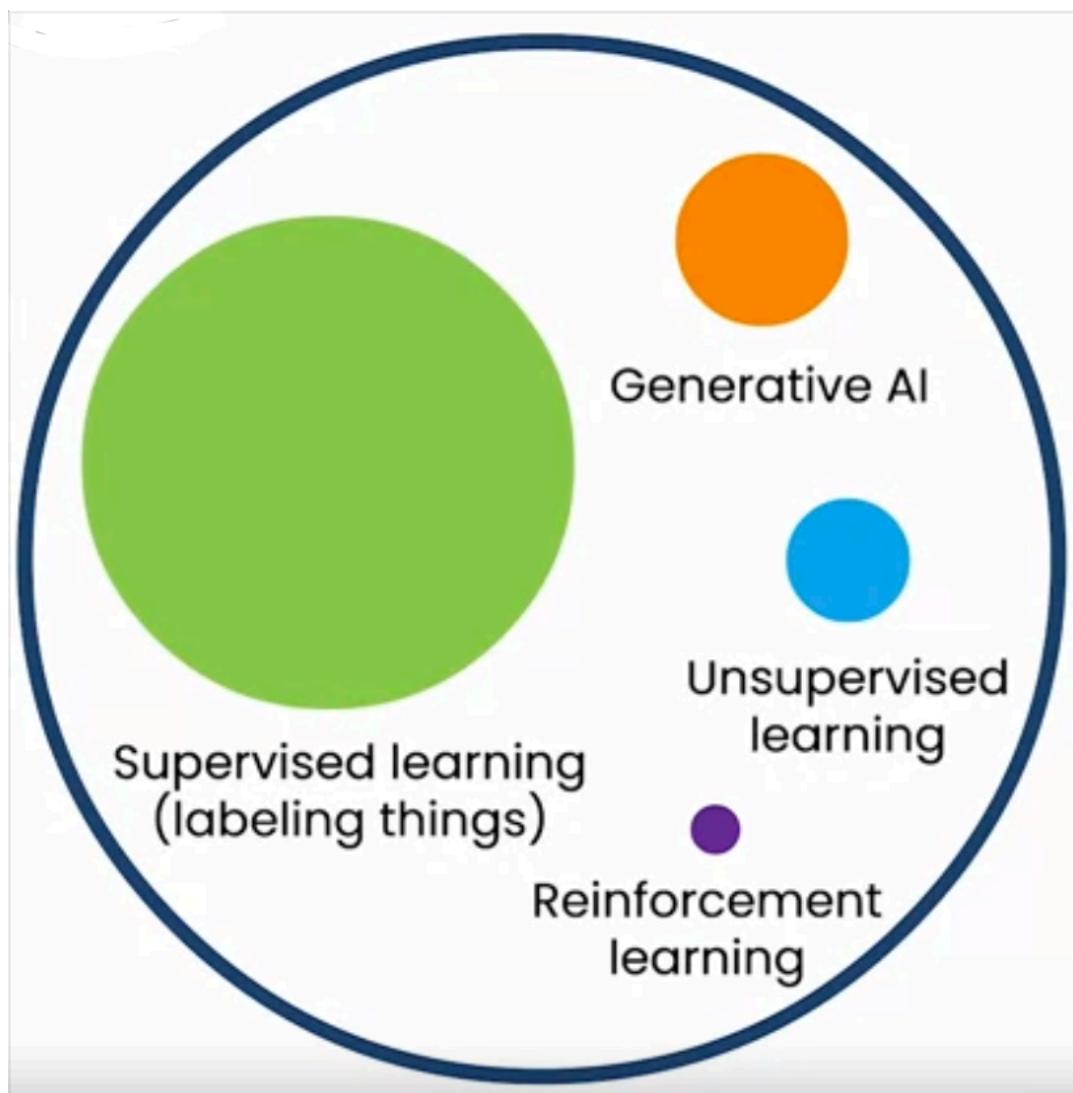


Generative AI:

What is Generative AI ?

Artificial intelligence systems that can produce high quality content, specifically **text, images and audio.**

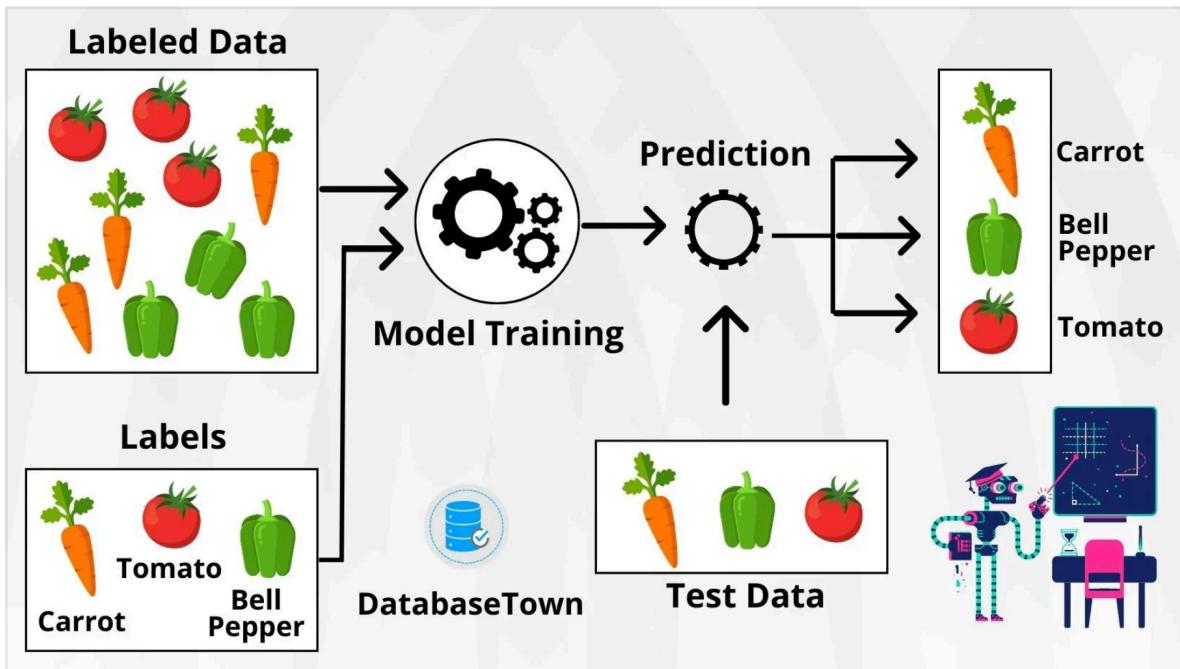
AI Landscape:



In this course we will mostly discuss about Supervised learning and Generative AI

What is Supervised Learning ?

Supervised machine learning is a branch of Artificial Intelligence that focuses on training models to make predictions or decisions based on labeled training data.



Supervised machine learning examples

Input (A)	Output (B)	Application
Email	Spam? (0/1)	Spam filtering
Ad, user info	Click? (0/1)	Online advertising
Image, radar info	Position of other cars	Self-driving car
X-ray image	Diagnosis	Healthcare
Image of phone	Defect? (0/1)	Visual inspection
Audio recording	Text transcript	Speech recognition
Restaurant reviews	Sentiment (pos/neg)	Reputation monitoring

Text Generation:



You

write a poem on generative ai. poem length should be 10 lines



ChatGPT

In the circuits' quiet hum, where dreams arise,
Generative AI, a poet in disguise.
With lines of code, it weaves a tapestry,
A symphony of ones and zeros, pure alchemy.

Through the neural dance, creativity's trance,
A digital artisan, in the realm of chance.
From structured data to artistry's bloom,
Generative whispers craft a future's tune.

In the byte-sized verses, a world anew,
Generative AI, the innovator true.



How text generation works?

My favorite food is a bagel with cream cheese

Input (A)	Output (B)
My favorite food is a	bagel
My favorite food is a bagel	with
My favorite food is a bagel with	cream
My favorite food is a bagel with cream	cheese

Few popular examples of text generation tools

ChatGPT / OpenAI

Bard / Google
Bing Chat / Microsoft

Image, audio and video generation:

Generative AI Applications?

1. Writing
2. Reading
 1. Rephrasing
 2. Generate summary of a text
3. Chatting

Advice for deploying chat boats?

1. Start with internal facing chat-boats
 1. Work with staff to assess behaviour of chat-boat
 2. Avoid public mistakes
2. Deploy with human-in-the-loop to check for mistakes
3. Only after deemed safe, allow boat to communicate directly with customers

What LLMs can and cannot do ?

LLM can give information only on the data on which it is trained.

e.g.



You

who is prime minister of india ?



ChatGPT

As of my last knowledge update in January 2022, the Prime Minister of India is Narendra Modi. However, please note that my information might be outdated as my training data goes up to that time, and the browsing capability is disabled. Please verify with up-to-date sources.



You

who is president of india ?



ChatGPT

As of my last knowledge update in January 2022, the President of India is Ram Nath Kovind. However, keep in mind that my information might be outdated as my training data goes up to that time, and I do not have browsing capabilities to check for the latest information. Please verify with up-to-date sources.



who is president of india ? 

[View other drafts](#)  



As of today, Thursday, January 11, 2024, the current President of India is Droupadi Murmu. She took office on July 25, 2022, making her the 15th President of India. She is also the first tribal person and the second woman to hold this prestigious position.

Would you like to know more about President Murmu's background or anything specific about her role as President?

What LLM's can't do ?

LLM has limitation of tokens. e.g if you want to summarise a book whose length is 100 pages, but the llm chat-gpt-3.5 has limitation of 4096 tokens, so we can not generate summary of this book in one go.

MODEL	DESCRIPTION	CONTEXT WINDOW	TRAINING DATA
gpt-3.5-turbo-1106	New Updated GPT 3.5 Turbo The latest GPT-3.5 Turbo model with improved instruction following, JSON mode, reproducible outputs, parallel function calling, and more. Returns a maximum of 4,096 output tokens. Learn more.	16,385 tokens	Up to Sep 2021
gpt-3.5-turbo	Currently points to gpt-3.5-turbo-0613.	4,096 tokens	Up to Sep 2021
gpt-3.5-turbo-16k	Currently points to gpt-3.5-turbo-0613.	16,385 tokens	Up to Sep 2021
gpt-3.5-turbo-instruct	Similar capabilities as GPT-3 era models. Compatible with legacy Completions endpoint and not Chat Completions.	4,096 tokens	Up to Sep 2021
gpt-3.5-turbo-0613	Legacy Snapshot of gpt-3.5-turbo from June 13th 2023. Will be deprecated on June 13, 2024.	4,096 tokens	Up to Sep 2021
gpt-3.5-turbo-16k-0613	Legacy Snapshot of gpt-3.5-16k-turbo from June 13th 2023. Will be deprecated on June 13, 2024.	16,385 tokens	Up to Sep 2021
gpt-3.5-turbo-0301	Legacy Snapshot of gpt-3.5-turbo from March 1st 2023. Will be deprecated on June 13th 2024.	4,096 tokens	Up to Sep 2021

We recommend using `gpt-3.5-turbo` over the other GPT-3.5 models because of its lower cost and improved performance.

Source: <https://platform.openai.com/docs/models/gpt-3-5>

Generative ai does not work well on tabular data. As per below example Generative AI is not able to predict cost of 1000 square feet house.

Home prices

size (square feet)	price (1000\$)
523	100
645	150
708	200
1034	300
2290	350
2545	440

A B

Use supervised learning (A → B) to estimate price.

Generative AI works best with Unstructured data (text, images, audio, video)

Bias and Toxicity:

An LLM can reflect the biases that exist in the text it learned from

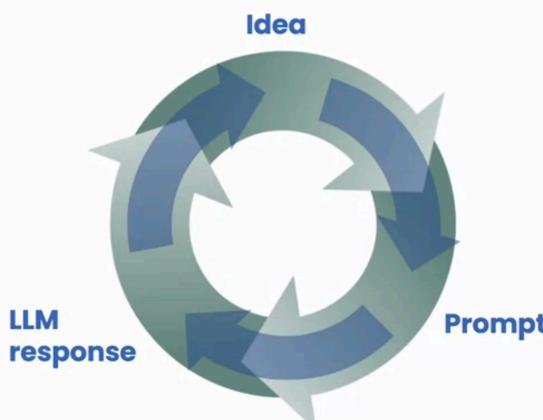
e.g. Complete the sentence :

1. The surgeon walked to the parking lot and took out — **his** car key
— Male bias
2. The nurse walked to the parking lot and took out — **her** phone. —
Female bias

Tips for Prompting:

1. Be detailed and specific
2. Guide the model to think through its answer
3. Experiment and Iterate

Iteratively improving your prompt



Prompting process

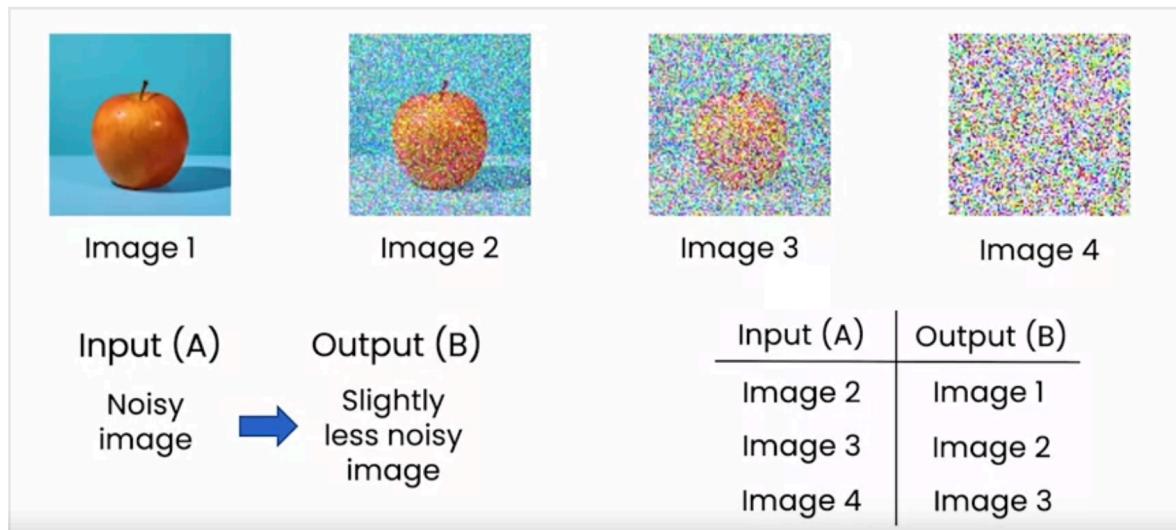
- Be clear and specific in prompt
- Think about why result isn't giving desired output
- Refine your prompt
- Repeat

Tip: Don't overthink the initial prompt. Just try something quickly and improve it over time!

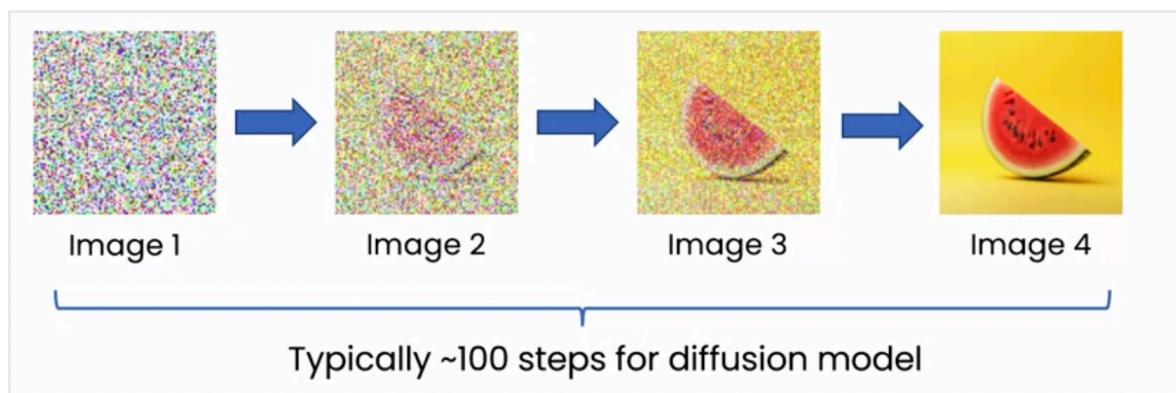
Caveats: Be careful with

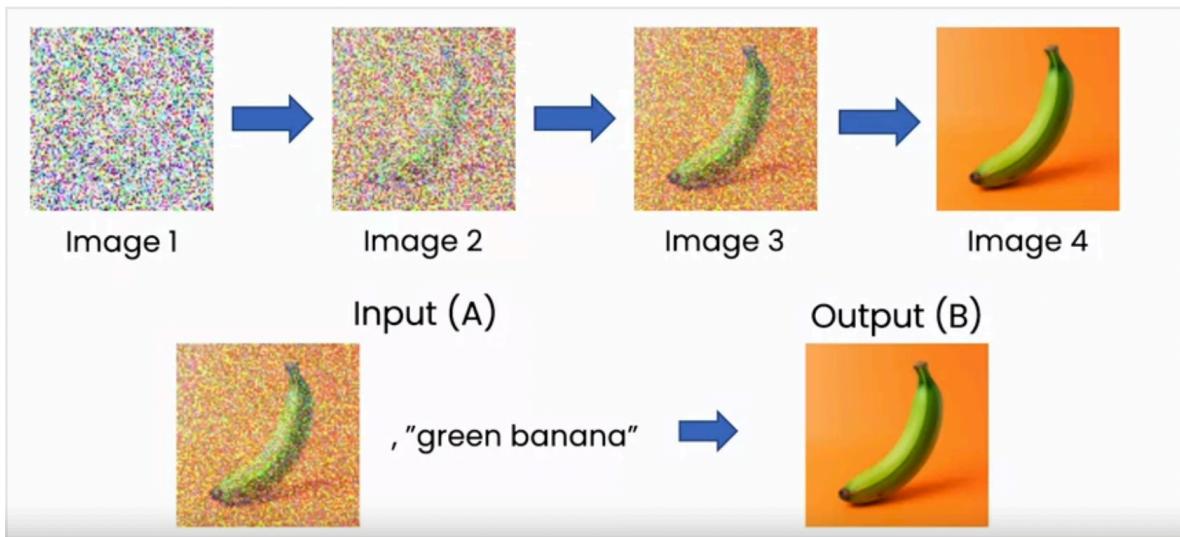
- (i) confidential information
- (ii) whether you trust the LLM output

Image generation with diffusion models:



At the time of model training input is noise image and output is less noise image





Source: <https://www.coursera.org/learn/generative-ai-for-everyone/lecture/CQP1v/image-generation-optional>

Resources:

What is generative AI and how does it work? – The Turing Lectures with Mirella Lapata: https://www.youtube.com/watch?v=_6R7Ym6Vy_I&t=373s

Davis ben