Machine learning → Subfield of AI

gives ability to learn without Explicit programming.

Humans

Supervised

labelled data

Eg:- Name | data set

Input data : X

model ← model update

model

Predict output ($\hat{y}$) → Error

Compare

Expected output (y)

Unsupervised

Unlabelled data

Input data X

model

generate example.

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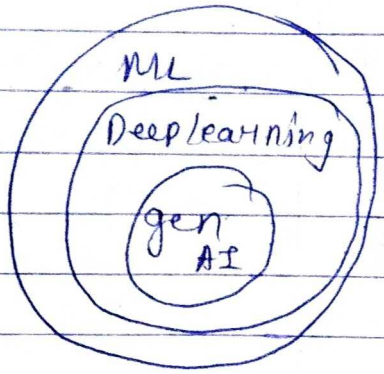
Artificial neural networks are inspired by human brain

Deeplearning Methods have more Complex neural networks than the machine learning

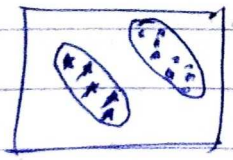
Semi supervised learning → A neural network is trained on small amount of labelled data and a large amount of unlabelled data

* Unlabled data help the neural network to generalise new examples

Generative AI is a subset of deep learning

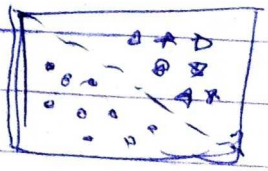


Generative Model



A gen model generate new instances based on a learned probability distribution of existing data

Discriminative Model



Discriminative models discriminate b/w different kinds of data instances.

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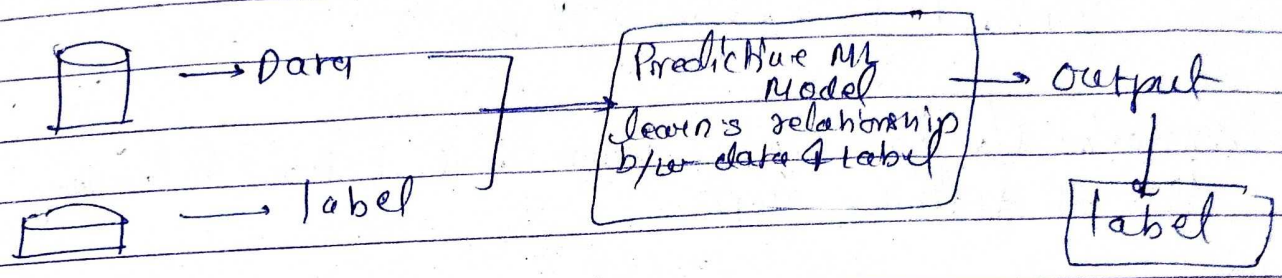
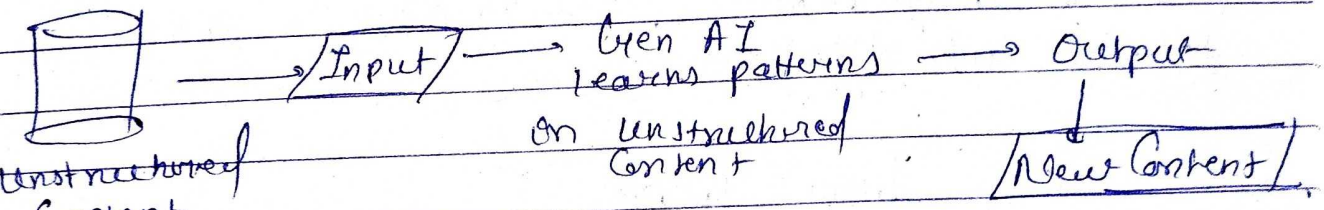
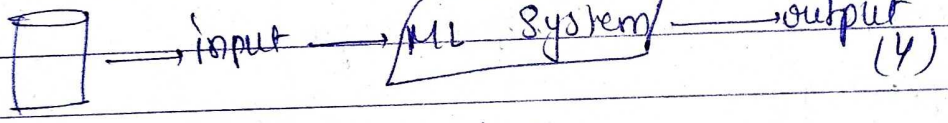
Gen AI Model can generate new data instances







Not gen AI when Y is
- Number
- Discrete
- Class
- Probability

Gen AI when Y is
- Natural language
- Image
- audio

$Y = f(x)$ — f: func. / model; x: input; Y: model output

Training Code + labeled data → model building → Predict / classify / cluster → traditional method

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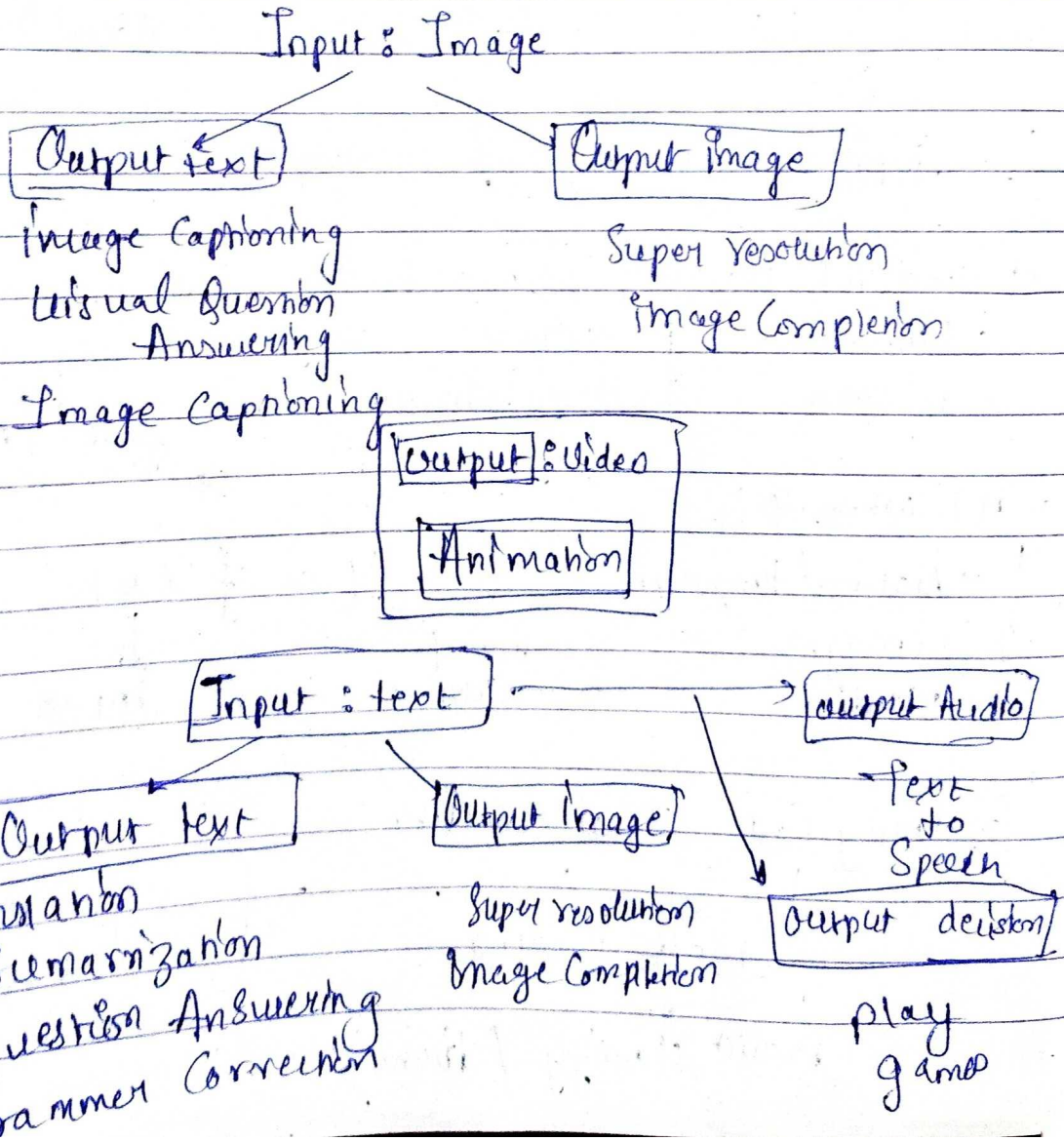
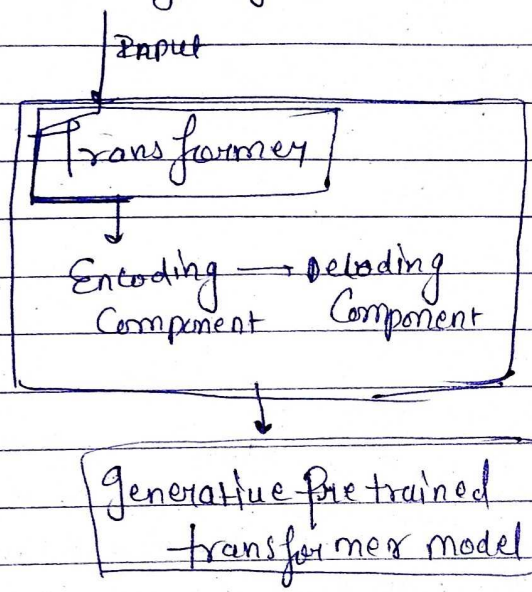
Gen AI → is a type of artificial intelligence that create new content from what it had learned from existing content.

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

Generative Image models produces new images using techniques like diffusion.



⇒ How it's going ?

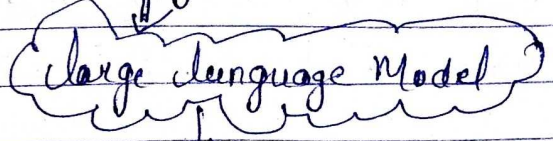


Hallucinations make the output text difficult to understand and make the model more likely to generate incorrect or misleading information

Hallucination are bad

Prompting

- Summarizing a text of x
- generate poem in the style of x
- give me a list of keywords based on semantic similarity of x.



output

Summarize , writing , keyword Extraction

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Text → Text (Translation)

Text → Image (Trained on large set of images)

Text → Video

Text → 3D

Text → Task

Data

Text
Image
Speech
Structured data
3D signals

→ Training → Foundation model → Adaption →

Task

Question Answering
Sentiment Analysis
Information Extraction
Image Captioning
Object recognition
Instruction following

Language foundation model ⇒ includes Chat, text, Code

Vision foundation model ⇒ embedding extractor Stable diffusion V1-5
BLIP image Captioning BLIP VQA CLIP
OWL-ViT ViT GPT2

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GenAI Applications

Text	Code	Image	Other
Content	Code Recognition	image generation	gaming
email	Code documentation	Consumer / Social	RPA
Chat / email	Text to SQL	Media / advertising	Music
writing	Web app builders	Design	Audio
Note taking			Biology & Chemistry
Other			

Speech	Video	3D
Voice Synthesis	Video edit / generation	3D models / scenes

Vertex AI Studio ⟶ Specially Useful for Complete beginners

- Quickly explore and customize
- Developers create and deploy
- library of pre trained models
- Tool for fine tuning models
- Tool for deploying models to production
- Community forum for developers to share idea and collaborate

Vertex AI Helps us on generation of

1) Chatbots
2) Digital assistants
3) Custom search engines
4) Knowledge bases
5) Training Application & more