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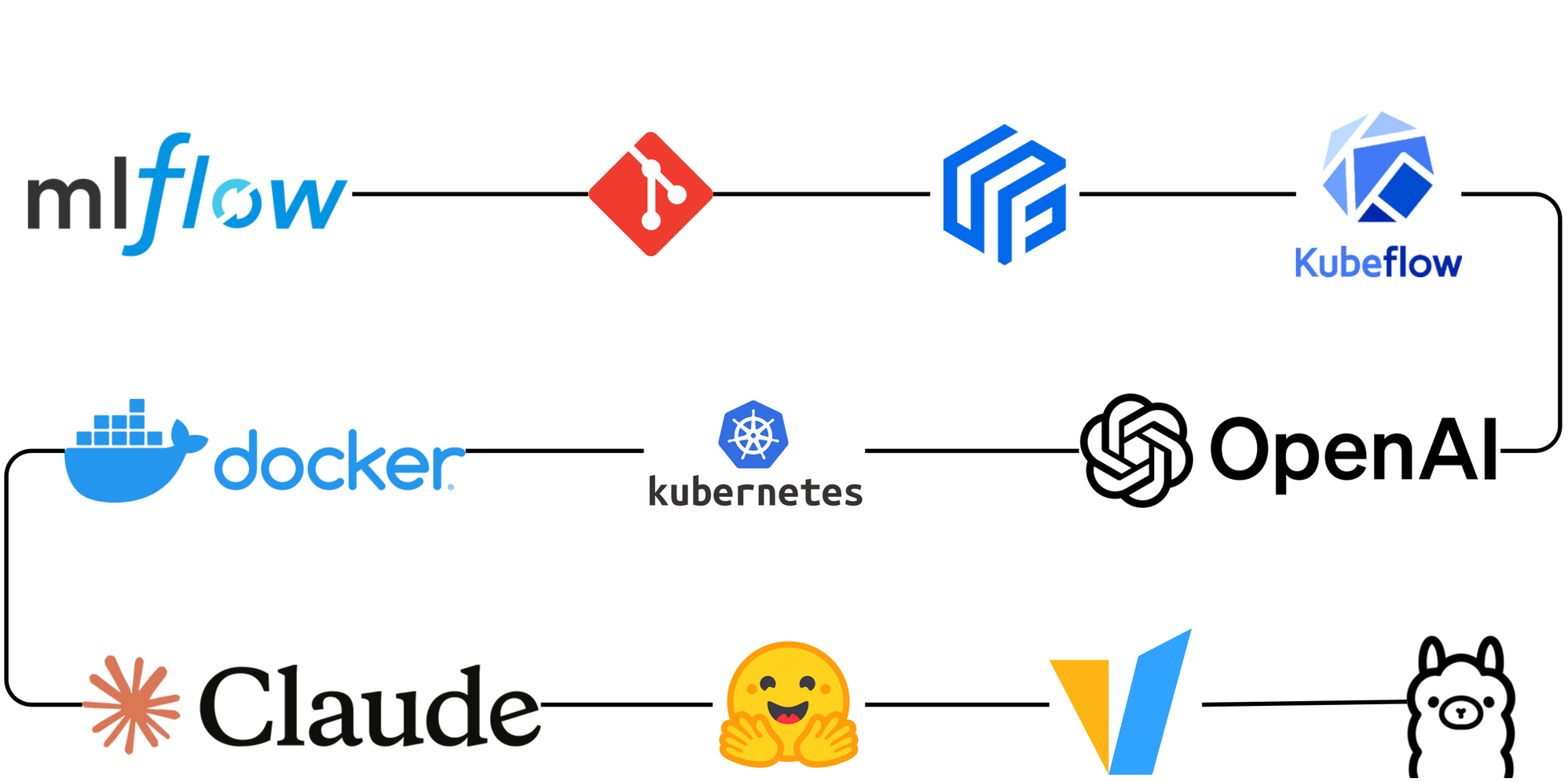
MLOps Training

MACHINE LEARNING OPERATIONS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mlflow
Kubeflow
docker
kubernetes
OpenAI
Claude

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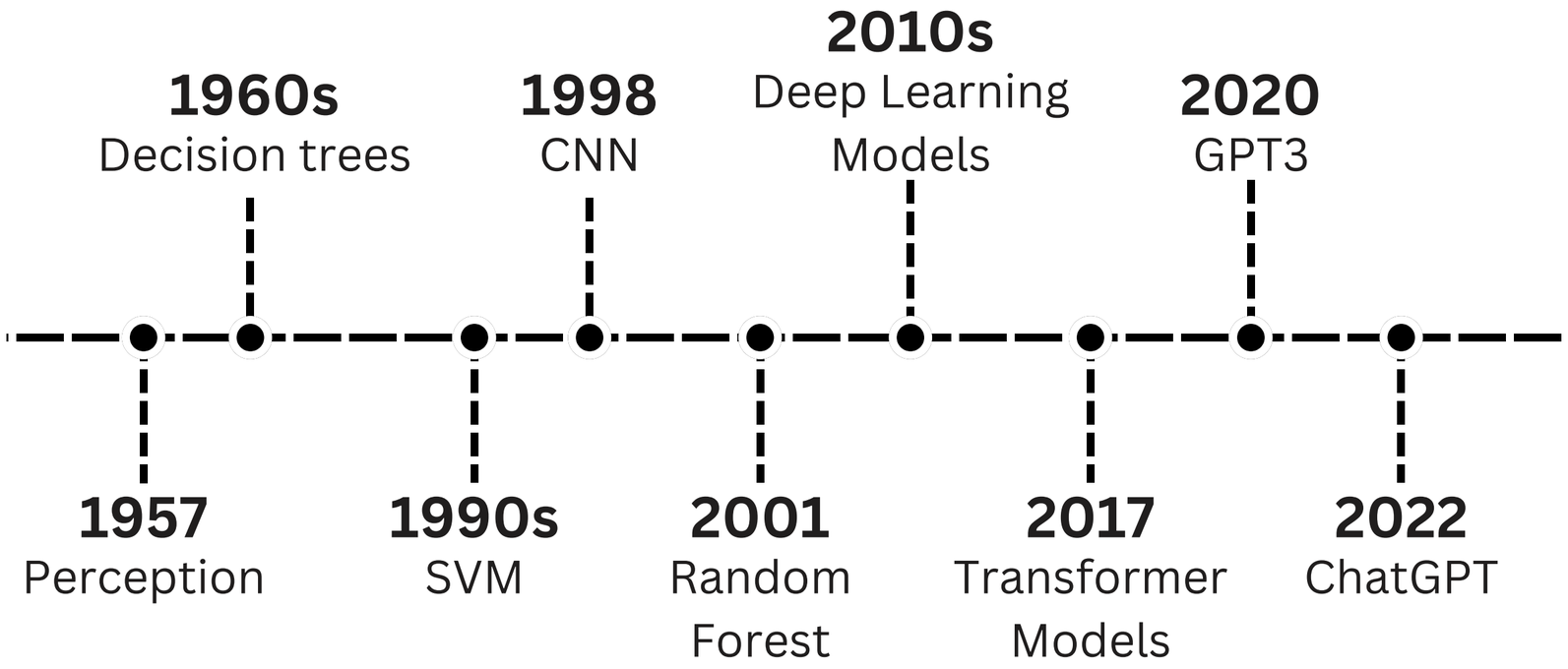
Day 1
Agenda

Overview of Machine Learning

- What is ML? Use cases
- Supervised learning: Classification & Regression
- Training and evaluating basic models with scikit-learn

History of Machine Learning



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What is Machine Learning ?

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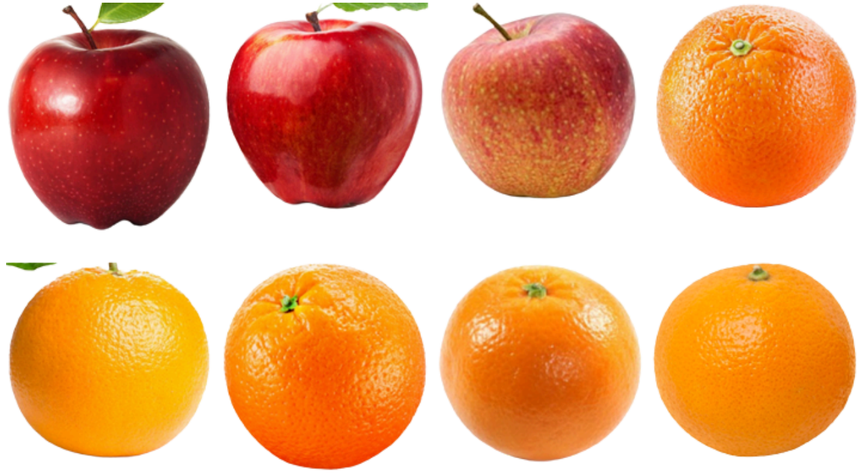


What is Machine Learning ?

Machine Learning (ML) is a subset of Artificial Intelligence that involves the development of algorithms enabling computers to learn from data and improve their performance on a specific task without being explicitly programmed.

- It focuses on the creation of models that can recognize patterns,
- Models can make predictions,
- Models can adapt to new information

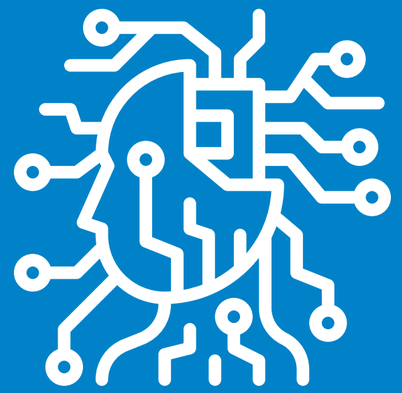
Usecases

Usecases

Machine learning is used across industries to enhance efficiency and decision-making.

Common Use Cases:

- **Healthcare**: Predict disease risk from patient data
- **Finance:** Detect fraud in transactions
- **Retail:** Recommend products to users (like Amazon or Netflix)
- **Manufacturing:** Predict equipment failure (predictive maintenance)
- **Marketing:** Segment customers and personalize campaigns



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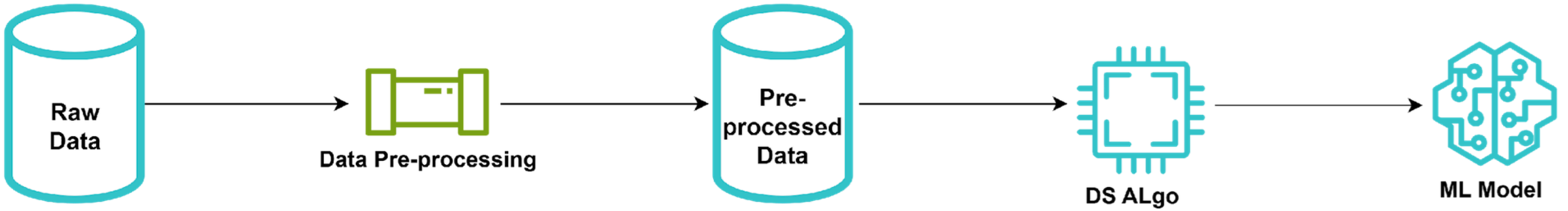
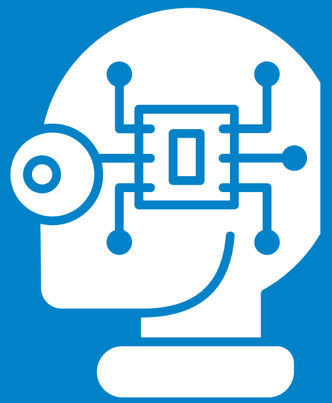
Introduction to Machine Learning


Raw Data
Data Pre-processing
Pre-processed Data
DS ALgo
ML Model



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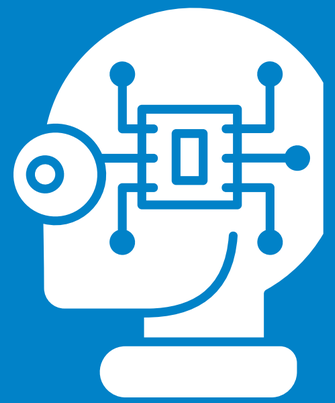
Types of Machine Learning

- Supervised
- Unsupervised
- Reinforcement Learning



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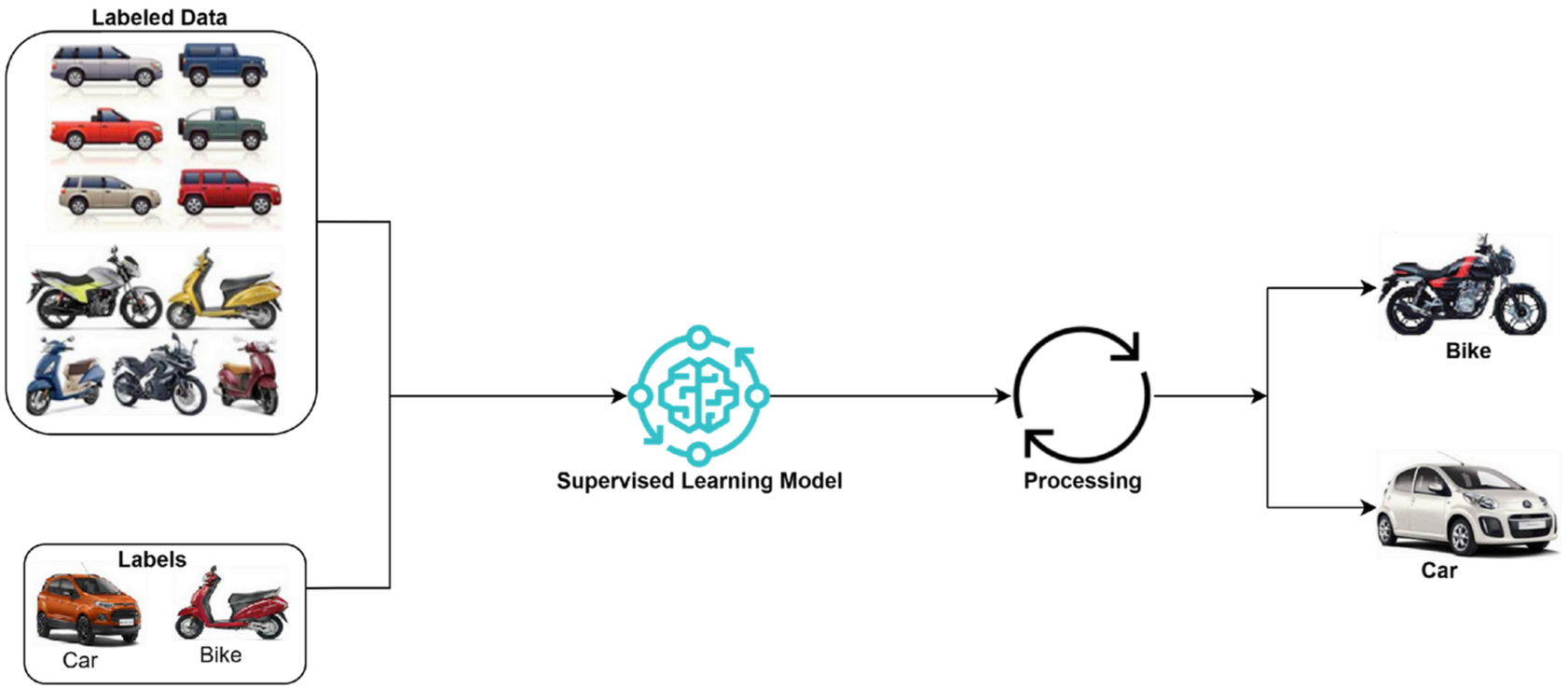
Supervised Learning

Supervised Learning



Supervised Learning

Supervised learning is when the model learns from labeled data (input + correct output).

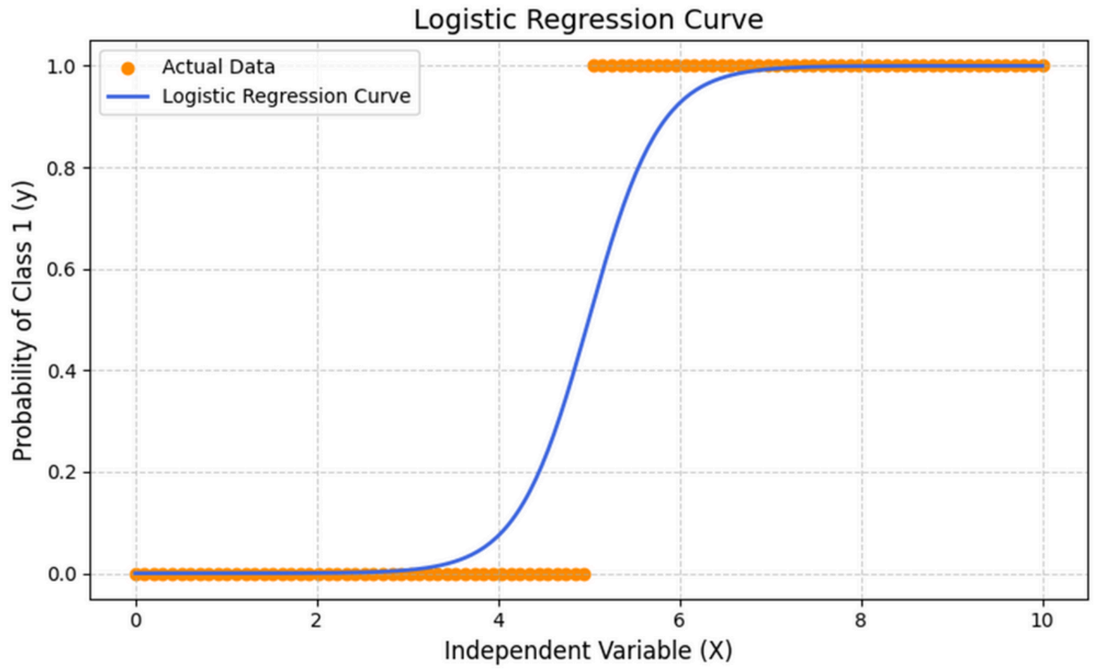
Two Main Types:

1. Classification
    - Output is categorical
    - Example: Email → spam or not spam
2. Regression
    - Output is numerical
    - Example: Predict house price based on size, location

Classification

Logistic Regression is based on Maximum Likelihood Estimation, which is a method of estimating the parameters of an assumed probability distribution, given some observed data.

Notebook



Regression

Linear Regression is used to predict a continuous dependent/target variable based on one or more independent variables.

Notebook

$$y = mx + c$$

- y is predictive value(i.e. dependent variable)
- x is the input (i.e. independent variable)
- m is the slope of the line (how much y changes when x changes)
- c is the intercept (the value of y when x = 0)

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Training & Evaluating

Requirements

Problem Statement:

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We have to predict the Icecream cosumption based on temperature

Summar

Winter

ice cream consumption vs temperature

Knowledge Test

OVERVIEW OF MACHINE LEARNING

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Which one is a common use of Machine Learning?

A. Watching TV

B. Predicting house prices

C. Writing books by hand

D. Cooking food

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What is the primary goal of Machine Learning (ML)?

A. To write explicit rules for software to follow

B. To allow systems to learn patterns from data and make predictions

C. To create static programs that do not change behavior

D. To replace databases with neural networks

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In supervised learning, what do we give the computer to learn from?

A. Games

B. Data with answers (labels)

C. Music

D. Movies

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What is classification used for?

A. Predicting numbers

B. Grouping words

C. Predicting categories like “spam” or “not spam”

D. Drawing pictures

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What does train_test_split() do in scikit-learn?

A. It teaches robots to cook

B. It mixes data randomly

C. It splits data into training and testing parts

D. It deletes the dataset