

Name: MohammedAmman Chopadiya

Date: 15th December 2023

Artificial Intelligence

- Machine thinks without human intervention and make its own decisions.
- Artificial Intelligence is basically the mechanism to incorporate human intelligence into machines through a set of rules(algorithm).

➤ Types of AI:

- Artificial Narrow Intelligence
- Artificial General Intelligence
- Artificial Super Intelligence

➤ Examples:

- Speech Recognition
- Personalized Recommendations
- Predictive Maintenance
- Medical Diagnosis
- Autonomous Vehicles
- Virtual Personal Assistants (VPAs)
- Fraud Detection

Machine Learning

- Subset of AI using statistical analysis to automatically learn and improve.
- In Machine Learning we train the algorithm by providing it with a lot of data and allowing it to learn more about the processed information.

➤ Categories of Machine Learning

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning

➤ **Examples:**

- Image recognition
- Speech recognition
- Natural language processing
- Recommendation systems
- Sentiment analysis
- Predictive maintenance

Deep Learning

- Filter the input data through layers to predict and classify information.
- Most of the deep learning methods use neural network architectures.

➤ **Architectures of Deep Learning:**

- Convolutional Neural Network
- Recurrent Neural Networks
- Recursive Neural Networks

➤ **Examples:**

- Image and Video Recognition
- Generative Models
- Autonomous Vehicles
- Image Classification
- Speech Recognition
- Natural Language Processing
- Recommender Systems
- Fraud Detection
- Game-Playing AI
- Time Series Forecasting

Neural Network

- Subset of machine learning and are the backbone of deep learning algorithms.
- Mimic how neurons in the brain signal one another.
- Neural networks are made up of node layers.
- When one node's output is above the threshold value, that node is activated and sends its data to the network's next layer.
- Training data teach neural networks and help improve their accuracy over time.
- A neural network of more than three layers, including the inputs and the output, can be considered a deep-learning algorithm.

Supervised VS Unsupervised Learning

➤ Types:

- Supervised: Classification, Regression
- Unsupervised: Clustering, Association, Dimensionality Reduction

➤ Data:

- Supervised: Learns with labelled data
- Unsupervised: Learns with unlabelled data

➤ Goals:

- Supervised: Predict outcomes for new data
- Unsupervised: Get insights from large data

➤ Applications:

- Supervised: Spam detection, sentiment analysis, weather forecasting, pricing predictions
- Unsupervised: Anomaly detection, recommendation engines, customer personas, medical imaging

➤ Complexity:

- Supervised: Simple method
- Unsupervised: More complex

➤ Drawbacks:

- Supervised: time-consuming, requires expertise
- Unsupervised: More inaccuracy, validation required

Semi-supervised learning

- It uses a combination of labelled and unlabelled datasets.
- Combination of both supervised and unsupervised learning.
- Initially train on labelled data, then on unlabelled sections.