**Decision Tree :**

\*A **Decision Tree** is a machine learning algorithm used for classification and regression tasks.

It is a flowchart-like structure where each internal node represents a decision based on a

feature, each branch represents an outcome, and each leaf node represents a final decision

or prediction.

**What It Does:**

* Splits the dataset into subsets based on feature values.
* Helps in decision-making by following a series of conditions.
* Can be used in classification (e.g., predicting whether a customer will churn) or

regression (e.g., predicting sales).

**Advantages of Decision Trees:**

✅ **Easy to Understand & Interpret** – The structure is simple and mimics human decision-making.  
✅ **Requires Little Data Preprocessing** – Works well with numerical and categorical data without scaling.  
✅ **Handles Non-linearity** – Can capture complex decision boundaries.  
✅ **Feature Importance** – Identifies the most important features for prediction.

**Disadvantages of Decision Trees:**

❌ **Overfitting** – A deep tree can become too complex and perform poorly on new data.  
❌ **Unstable** – Small changes in data can lead to a completely different tree.  
❌ **Biased towards Dominant Classes** – If data is imbalanced, it might favor the majority class.  
❌ **Computational Cost** – Large trees can be expensive to train and interpret.

**Conclusion**

Decision trees are powerful but need careful tuning (like pruning and setting depth limits) to avoid overfitting. They are often used as the base model in **Random Forests** to improve stability and accuracy.