Aspect	Supervised Learning	Unsupervised Learning	Reinforcement Learning
Learning Paradigm	Labeled data with input-output pairs	Unlabeled data with no explicit target labels	Feedback-based learning through interactions
Input Data	Input features (X) and corresponding target labels (Y)	Input features (X) without corresponding target labels	Input features (X) and environment feedback (rewards and penalties)
Goal	Make predictions or decisions on new data	Discover patterns and relationships in data	Learn a policy to make optimal decisions
Example Applications	Image classification, sentiment analysis, regression tasks, etc.	Clustering, anomaly detection, dimensionality reduction, recommendation systems,	Game playing (e.g., AlphaGo), robotic control, self-driving cars, etc.
Training Approach	Supervised learning algorithms optimize a mapping between X and Y using labeled data	Unsupervised learning algorithms seek to find patterns or structure in the data without labels	Model learns through trial and error with exploration and
Knowledge Required	Requires labeled data for training	Does not require labelled data	Requires understanding of the environment and its feedback
Evaluation	Performance measured based on prediction accuracy or other classification metrics	Evaluation is more challenging and may be based on metrics like clustering quality	Evaluation is based on long-term cumulative rewards and penalties

Aspect	Supervised Learning	Unsupervised Learning	Reinforcement Learning
Exploration vs Exploitation	Not applicable	Not applicable	Balancing exploration and exploitation
Common Algorithms	Linear regression, logistic regression, support vector machines, decision trees, etc.	K-Means clustering, Gaussian Mixture Models, autoencoders, etc.	Q-learning, Deep Q Network (DQN), Policy Gradient methods,Actor-Critic, etc.

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