

AI

- Agentic AI
- MCP
- A2A protocol

~~AI vs ML vs DL vs GenAI~~

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~~AI vs ML vs DL vs GenAI~~

GenAI vs Productive AI

- LLM
- Diagnostic AI

→ different model

① Basic Algorithm (model)

① classification

② regression

③ clustering.

Neural Network

④ Foundation Models

⑤ Computer Vision

⑥ NLP

⑦ category of ML model.

⑧ Traditional Machine Learning Model

⑨ Representation based deep learning

deep learning
or
Neural Network

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ML

Categories

- ✓ Supervised learning
 - Supervised model
 - labeled data
- unsupervised learning
 - unsupervised model.
 - unlabeled data.

~~category~~

⑩ Traditional model

- linear regression } ML
- decision tree } algorithm
- logistic regression }
- support vectors }
- ensemble learning. } 155

AI: Creating ^(computers) machines capable of performing tasks that typically require human intelligence.

ML: An Algorithm that learn from data.
→ Subset of AI.

- Enabling computers to learn from data without being explicitly programmed.
- ML algorithms (^{or} Models) identify patterns in data and use those patterns to make predictions or decisions.
- ML algorithm → Feeding (training data) data to algorithm
→ algorithm process the data → output

DL → subfield of ML. of this learning process is 'model'

- Uses Artificial neural net with multiple layers (hence-'deep') to Analyze complex data patterns.
ex - NLP, image recognition, speech recognition.

GenAI → model

Type of deep learning model.

- Learns from the training data and then generate new, unseen data that resembles the training data.
- LLM → Specific type of model within Generative AI.
- It focuses on understanding & generating human language (text).
- DNNs (deep neural net) are the core architecture behind most modern GenAI ~~models~~ models.

ML

* General algorithm → set of rules (instruc.) to produce output.

* ML algorithm.

↓
predetermined

- Trained on Large amount of data to produce statistical patterns found in the data to predict outcomes in unseen data.
- They do not follow any rules.
- Learns the rules from data that we feed to ML algorithm or model.



ML Algorithm

→ Feed in Huge training data to learn

(Model)

Pattern → Training the model (parameters)

→ These model's parameter are then used for prediction.

Starts off knowing nothing

• Statistical patterns

& attributes exist in the data.

• Naive pattern

Recognition exercise.

• Training process is

an iterative process.

keeps on improving;

that improvement is

reflected in the updated parameter.



• Feature or X variable



• Label, target or Y variable.



3 Basic Algorithms:-

Classification algo:-

↳ supervised learning

Predict categorical value.

ex- discrete output

• Binary classification model (two category)

• spam or ham

• multi-class classification (many categories)

• dog, cat, bird

• Evaluating " model".

• yes or no.



Regression algo:-

Predict continuous values.

• Neural net

• linear regn

• supervised

ex- price of home,

• Decision tree

Learning Technique

price of stock, the quantity of rainfall.

• support vector machine & random forest.

• cause-effect analysis



Clustering Model:-

↳ unsupervised learning.

Used to find logical groups in data.

↳ what data points are similar &

ex- People on social media - who like sports,

what data points are different.

media - who like music,

Categories of ML (2 Main)

• Supervised Learning :- Sentiment Analysis Algo.

✓ Improve model's parameter.
It has:

→ features or X variables

→ Targets or Y variables

$$y = f(x)$$

→ target.

→ features

Algorithms job is
to learn the relationship
b/w the X-variables
& Y-variables.

[Have 'X' to predict 'Y']
 Training process uses 'Y' values
to improve the model's accuracy

• Unsupervised Learning:

Does not need

Labels to improve its performance.

• 'Labeled' data not available.
 • Model learns from the data
itself.

• It has: feature or X variables only.

• focus on intrinsic patterns, does not reverse engineer rel.

• Most of the data available in the world is unlabeled,

• Anomaly detection &
dimensionality reduction. so very powerful concept.

• Linear regression:- finding best fit line on data.

evaluated using a metric (R^2)

(0-1)
best fit

clustering:

• n-dimensions

• elbow method

• silhouette score. value $[-1, 1]$ -1 → assigned to wrong cluster
0 → close, 1 → far away from cluster

#

Traditional Machine Learning Model :-

(fundamental algorithmic structure.)

- linear regression
- classified algo (logistic regression)
- decision tree.

+ Ensemble Learning
& random Forest

#

Representation Based Deep Learning Model.

GenAI# GenAI Interface (57)

- 175 billion parameters
- 500 billion texts
- Dall-E → images
- chatgpt text.
- Bard. for music or voices

rely on GPT or other deep learning model.

GenAI vs Predictive AI [both are required complex algot
neural network]

↓ generate new contents

based on info? if ~~learnt~~ has learned.

• Predictive AI (discriminative AI)

- classify or predict outcomes based on given inputs
- Task → image recognition
- ↓ sentiment analysis.
- commonly uses supervised learning algorithm.

NLP: Foundational concept in GenAI.

Enabling computers to understand, interpret & generate human language.

GAIN

① generator → Generate synthetic data like images, audio or text

② discriminator → differentiates b/w real data & synthetic data.
• identify real vs fake samples.

• GPT mode

→ encoder, transform inputs to dense or contextualized repres.
→ Decoder → produce text.

GenAI interfaces

- Stable Diffusion.
 - Impainting.
 - Outpainting.
 - Image-to-Image.

- Midjourney. →
 - Generate image
 - upscale the image.
 - DMCA takedown policy.

Gen AI Models

- Generative models

- Pre-Trained Models

- LLMs

Foundation Models

- In-Application (copilot models)
- Proprietary (ChatGPT)
- Open-source. (Llama2 model)