The Hierarchy of Modern AI

Artificial Intelligence (AI) is the entire field dedicated to creating machines that can simulate human intelligence. Within AI, a major branch is Machine Learning (ML), which focuses on giving computers the ability to learn from data without being explicitly programmed. A powerful and popular technique within Machine Learning is Deep Learning (DL), which uses a specific architecture to learn from vast amounts of data. That architecture is the Artificial Neural Network (ANN), a complex, multi-layered system inspired by the human brain. So, Deep Learning is a type of Machine Learning, which is a subfield of AI, and it's all powered by Neural Networks.

ARTIFICIAL INTELLIGENCE SCAN TO EXPLORE

WHAT IS ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a shift from traditional programming to systems that learn logic directly from data.

Origins: The term was coined by computer scientist John McCarthy, and the field was formally established at the Dartmouth Workshop in 1956.
Core Method: AI trains mathematical models, like neural networks (Deep Learning), on vast datasets. The model makes predictions, a 'loss function' measures the error, and an optimization algorithm adjusts the model's parameters to improve accuracy over many iterations.
Driving Engine: This learning-based approach, known as Machine Learning, is the fundamental engine behind nearly all modern AI.

Key Applications:
- **Natural Language Processing (NLP):** Allows machines to understand and process human text and speech.
- **Computer Vision:** Enables machines to interpret and understand visual information from images and videos.

WHAT IS MACHINE LEARNING

Machine Learning (ML) is a field of AI where algorithms learn directly from data to make predictions, rather than being explicitly programmed.

Core Process: A model is trained on a dataset, where it continuously makes predictions and adjusts itself to minimize error, a process measured by a 'loss function'.
Primary Goal: The main objective is to develop a model that can accurately make predictions on new, previously unseen data.

Learning Types:
- **Supervised Learning:** Learns from data that is already labeled.
- **Unsupervised Learning:** Finds hidden patterns in unlabeled data.
- **Reinforcement Learning:** Learns by taking actions and receiving rewards or penalties.

WHAT IS DEEP LEARNING

Deep Learning is a powerful type of AI that uses multi-layered deep neural networks,inspired by the human brain, to learn directly from data.

How it Works: The network's layers learn in a hierarchy. For instance, in image recognition, one layer learns simple edges, the next learns shapes, and a deeper layer identifies complex objects like faces.
Key Advantage: It can automatically discover complex patterns in unstructured data like images, audio, and text, removing the need for manually programmed rules.
Modern Applications: This is the core technology behind many advanced features, such as facial recognition, Netflix recommendations, and generative AI tools.

WHAT IS NEURAL NETWORK

An Artificial Neural Network (ANN) is a computing model inspired by the human brain and forms the foundational structure of Deep Learning.

Core Structure: It is built from interconnected nodes, or 'neurons,' which are organized into distinct layers (typically an input, one or more hidden layers, and an output layer).
Learning Process: ANNs learn by adjusting the strength, or 'weights,' of the connections between neurons. When a prediction is incorrect, a process called backpropagation is used to slightly modify these weights, gradually improving the network's accuracy.
Key Capability: This structure allows the network to automatically discover complex patterns in data, making it the engine behind tasks like image recognition, recommendation systems, and natural language processing.