200 days of machine learning:-

Day-1 :

Machine learning is the field of study that gives computers the ability to learn from the data without being explicitly programmed

Ex:-

1. Email Spam filter
   - A machine learning algorithm that learns pattern by training set, after an instance arrives, the trained model analyzes it and predict whether it is Spam/Ham

Training set: Collection of data used to train the model

Training instance: particular data in the training set

In traditional programming:-

Rules + data → output

Machine learning:-

Data + output → Rules (model)

- ML System improves as they see more data

Types of ML:-

There are different types of ML

- Supervised learning
- unsupervised learning
- Reinforced learning
- Semi-supervised learning
- online learning

1. Supervised learning:-

- model learns from the labelled data, where each input has correct output
- The model learns a mapping : Input → output
- goal is to predict output for new, unseen data

Ex:-

1. Image classification
2. Email spam filter

2. unsupervised learning

- model learns from the unlabelled data, where no correct answers are provided
- The model discovers patterns, structure or groups in data
- goal is to find the hidden structure

Ex:-

1. Anomaly detection
2. Coustomer segmentation

3. Reinforcement learning

- model learns by interacting with an environment using rewards and penalities
- Agent takes action → gets rewards / penalities → learns best stratergy
- goal is to maximize rewards

Ex:-

- Self-driving Cars
- Robotics control

4. Semi-Supervised learning

- model learns from a small amount of labelled data + large amount of unlabelled data
- Combines supervised and unsupervised
- goal is to improve performance when labelled data is expensive
  - medical image analysis
  - Speech recognition

5. online learning

- model learns continously from new data as it arrives, instead of training once from a fixed dataset
- model updates step by step
- goal is to adapt to changing data
  - Stock price prediction
  - Real-time fraud detection