

ML Fundamentals

Tuesday, 12 November 2024 9:39 PM

• What is Machine Learning?

- Machine Learning is a field where we create models that learn from data and can make predictions or decisions without explicit programming for each task.

• Types of Machine Learning:

- Supervised Learning:** Trains models on labeled data. Useful for tasks like classification (e.g., spam detection) and regression (e.g., predicting house prices).
- Unsupervised Learning:** Works with unlabeled data to find patterns. Useful for clustering (e.g., customer segmentation).
- Reinforcement Learning:** Involves agents that learn by taking actions in an environment to maximize rewards. Used in robotics, gaming, etc.

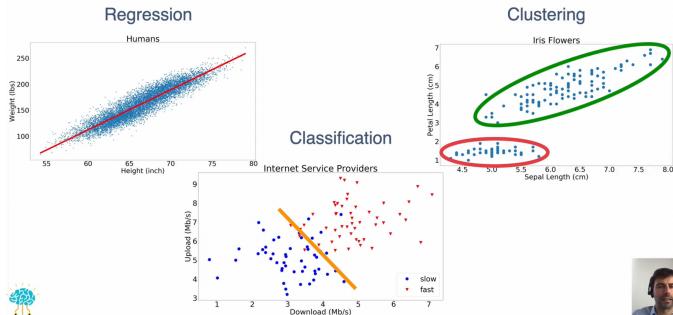
Key Terminology:

- Features:** The input variables or data points (like the columns in a dataset).
- Labels:** The output or target variable in supervised learning.
- Model:** The algorithm or mathematical structure we use to make predictions.

3 Main techniques of ML:

- Regression
- Clustering
- Classification

Three main techniques

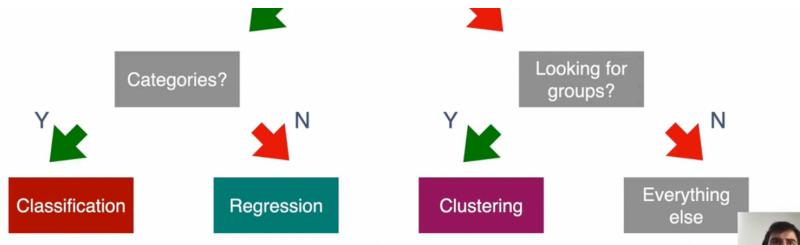


Different types of learning

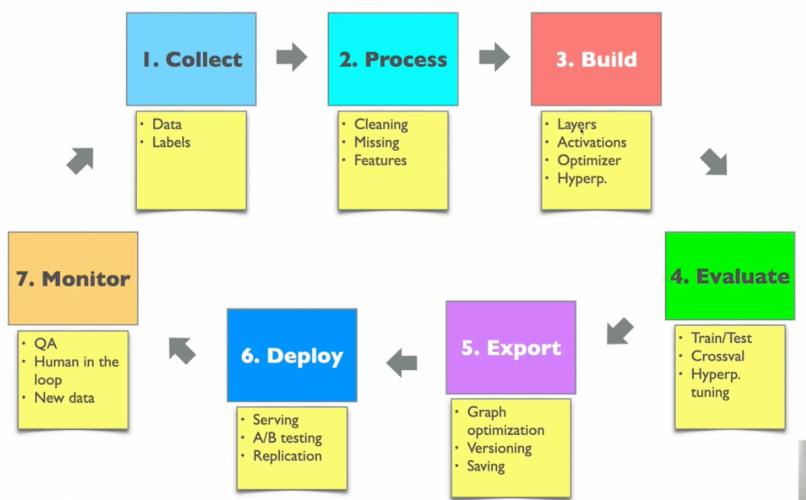
| Type | Goal | Techniques | Examples |
|---------------|------------------------|----------------------------|-----------------------------|
| Supervised | Learn from examples | Classification, Regression | Spam detection, forecasting |
| Unsupervised | Find relationships | Clustering | Customer segmentation |
| Reinforcement | Learn by trial & error | Deep RL | Robotic hand control |

Which technique?





Process:



Key tips:

- Small batch size tends to not stuck in local minima
- Large batch size can converge into a wrong solution by random
- Large learning rate can overshoot the correct solution
- Small learning rate will increase the learning rate
- Over fitting to the training data says that it has more layers and more neuron's than expected to be so reduce the neuron's or layer's