Types of Learning Algorithms

Types of Supervised Learning Algorithms

Classification Algorithms	Regression Algorithms
They are used when the output variable is categorical. The task is to assign input data to one of several predefined classes or categories. **Use Cases:** • **Email spam detection:** Classifying emails as spam or not spam. • **Image recognition:** Identifying objects in images (e.g., cat, dog). • **Medical diagnosis:** Classifying patients based on disease presence.	They are used when the output variable is continuous. The task is to predict a numeric value based on input data. **Use Cases:** • **Predicting sales:** Estimating future sales based on historical data. • **House price prediction:** Predicting house prices based on features like size, location, and age. • **Weather forecasting:** Predicting future temperatures or rainfall.

Types of Unsupervised Learning Algorithms

Clustering Algorithms	Dimensionality Reduction Algorithms
Group data based on similarities, e.g., K-means, DBSCAN, and Hierarchical Clustering. **Use cases:** **Customer segmentation:** Grouping customers based on buying behaviour for targeted marketing.	Reduce the number of features while preserving data variance, e.g., PCA (Principal Component Analysis), t-SNE. **Use cases:** **Data compression:** Reducing the complexity of data while preserving key patterns.

Anomaly detection: Identifying unusual patterns or outliers in data, like fraud detection. **Document classification:** Organising documents by topic or theme without prior labelling.	**Feature extraction:** Identifying the most important features that drive the variance in data. **Visualisation:** Simplifying high-dimensional data for easy visualisation in 2D or 3D.