

Understand the Machine

A QUICK-REFERENCE CHEAT SHEET

AI / ML / Deep Learning Cheat Sheet

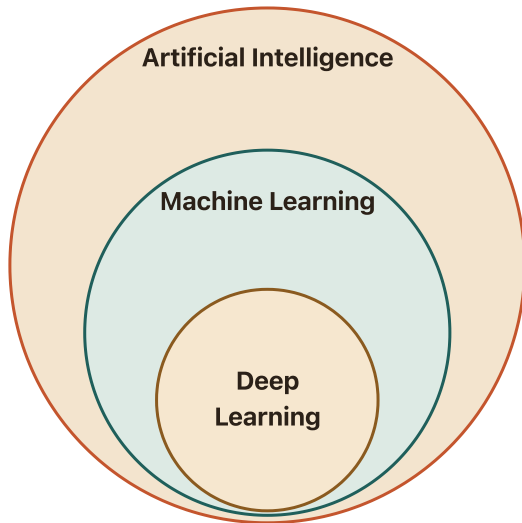
AI, machine learning, and deep learning — what each one means, how they nest together, and how to tell them apart. No math required.

Free AI literacy for everyone — no tech background needed

understandthemachine.org

THE DIFFERENCE IN 60 SECONDS

Artificial intelligence is the big goal: machines doing things that need human-like smarts. **Machine learning** is one way to get there — software that learns from examples. **Deep learning** is a powerful kind of machine learning. Picture nesting dolls: deep learning sits inside machine learning, which sits inside AI.



All deep learning is machine learning.

All machine learning is AI.

But **not all** AI learns from data — some AI just follows hand-written rules (like early chess programs or tax software).

Deep learning fits inside machine learning, which fits inside AI.

Side by Side

Concept	What it is	Everyday analogy	Example
Artificial Intelligence	Any software that mimics human-like intelligence — reasoning, language, problem-solving	A whole cookbook of recipes for making smart software	A chess program that beats you using programmed rules
Machine Learning	Software that learns patterns from data instead of following pre-written rules	Learning to cook by tasting many dishes, not reading a recipe	Netflix recommending shows from what you've watched
Deep Learning	Machine learning using many layers to handle messy data like images and speech	A chef trained for years across many cuisines, inventing new dishes	Your phone recognizing your face to unlock

A simple way to remember

- **AI** = the goal (do smart things)
- **ML** = the method (learn from examples)
- **Deep learning** = the power tool (ML with many layers)

How machine learning works

1. **Data** — feed it many labeled examples
2. **Train** — it finds the patterns
3. **Predict** — it applies them to new cases

Common Mix-Ups

"AI" and "machine learning" aren't the same. AI is the umbrella; ML is one tool under it. Calling all AI "machine learning" is like calling every car "transportation" — true, but imprecise.

Not all AI learns. Rule-based AI (tax software, old chess engines) does human-like reasoning but never learns from data — a person wrote every rule.

"Deep" isn't a grade. It means the neural network has many layers, not that it's "better." For simple problems, plain machine learning often works just as well.

ML still needs humans. People choose the data, clean it, pick the model, and judge the results. It's a tool, not magic.

Why It Powers Today's AI

Deep learning became practical in the 2010s when three things came together — and it's what makes voice assistants, translation, face unlock, and ChatGPT work:

More data

The internet and phones created oceans of text, images, and video to learn from.

Faster hardware

Gaming chips (GPUs) turned out to be perfect for running neural networks.

Better techniques

Researchers found ways to train networks with many layers that used to be impossible to train well.

Mini-Glossary

Model

The set of patterns a system has learned. "We trained a model" = "we showed software a lot of data and it found the patterns."

Neural network

A layered system loosely inspired by the brain — the engine behind deep learning.

Training data

The examples a model learns from. Its quality and fairness shape everything the model does.

Large language model (LLM)

A deep-learning model trained on huge amounts of text — the tech behind ChatGPT, Gemini, and Claude.

Rule-based AI

AI that follows hand-written "if-then" rules instead of learning. Still AI, but not machine learning.

Every time you hear one of these terms, just ask: "Which nesting doll am I looking at?"

Sources & further reading

- Full guide: understandthemachine.org/machine-learning-explained/
- Elements of AI — free introductory course, elementsofai.com
- Stanford HAI, AI Index Report — hai.stanford.edu

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