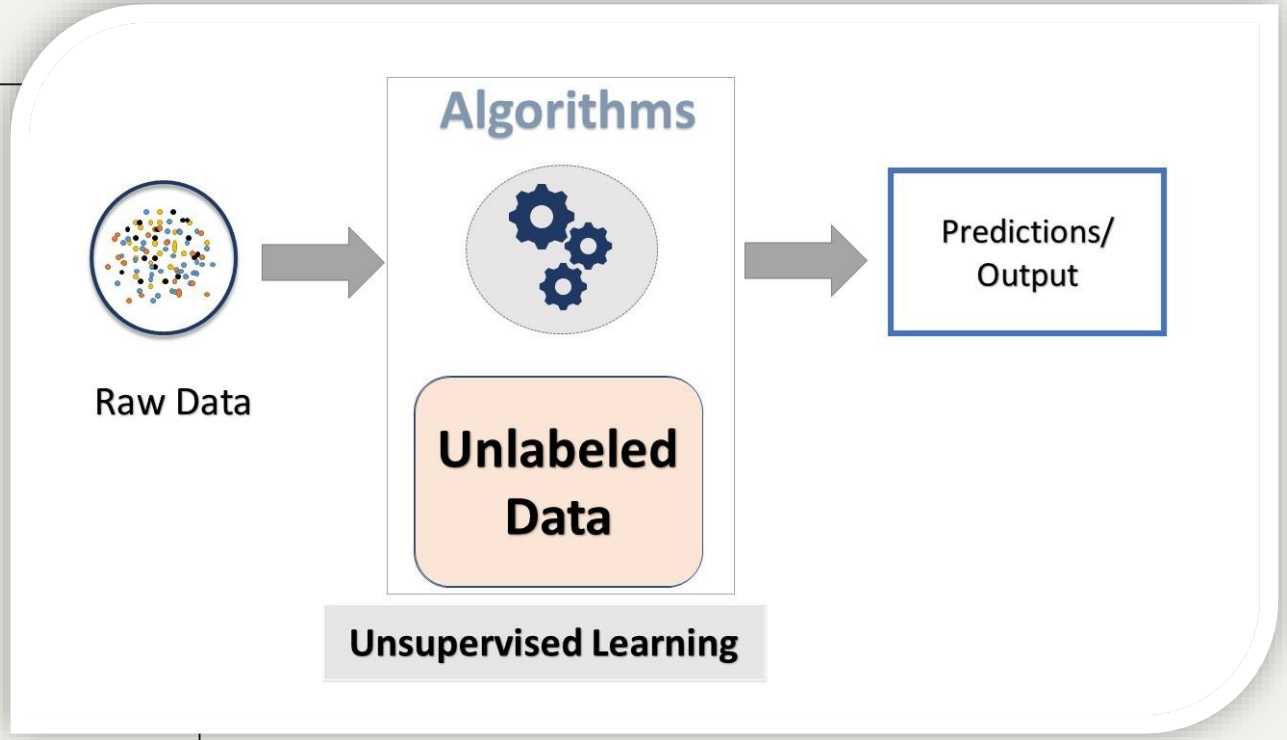
Machine Learning

Free Machine Learning Training – Session **8**

Unsupervised Learning



In the previous session, we explored supervised learning, where models are trained using labeled data. However, in many real-world scenarios, labeled data is unavailable, making it essential to uncover hidden patterns and structures within the dataset.

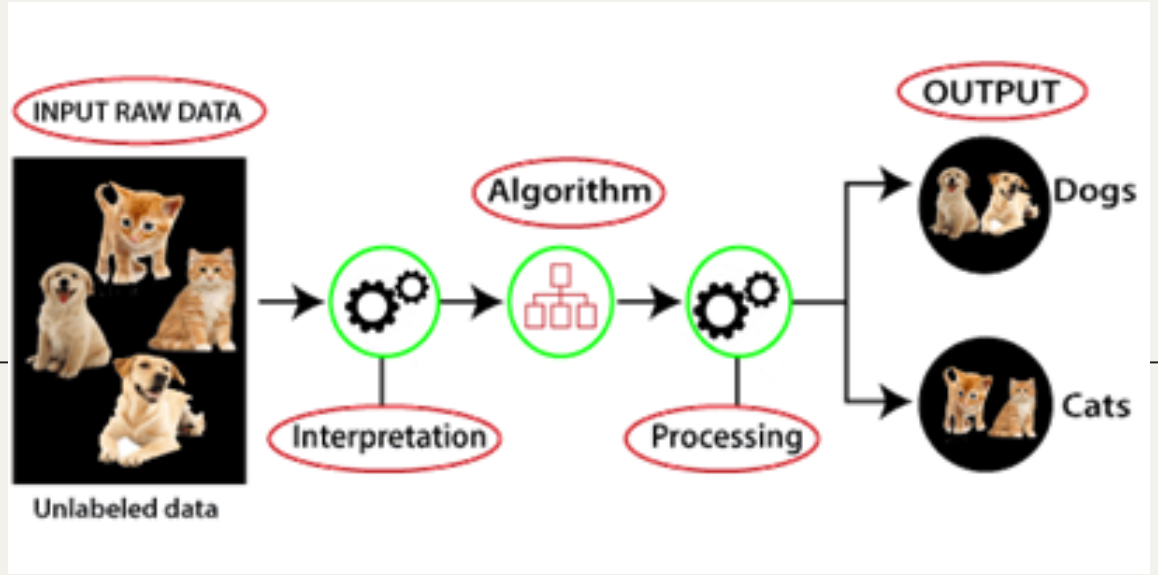
This is where **unsupervised learning** comes into play.

What is Unsupervised Learning?

Unsupervised learning is a type of machine learning where models are trained on unlabeled data without explicit supervision.

Unlike supervised learning, where the model learns from labeled examples,

unsupervised learning enables the model to autonomously identify **patterns, structures, and relationships within the data**.



Common Unsupervised Learning Algorithms

- K-means Clustering
- Hierarchical Clustering
- K-Nearest Neighbors (KNN)
- Neural Networks
- Anomaly Detection
- Principal Component Analysis (PCA)
- Independent Component Analysis (ICA)

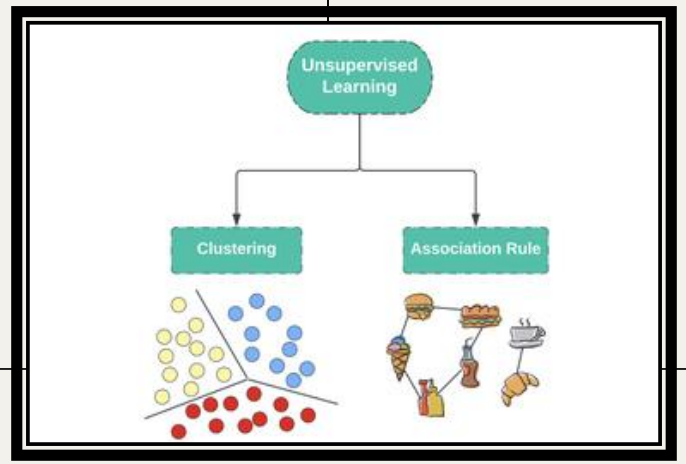
Types of Unsupervised Learning

Clustering

- **Clustering** is a technique that groups objects based on their similarities. Objects that are most similar are placed in the same group (cluster), while objects with less similarity are assigned to different groups.

Association

- **Association** learning is used to find relationships between variables within large datasets. It identifies sets of items that often occur together in transactions or events.



Real-World Applications of Unsupervised Learning

- **Customer Segmentation –** Businesses group customers based on behavior.
- **Anomaly Detection –** Identifying fraud or cybersecurity threats.
- **Recommendation Systems –** Suggesting products (e.g., Netflix, Amazon).
- **Medical Diagnosis –** Discovering patterns in medical images.

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💡 Mastering Machine Learning requires dedication, practice, and continuous learning.

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Thank you!

Do you have any questions?

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