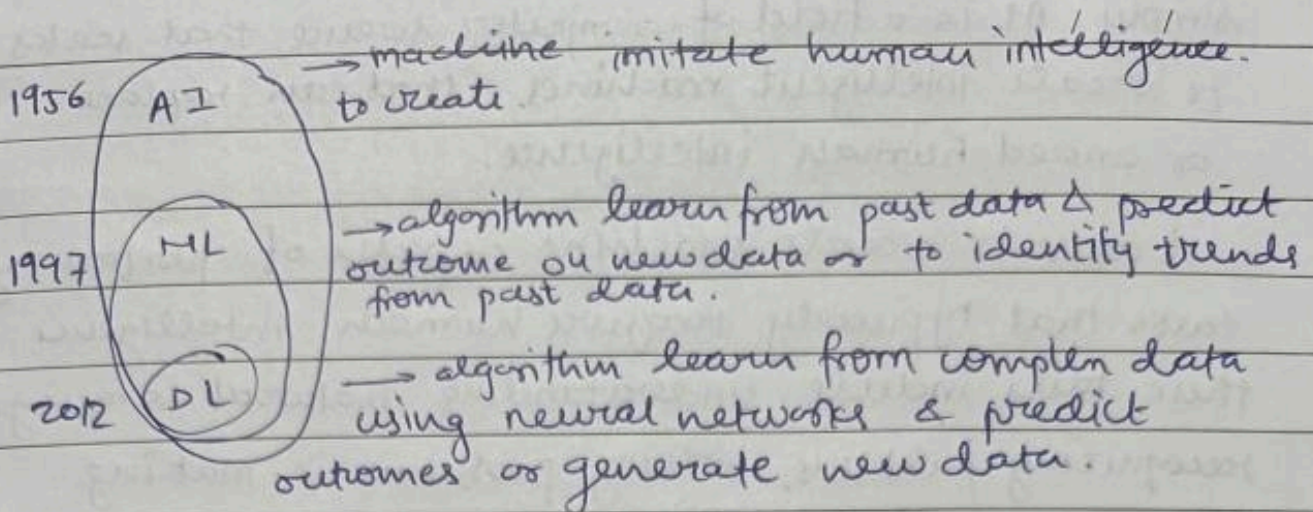


Generative AI



1) Machine learning (1997):- It is a subset of AI that enables to learn from existing data and improve upon data to make decision.

a) supervised learning (label data)

b) unsupervised learning (unlabel data / extract trends)

c) Reinforcement learning (trial & error)

Ex:- Disease detection, weather forecasting, stock price prediction, outlier detection, automated robots, autonomous cars.

2) Artificial Intelligence :- think of AI as a computer or machine that can do tasks that usually require human intelligence.

This includes things like understanding speech recognizing pictures, making decisions or solving problems. AI can range from simple tasks (calculator) to more complex ones (self-driving car).

simply AI is a field of computer science that seeks to create intelligent machines that can replace or exceed human intelligence.

- It aims to create machine capable of performing tasks that typically require human intelligence. these tasks include understanding natural language, recognizing patterns, solving problems & making decisions.

working:- works by simulating human intelligence through use of algorithms, data and computational power. AI system can learn from data and improve their performance over time, allowing them to make decisions and take actions without being explicitly programmed.

→ AI different from human Intelligence

- 1) processing information
- 2) learning
- 3) speed
- 4) adaptability
- 5) Emotions

→ language related AI tasks :

task related

- 1) Detect language
- 2) Extract entities
- 3) Extract key phrases
- 4) sentiment
- 5) Translation

Generative AI tasks / /

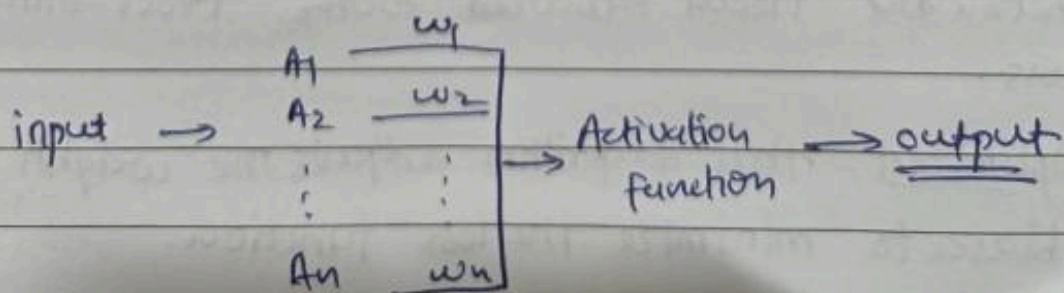
- 1) create story / poem
- 2) summarization text
- 3) answer questions
- 4) generating image caption.

Deep learning (2012) :- It is a subset of ML that focuses on training ANN with multiple layers. In this layers of neural networks are used to process data and make decisions.

- DL extract features from raw & complex data.

Artificial neural network :- Inspired by human brain, consists of interconnected nodes called neurons, processes information.

- It consists of layers of interconnected neurons, where each connection has an associated weight.



weight determine strength of connection between neurons.

Components of neural network:

- 1) Input layer: this layer receives the input data.
- 2) Hidden layer: It performs transformation on input data through weighted connections & activation fn.
- 3) Output layer: produces the final output of the network.
 - no. of neurons in this layer depends on nature of task
 - binary classification:- one neuron.
 - multi class classification:- one neuron per class.
- 4) weight and bias: each connection between neurons has a weight that is adjusted during training to minimize error of the network.
- 5) Activation function: introduce non-linearity into the network, enabling it to learn complex patterns. common AFs are Sigmoid, Tanh, ReLU.
- 6) loss function: measures difference between network predictions & actual target values. common loss functions are Mean Squared Error, Cross-Entropy Loss.
- 7) Optimizer: this algorithm adjusts the weights and biases to minimize the loss function.

→ uses of deep neural networks

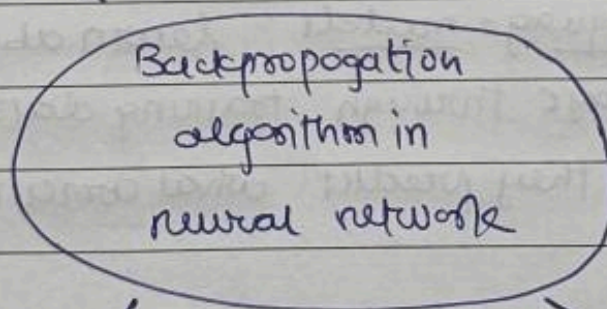
- 1) feature extraction
- 2) Transfer learning
- 3) Regularization techniques

→ Applications

- 1) Computer vision: Image classification.
- 2) Natural language processing
- 3) Speech recognition
- 4) Recommendation systems.
- 5) Healthcare & Autonomous vehicles.

① Guess & compare

② measure error



Backpropagation
algorithm in
neural network

③ Adjust the
guess

④ update the
weights.