

Machine Learning is a subset of Artificial Intelligence (AI) that enables computers to learn from data without being explicitly programmed. It involves the development of algorithms that can automatically improve their performance on a task as they are exposed to more data.

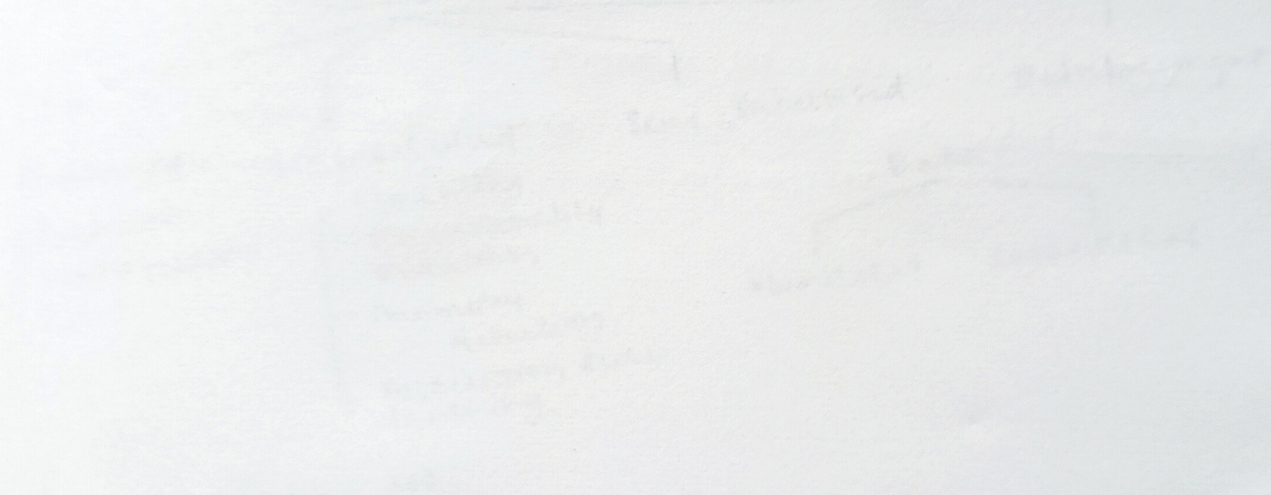
The process of machine learning typically involves three main steps:

- Training:** The algorithm is fed a large dataset of labeled examples. It learns to identify patterns and relationships within the data.
- Validation:** The trained model is tested on a separate set of data to evaluate its performance and ensure it generalizes well to new, unseen data.
- Deployment:** The trained model is used to make predictions or classifications on new, unlabeled data.

Machine learning is used in a wide variety of applications, including:

- Spam filtering
- Image recognition
- Recommendation systems
- Fraud detection
- Self-driving cars

Types of Machine Learning



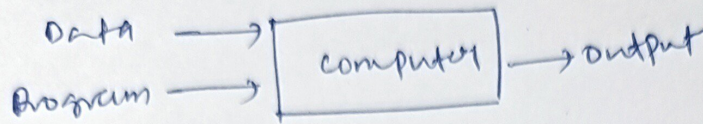
Machine learning algorithms are typically divided into two main categories: supervised and unsupervised learning.

Supervised Learning: This type of learning involves training a model on a dataset where the target variable is known. The goal is to learn a function that maps input features to the target variable. Common tasks include classification (e.g., spam/not-spam) and regression (e.g., predicting house prices).

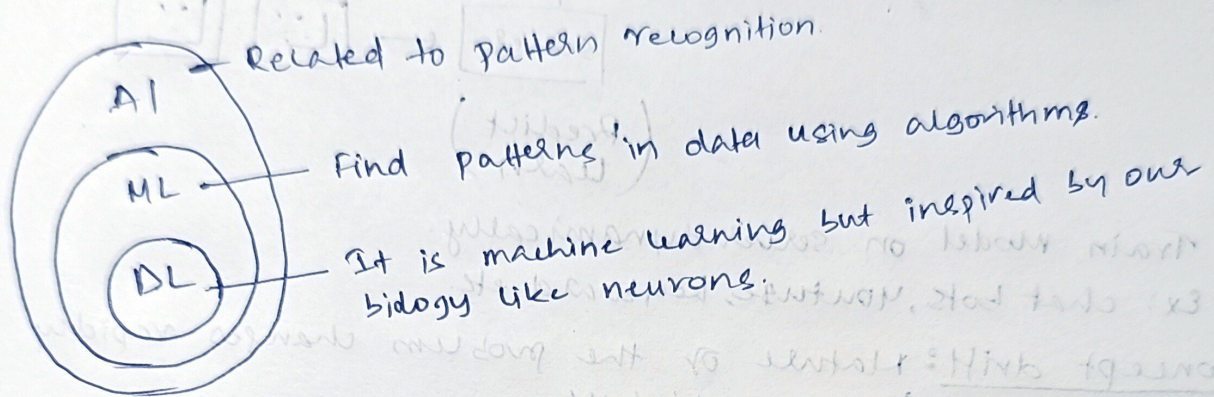
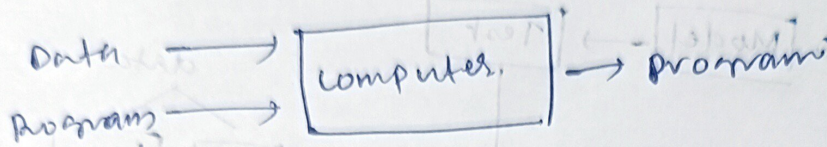
Unsupervised Learning: This type of learning involves training a model on a dataset where the target variable is unknown. The goal is to discover hidden patterns or structures in the data. Common tasks include clustering (e.g., grouping similar documents) and association (e.g., finding items that are often purchased together).

Reinforcement Learning: This type of learning involves training a model to learn from its interactions with an environment. The model receives rewards or penalties based on its actions, and its goal is to maximize the cumulative reward. Common tasks include game playing (e.g., Go, Chess) and robotics.

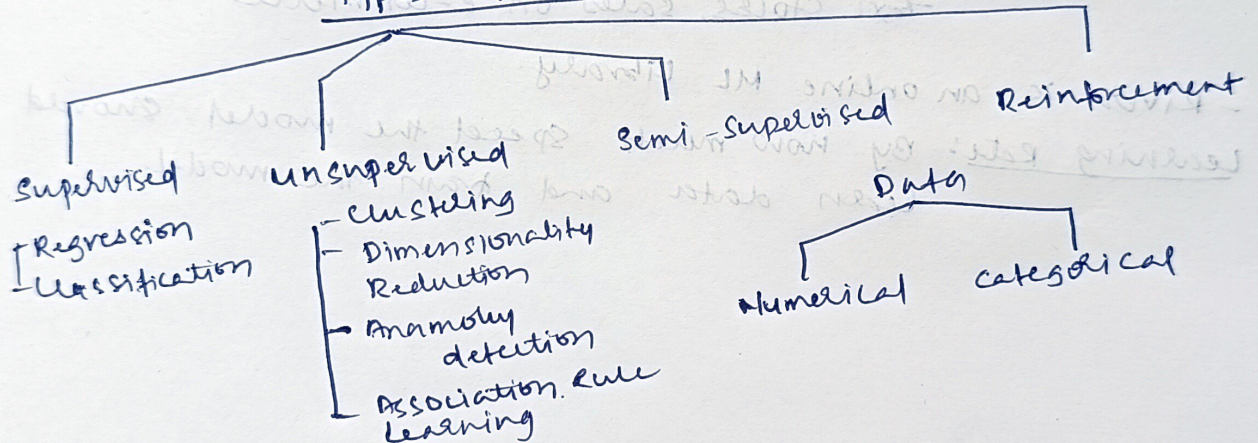
- learning from data.
traditional programming



Machine Learning

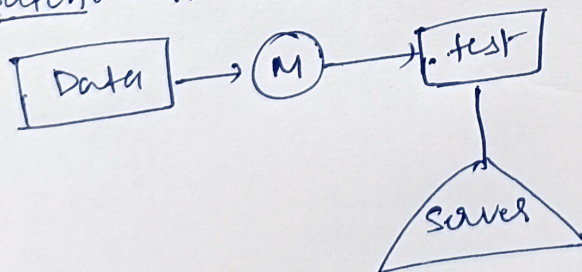


Types of ML

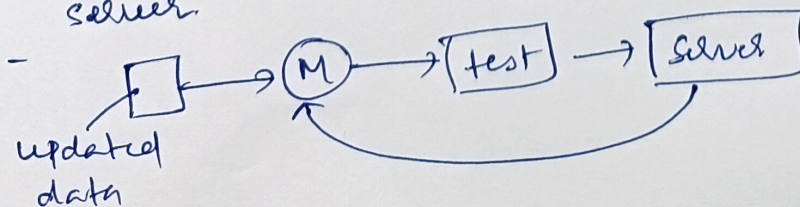


Batch Vs Online ML

Batch: (Offline ML)



- we will train it with a batch and upload to the server.

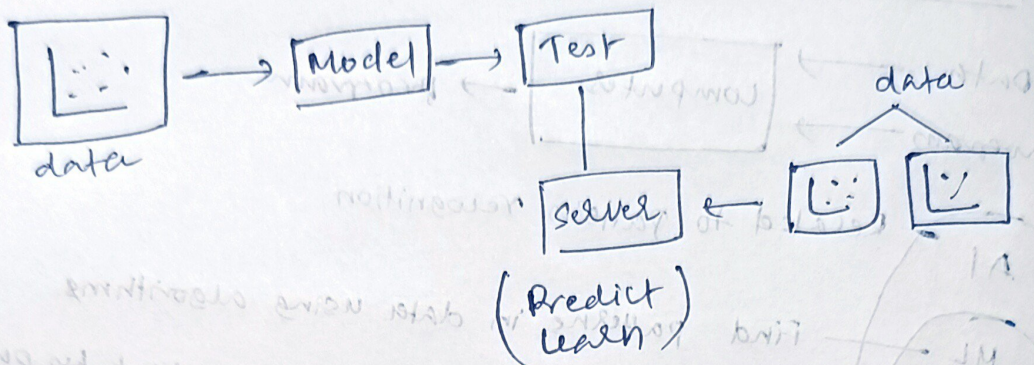


- No incremental learning.

disadvantages

- lots of data
- Hardware limitation
- Availability

Online ML



- Train model on server dynamically.
 - Ex: chat bots, Youtube, keyboard, etc.
- concept drift: Nature of the problem changes rapidly
is concept drift
- Ex: Stocks, sales on e-commerce

River is an online ML library

Learning Rate: By how much speed the model should learn data and train the model

