

Clustering is an unsupervised machine learning technique used to group similar data points based on their features. The logic behind clustering is to identify natural patterns or groupings in data without predefined labels. The key steps in clustering include:

**1. Data Preparation:**

- Combine relevant features from the dataset to create a feature set for clustering.
- Normalize or standardize the data to ensure all features have equal importance and prevent bias from differing scales.

**2. Algorithm Selection:**

- Choose an appropriate clustering algorithm, such as:
  - **K-Means Clustering:** Divides data into k predefined clusters by minimizing the variance within clusters.
  - **DBSCAN (Density-Based Spatial Clustering):** Groups points based on their density and handles noise effectively.
  - **Hierarchical Clustering:** Builds a hierarchy of clusters either through agglomeration (bottom-up) or division (top-down).

**3. Defining Number of Clusters:**

- Use methods like the Elbow Method or Silhouette Score to determine the optimal number of clusters for algorithms like K-Means.

**4. Evaluation:**

- Evaluate the quality of clusters using clustering metrics.