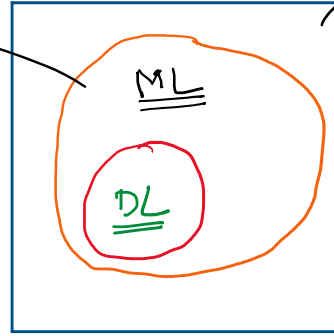# AI Vs ML Vs DL

→ Machine learning

→ It provide state tool to learn, analyze, visualize & develop Predictive models from data. & also fercasting model if time series date given.
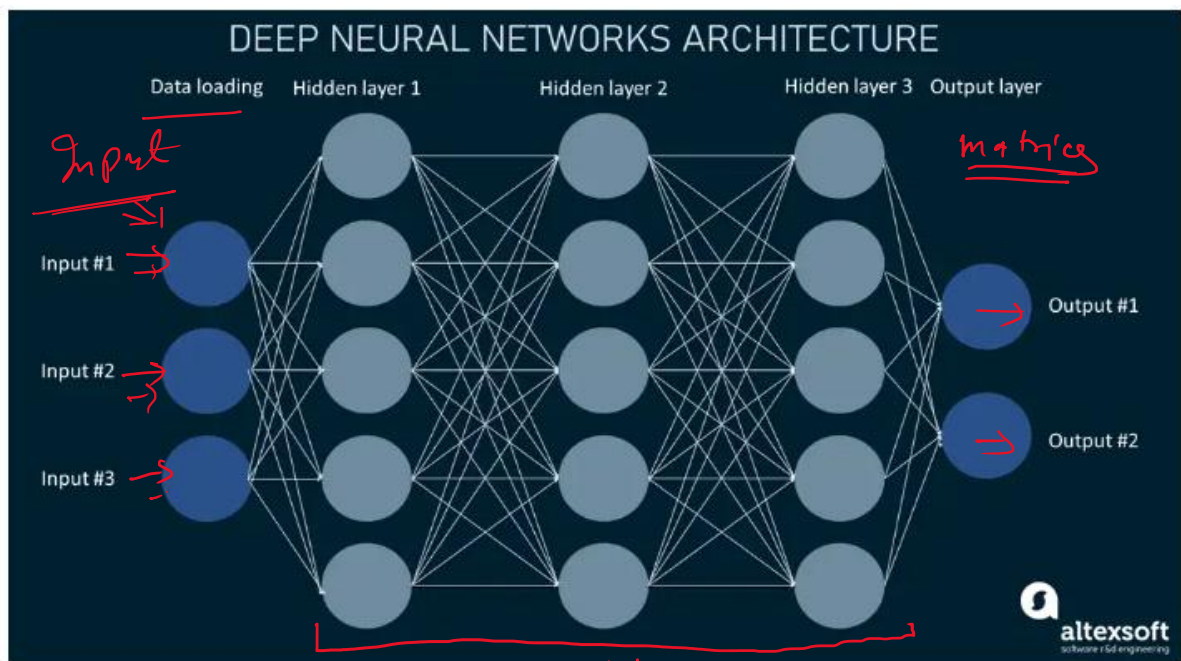
eg   * Recommendation System
       * Email spam filtering
(a) Regression application
(b) classifical application

A.I →

Smart application that can perform its own task without human intervention

eg   * Self driving car
       * Robots

ML
  DL

DL (Deep learning) → mimic the human brain using multilayered Neural network

DEEP NEURAL NETWORKS ARCHITECTURE

Input *matrix*

Hidden neurons

eg   × object dection →
      × Image classification →
      × chatbots →

What Is Machine Learning?

Machine Learning is the science (and art) of programming computers so they can *learn from data.*

Here is a slightly more general definition:

[Machine Learning is the] field of study that gives computers the ability to learn without being explicitly programmed.

—Arthur Samuel, *1959*

And a more engineering-oriented one:

A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E.

—Tom Mitchell, *1997*

Type of ML

① Supervised machine learning [→ classification → Regression]

②) Unsupervised machine learning

② Unsupervised machinelearning

③ Semisupervised machinelearning

④ Reinforcement learning

① Supervised ML

* Dataset → O/P

(a) Classification

Independent features }

target
Dependent feature }
→ O/P

No. of hr Played	No. of hr Study	Pass/Fail
8	2	Fail
6	4	Fail
		Fail
7	3	Pass
5	5	Pass
4	6	

O/P → Pass/Fail

Regression   Input variable   Dependent feature
                    data   ID I A

Regression

Input variable → Independent feature

Dependent feature

O/P → target

Size of house	No. of rooms

Price of house
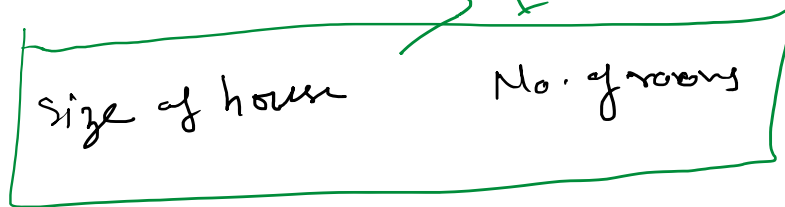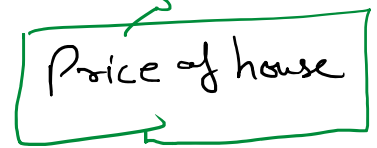
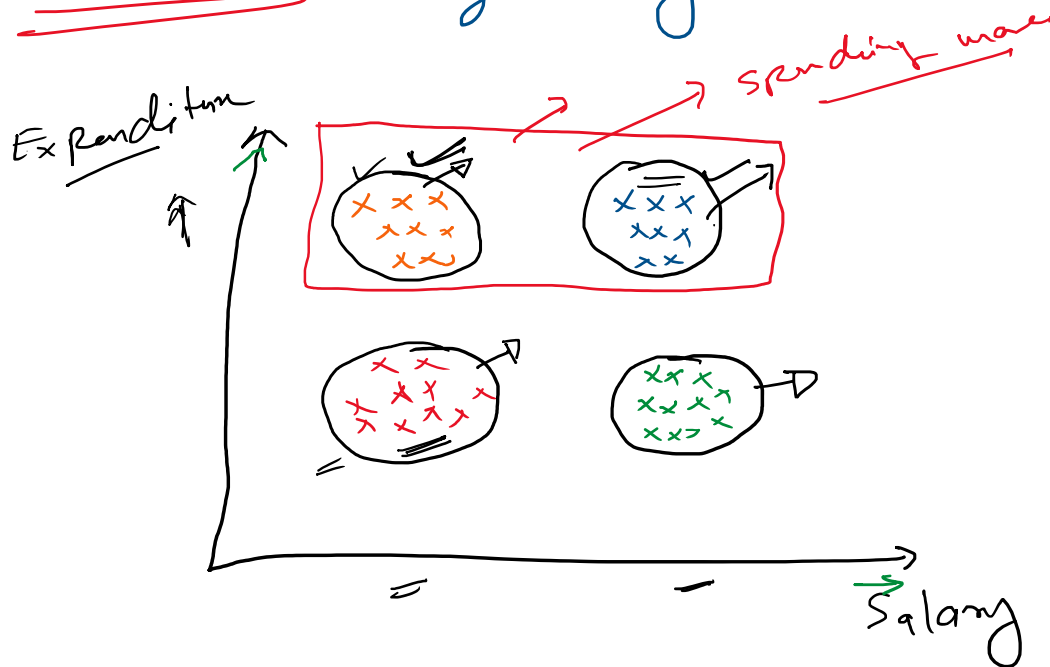|		
1200 sqft	2	12 L
2000 sqft	3	15 L
3000 sqft	4	20 L
3500 sqft	5	25 L

Ex →
- k - Nearest Neighbors
- Linear Regression
- logistic Regression
- Support vector machine (SVM)
- Decision trees & Random forest

② = Unsupervised ML

* The training data is unlabeled

eg → Customer Segmentation

MO → o/p

① <u>clusters</u> → group of similar data

Expenditure

spending more

Salary

g { k-means
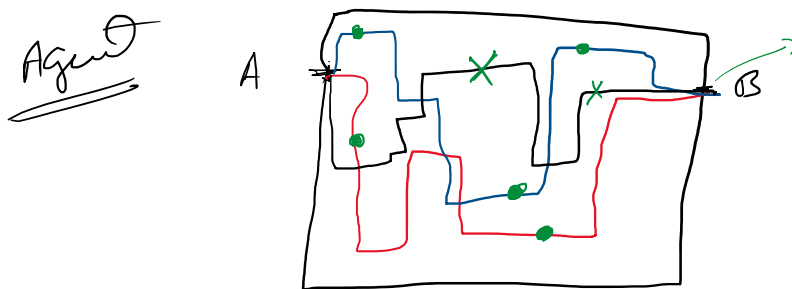DB SCAM
Hierarchical cluster Analysis (HCA) }

② Anomaly detection →

* One-class svm
* isolation forest }

— Semisupervised ML

③ **Semi supervised ML**

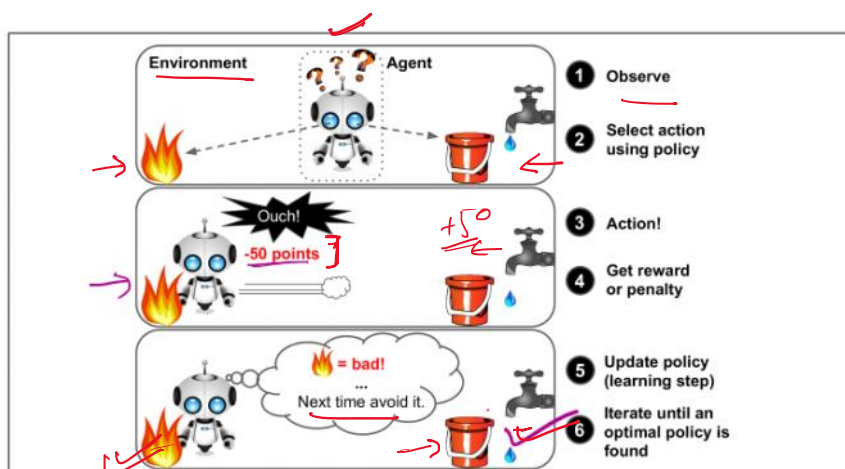→ It is combination of supervised & unsupervised ML.

eg Google Photos.

④ **Reinforcement learning** →

Agent

A [maze diagram] B

Reinforcement Learning

Reinforcement Learning is a very different beast. The learning system, called an *agent* in this context, can observe the environment, select and perform actions, and get *rewards* in return (or *penalties* in the form of negative rewards, as in Figure 1-12). It must then learn by itself what is the best strategy, called a *policy*, to get the most reward over time. A policy defines what action the agent should choose when it is in a given situation.

Environment ??? Agent	① Observe
	② Select action using policy
Ouch! -50 points	③ Action!
	④ Get reward or penalty
🔥 = bad! ... Next time avoid it.	⑤ Update policy (learning step)
	⑥ Iterate until an optimal policy is found

... Next time avoid it.

(learning step)

Iterate until an optimal policy is found

6