What is Machine Learning?

Quacky is excited. After discovering that machines learn like ducks, he wants to know how they actually learn. He realizes there are three main ways machines learn from data:

1. Supervised Learning
2. Unsupervised Learning
3. Reinforcement Learning

Quacky tries to understand each method using his own life experiences.

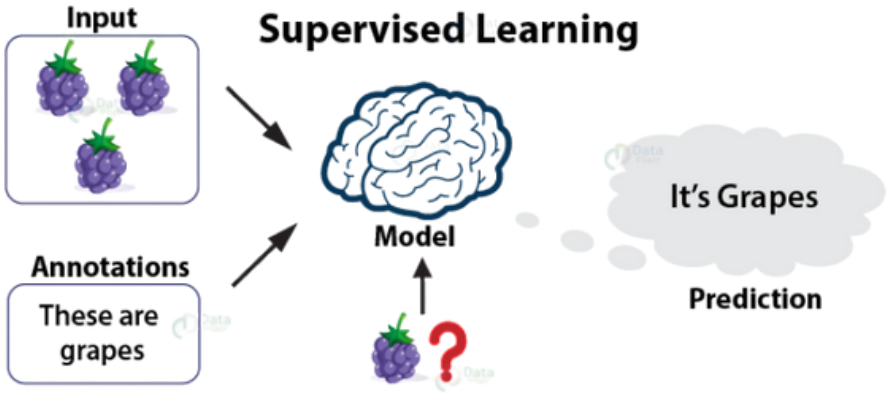
Supervised Learning

Imagine Quacky finds a pile of shiny objects near the pond: some are real gold coins dropped by humans, and others are just useless pebbles. Luckily, Mama Duck is with him. She points to each item and tells him:

- This is a real treasure
- That one is just a rock
- This coin is valuable
- That stone is not worth picking up

Quacky uses these labelled examples to learn the differences. Eventually, he can identify treasure all by himself. That is supervised learning. The machine is trained on data where each example already has the correct answer. The computer is told what is right or wrong during training, so it can learn to make correct predictions for the future.

Quacky's thoughts: "Someone guides me while I learn. I feel confident because I know the correct answers while practicing."



Unsupervised Learning

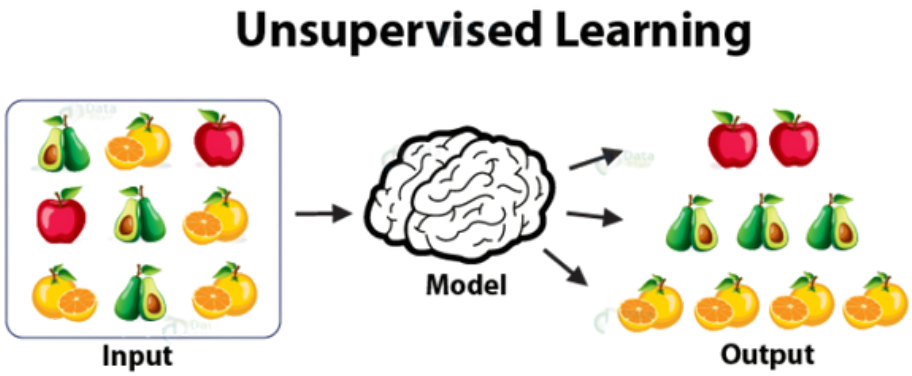
Another day, Quacky discovers a mysterious underground tunnel full of different kinds of gems, shells, and stones. This time, no one is there to explain what each item is. He observes them on his own.

He starts grouping them based on their similarities:

- Shiny gems in one corner
- Smooth shells in another
- Rough rocks separately

No one told him what these objects are called. He just noticed patterns and grouped them. That is unsupervised learning.
The machine is given data without answers. It figures out patterns, groups, or structures by itself.

Quacky's thoughts: "No one tells me what anything is. I explore, compare, and discover patterns on my own. It feels like solving a mystery."



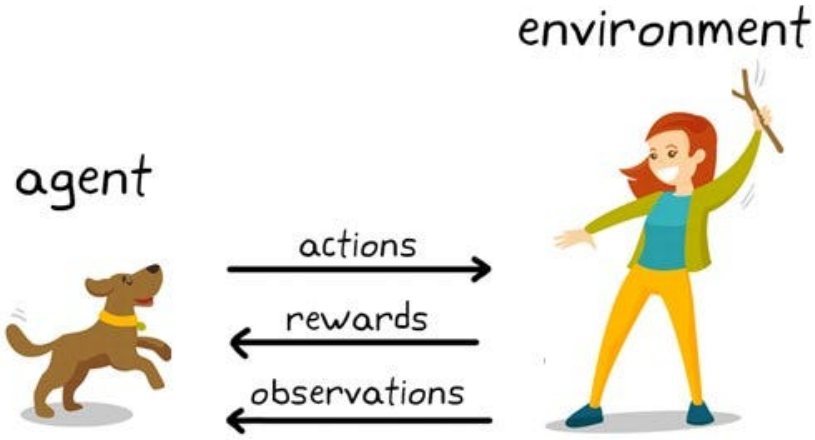
Reinforcement Learning

Quacky loves eating juicy fish, but they are fast and tricky to catch.
He practices daily:

- When he swims quickly and catches a fish, he feels rewarded
- When he misses and splashes loudly, the fish swim away, that feels like a penalty

Over time, he learns the best strategy: move quietly, wait patiently, and strike at the right moment. His skills improve because he learns from both success and mistakes. This is reinforcement learning. The machine learns by interacting with an environment. It tries actions, receives rewards or penalties, and gradually learns the best actions to take for maximum reward.

Quacky's thoughts: "I learn by doing. When something works, I get rewarded. When it fails, I adjust my actions. I become smarter with experience."



instructor

Miss Hootsworth

Final Simple Definition

Just like ducks, can learn in different ways.
Sometimes with guidance, sometimes by exploring, and sometimes by trying again and again until they get it right.