CS – Machine Learning

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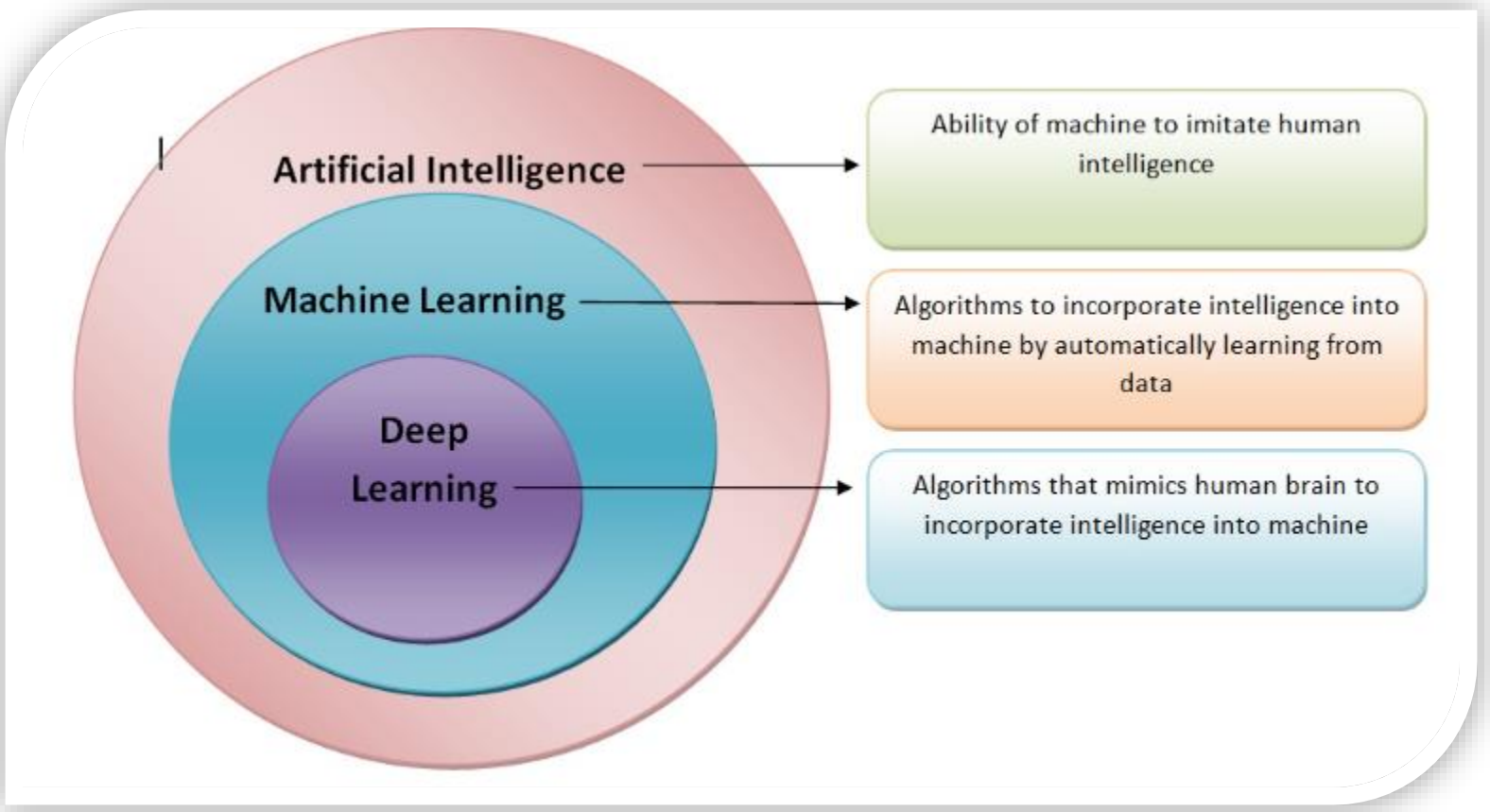
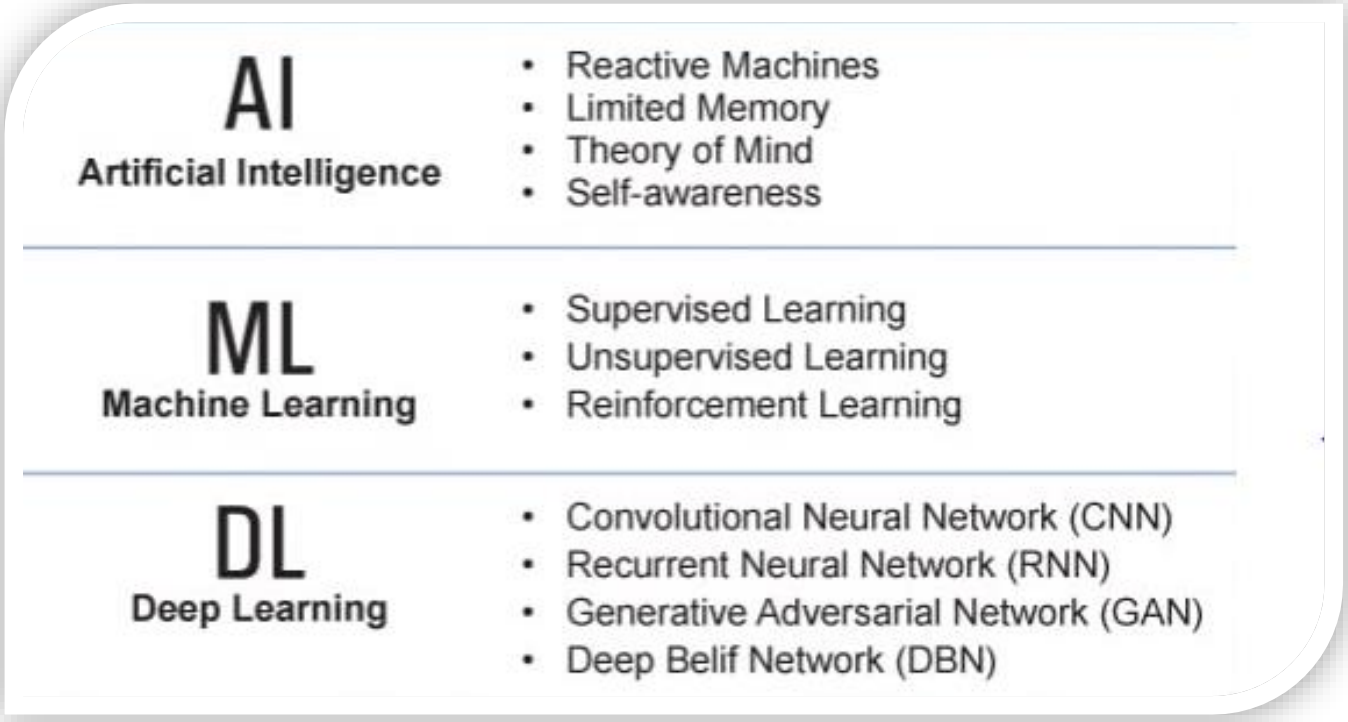
Overview

- Artificial Intelligence
- Machine Learning
- Deep Learning

AI vs ML vs DL


Artificial Intelligence
Machine Learning
Deep Learning
Ability of machine to imitate human intelligence
Algorithms to incorporate intelligence into machine by automatically learning from data
Algorithms that mimics human brain to incorporate intelligence into machine

AI vs ML vs DL

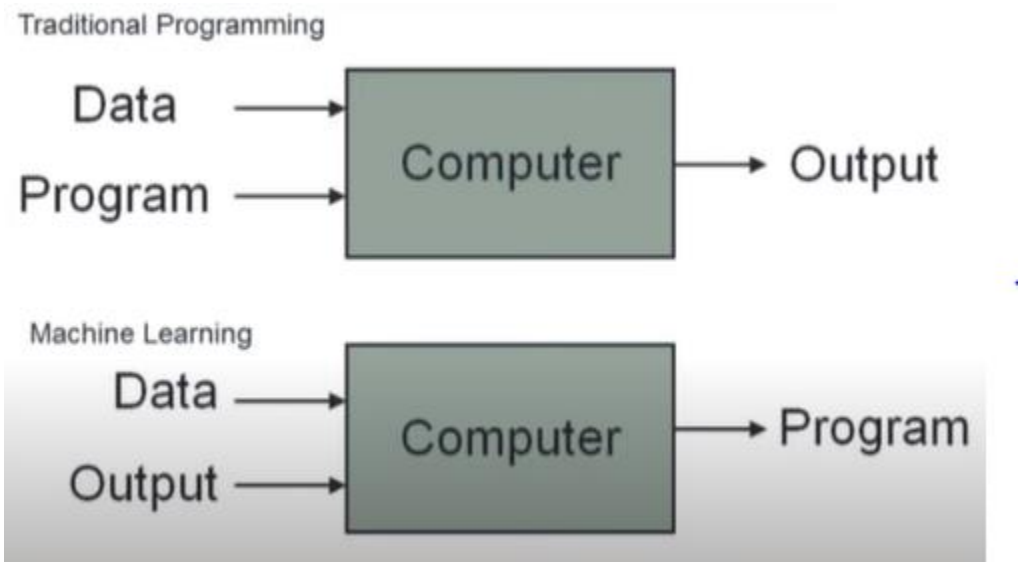

AI
Artificial Intelligence
Reactive Machines
Limited Memory
Theory of Mind
Self-awareness
ML
Machine Learning
Supervised Learning
Unsupervised Learning
Reinforcement Learning
DL
Deep Learning
Convolutional Neural Network (CNN)
Recurrent Neural Network (RNN)
Generative Adversarial Network (GAN)
Deep Belif Network (DBN)

Machine Learning

- Machine Learning is a subset of artificial intelligence that focuses on the development of algorithms and statistical models that enable computer systems to improve their performance on a specific task through experience, without being explicitly programmed.

Traditional Programming vs Machine Learning

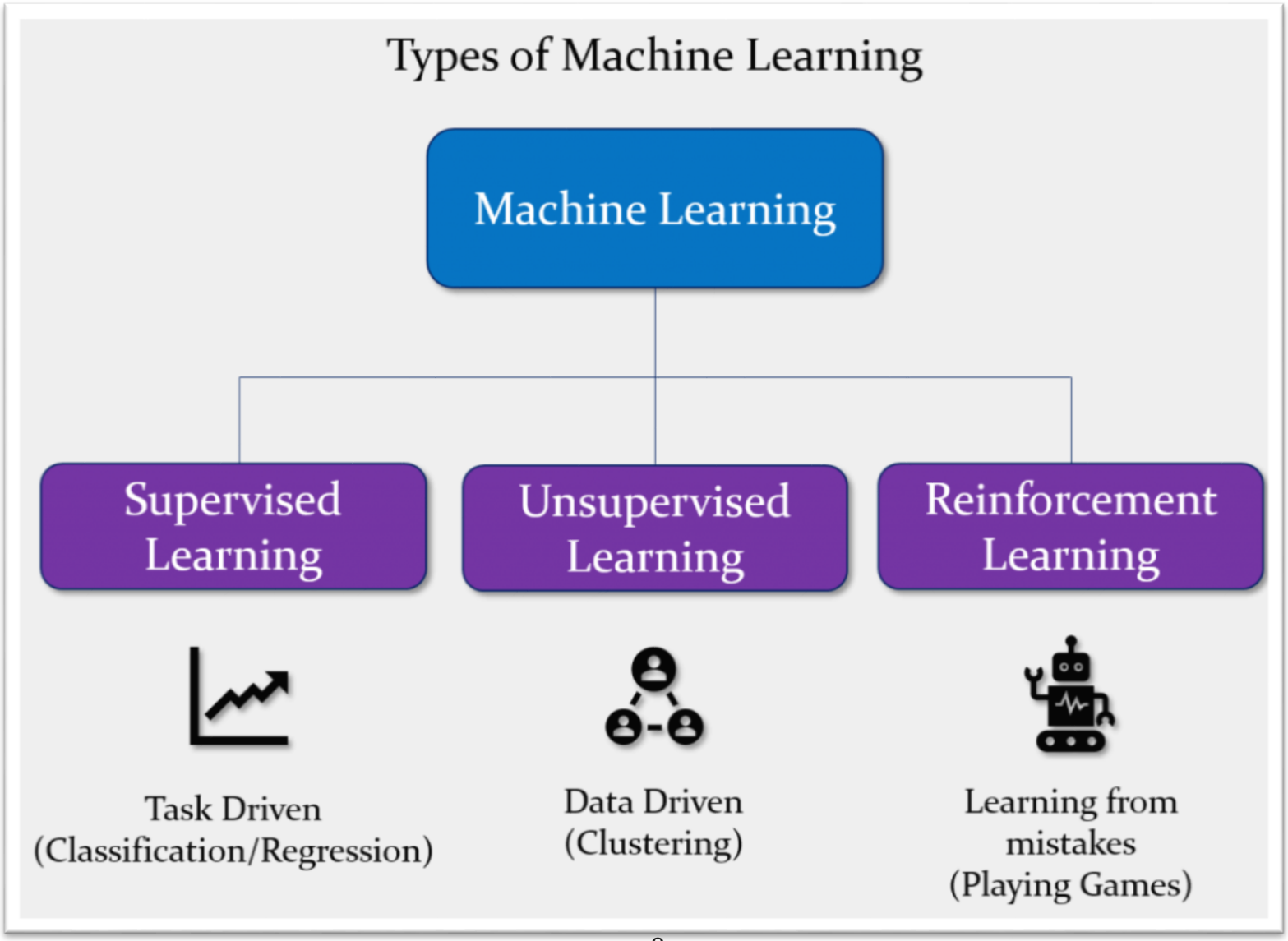
- Probably the most common problem type in machine learning
- Example : Predicting House Price



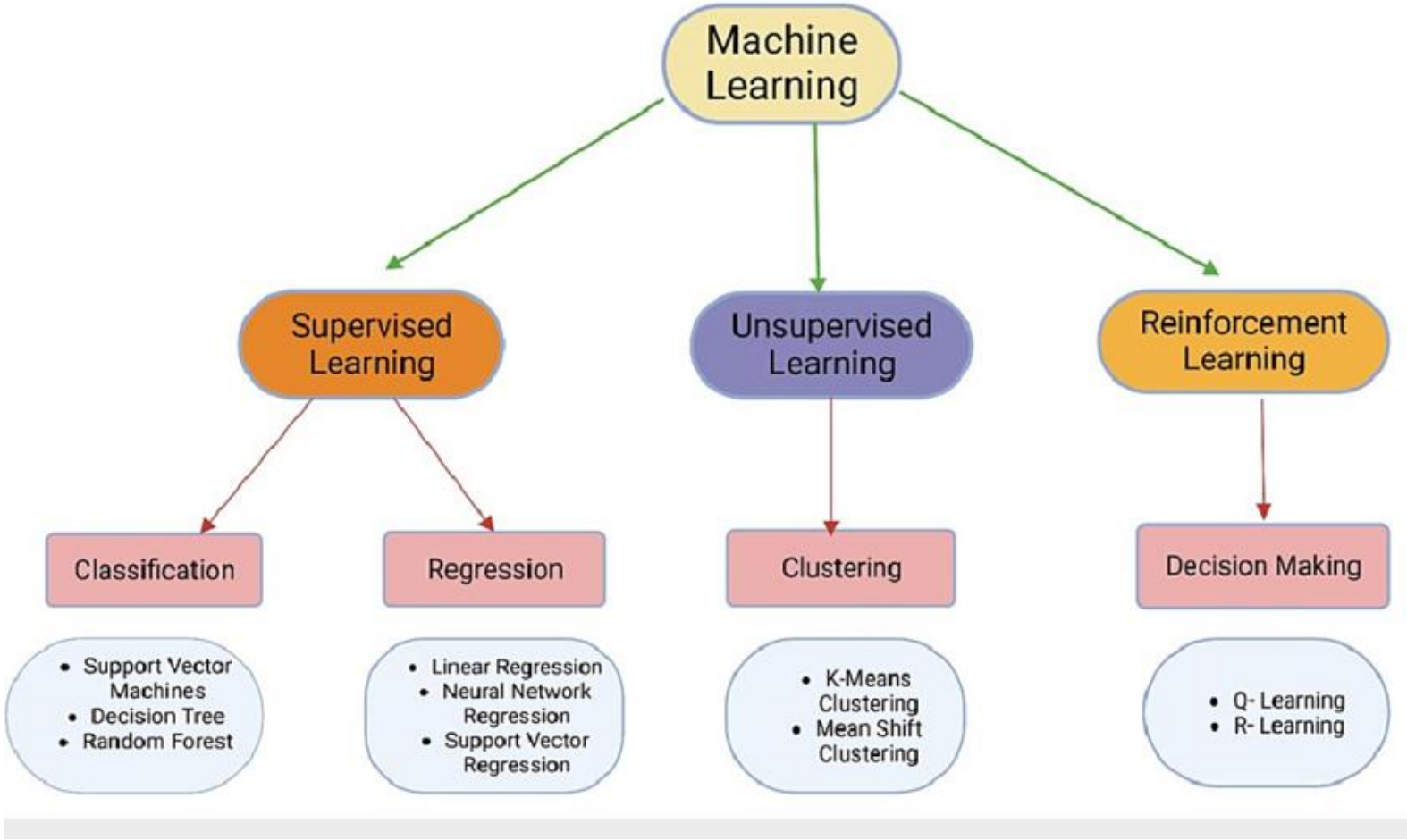
Applications of Machine Learning

- Personalized recommendations in e-commerce and streaming services
- Autonomous vehicles and self-driving cars
- Medical diagnosis and disease prediction
- Stock market prediction
- Spam email detection
- And many more

Types of Machine Learning



Types of Machine Learning



1. Supervised Learning

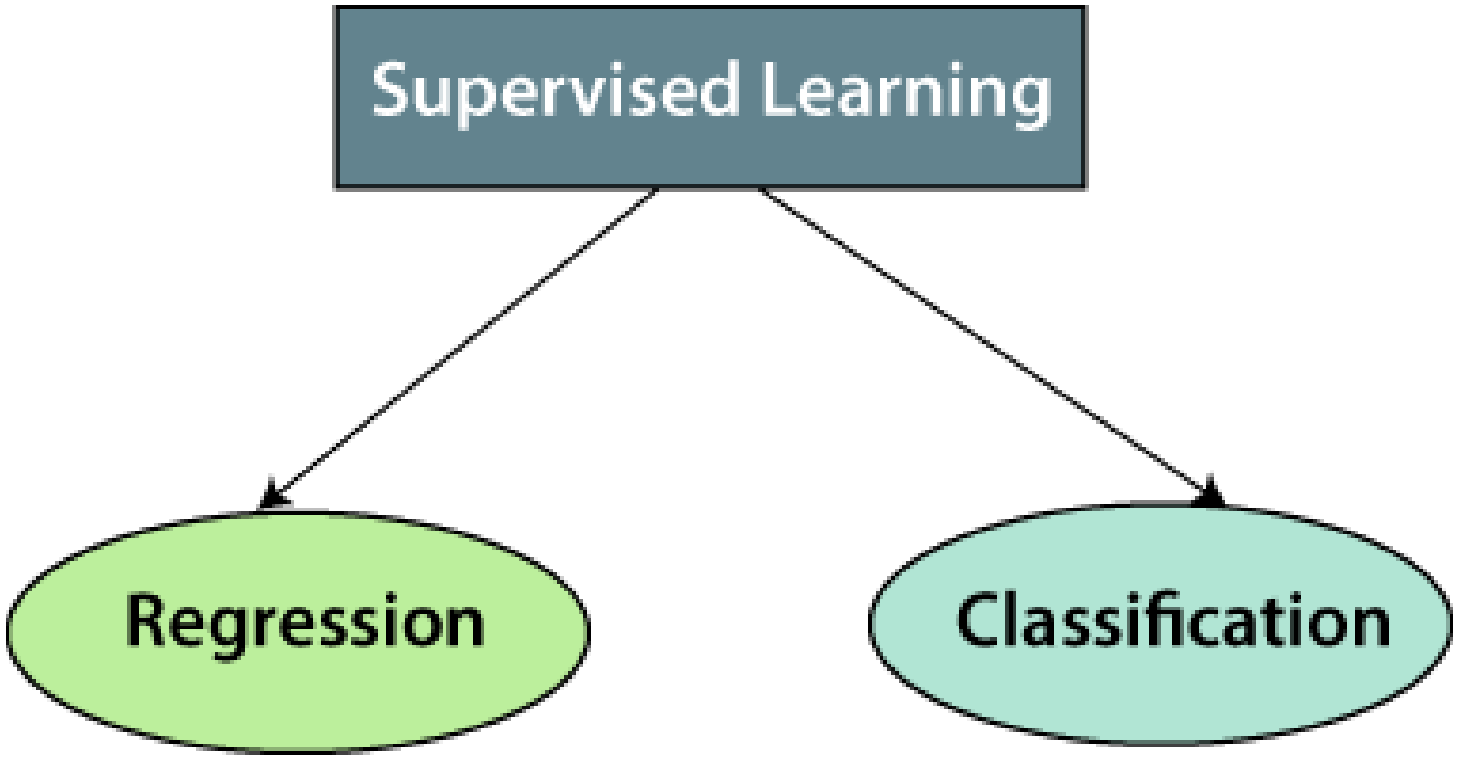
Definition:

Involves training a model on a labeled dataset, meaning that each training example is paired with an output label.

Applications: Classification, regression.

Examples: Linear regression, logistic regression, support vector machines, neural networks, k-nearest neighbors.

Types of Supervised Learning



2. Unsupervised Learning

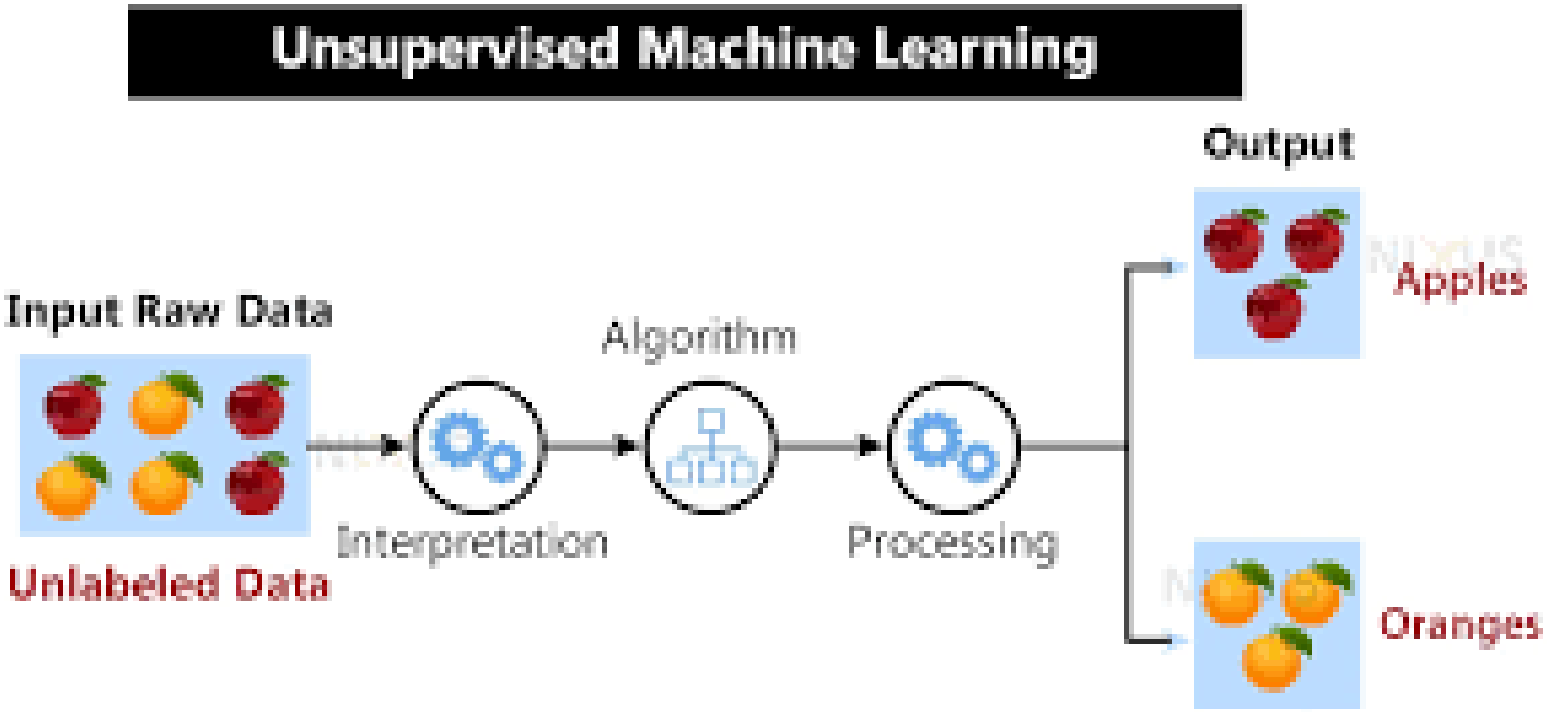
Definition:

Involves training a model on data without labeled responses, aiming to find hidden patterns or intrinsic structures in the input data.

Applications: Clustering, dimensionality reduction, Anomaly detection, Association

Examples: K-means clustering, hierarchical clustering, principal component analysis (PCA), t-SNE.

2. Unsupervised Learning Example



3. Reinforcement Learning

Definition:

Involves training an agent to make sequences of decisions by rewarding desired behaviors and/or punishing undesired ones. The agent learns to achieve a goal in an uncertain, potentially complex environment.

Applications: Game playing, robotic control, recommendation systems.

Examples: Q-learning, deep Q networks (DQNs), policy gradient methods.

Thank You