THE AI STACK: AI, ML, DL, AND GENERATIVE AI EXPLAINED

Summary

This document summarizes the differences between the most common basic terms in the Artificial Intelligence (AI) world: Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL), and Generative AI (GenAI).

Artificial Intelligence (AI)

Artificial Intelligence is the broadest concept. It refers to any system or machine that is designed to mimic human intelligence. AI systems can perform tasks such as reasoning, problem solving, decision making, and understanding language.

1. Does not always learn from data.
2. Can be rule based or logic based.
3. Examples: Expert systems, chess playing programs, rule-based chatbots.

Machine Learning (ML)

Machine Learning is a subset of AI. Instead of being explicitly programmed with rules, ML systems learn patterns from data and improve their performance over time.

- Learns from historical data.
- Examples: Spam detection, recommendation systems, credit scoring.

Deep Learning (DL)

Deep Learning is a subset of Machine Learning that uses neural networks with many layers (deep neural networks). It is especially powerful for unstructured data like images, audio, and text.

- Uses neural networks with multiple layers.
- Requires large amounts of data and computing power.
- Examples: Face recognition, speech recognition, self-driving cars.

Generative AI (GenAI)

Generative AI is a specialized area of Deep Learning focused on creating new content rather than just analyzing data. It can generate text, images, audio, video, and code.

- Generates new data similar to training data.
- Usually based on large deep learning models (e.g., Transformers).
- Examples: Text Generation (e.g.,ChatGPT), image generators, music generation models.

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