

Machine Learning Terminology

Machine learning systems use relationships between inputs to generate predictions.

1. Relationship
2. Label
3. Feature

Relationships in Machine Learning

Machine learning systems use relationships between inputs to generate predictions.

In algebra, a relationship is often written as $y = ax + b$:

1. y is the label we want to predict.
2. a is the slope of the line
3. x are the input values
4. b is the point where it intersects the y-axis.

In Machine Learning, a relationship is written as $y = b + wx$:

1. y is the label we want to predict.
2. w is the weight (slope).
3. x represents the features (input values).
4. b is the point where it intersects the y-axis.

Labels in Machine Learning

In Machine Learning terminology, labels are what we want to predict.

It's similar to the y - axis in a linear graph:

Algebra	Line Learning
$y = ax + b$	$y = b + wx$

Features in Machine Learning

In Machine Learning terminology, the key features are the input data.

They are similar to the x values in a linear graph:

Algebra	Line Learning
$y = a x + b$	$y = b + w x$

Sometimes there may be multiple features (input values) with different weights:

$$y = b + w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4$$

1. Machine Learning Model
2. Machine Learning Training
3. Machine Learning Inference
4. Stages of Machine Learning

Machine Learning Model

A model defines the relationship between labels (y) and features (x).

There are three stages in the lifecycle of a model:

1. Data collection
2. Train
3. Deduce

Machine Learning Training

The goal of the training is to create a model that can answer a question. For example, what is the expected price of a house?

Reasoning in Machine Learning

Inference occurs when a trained model is used to infer (predict) values using real-world data. For example, putting the model into production.

Stages in Machine Learning

Machine learning has two main stages:

1. Training:

Input data is used to calculate the model parameters.

2. Reasoning:

The "trained" model produces accurate data from any input.

1. Supervised Machine Learning
2. Unsupervised Machine Learning
3. Machine Learning self-monitoring

Supervised learning

Supervised machine learning uses a set of input variables to predict the value of an output variable.

Supervised learning uses labeled data (data with known answers) to train algorithms in order to:

1. Data classification
2. Predict the result

Supervised learning can classify data such as "What is spam in email?", based on known examples of spam.

Supervised learning can predict outcomes, such as predicting the type of videos you'll like, based on the videos you've already watched.

Unsupervised learning

Machine learning doesn't monitor the use of patterns from any unlabeled dataset, attempting to understand the patterns (or groups) within the data.

Unsupervised learning is used to predict previously unknown relationships as meaningful patterns in data.

It involves creating computer algorithms that can improve themselves.

It is expected that Machine Learning will shift to unsupervised learning, allowing programmers to solve problems without having to create models.

Intensive learning

Reinforcement learning is based on unsupervised learning but receives feedback from users on whether the decision was good or bad. This feedback contributes to improving the model.

Self-monitoring

Self-supervised learning is similar to unsupervised learning because it works with data that doesn't have human-added labels.

The difference is that unsupervised learning uses clustering, grouping, and dimensionality reduction of data, while self-supervised learning draws its own conclusions for regression and classification tasks.

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