**ON UNSUPERVISED ML**

**Unsupervised machine learning** is a type of machine learning where the algorithm is given data **without labeled outcomes**—meaning, there are no predefined categories or correct answers. The goal is for the algorithm to **discover patterns, structures, or relationships** within the data on its own.

**Key Features of Unsupervised ML:**

* **No labels**: The data is not categorized or tagged in advance.
* **Pattern discovery**: The algorithm looks for ways to group or organize the data.
* **Exploratory**: It’s often used to understand the underlying structure of the data.

**Common Techniques:**

1. **Clustering** – Grouping similar data points together (e.g., using algorithms like k-means or DBSCAN).
2. **Dimensionality Reduction** – Simplifying large datasets by reducing the number of variables (e.g., with Principal Component Analysis or PCA).

**Use Cases:**

* Customer segmentation in marketing
* Anomaly detection (e.g., fraud detection)
* Organizing large collections of data (like images or documents)

In summary, unsupervised ML is about finding hidden patterns in data without prior knowledge of what you're looking for.