INTRODUCTION TO GEN AI

GEN AI-GENERATIVE ARTIFICIAL INTELLIGENCE.

AI

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MACHINE LEARNING

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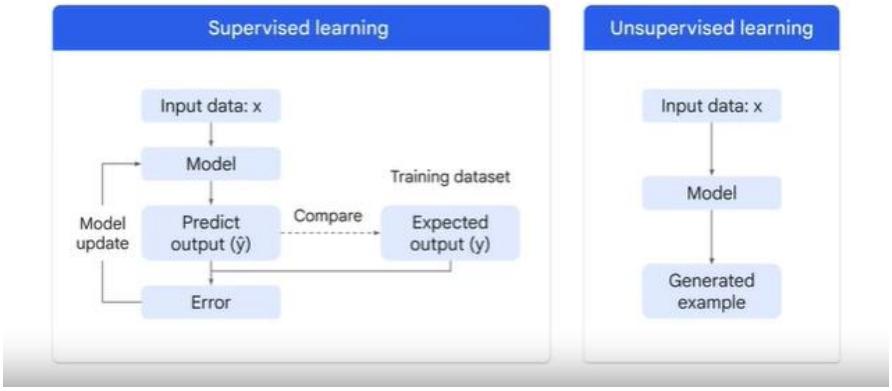
DEEP LEARNING

- Generative AI is type of artificial intelligence that produce various types of content which includes text, images, videos, audio and synthetic data.
- AI is a theory and development of computer systems able to perform tasks normally requiring human intelligence.
- In this ml is a subfield of AI.
- ML gives computers the ability to learn without explicit programming.

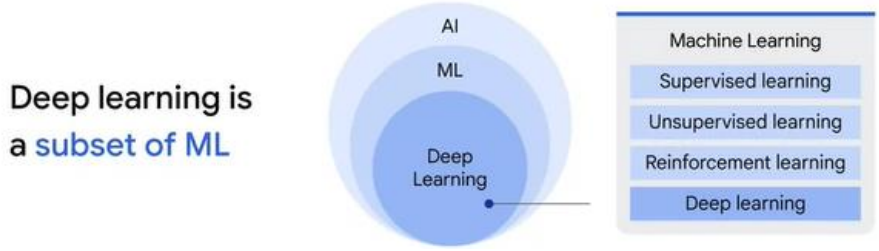


2 MOST COMMON USED MODELS OF ML ARE

- SUPERVISED LEARNING:
  - It implies that the data is already labeled.
  - In this we are learning from past examples to predict future values.

- UNSUPERVISED LEARNING.

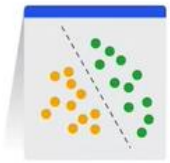
- It implies the data is not labeled.
- It is about looking at the raw data and seeing if it naturally falls into groups.



Deep learning is a subset of machine learning.

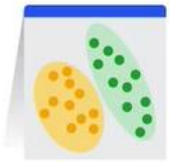
- Deep learning uses artificial neural networks- allowing them to process more complex patterns than traditional machine learning.
- In this gen ai is a subset of deep learning.
- Large language models(LLM's) are also subset of Deep learning.

Deep Learning Model Types



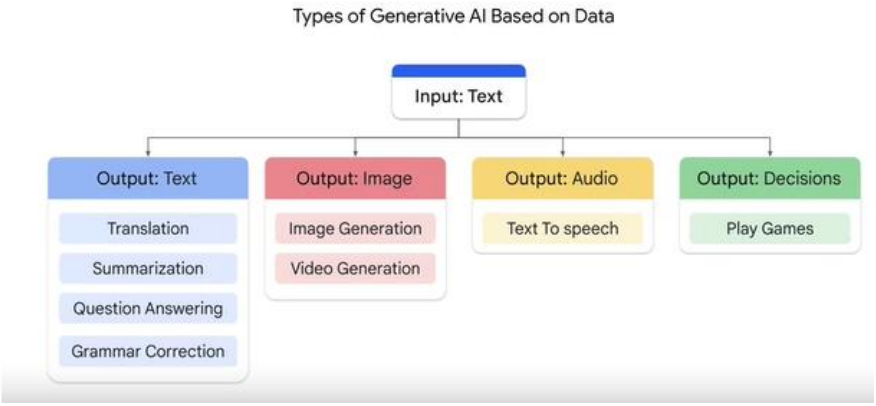
Discriminative

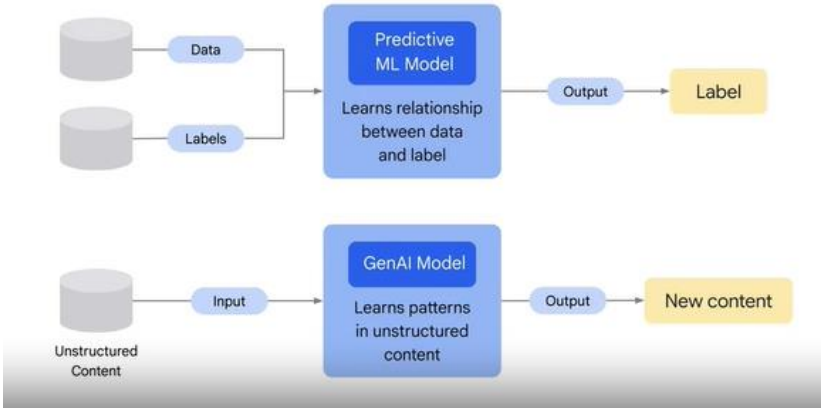
- Used to classify or predict
- Typically trained on a dataset of labeled data
- Learns the relationship between the features of the data points and the labels

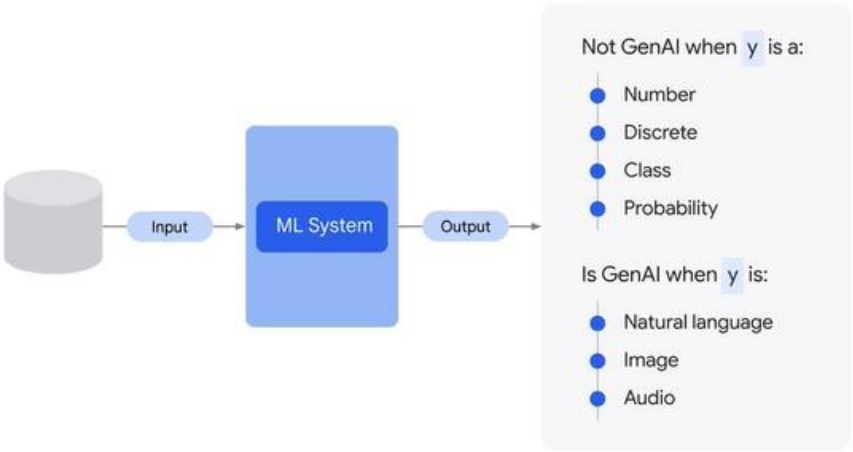


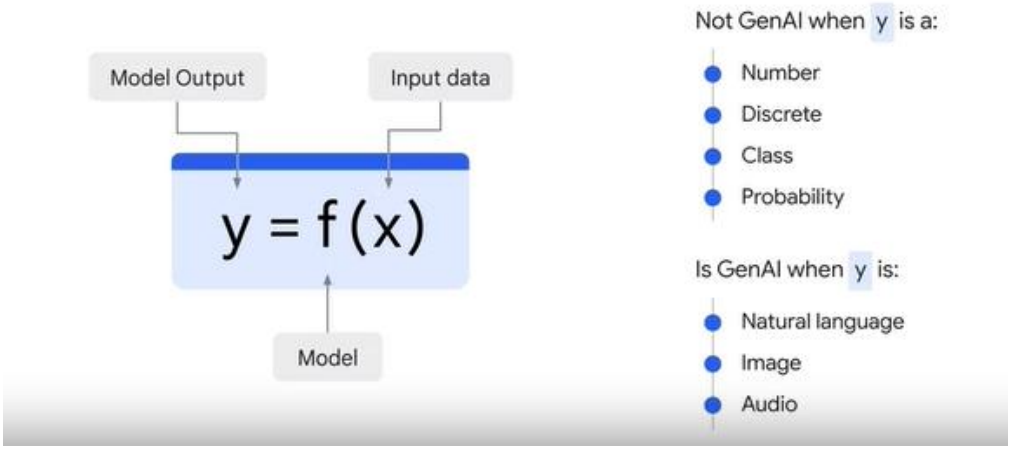
Generative

- Generates new data that is similar to data it was trained on
- Understands distribution of data and how likely a given example is
- Predict next word in a sequence

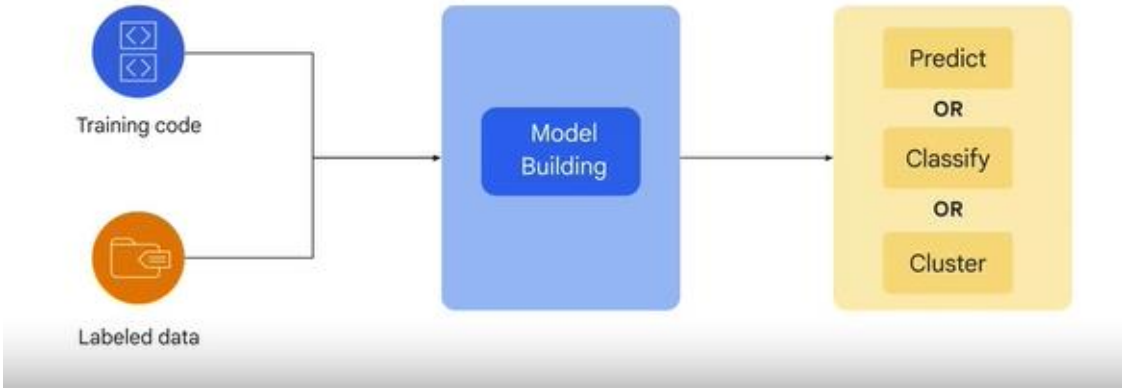


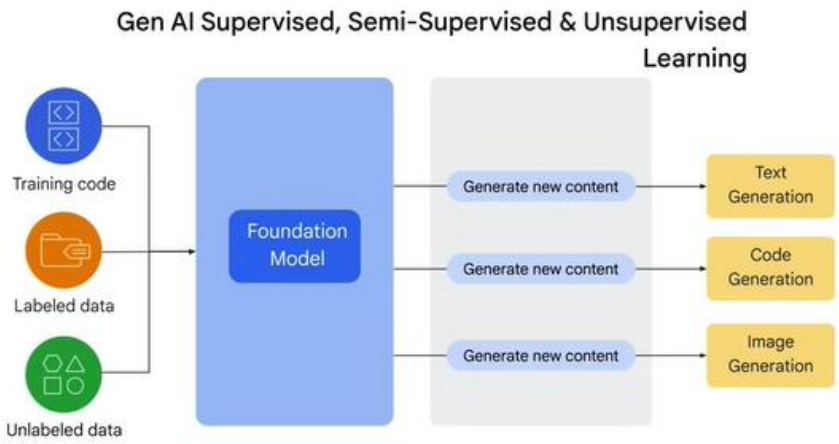






Classical Supervised & Unsupervised Learning





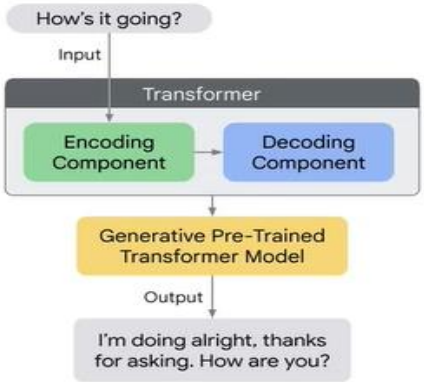
What is Generative AI?

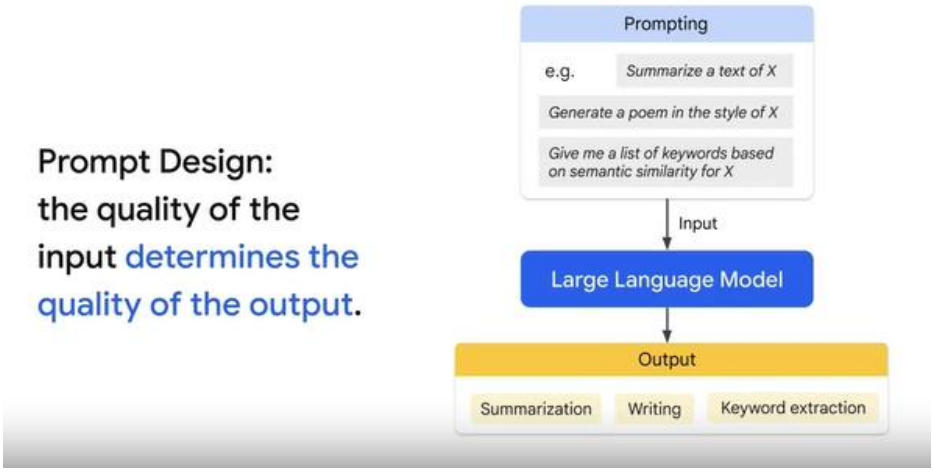
- GenAI is a type of Artificial Intelligence that creates new content based on what it has learned from existing content.
- The process of learning from existing content is called training and results in the creation of a statistical model.
- When given a prompt, GenAI uses this statistical model to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

How it Works

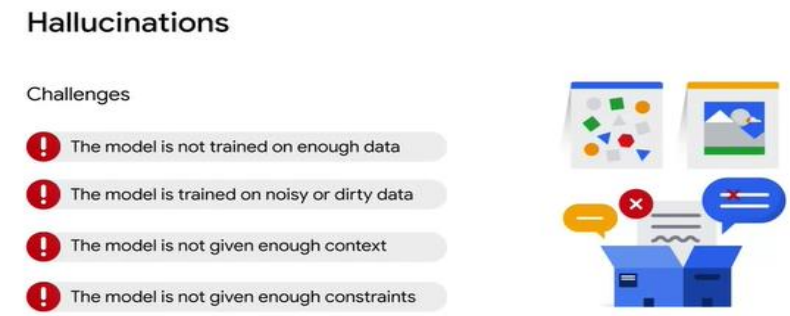
Pre-Training:

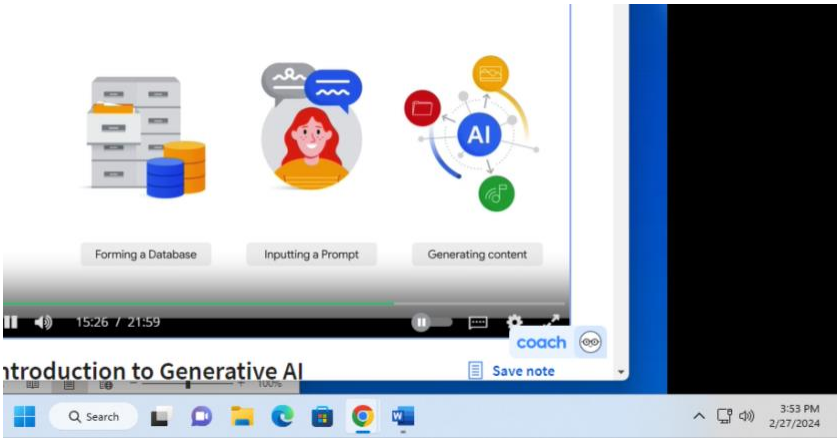
- Large amount of Data
- Billions of parameters
- Unsupervised learning





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





Generative Models

Generative language models

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

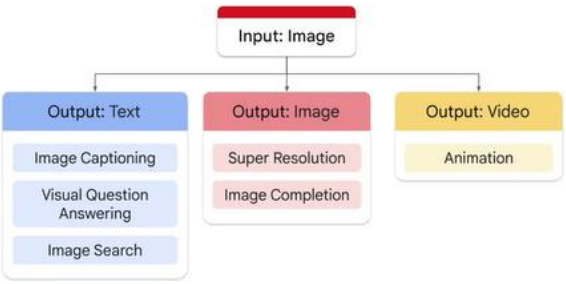
Then, given some text, they predict what comes next.

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 Data



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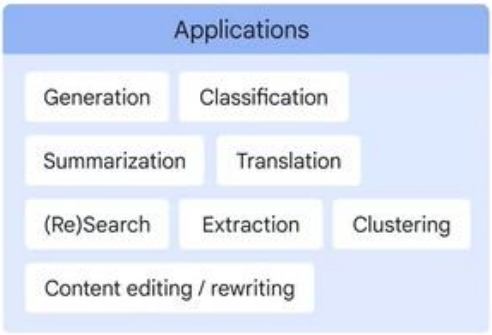
Then, given some text, they predict what comes next.

Model Types

text-to-text

Text-to-text models take a natural language input and produce text output. These models are trained to learn the mapping between a pair of texts (e.g. translation from one language to another).



Model Types

text-to-image

Text-to-image models are relatively new and are trained on a large set of images, each captioned with a short text description. Diffusion is one method used to achieve this.

Model Types

text-to-video text-to-3D

Text-to-video models aim to generate a video representation from text input. The input text can be anything from a single sentence to a full script, and the output is a video that corresponds to the input text. Similarly Text-to-3D models generate three-dimensional objects that correspond to a user's text description (for use in games or other 3D worlds).

Model Types

text-to-task

Text-to-task models are trained to perform a specific task or action based on text input. This task can be a wide range of actions such as answering a question, performing a search, making a prediction, or taking some sort of action. For example, a text-to-task model could be trained to navigate web UI or make changes to a doc through the GUI.

Applications

- Software agents
- Virtual assistants
- Automation