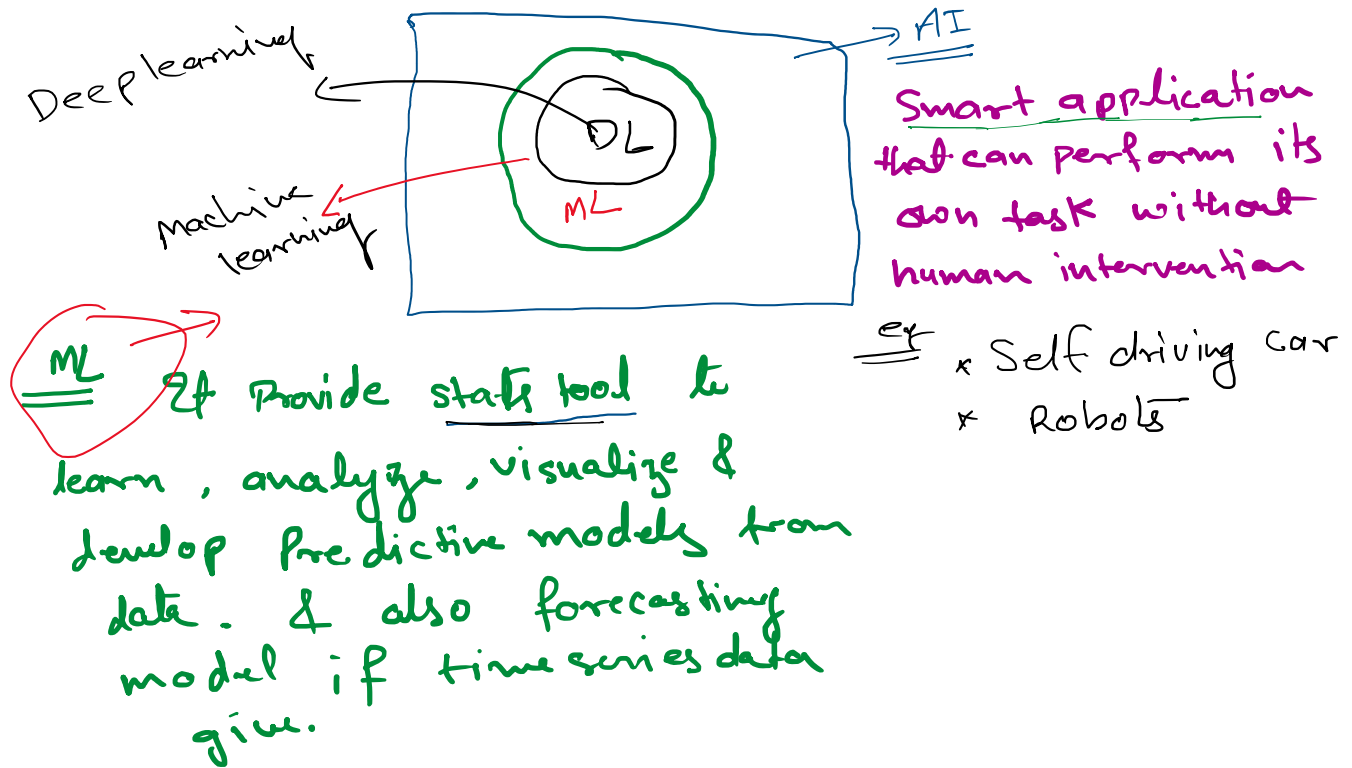


## AI vs ML vs DL

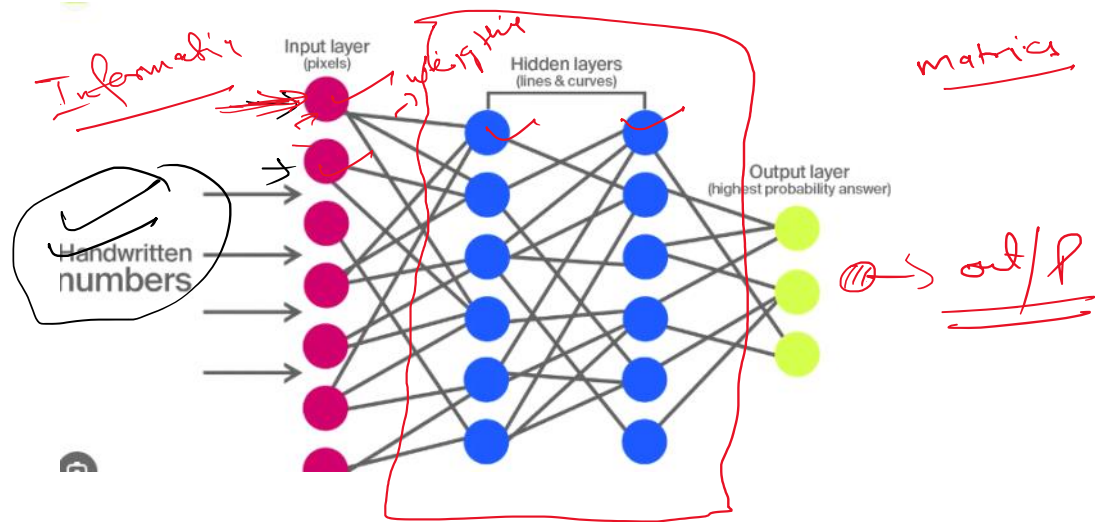


ML Provide statistical tool to learn, analyze, visualize & develop Predictive models from data. & also forecasting model if time series data give.

ex \* Recommendation system  
\* Email spam filtering

(a) Regression Application  
(b) Classification Application

DL mimic the human brain using multi layered Neural Network



- eg
- \* Object detection
  - \* Image Recognition
  - \* cheatbots →
  - \* Recommendation

## 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

## Types of ML

- ① Supervised Machine learning
- classification
  - Regression

① Supervised Machine learning  $\rightarrow$  Regression

② Unsupervised machine learning

③ Semi supervised machine learning

④ Reinforcement learning

## ① Supervised ML

Dataset  $\rightarrow$  o/p

### a) Classification

No. of hr played

8

6

7

5

4

No. of hr study

2

4

3

5

6

dependent feature  $\uparrow$

Pass/fail

fail

fail

fail

Pass

Pass

o/p  $\rightarrow$  Pass / fail

### Regression

Size of house      No. of rooms

o/p

Price of house

Size of house	No. of rooms
120 sqft	2
200 sqft	3
300 sqft	4
<u>350 sqft</u>	<u>5</u>

Price
12L
15L
20L
25L

Input  $\rightarrow$  model  $\rightarrow$  O/P (Price)

- Exam  $\rightarrow$
- $\rightarrow$  K-Nearest Neighbors
  - $\rightarrow$  Linear Regression
  - $\rightarrow$  Logistic Regression
  - $\rightarrow$  Support Vector Machine (SVM)
  - $\rightarrow$  Decision Trees & Random Forest

## ② Unsupervised ML

The training data is unlabeled

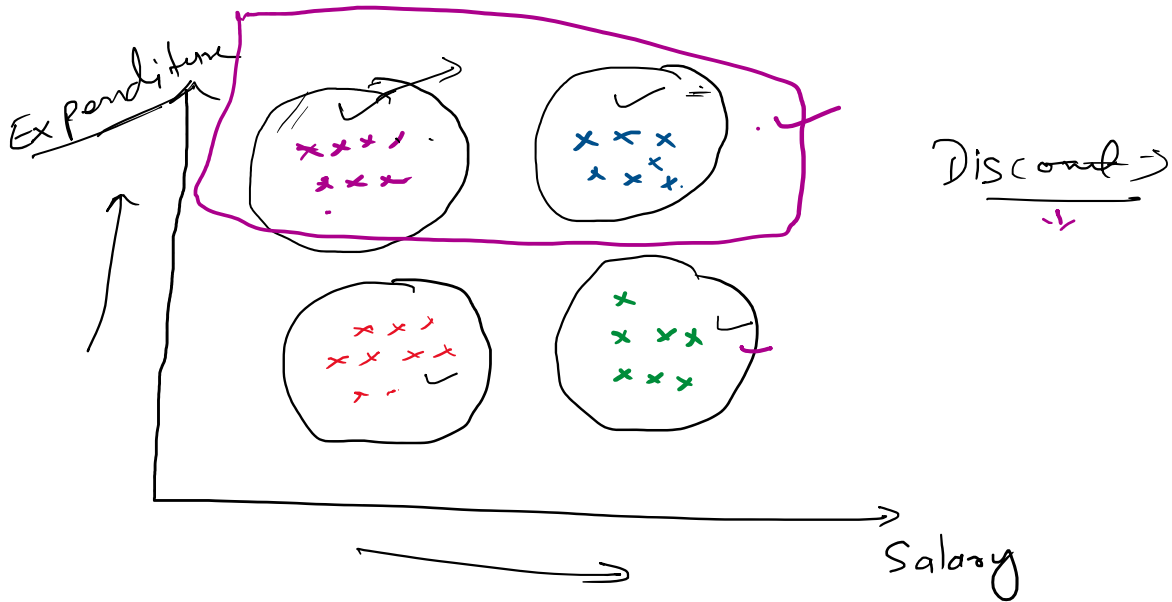
ex Customer Segmentation

Input  $\rightarrow$  O/P

Mo  $\rightarrow$  o/p

\* clusters

$\rightarrow$  group of similar data



eg

① clustering

- $\rightarrow$  K - means
- $\rightarrow$  DBSCAN
- $\rightarrow$  Hierarchical cluster Analysis (HCA)

② Anomaly detection

- $\rightarrow$  One - class SVM
- $\rightarrow$  Isolation forest

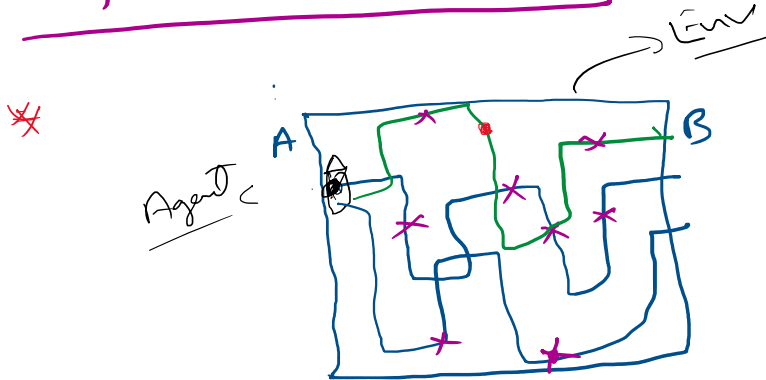
③ Semisupervised ML

### ③ Semisupervised ML

It is combination of supervised & unsupervised ML.

eg Google Photos.

### ④ Reinforcement learning



#### 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.

