What is Machine Learning?

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Machine Learning (ML) gradually learns how to make predictions by studying lots of data.

Types of Machine Learning Systems

1. Supervised Learning
2. Unsupervised Learning
3. Reinforcement Learning
4. Generative AI

Supervised Learning

The ML system is trained with the correct results. Imagine a student who is preparing for an upcoming exam. The student reviews old exams that contain both questions and answers in order to prepare for the new one.

Use Case 1: Regression (#)

A **regression model** predicts numerical values.

Scenario	Possible Input Data (X)	Predicted Number (y)
Future Laptop Price	Operating System, CPU, RAM, GPU, Brand, Screen Size and Type	Price of the laptop

Use Case 2: Classification (?)

A **classification model** predicts the likelihood that something belongs to a category. It returns a value indicating whether or not the item is in the category.

Binary Classification (0/1)

Yields only two values: `[cake, not cake]`

Multiclass Classification (*)

Yields more than two values: `[car, truck, motorcycle, bicycle, train]`

Unsupervised Learning

The ML system isn't trained with the correct answers, nor does it contain any correct answers. It doesn't make predictions; instead, it finds meaningful patterns in the data.

Use Case 1: Clustering

It finds data points that separate natural groupings and clusters those with similar features.

Reinforcement Learning

The ML system makes predictions by obtaining **rewards** or **penalties** based on actions performed within an environment. It follows a **policy** which dictates the best strategy for getting the most rewards.

Generative AI

The ML system returns content from the user input. It is *multimodal*, capable of handling text, images, and video.

Input	Output
Text	Text
Text	Image
Text	Video
Text	Code
Image	Text

The model is initially trained using an unsupervised learning approach, allowing it to learn patterns from the data. Afterward, a supervised or reinforcement learning approach is applied using data related to the model's intended capabilities.

References

- What is Machine Learning? - Google Developers
- Machine Learning Glossary - Google Developers