AI vs ML vs DL

What is Intelligence? the mental capacity to learn from experience, adapt to new situations, understand and use abstract concepts, and solve problems effectively

AI

→ Stands for Artificial Intelligence
→ Computer systems designed to perform tasks that typically require human intelligence, such as learning, problem-solving, decision-making, and perception

ML

→ Subset of AI
→ Used to learn the patterns in the data using the statistical techniques
→ In ML we don't do explicit programming (mean rule based programming where we write the code/logic for every possible scenario)
→ Instead we feed the data (input/output) to the system and the system finds out the patterns by itself.

Why do we need ML?

→ In rule-based systems, we have to manually extract patterns from the data and then write logic for each possible scenario.
→ The problem is, this becomes very hard to scale. For example, if we want to build a system that identifies the breed of a cat from an image, it's nearly impossible to manually write code to classify every single breed. That's where Machine Learning comes in.
→ In Machine Learning, the system automatically learns the patterns between input and output from the data, and builds the logic on its own.
→ For instance, if we train a system to classify cat breeds using ML, we simply provide a large dataset of cat images with their breed labels. The system learns the relationship between the images (input) and the breed names (output). Once trained, it can then classify the breed of any new cat image.

Deep Learning

→ Subset of ML
→ It's also Machine Learning but it uses the neural network to find out the patterns in the data that is inspired by our human brain

Why do we need Deep Learning?

→ In Machine Learning, we have to manually provide the features of the data to the algorithm — and that's where the limitation comes in.

→ In Deep Learning, the algorithm can automatically detect and learn the features from the data by itself, so we don't have to define them manually.
→ DL is more powerful for solving complex problems, especially when working with unstructured data like images, text, or audio.
→ There are cases where we don't even know what the right features are, and in those scenarios DL really shines.
→ For example, let's say we're building a system that reads resumes and predicts the chance of hiring. With ML, we'd have to manually extract features like skills, experience, or education. But with DL, we can feed the raw text directly, and the algorithm will figure out the useful features on its own.
→ Another thing about Deep Learning is that it keeps improving as we provide more data, but In Machine Learning, there's a certain point where more data doesn't really improve the model's accuracy any further.