31 May 2025

ARTIFICIAL INTELLIGENCE
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What is AI?

AI (Artificial Intelligence) is a program or set of instructions that gives a machine, device, or computer the ability to think and make rational decisions.

It's basically trying to mimic human intelligence. Simple as that.

The Turing Test – A Throwback to Where It All Began

Way back, people started asking: Can machines think? And more importantly: Can they think like us?

Enter: The Turing Test

Proposed by Alan Turing, this test was designed to judge whether an AI behaves like a human. In the test, a human judge interacts (usually through written text) with both a human and a machine. If the judge can't reliably tell which one is the human and which one is the machine, then the machine is said to have passed the Turing Test—a major milestone in demonstrating intelligence in AI.

TYPES OF ARTIFICIAL INTELLIGENCE

There are three types of AI:-

1. ANI – Artificial Narrow Intelligence

The most basic type.

Known as "Weak AI" (but not in a lame way—just limited).

It performs only specific, narrowly defined tasks. That's it.

Examples: Google Maps, Alexa, Siri.

2. AGI – Artificial General Intelligence

AKA "Strong AI".

It can think, learn, and make decisions like a human across various tasks.

This is the level where AI would stop being a tool and start being... a coworker.

Example (hypothetical for now): An AI doctor that can learn, diagnose, and perform surgery like a pro.

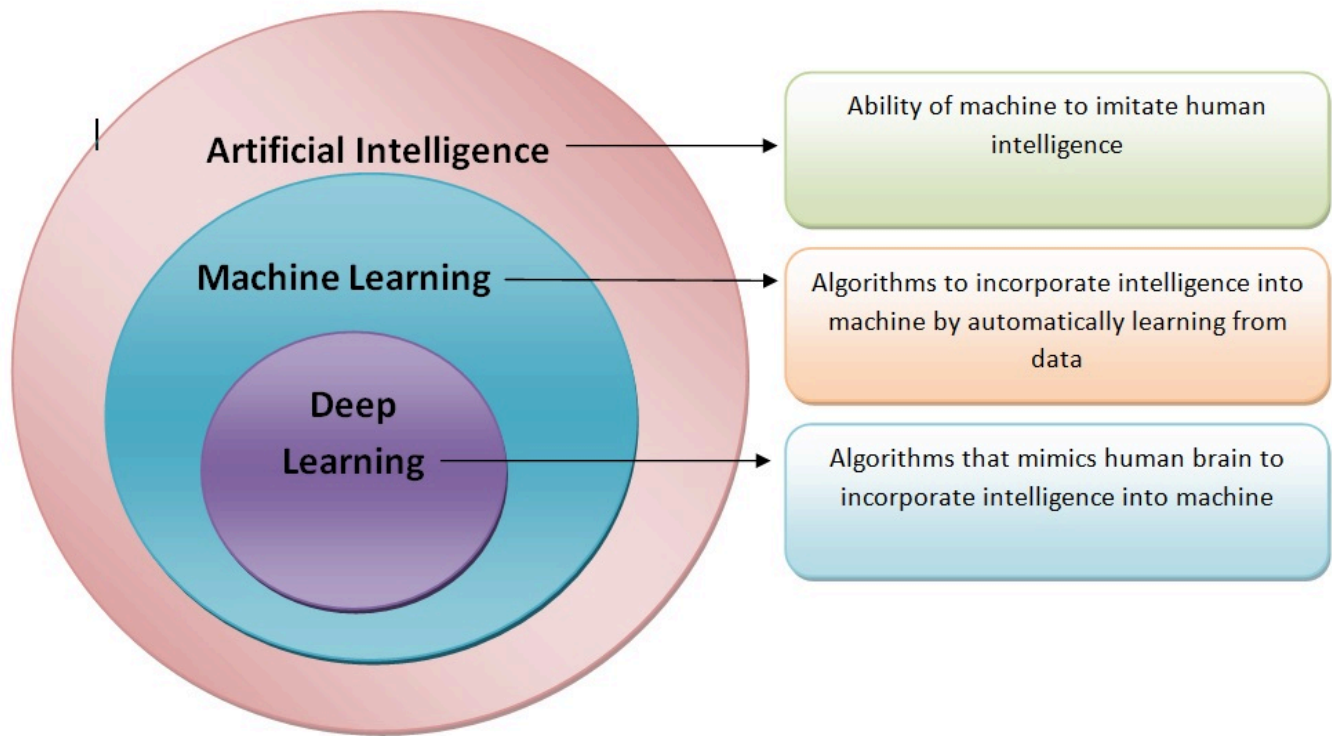3. ASI – Artificial Super Intelligence

This is the wild one.

Machines smarter than humans—in everything. Emotion, creativity, strategy... all of it.

Sci-fi level stuff—for now.

Examples (from fiction): Ultron (Marvel), Skynet (Terminator), Jarvis (if he had true free will and full self-awareness).

DOMAIN OF ARTIFICIAL INTELLIGENCE

- ML (Machine Learning)
  Teaching machines to learn from data and improve without being told what to do step-by-step.Example: Netflix recommending shows based on what you watched.
- Fuzzy Logic
  Deals with reasoning that's not just black and white—like human thinking.Example: Air conditioners adjusting temperature based on how hot it "feels".
- Robotics
  Machines that can move, sense, and act in the real world.
  Example: Robots used in factories or delivery bots.
- Deep Learning
  A powerful type of machine learning that uses brain-like structures (neural networks).Example: Face recognition in photos.
- NLP (Natural Language Processing)
  Helps machines understand and talk in human languages.Example: ChatGPT, Siri, or Google Translate.

What is Machine Learning?

Machine Learning (ML) is a method to achieve Artificial Intelligence (AI). It involves the study of algorithms that can improve automatically through experience and by using data. As a subset of AI, ML focuses on employing statistical techniques to build intelligent computer systems capable of learning from available databases.

- Enables computers to learn automatically from past data.
- Uses various algorithms for building mathematical models and making predictions using historical data or information.

In conclusion, a ML model is a file that has been trained to recognize certain types of patterns. You train a model over a set of data, providing it an algorithm that it can use to reason over and learn from those data.

ML: It is the way to achieve AI.

TYPES OF MACHINE LEARNING

1. Supervised Learning:

"The Teacher's Pet"

It learns from labeled data (where you already know the answers).

- Input == Output.

- Example: You give it photos labelled "cat" or "dog," and it learns to tell them apart.

Common algorithms:

- Linear Regression.
- Logistic Regression.
- Decision Trees.
- Support Vector Machines (SVM).
- K-Nearest Neighbors (KNN).

Examples:

- Spam detection in email (spam vs not spam).
- Predicting house prices.
- Credit score evaluation.

2. Unsupervised Learning

"The Detective"

It learns patterns from unlabeled data (nobody tells it what's what).

- Finds hidden structures like clusters or associations.
- Think of it as figuring out friend groups at school without being told who hangs with who.

Common algorithms:

- K-Means Clustering.
- Hierarchical Clustering.
- PCA (Principal Component Analysis).
- Apriori algorithm (for market basket analysis).

Examples:

- Customer segmentation.
- Anomaly detection.
- Data compression.

3. Semi-Supervised Learning

"Half Teacher, Half Detective"

Uses a small amount of labeled data + a lot of unlabeled data.

- Like cheating a little by peeking at the answer key, then guessing the rest.
- Super helpful when labelling data is expensive or hard.

Examples:

- Web content classification.
- Medical image diagnosis (you only have some labelled scans).

4. Reinforcement Learning

"The Gamer"

Learns by trial and error using a reward system.

- Agent → takes action → gets feedback (reward or penalty)
- Basically: "If I do this, what happens?"

Algorithms:

- Q-Learning
- Deep Q Networks (DQN)
- Policy Gradients

Examples:

- Game playing (AlphaGo, Chess)
- Robotics
- Self-driving cars
- Ad placement optimization