

# Hello, GenAI for Vision

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# Course Objective

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Introduction to Generative AI.

Foundation of Image Representation.

Diffusion Model Basics.

Prompt Engineering for Images.

Project.

# Agenda

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What is AI ?

Discriminative AI vs Generative AI.

What is prompt engineering?

Language model & vision model.

What is image generation model?

Unconditional vs Conditional image generation.

List of vision model.

Generative AI Workflow.

# 1. What is AI?

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**Artificial Intelligence**, is the simulation of human intelligence processes by machines, especially computer systems.

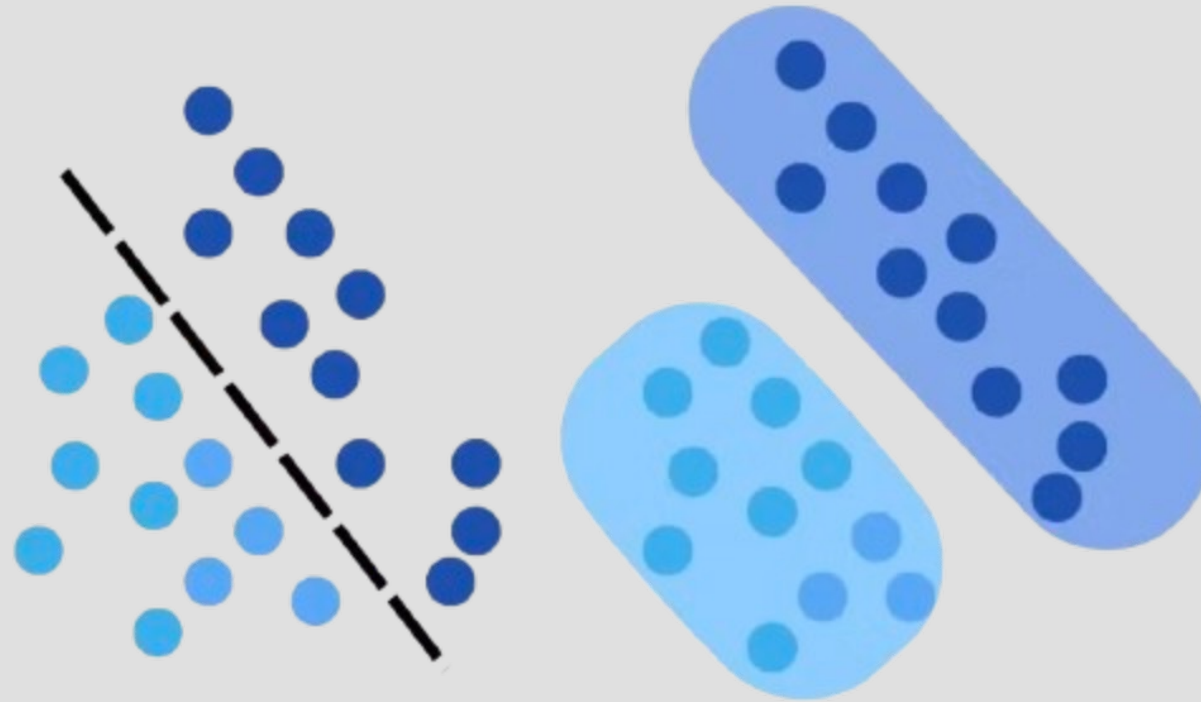
A computer program which simulate the human intelligence is called AI model.

Machine Learning Model

Deep Learning Model

## 2. Discriminative AI vs Generative AI

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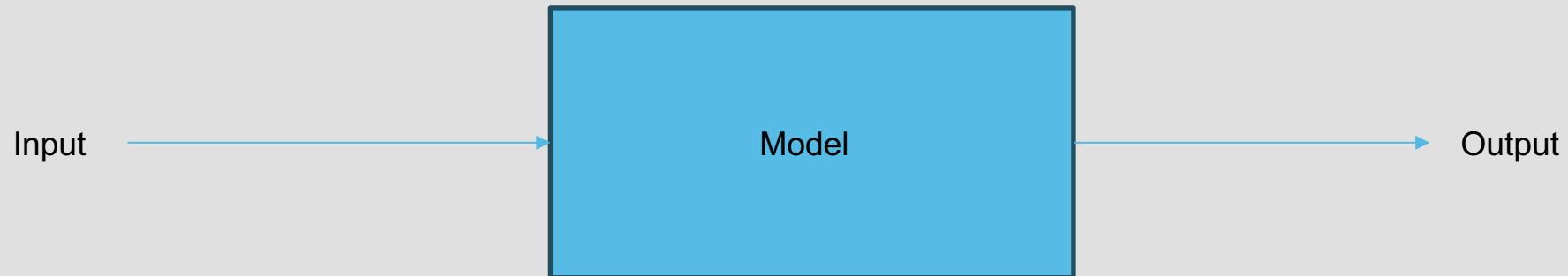
Discriminative

Generative

### 3. What is Prompt Engineering?

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Designing **input queries** (prompts) to **optimize the performance** and **output quality** of AI models



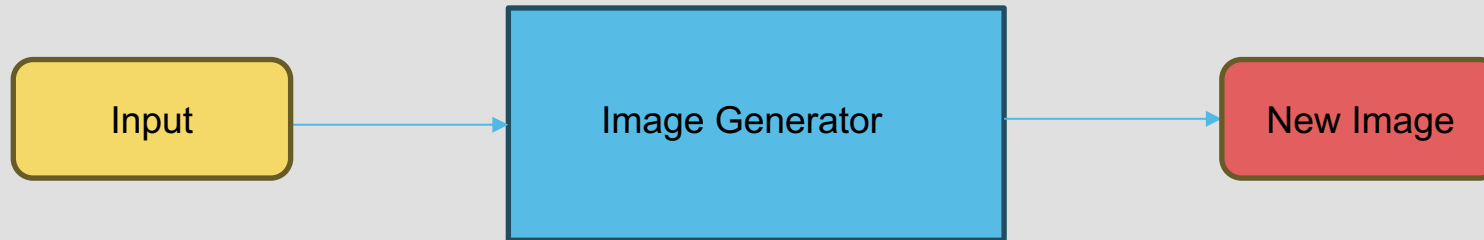
## 4. Language Model vs Vision Model

Feature	Language Model	Vision Model
Data Type	Text	Images/Videos
Primary Architecture	Transformers	Convolutional Neural Networks (CNNs)
Key Tasks	Text generation, translation, summarization	Image generation, Image recognition, object detection, segmentation
Example Models	GPT, BERT	Diffusion Models
Extension Of	Natural Language Processing(NLP)	Computer Vision(CV)

## 5. What is image generation model?

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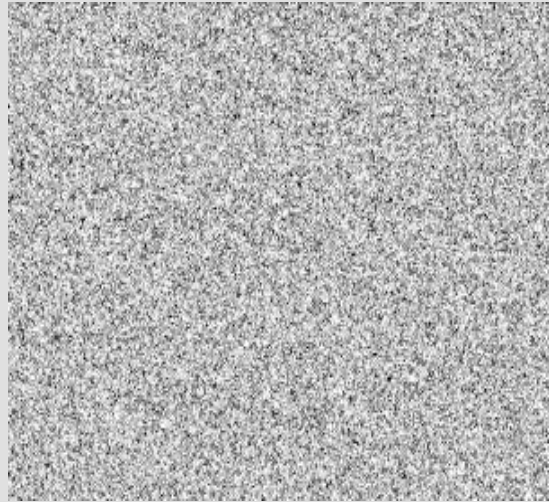
Image generation models takes **input** (text, noise, images, and so on) and use that to sample an image from the **appropriate distribution**





## 6. Unconditional Image Generation

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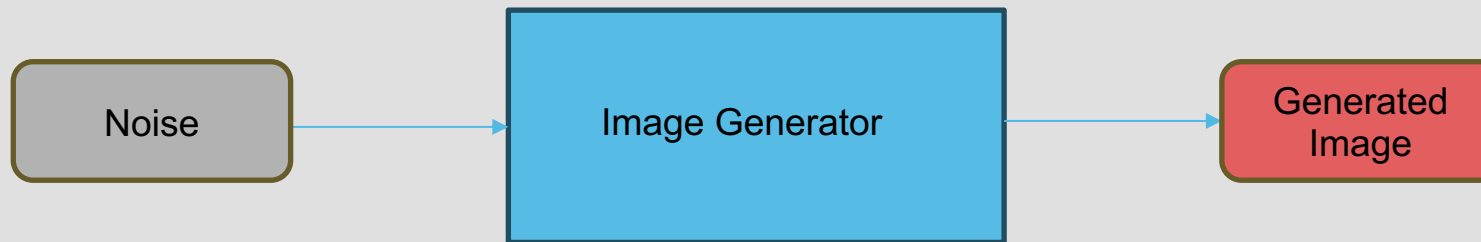


Noise

## 6. Unconditional Image Generation

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Only input is noise. For example, **GANs**, **DDPMs**



GAN: Generative Adversarial Network  
DDPM: Denoising Diffusion Probabilistic Model

## 6. Unconditional Image Generation

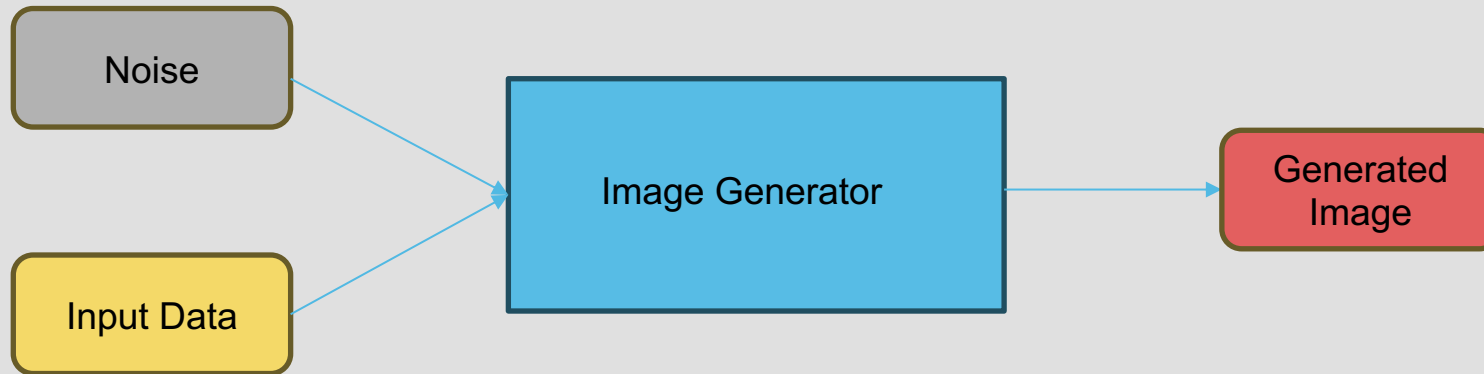
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<https://thispersondoesnotexist.com/>

## 7. Conditional Image Generation

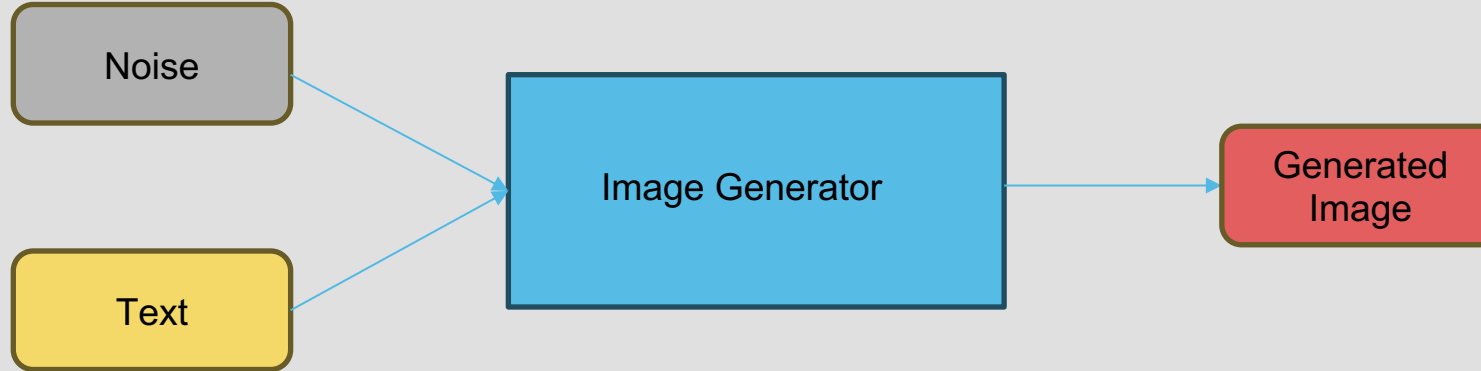
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Generate samples conditionally from the dataset, based on an input  
(class, text, image, and so on)



## 8. Conditional Image Generation

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“Generate a dog image wearing a hat and riding a cycle.”

## 8. Conditional Image Generation

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<https://huggingface.co/spaces/stabilityai/stable-diffusion>

## 9. Popular Vision Model

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Midjourney by Midjourney

DALL-E by OpenAI

Stable Diffusion by Stability AI

Imagen by Google

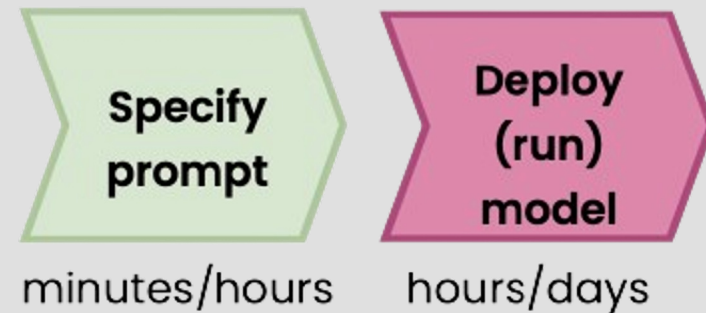
# 10. Generative AI Workflow

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## ML/DL Workflow



## GenAI Workflow





**Thank You !**

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