Machine Learning in One Picture (Super Easy Version)

Think of ML like teaching a kid:

1️⃣ Supervised Learning → “Teacher helps”

You give:

- **Question**
- **Correct answer**

Kid learns from examples.

Examples:

- Show 1000 photos: “This is a cat”, “This is a dog”.
- Predict marks from study hours.
- Predict house price.

🧠 **Model learns: What input → What output**

2️⃣ Unsupervised Learning → “Kid explores alone”

No answers given.
Kid looks at things and groups them by similarity.

Examples:

- Group customers (rich, average, low spenders) automatically.
- Cluster movies by genre.
- Detect unusual transactions (fraud).

🧠 **Model finds patterns on its own.**

3️⃣ Semi-Supervised Learning → "Teacher gives one example, kid guesses others"

Little labeled data + lots of unlabeled.

Examples:

- 100 labeled medical images + 10,000 unlabeled.
- Google Photos face clustering.

🧠 **Used when labeling is expensive.**

4️⃣ Reinforcement Learning → "Kid learns by trial & error"

Kid gets:

- **Reward** for good action
- **Penalty** for bad action

Examples:

- Self-driving car (reward: staying in lane)
- Chess AI
- Robot learning to walk
- Trading bot

🧠 **Do → Get reward → Improve**

5️⃣ Self-Supervised Learning → “Kid creates his own questions”

The model hides part of data and learns to predict the missing part.

Examples:

- GPT training (predict next word)
- BERT (fill in missing word)
- Vision Transformers (predict missing patch)

🧠 **Most powerful Deep Learning models use this.**

⭐ THE BEST MEMORY TRICK

Imagine a student:

Student Type	ML Type	How the student learns
With teacher & answers	Supervised	Learns from labeled data

No teacher	Unsupervised	Finds patterns alone
Few answers	Semi-supervised	Mix of both
Learns by reward	Reinforcement	Trial & error
Creates own questions	Self-supervised	Predicts missing parts