

SUPERVISED LEARNING:

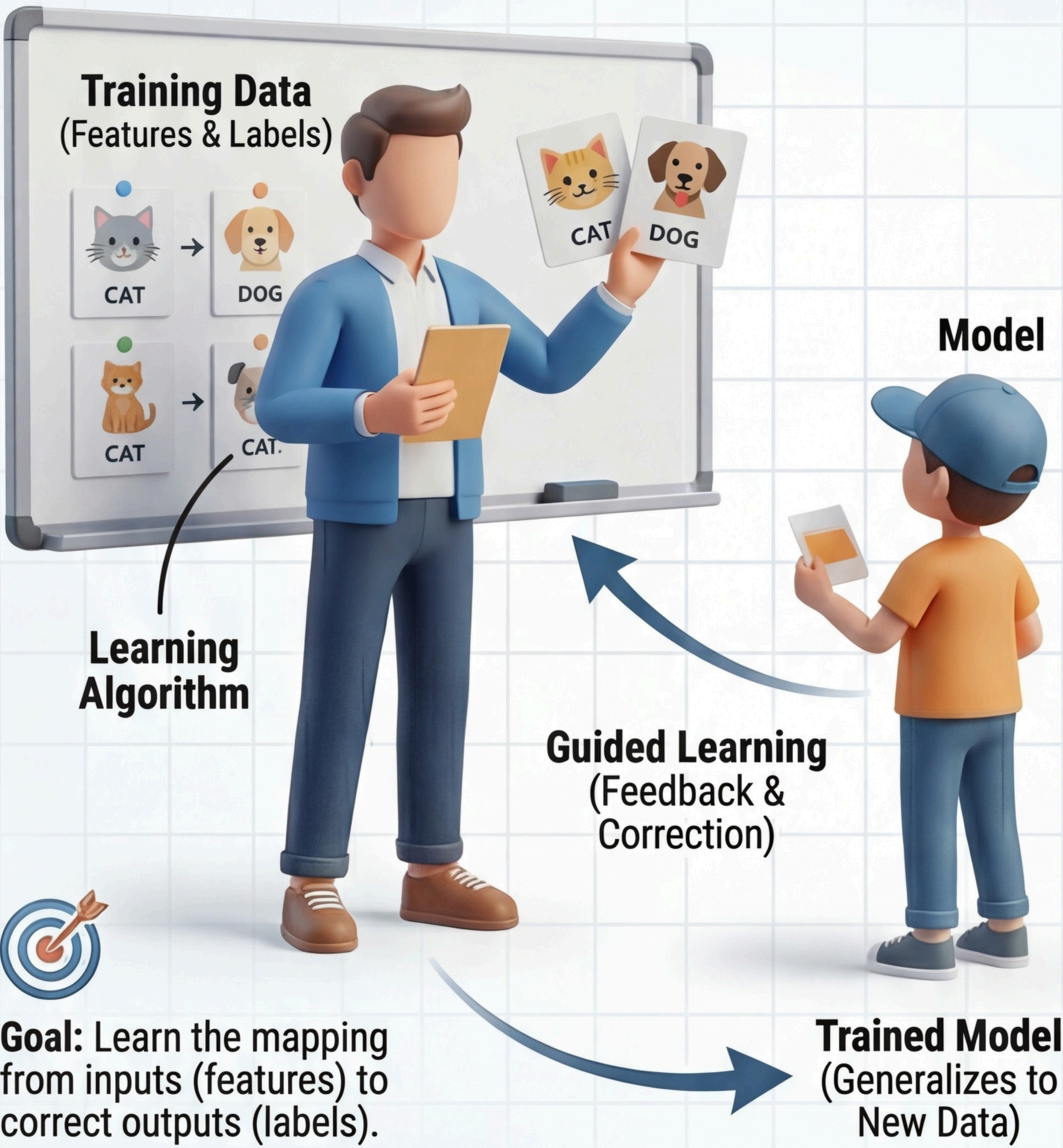
The Foundation of Predictive Modeling



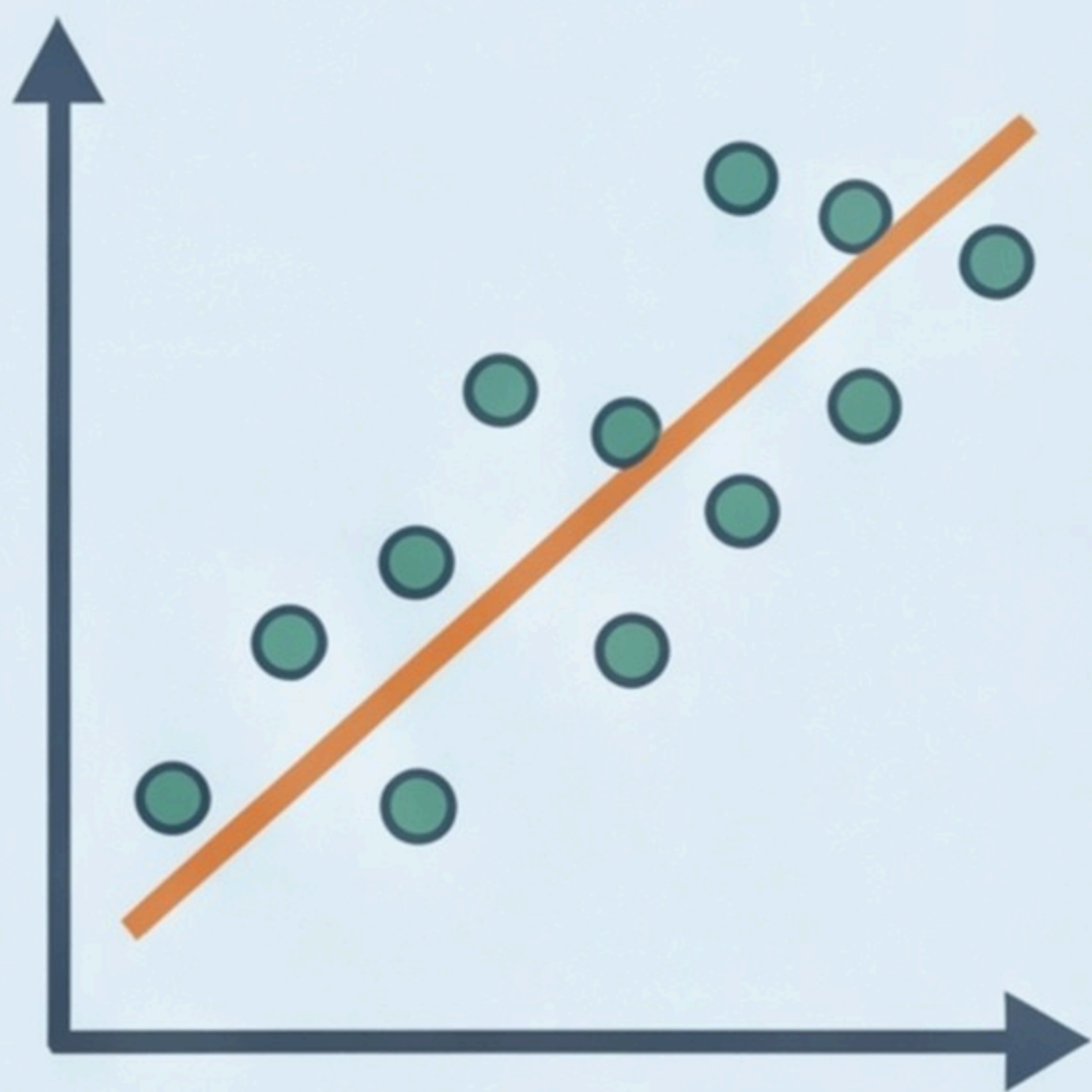
WHAT IS SUPERVISED LEARNING?

A type of machine learning where the model learns from labeled training data to make predictions.

THE ANALOGY: LEARNING WITH A TEACHER

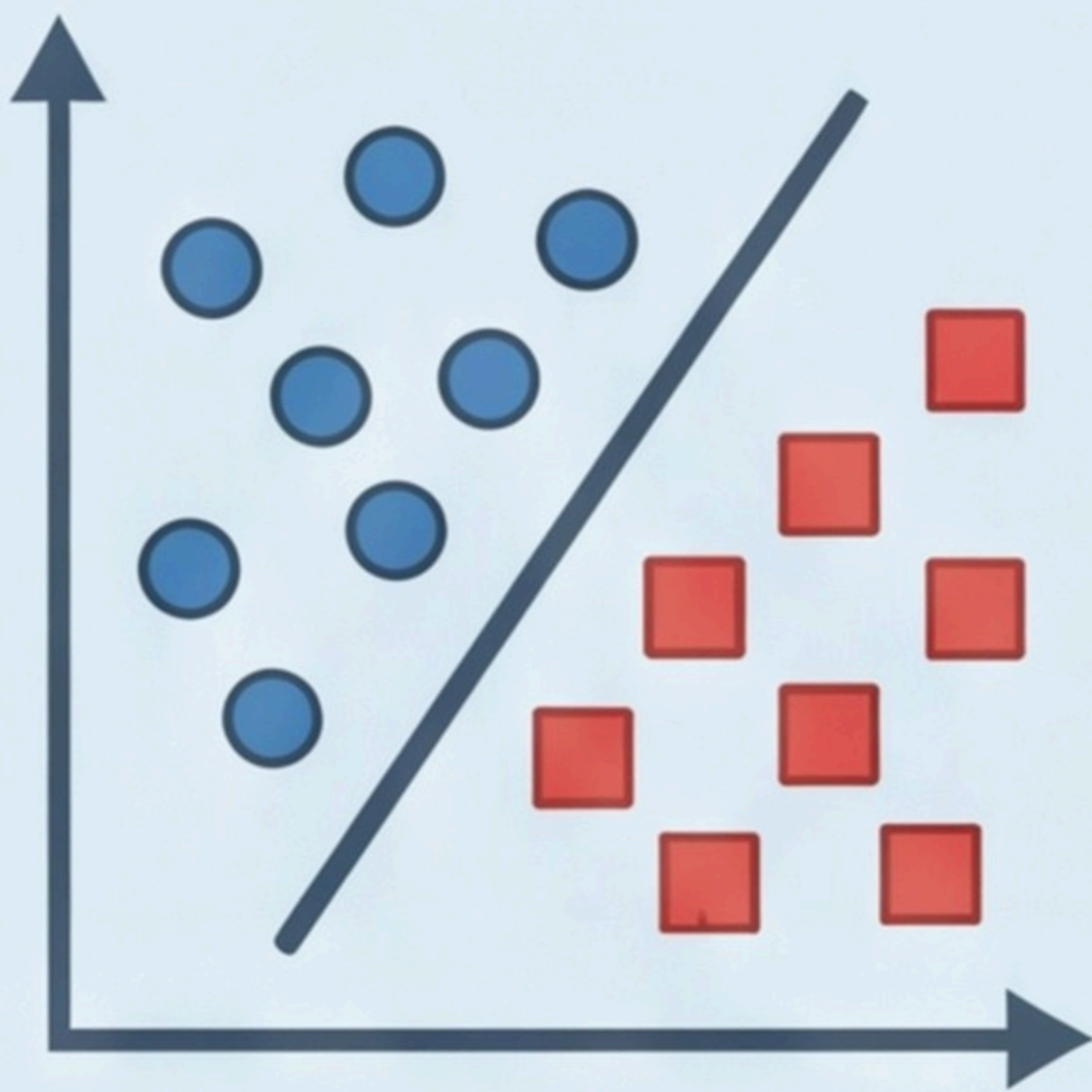


TYPES OF SUPERVISED LEARNING



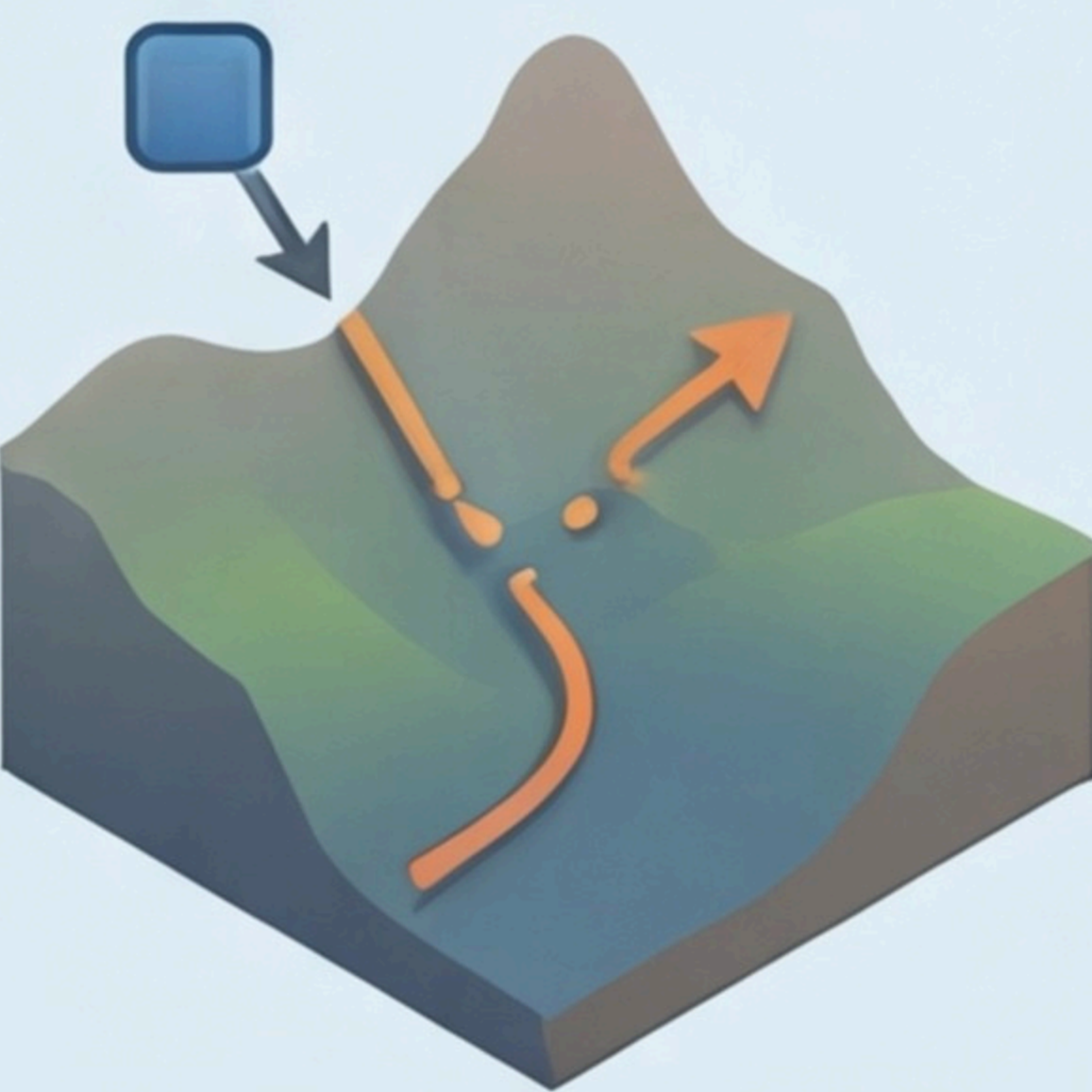
REGRESSION

Predicts continuous values (e.g., house prices, temperature).



CLASSIFICATION

Predicts categorical labels (e.g., spam/not spam, image recognition).



TRAINED MODEL

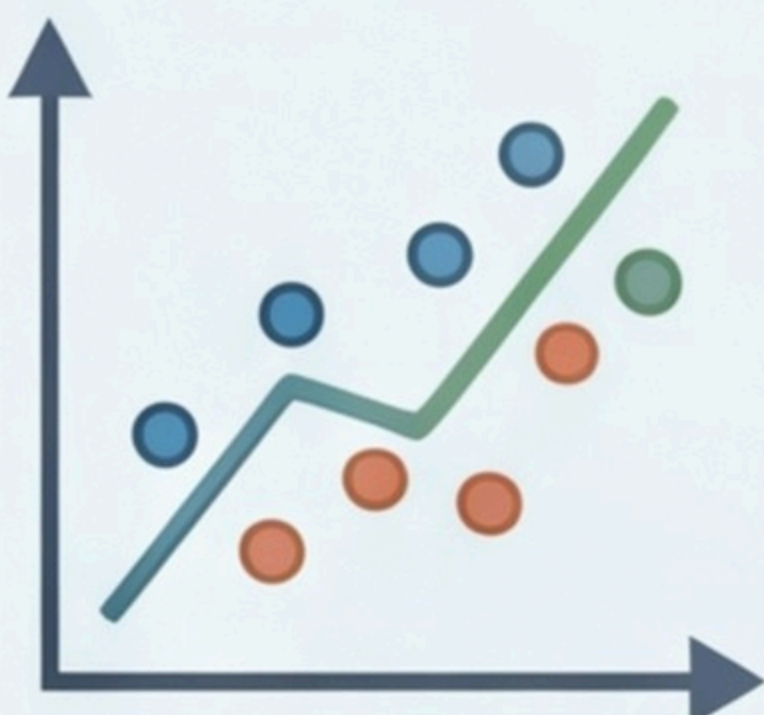
Predicts categorical labels (e.g., not spam, image recognition).

KEY COMPONENTS & PROCESS



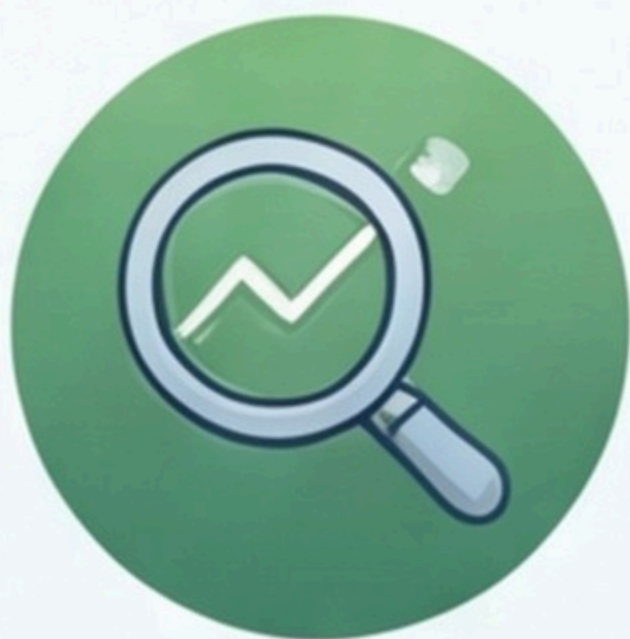
1. TRAINING DATA

Labeled examples with input features (X) and output labels (Y). Crucial for learning.



2. LEARNING ALGORITHM

Iteratively adjusts model parameters to minimize error on the training data.



3. TRAINED MODEL

The final model can now predict outputs for new, unseen data (generalization).

$$Y_{\text{pred}} = f(X_{\text{new}})$$

KEY TAKEAWAYS

- ✓ Requires large datasets with ground truth labels.
- ✓ Goal is to generalize well to new, unseen data.
- ✓ Used for both regression and classification tasks.

