AI, ML, and DL

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AI in Computer Science

Operating Systems (OS)

Database (DB)

Computer Networks (CN)

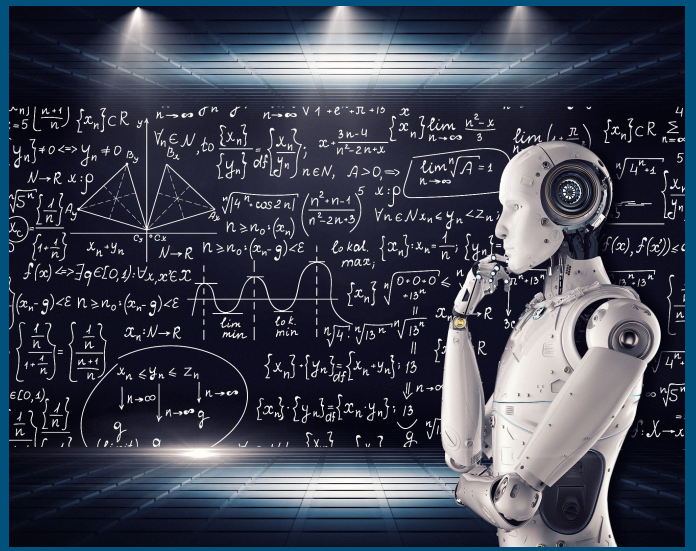
Security

Software Engineering (SE)

Artificial Intelligent (AI)

What is AI?

AI (Artificial Intelligence) is a field of computer science focused on creating intelligent machines capable of mimicking human-like behavior and problem-solving.



Shortly, can be defined as

A software or machine that **thinks like human or acts like human**

AI vs Data Science and Data Analytics

Artificial Intelligence (in Computer Science) is a broad field that focuses on creating intelligent machines capable of performing tasks that typically require human intelligence.

Data science (in Statistics) involves extracting insights and knowledge from data using various techniques, such as statistical analysis, machine learning, and programming, to solve complex problems and make informed decisions.

Data analytics (in Business) is the process of examining large datasets to uncover patterns, trends, and insights that can inform decision-making and drive business strategies.

In summary, AI is the broader concept of creating intelligent machines, while data science and data analytics are specific approaches for extracting insights and making use of data.

Subdomains of AI

Natural Language Processing

Robotics

Computer Vision

Speech Recognition

Machine Learning

And so on

What is **Learning**?

Using past experiences to improve future performance

What is Machine Learning?

Experience for Machines:

In the context of machine learning, experiences are represented by **data**.

This data can be collected from various sources and in different forms like numerical, categorical, text, image, etc.

Performance Improvement:

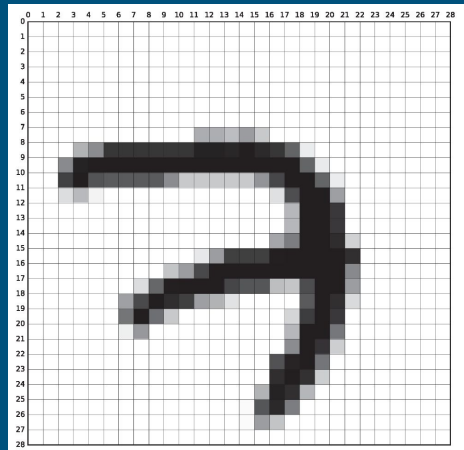
The goal of machine learning is to improve the **accuracy** of predictions or decisions made by the model over time.

The concept of 'improvement' is determined based on the specific task at hand. It could mean reducing error rates in predictions, increasing accuracy, or optimizing towards a particular goal.

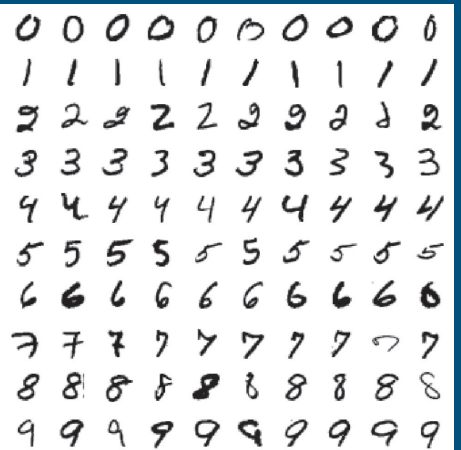
Learning from data

Why learning approach?

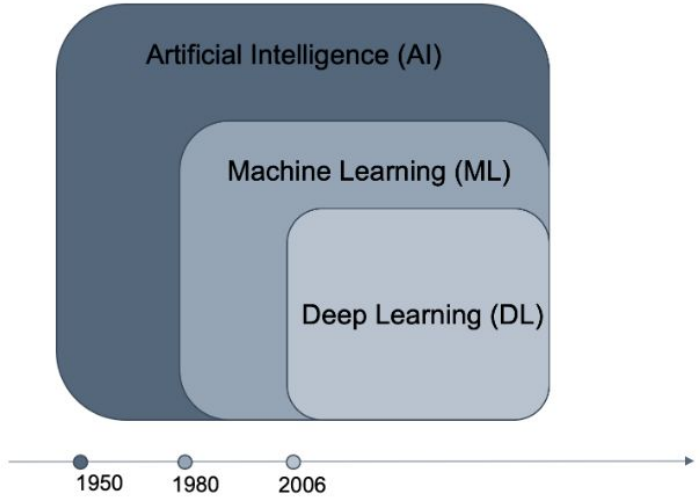
- Why not rule-based approach?
  - Handwritten digit recognition

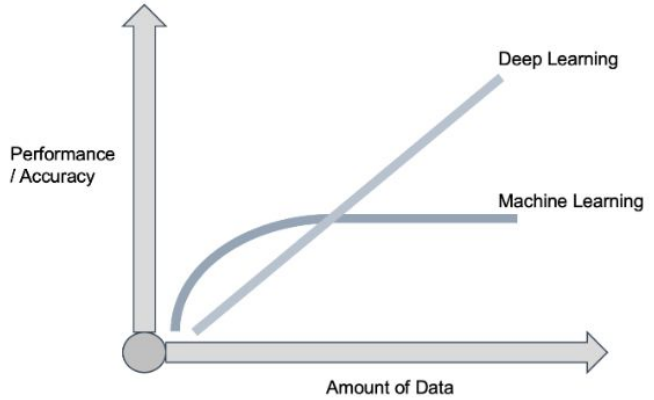


(**a**) MNIST sample belonging to the digit '7'.



(**b**) 100 samples from the MNIST training set.


Artificial Intelligence (AI)
Machine Learning (ML)
Deep Learning (DL)
1950
1980
2006


Deep Learning
Performance
/ Accuracy
Machine Learning
Amount of Data

Top 10 Algorithms every Machine Learning Engineer should know

1. Naïve Bayes Classifier Algorithm

2. K Means Clustering Algorithm

3. Support Vector Machine Algorithm

4. Apriori Algorithm

5. Linear Regression Algorithm

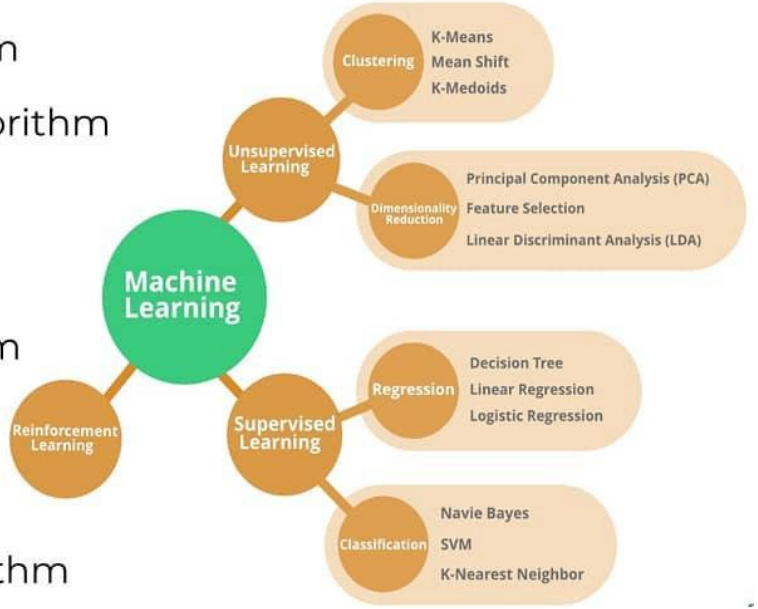
6. Logistic Regression Algorithm

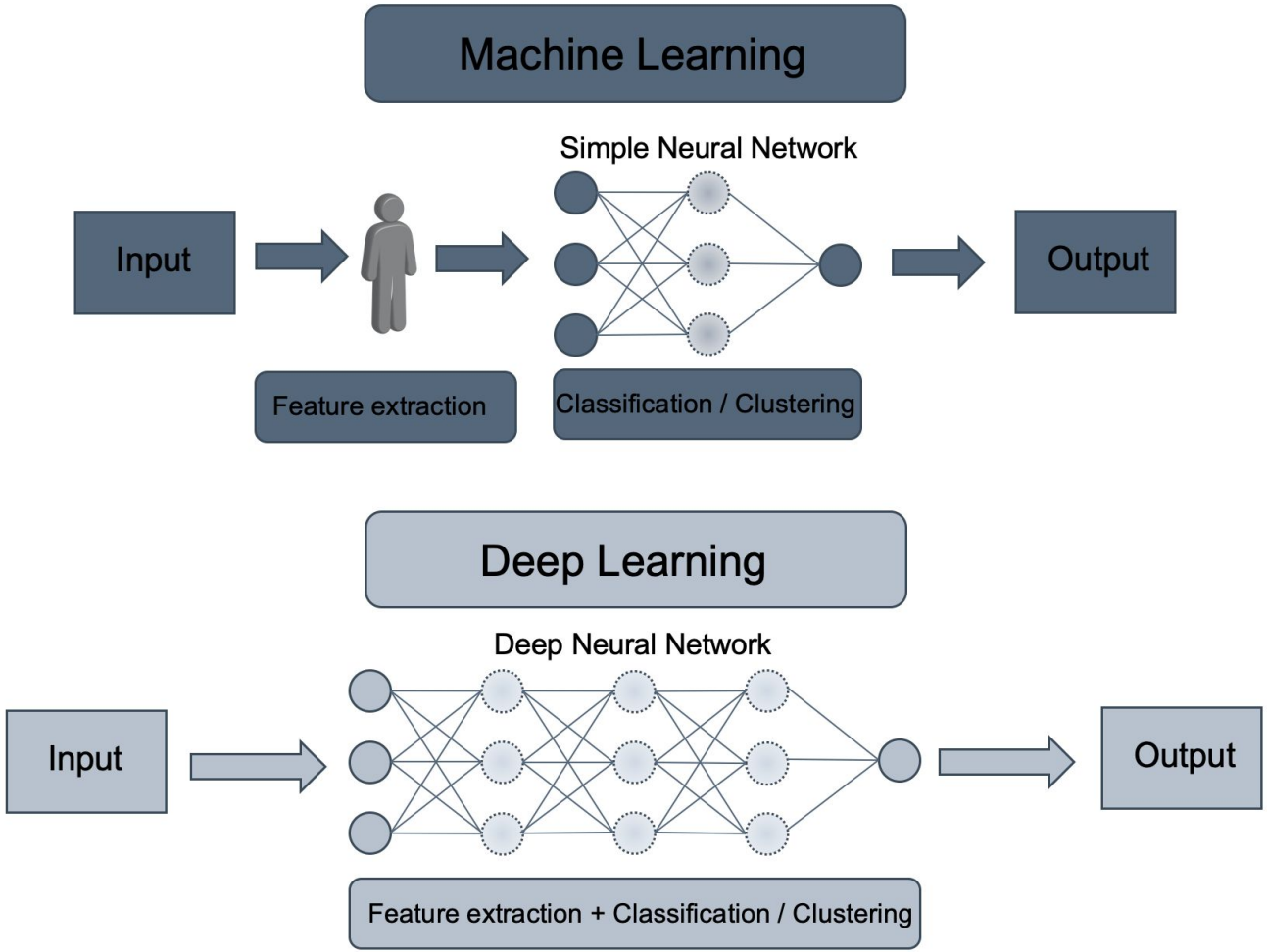
7. Decision Trees Algorithm

8. Random Forests Algorithm

9. K Nearest Neighbours Algorithm

10. Artificial Neural Networks Algorithm




Machine Learning
Simple Neural Network
Input
Output
Feature extraction
Classification / Clustering
Deep Learning
Deep Neural Network
Input
Output
Feature extraction + Classification / Clustering