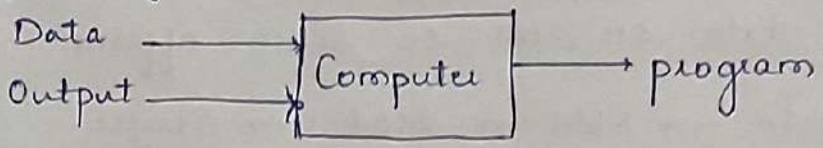
AI > Imagination

MACHINE LEARNING

"Machine Intelligence is the last invention that humanity will ever need to make."

Machine - learning

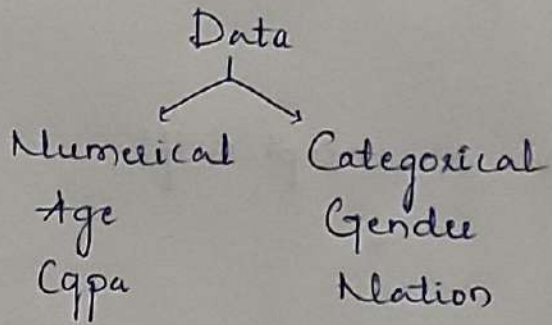
- **Machine learning :→** It is a field of computer science that uses statistical techniques to give computer systems the ability to "learn" with data, without being explicitly programmed.

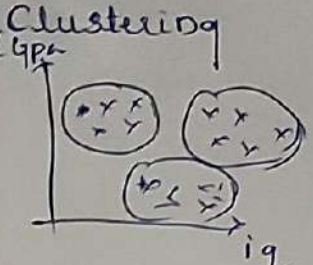


* Types of Machine learning :→

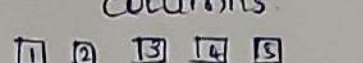
1. Supervised
2. Unsupervised
3. Semisupervised
4. Reinforcement

- **Supervised** → i/p & o/p
  1. Regression → Numerical
  2. Classification → Categorical
- **Unsupervised.**
  1. Clustering
  2. Dimensionality Reduction
  3. Anamoly detection
  4. Association.

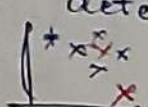




Dimensionality reduction
=> Remove unnecessary columns



Anamoly detection



Association : Purch -asing
Supermarket wants to understand custome

- Semisupervised → labelling
  Google photos →
- Reinforcement → trial & error → learn to make decision

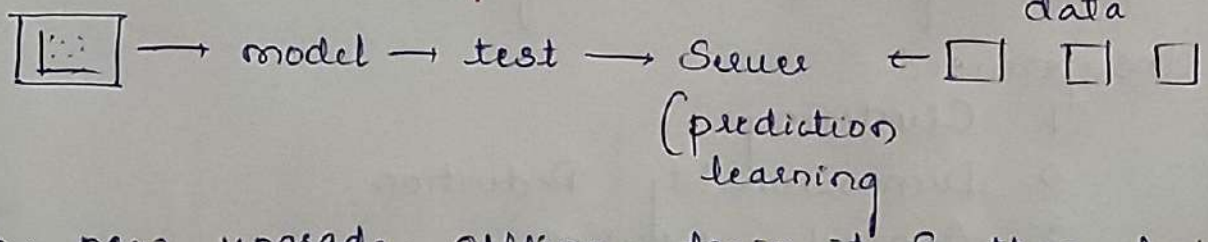
* Batch / offline vs online ml :→
Take entire data on ml to train offline = Batch

Data → Model → test → Server

problem →
Server → not updated
↓
always retrain

- Disadvantage :
  1. lots of data
  2. Hardware limitation
  3. Availability

* Online Machine learning



Batch = new upgrade = offline = train it & then deploy on server
Online = learn from the data

* When to use?
  1. where there is a concept drift
  2. Cost effective
  3. Faster solution.

- Disadvantage
  1. Tricky to use
  2. Risky.

Features	Offline learning	Online learning
Complexity	- Less complex as model is constant	- Dynamic complexity as the model keeps evoluing Overtime
Computational power	- Fewer computations, Single time batch based training	- Continuous data ingestions result in consequent model refinement computat-ions
Use in production	- Easier to implem-ent	- Difficult to implement & manage
Applications	- Image classification or anything related to ml, where data patterns remains constant without sudden concept drift	- Used in finance, economics, health where new data patterns are constantly emerging
Tools	- Industry proven tools Eg: Scikit, Tensorflow, pytorch, Keras, Spark MLib	- Active research/ New project role Eg: MOA, SAMOA, Scikit-multiflow, StreamDM.