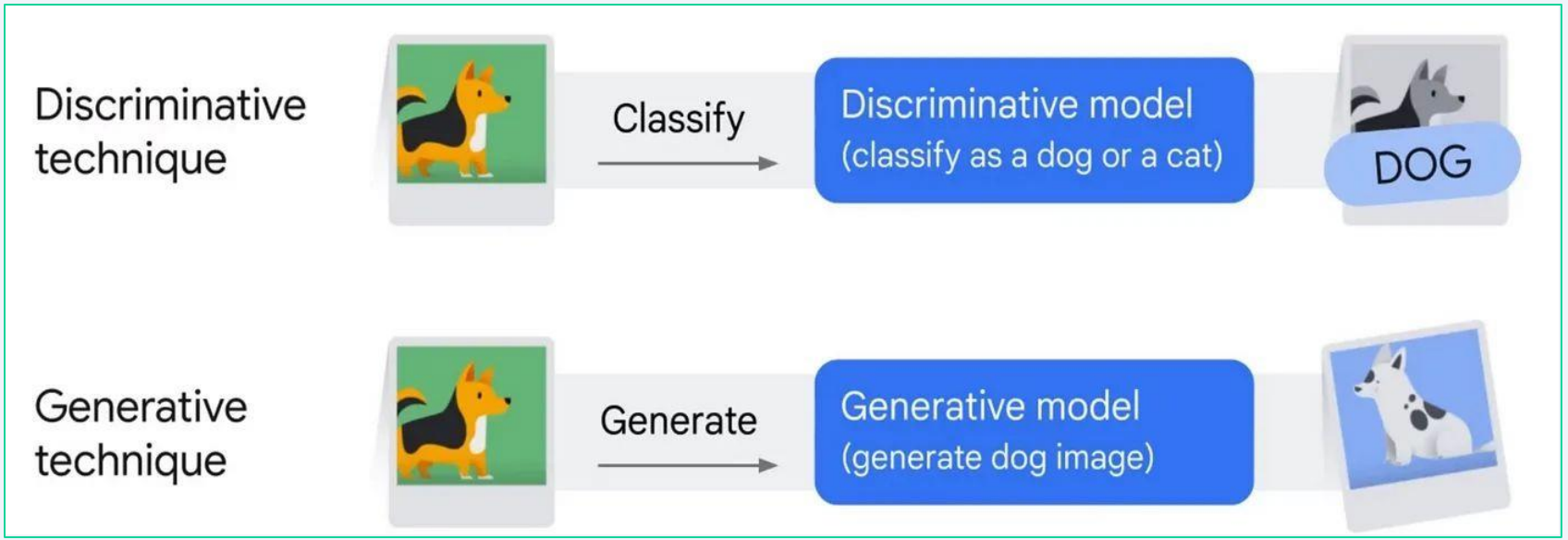
Deep Learning is a Subset of Machine Learning.

It Uses **Artificial Neural Networks** — allowing them to process more complex patterns than Machine Learning.

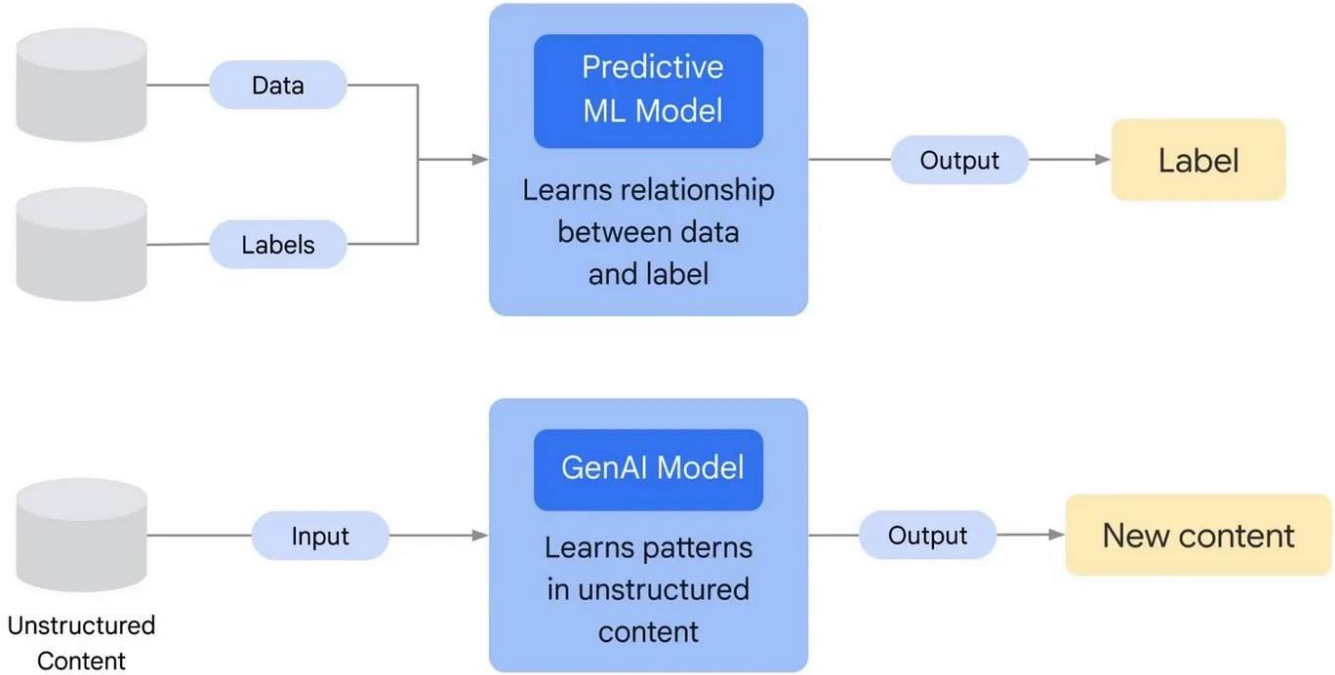


Two Types of Deep Learning Models

1. **Discriminative** : Used to Classify or Predict
2. **Generative** : Generate new data that is similar to the data it was trained on. Eg — Next Word Prediction



Two Types of Deep Learning Models



What is Generative AI

not Generative AI , the output is

1. Number
2. Discrete
3. Class
4. Probability

Generative AI , the output is

1. Natural Language
2. Image
3. Audio

What is Generative AI?

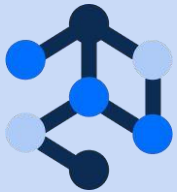
A type of Artificial Intelligence Technology that can produce various types of

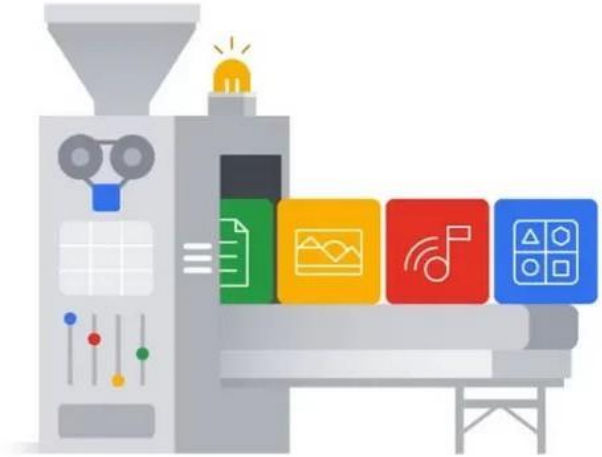
Content

Text & Imagery

Audio

Synthetic Data





What is Generative AI?

- GenAI is a type of Artificial Intelligence that creates new content based on what it has learned from existing content.
- The process of learning from existing content is called training and results in the creation of a statistical model.
- When given a prompt, GenAI uses this statistical model to predict what an expected response might be–and this generates new content.

Generative language models

Generative language models learn about patterns in language through training data.

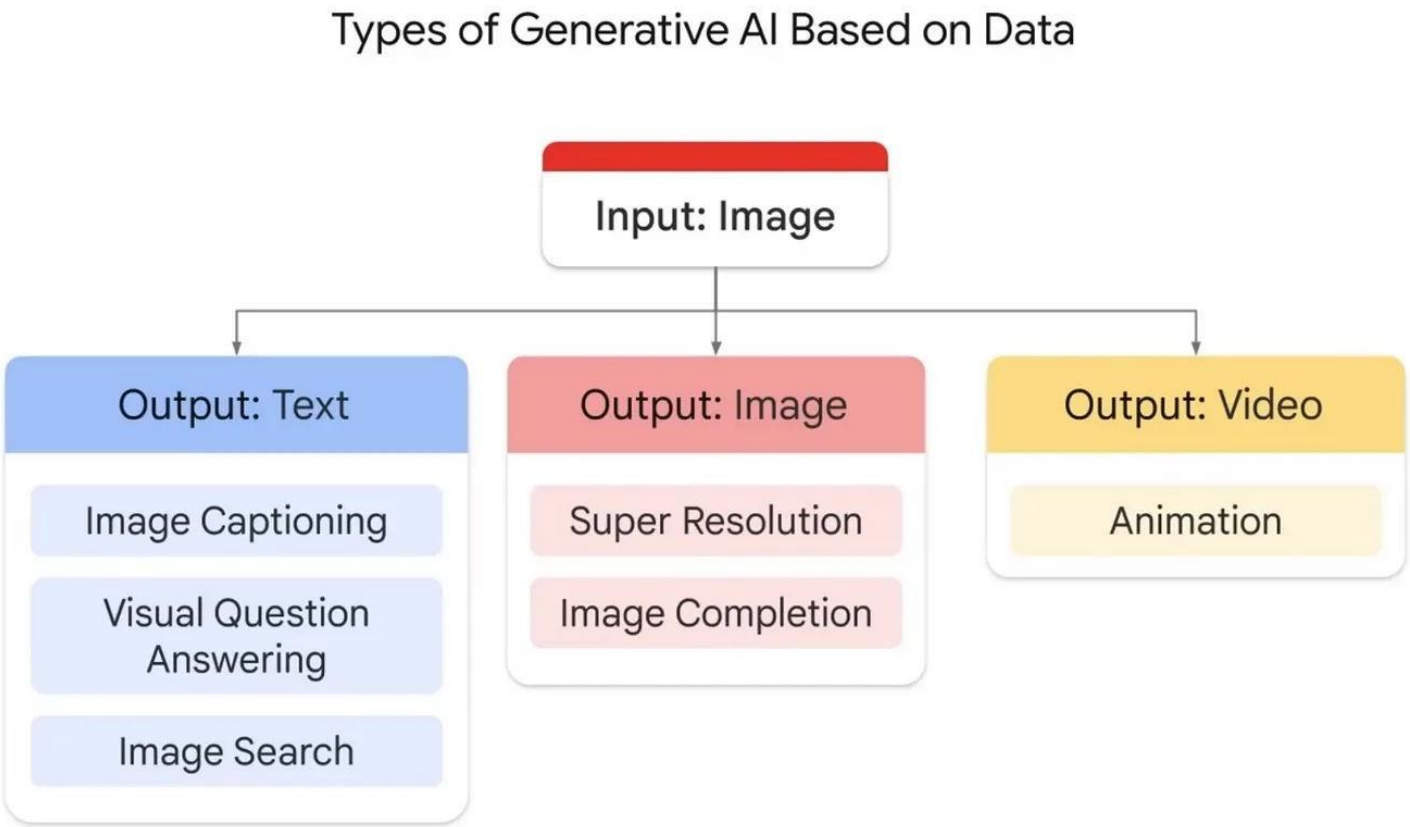
Then, given some text, they predict what comes next.

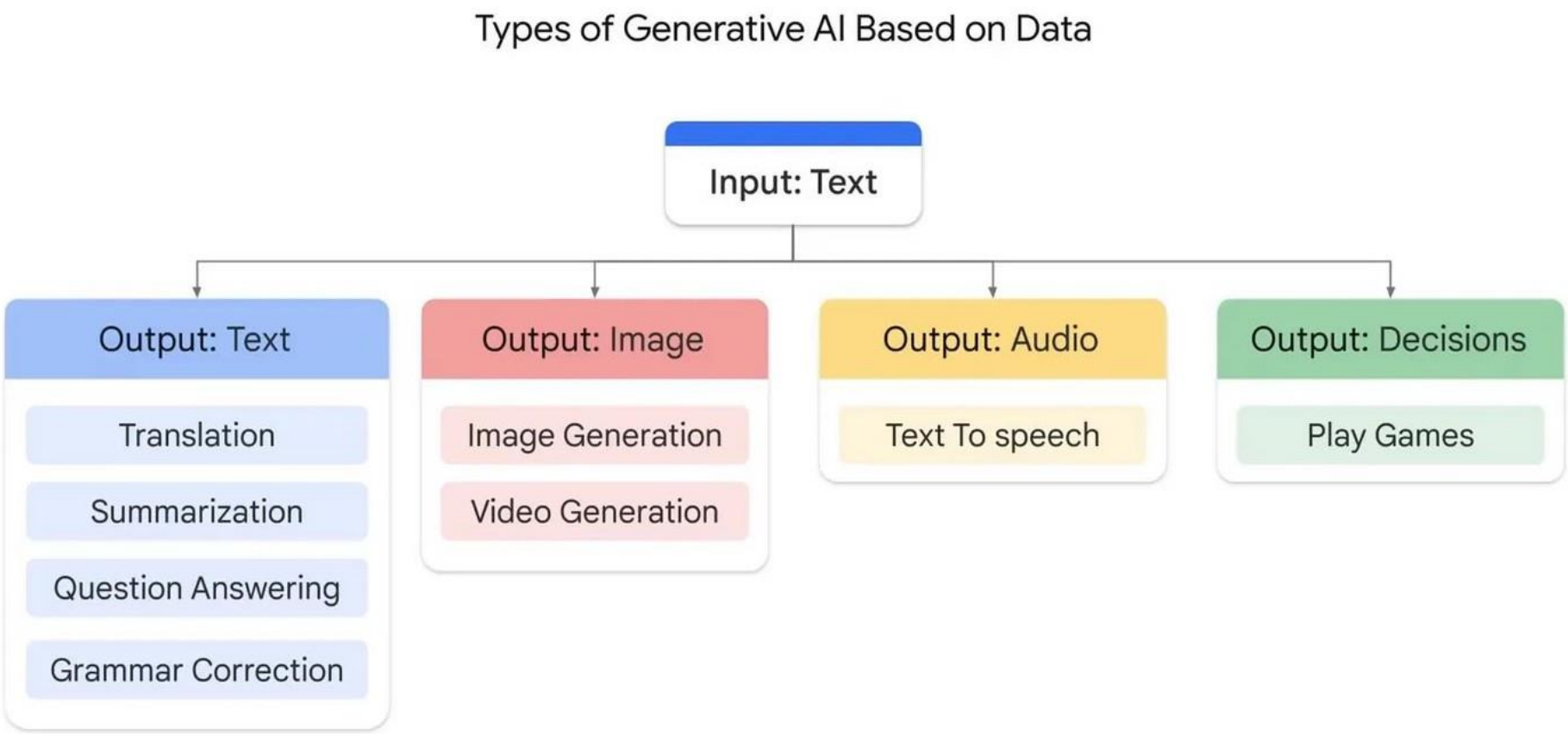
Generative image models

Generative image models produce new images using techniques like diffusion.

Then, given a prompt or related imagery, they transform random noise into images or generate images from prompts.

Types of Generative AI based on Input

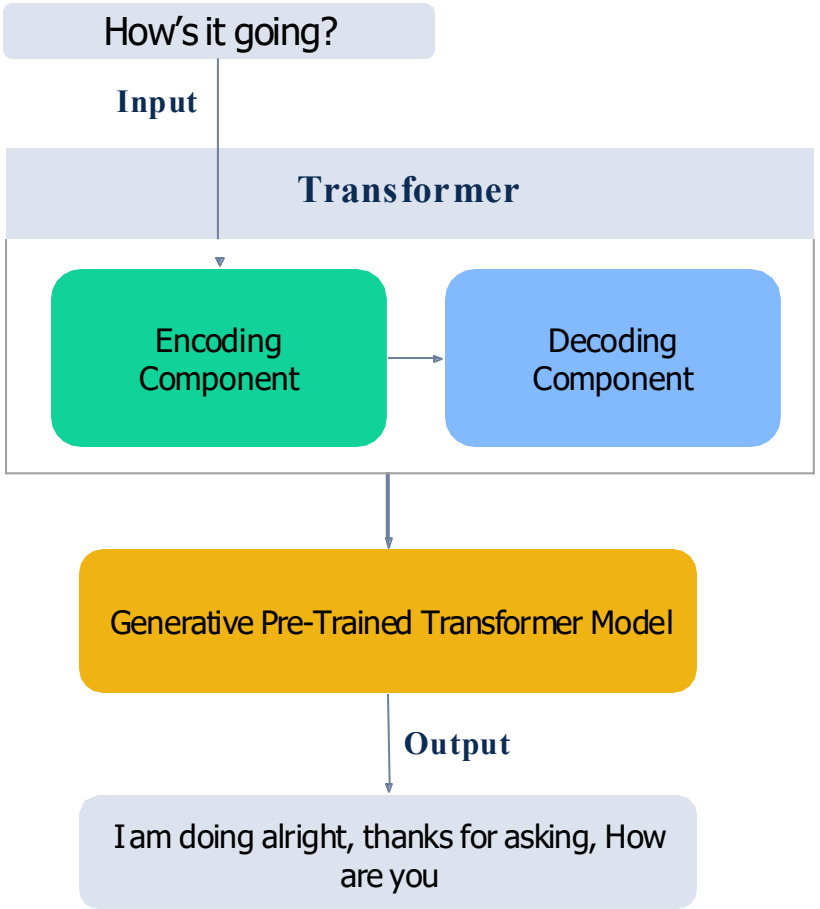

Types of Generative AI Based on Data
Input: Image
Output: Text
Image Captioning
Visual Question Answering
Image Search
Output: Image
Super Resolution
Image Completion
Output: Video
Animation


Types of Generative AI Based on Data
Input: Text
Output: Text
Translation
Summarization
Question Answering
Grammar Correction
Output: Image
Image Generation
Video Generation
Output: Audio
Text To speech
Output: Decisions
Play Games

Transformer powering Generative AI

Pre-Training

1. Large Amount of Data
2. Billions of Parameters
3. Unsupervised Learning



AI Hallucinations

Hallucinations are words or phrases that are generated by the model that are **often nonsensical or grammatically incorrect.**

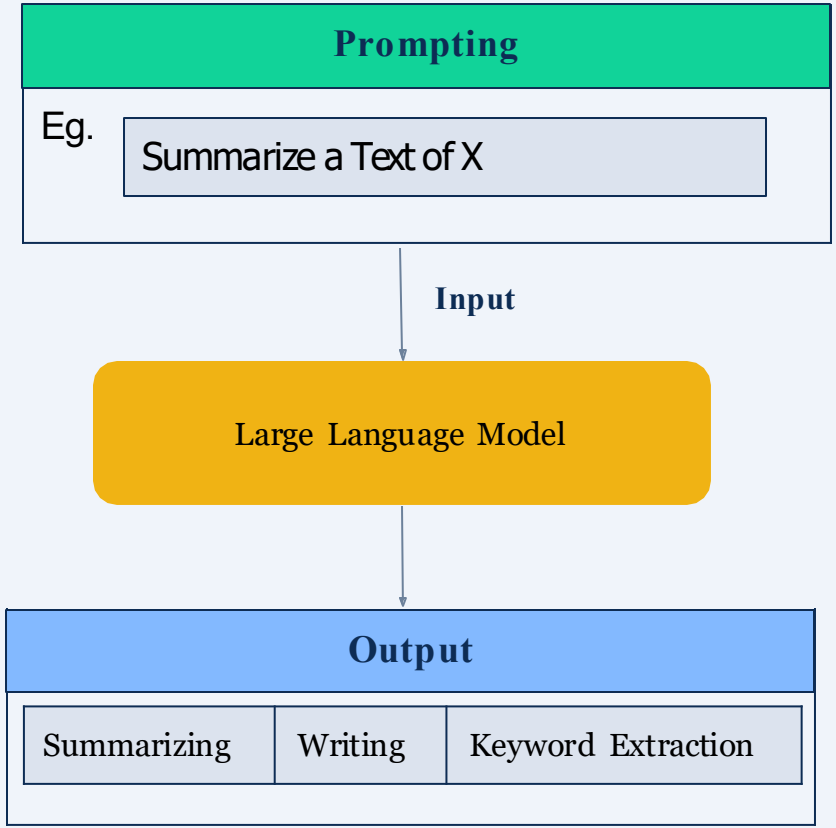
Challenges

- The model is not trained on enough data.
- The model is trained on noisy or dirty data.
- The model is not given enough context.
- The model is not given enough constraints.

Prompt Design

Prompt Design

The **quality of Input** data determines the The **quality of Output** data

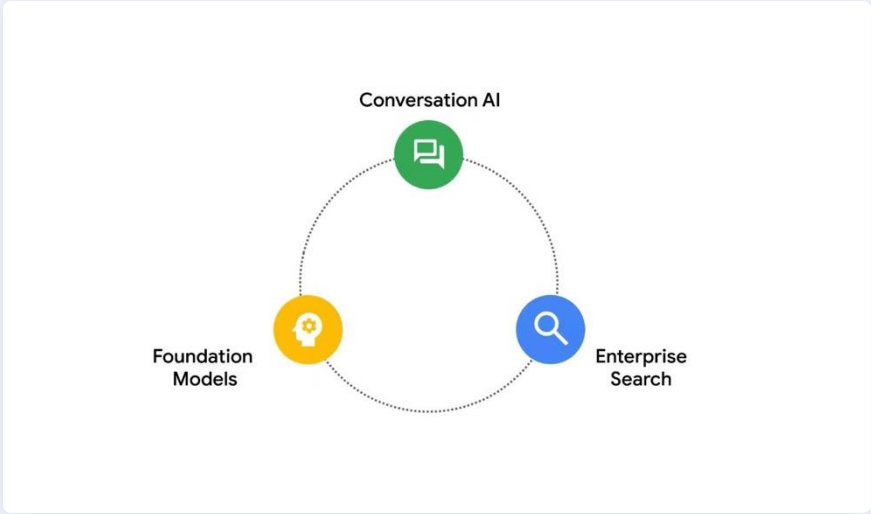


GenAI Studio

GenAI Studio facilitates the exploration and customization of GenAI models, offering pre-trained models, fine-tuning tools, and deployment resources.

GenAI App Builder

GenAI App Builder allows code-free creation of Gen AI Apps through a visual editor and drag-and-drop interface. more



That's it!

Recap ☺

•**What is GenAI?** — Establishes the foundational definition with emphasis on content generation

•**Core Architecture** — Highlights the transformer model mechanism

•**Statistical Learning** — Clarifies the prediction-based operational model

•**Model Types** — Encapsulates the input-output taxonomy you presented

•**Prompt Engineering** — Reinforces the critical principle that input quality drives output quality

•**Key Challenge** — Addresses AI hallucinations with root causes