

(I) Explain Supervised vs Unsupervised Learning.

- Supervised Learning is a type of machine learning where the model is trained on labeled data.
- each training example includes both input data and the correct output.
- The model compares its predictions to the true labels, measure the error, adjust itself to improve Accuracy.
- characteristics of Supervised Learning,
- It Requires labeled data, clear target variable and performance can be measured directly using Accuracy, error rate, etc.
- Common Tasks like classification and regression for predicting categories or predicting numerical values.
- example → Email Spam detection
→ House price prediction
→ Medical diagnosis based on patient data.

→ Unsupervised Learning is a type of machine learning where the model is trained on unlabeled data.

- Model tries to discover patterns or structures in the data on its own.
- The Model explores the data and identifies hidden patterns, grouping and relationship.
- The goal is not prediction of known outcome but understanding the structure of data.
- Because There is no labels evaluation less straightforward and often domain dependent.
- Characteristics of Unsupervised Learning,-
- No labeled data required, No explicit target variable and focuses on a pattern discovery.
- Common Tasks like clustering, Dimensionality Reduction and association rule learning example like Customer Segmentation Market Analysis, Grouping similar documents and images.