

Generative AI Introduction: - (AI & ML Introduction)

Q What is AI?

Imagine if a machine could think, learn or solve problems just like a human does. That's what AI is all about.

⇒ AI is the ability of a machine or software to mimic human intelligence

• It's called artificial because this intelligence is created by humans, not born naturally like human or animal intelligence.

↓
natural intelligence

→ We know that humans are the most intelligent form of species that has ever existed on Earth. We do great in every field like Science, Arts, Sports, etc. This is Natural / Real intelligence

→ But when we try to make a machine as smart, as intelligent as a human, then this is called Artificial Intelligence

→ So, we can say that AI or Artificial Intelligence is a branch of computer science that focuses on creating machines or softwares that can think, learn & make decisions like humans (or at least try to)

e.g. ⇒ AI can detect medical images (X-Ray or MRIs) & detect diseases such as cancer, Google Assistant or Siri understands your voice & helps you to call someone, set alarms etc.

- Self-driving cars use AI to recognize traffic lights, pedestrians & other vehicles to drive safely
- When we buy a product, shopping websites recommends similar or related items using AI

Question is:- How AI learns? How machines are able to make decisions? How machines are as intelligent as humans?

- * A baby learns things by watching others
- * A dog recognizing its owner & reacting with excitement
- * A Student learns coding by practicing & getting feedbacks

⇒ Real-life Analogy:- how a child learns?

Let's imagine you are teaching a child to recognize a cat.

① You show a few pictures of different cats & say:-
"This is a cat"

② So the child notices different unique characteristics of cat like legs, fur, tail, color, size, etc.

③ Child ask questions (may be silly questions), sees cat in real life, hears sound of cat 'meow' & makes a connection.

④ Even if the next cat is a different color or size, the child says: "That's a cat"

⇒ So the child learns from a few pictures + real experiences + common sense.

⇒ Now How AI learns to Recognize a Cat

- ① We feed millions of cat images into a computer
- ② We label each one as "cat" or "not a cat"
- ③ The AI (a machine learning model) looks for patterns:
 - shape of ears,
 - Eye size,
 - fur texture
 - whiskers
- ④ Overtime, it learns from the patterns & build its own logic:
 - "If the image has these features, its probably a cat"
- ⑤ We test the AI by showing new cat pictures it has never seen - and check if it gets it right

So AI learns from millions of ^(data) examples but has no feeling or understanding - no common sense - just pattern matching & this is Machine Learning

Machine Learning - It is a subset of AI that allows machines to learn from data & improve over time without being explicitly programmed for every single task

⇒ So the concept behind machine learning is same like we human learn but there are somethings which are different like:

★ ① It needs lots of training data. (as we humans can generalize easily, we need few examples, we can guess a cartoon cat is still a cat but machines can not generalize things easily, it needs training on cartoon cats too)

★ [②] We need significant computational power. Because we need massive amount of data to train machines, lots of processing & optimization would be required.

★ [③] And algorithms (we need solid algorithms behind the scene that will process all the information, that will learn from the training data, identify patterns & predict results etc.

