Comparison Table: AI vs ML vs DL

Aspect	Artificial Intelligence (AI)	Machine Learning (ML)	Deep Learning (DL)
Definition	Broad field of building smart systems that mimic human intelligence.	Subfield of AI where machines learn from data.	Subfield of ML that uses neural networks with many layers.
Core Concept	Machines simulating human intelligence.	Systems learn patterns from data to make decisions.	Learn patterns using deep (multi-layered) neural networks.
Data Dependency	Not always data-driven (can use rules/logic).	Requires structured data for learning.	Requires massive amounts of data for high performance.
Programming Approach	Uses logic, rules, decision trees, and ML/DL.	Uses algorithms like regression, decision trees, etc.	Uses complex architectures like CNNs, RNNs, Transformers.
Examples	Chess bots, smart assistants, expert systems.	Spam filters, recommendation engines, price predictions.	Face recognition, language translation, autonomous driving.
Types	Narrow AI, General AI, Super AI.	Supervised, Unsupervised, Reinforcement Learning.	CNNs, RNNs, GANs, Transformers, etc.
Feature Engineering	Manual or rule-based.	Manual: selecting and transforming input features is required.	Automatic: features are extracted by the model itself.
Computational Power	Varies widely (some low, some high).	Moderate (based on model complexity).	Very high (needs powerful GPUs/TPUs).
Human Intervention	High (especially for rule-based AI).	Medium (requires tuning and supervision).	Low (automated learning from raw data).
Accuracy	Depends on design and implementation.	Usually good with enough data.	Very high when trained with large datasets.
Training Time	Low to high.	Moderate.	High (especially for large models).
Interpretability	Easy to explain rule-based systems.	Moderate—can often trace logic.	Hard to interpret (black-box models).
Real-World Tools	Expert Systems, Prolog, Planning Systems.	Scikit-learn, XGBoost, LightGBM.	TensorFlow, PyTorch, Keras, Hugging Face.