Types of Machine Learning

This lesson provides an overview of machine learning types, including its types, algorithms, and how it works.

What is Supervised Machine Learning?

- Supervised machine learning involves training a model on a labeled dataset.
- Each training example is paired with an output label.
- The model learns to predict the output from the input data.
- The goal is to accurately predict the output for new, unseen data.
- Types of ML is called supervised because it uses labeled data.

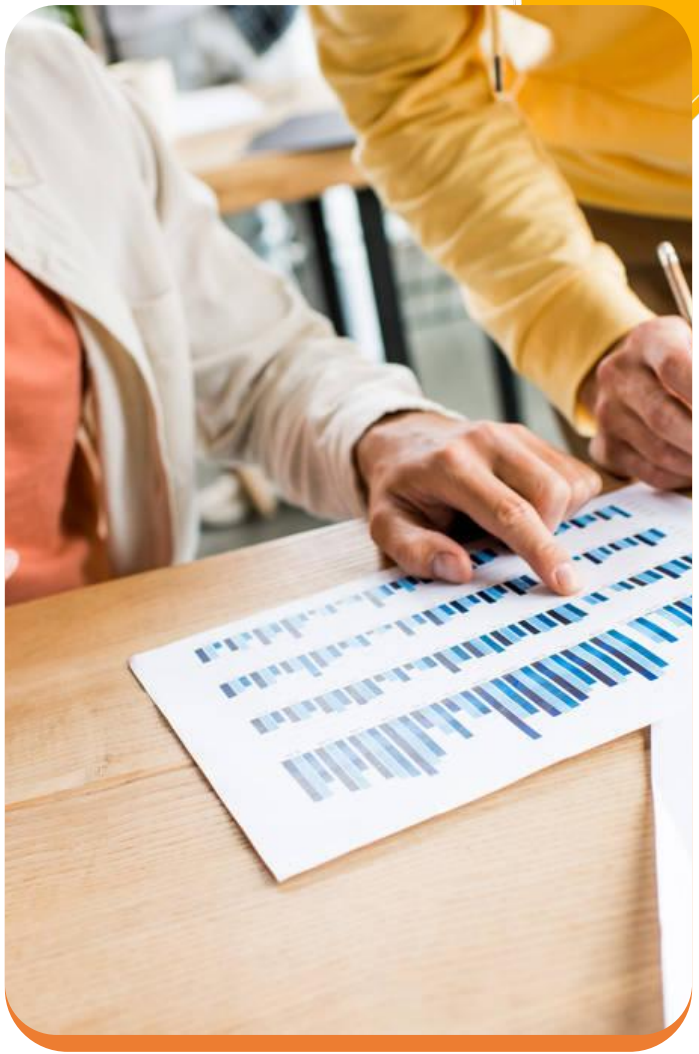
Types of Supervised ML

- Supervised ML can be classified into two main types: **classification** and **regression**.
- Classification models are used when the output variable is a category.
- Regression models predict a continuous quantity.

Classification Models

01 Common classification models include Logistic Regression, Decision Trees, and Random Forest.

02 Classification models are used for categorical output variables.



Logistic Regression Analysis

01 It estimates the probabilities of the possible outcomes using a logistic function.

02 Logistic regression is used for analyzing datasets with one or more independent variables that determine a binary outcome.

Scenario Example

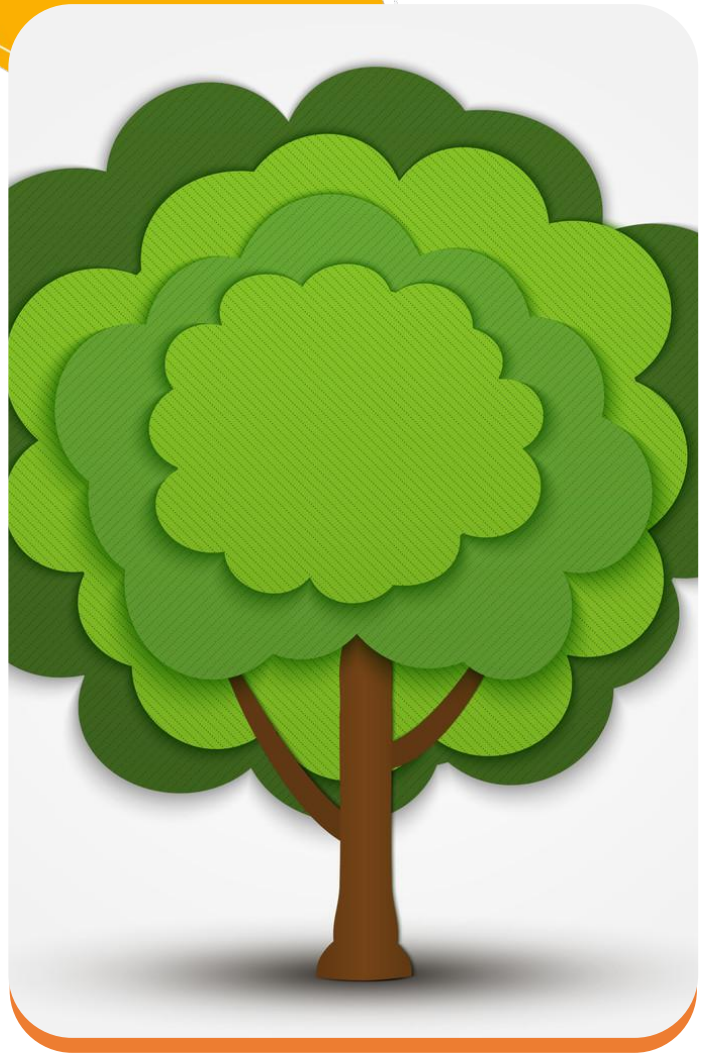
- Example scenario: Studying the relationship between taking a new drug and the reduction of heart attack risk.
- Independent variables: Dosage of the drug, patient age, gender, cholesterol level, and blood pressure.
- Dependent variable: Whether a heart attack occurred or not.

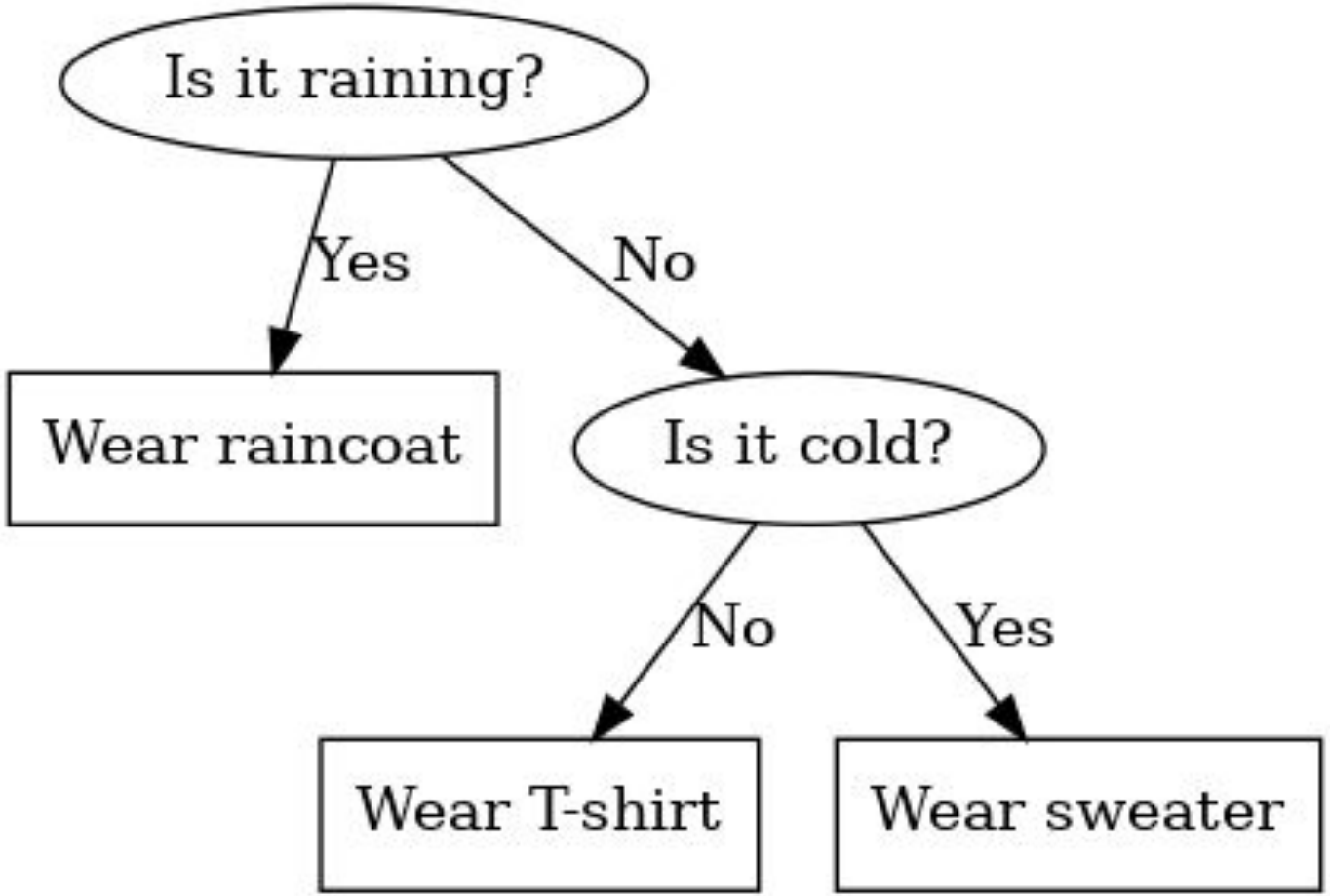
How a Decision Tree Works

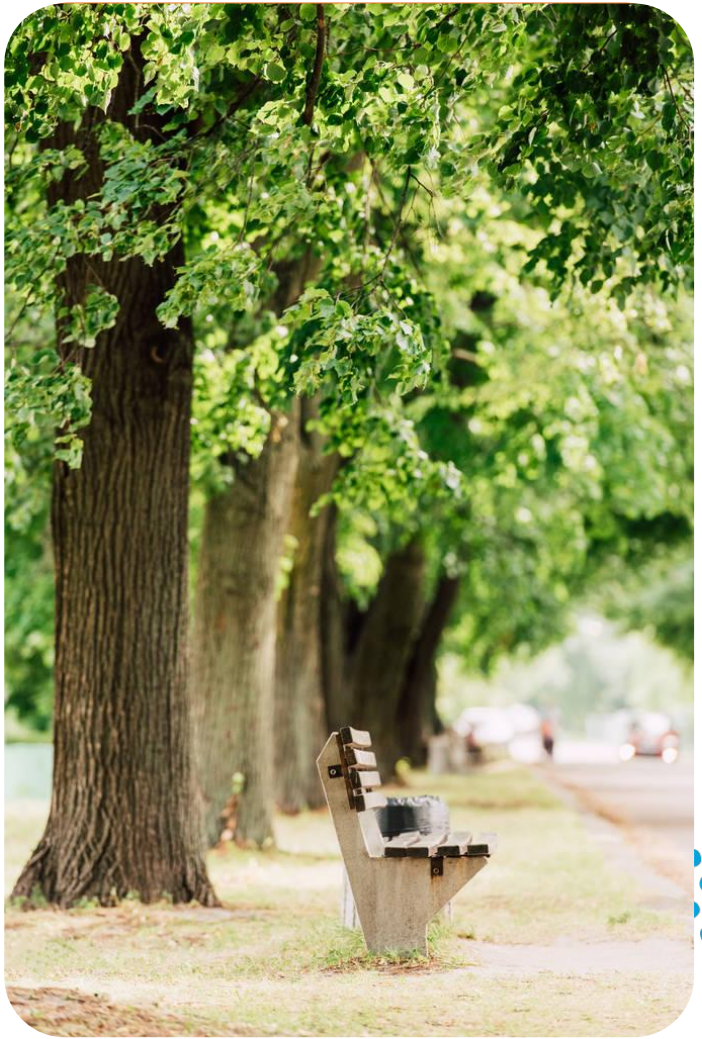
01 A decision tree makes splits based on features in the data.

02 It asks questions and follows different paths to different outcomes, similar to a flowchart.

03 The tree keeps splitting until it finds its final results.

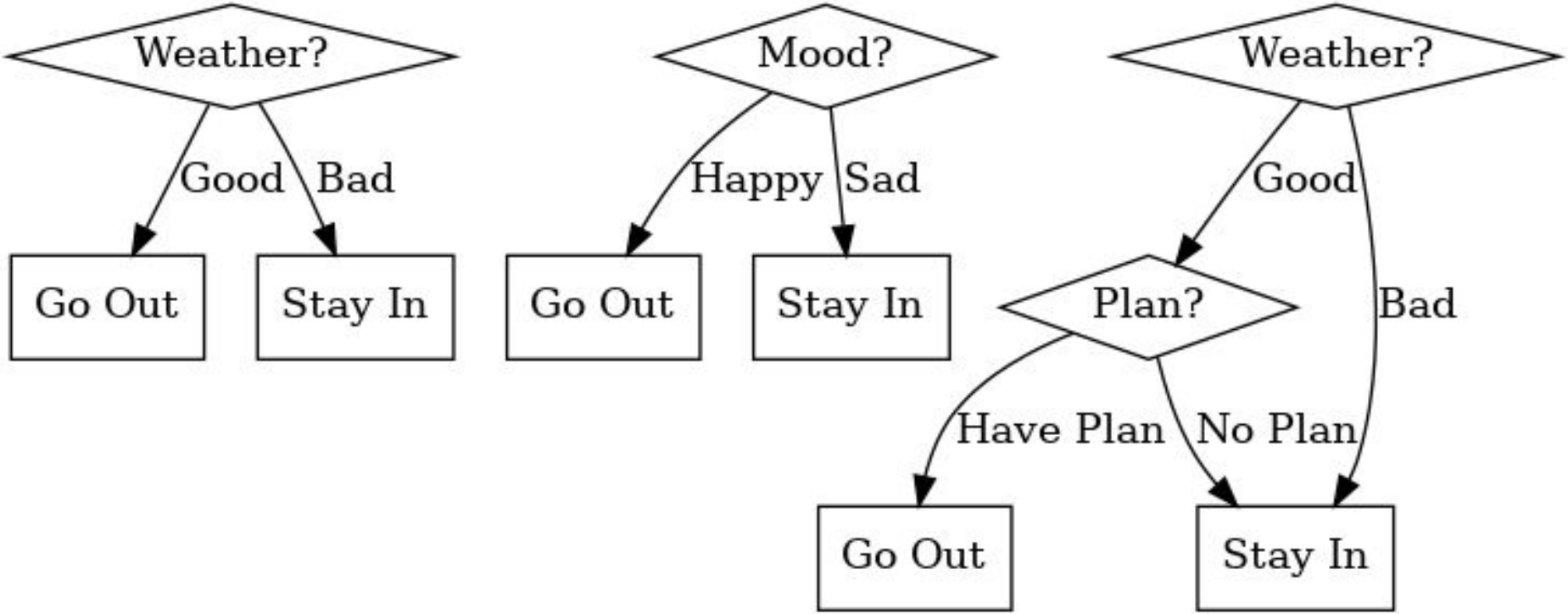



Is it raining?
Yes
No
Wear raincoat
Is it cold?
No
Yes
Wear T-shirt
Wear sweater



How Random Forest Classification Works

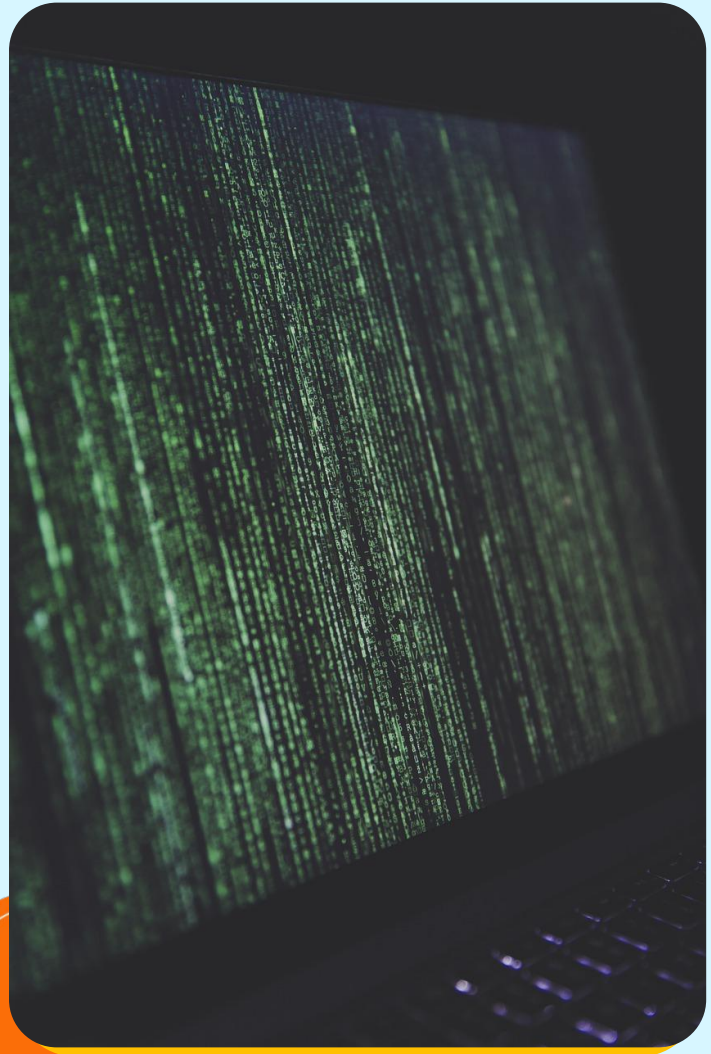
- Random Forest is a collection of decision trees.
- Each tree is created using a random subset of data and features.
- When classifying new data, each tree makes its own decision, and the final classification is determined by majority vote.


Weather?
Good
Bad
Go Out
Stay In
Mood?
Happy
Sad
Go Out
Stay In
Weather?
Good
Bad
Plan?
Have Plan
No Plan
Go Out
Stay In

Regression Models

01 Common regression models include Linear Regression, Decision Trees for Regression, and Random Forest for Regression.

02 Regression models predict continuous or numeric variable.

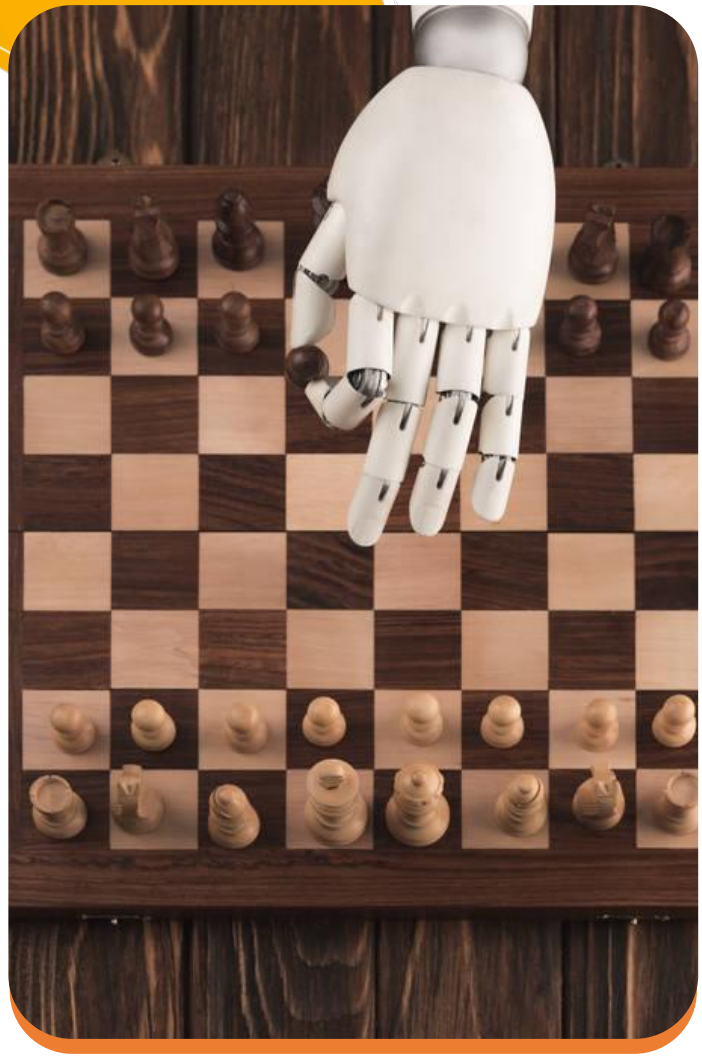


Unsupervised Machine Learning

01 Unsupervised ML deals with data that has no labels.

02 It learns patterns and structure from the data without explicit instructions.

03 Common applications include customer segmentation and data clustering.



How KMeans Clustering Works

01 KMeans clustering is a method of grouping objects based on similarity.

02 It discovers inherent groupings in the data without labels.

03 Common applications include grouping customers by behavior and organizing research data.

Example of KMeans

01 KMeans clustering can be used to segment customers based on purchasing behavior.

02 For example, customers A and B can be classified as most loyal, C and D as loyal, and E as less loyal.

Thank you for your time and attention 🙂