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**Artificial Intelligence**

* Machine thinks without human intervention and make its own decisions.
* Artificial Intelligence is basically the mechanism to incorporate human intelligence into machines through a set of rules(algorithm).
* **Types of AI:**
* Artificial Narrow Intelligence
* Artificial General Intelligence
* Artificial Super Intelligence
* **Examples:**
* Speech Recognition
* Personalized Recommendations
* Predictive Maintenance
* Medical Diagnosis
* Autonomous Vehicles
* Virtual Personal Assistants (VPAs)
* Fraud Detection

**Machine Learning**

* Subset of AI using statistical analysis to automatically learn and improve.
* In Machine Learning we train the algorithm by providing it with a lot of data and allowing it to learn more about the processed information.
* **Categories of Machine Learning**
* Supervised Learning
* Unsupervised Learning
* Reinforcement Learning
* **Examples:**
* Image recognition
* Speech recognition
* Natural language processing
* Recommendation systems
* Sentiment analysis
* Predictive maintenance

**Deep Learning**

* Filter the input data through layers to predict and classify information.
* Most of the deep learning methods use neural network architectures.
* **Architectures of Deep Learning:**
* Convolutional Neural Network
* Recurrent Neural Networks
* Recursive Neural Networks
* **Examples:**
* Image and Video Recognition
* Generative Models
* Autonomous Vehicles
* Image Classification
* Speech Recognition
* Natural Language Processing
* Recommender Systems
* Fraud Detection
* Game-Playing AI
* Time Series Forecasting

**Neural Network**

* Subset of machine learning and are the backbone of deep learning algorithms.
* Mimic how neurons in the brain signal one another.
* Neural networks are made up of node layers.
* When one node’s output is above the threshold value, that node is activated and sends its data to the network’s next layer.
* Training data teach neural networks and help improve their accuracy over time.
* A neural network of more than three layers, including the inputs and the output, can be considered a deep-learning algorithm.

**Supervised VS Unsupervised Learning**

* **Types:**
* Supervised: Classification, Regression
* Unsupervised: Clustering, Association, Dimensionality Reduction
* **Data:**
* Supervised: Learns with labelled data
* Unsupervised: Learns with unlabelled data
* **Goals:**
* Supervised: Predict outcomes for new data
* Unsupervised: Get insights from large data
* **Applications:**
* Supervised: Spam detection, sentiment analysis, weather forecasting, pricing predictions
* Unsupervised: Anomaly detection, recommendation engines, customer personas, medical imaging
* **Complexity:**
* Supervised: Simple method
* Unsupervised: More complex
* **Drawbacks:**
* Supervised: time-consuming, requires expertise
* Unsupervised: More inaccuracy, validation required

**Semi-supervised learning**

* It uses a combination of labelled and unlabelled datasets.
* Combination of both supervised and unsupervised learning.
* Initially train on labelled data, then on unlabelled sections.