Types:

1) Supervised : a. Regression and b.Classification

2) Unsupervisied: a. Clustering b. Dimensional Reduction c. Anomoly detection d. Association

3) Semi supervised

4) Reinforcement

Supervised

Suppose we have data for input and output and with the help of data we can find relationship so that we can predict output with new input.

Example:

Suppose we have Group of students = 5000 (Data)

where, we have,

student GPA|Student IQ|Placement after graduation

- 3.5 700 Y
- 2.6 900 N
- 3.3 600 Y
- 2.9 300 N

So, now one student is going to graduate, we will input his IQ and GPA to predict whether he will get placement or not. This type of machine learning is supervised learning.

Regression and Classification

Regression: In supervised Machine Learning, we all know that there is input data and output data to trained machine before predicting, if our output is Numerical then we will do regression and our output is categorical then we will do classification.

Example: Take Previous example: we have GPA, IQ level and output is placement or not (Y or N) - This is classification. If instead of Y/N - How much package graduate is earning or will earned(during prediction) - 3K,1K,4K - This is regression

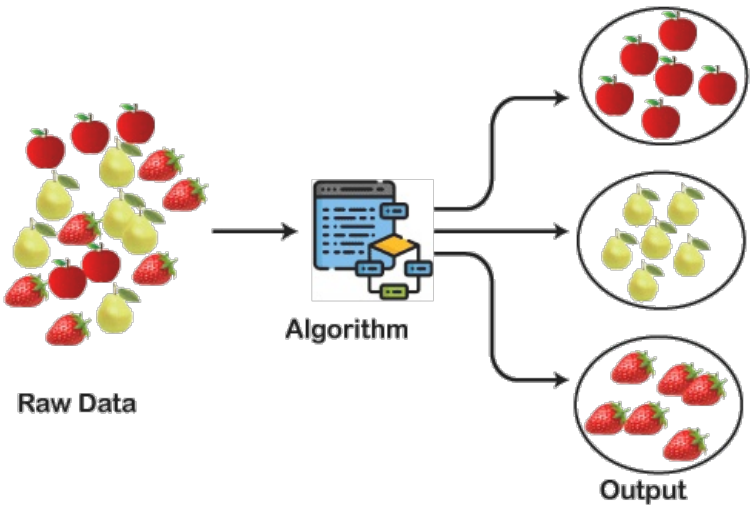
Example: House price prediction (Regression) ; Email is spam or not (Classification)

Unsupervised

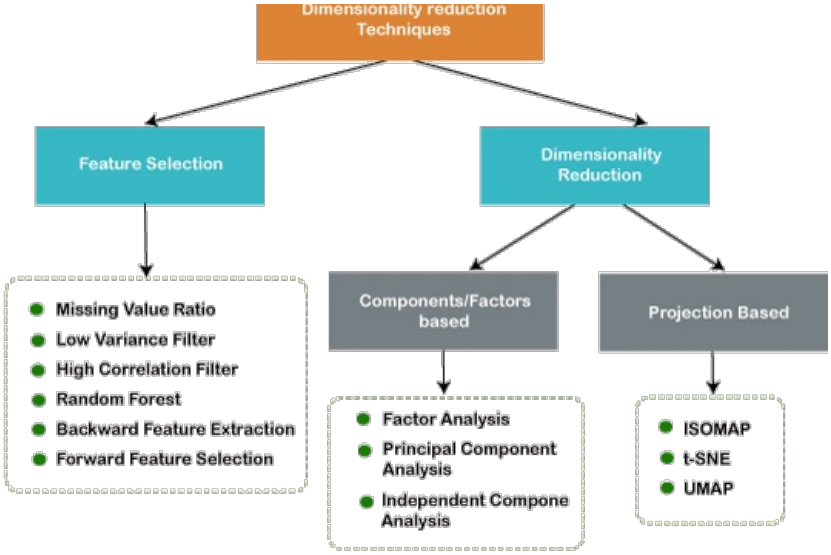
In supervised we will have input and output data but in Unsupervised, we only will have input.

Example: suppose now we have cgpa/gpa and IQ level only, we do not have any data on placements or package.

- Now, clustering learning model can detect or categorize group of students according to gpa and IQ levels.

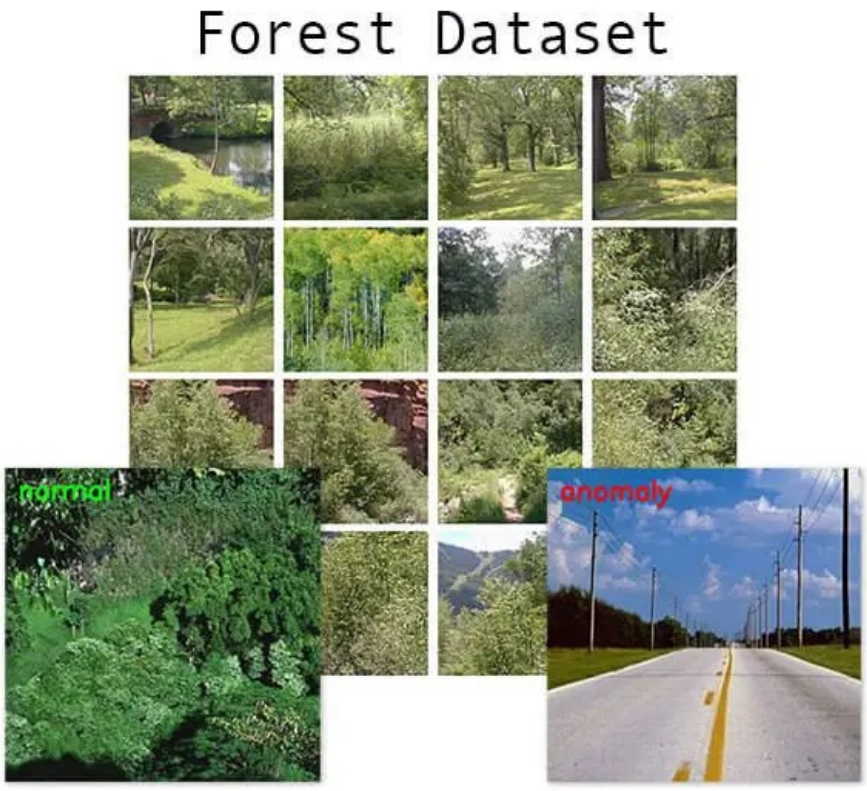


Or, Customer Segmentation: Businesses often prefer to segment their customers so that they may develop unique marketing strategies for each group of customers.



Dimensionality reduction

Anomaly detection: Detecting outliner (mainly example)



Association rule learning: Suppose it is using in mall to insert stuffs /food in mall in proper way:

EXAMPLE OF ASSOCIATION RULES

Assume there are 5 customers

3 of them bought milk, 2 bought potato chip and 2 bought both of them

Transaction 1: Frozen pizza, cola, milk
Transaction 2: Milk, potato chips
Transaction 3: Cola, frozen pizza
Transaction 4: Milk, potato chips
Transaction 5: Cola, pretzels

milk → potato chip

How about Potato chip → Milk ?

support milk = P(milk) = 3/5 = 0.6

support potato chip = P(potato chip) = 2/5 = 0.4

support = P(milk & potato chip) = 2/5 = 0.4

confidence

= support (milk & potato chip)/support(milk)

= 0.4/0.6

= 0.67

CONFIDENCE= P(Milk & potato chip) /P(Milk)

lift = confidence/support(potato chip) = 0.67/0.40 = 1.67

LIFT = [P(Milk & Potato chip)/P(milk)] /P(Potato chip)

Any rule with a lift < 1 does not indicate a cross-selling opportunity

Reinforcement Machine Learning

Think it is like human, how human learn? by doing from scratch - In supervised , we have both input and output, In unsupervised, we only have input, now here we do not have any data. Example: Self driving car.

Example: Robot learning many new things itself with some intelligent