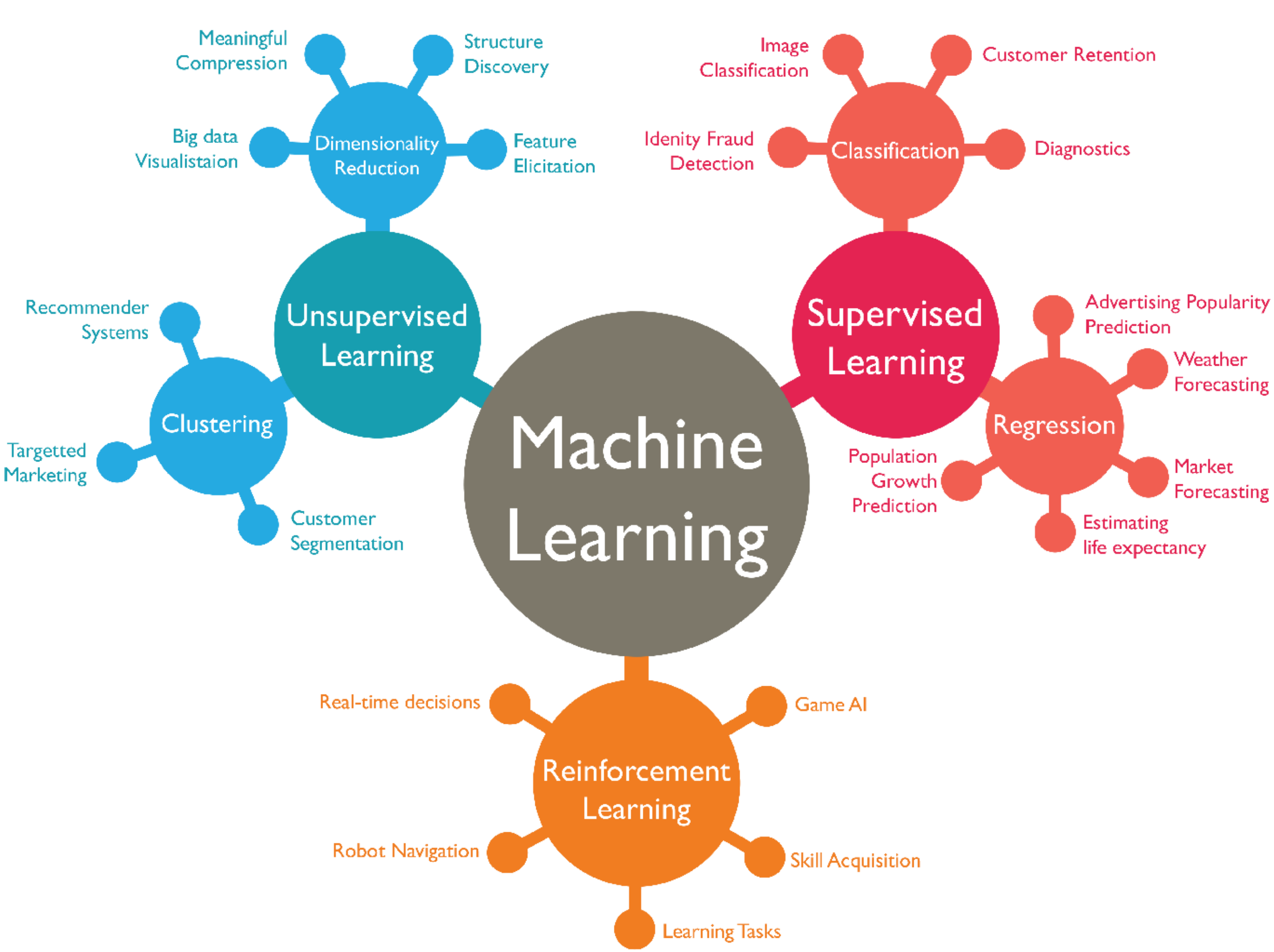
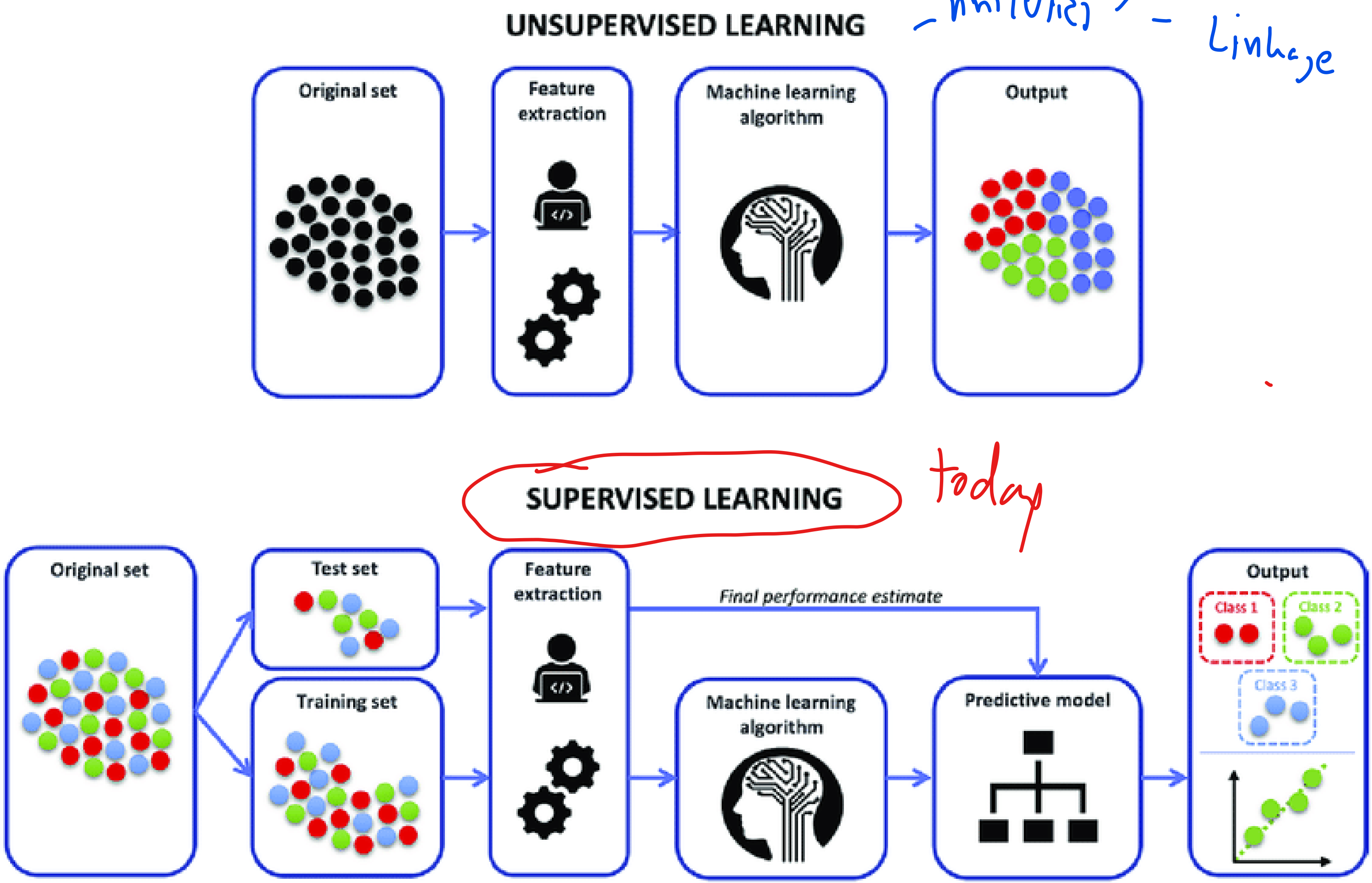
Today Focus



INVESTIC

ML Process

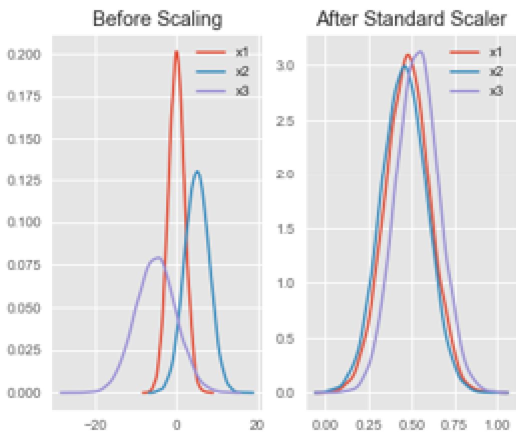
- Label enc
- Linkage



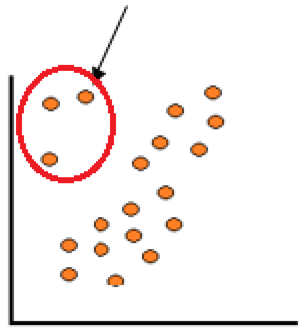
today

Today Focus

Normalization



Outliers



Imputation

	First	Second	Third
0	100.0	30.0	NaN
1	90.0	45.0	40.0
2	NaN	56.0	80.0
3	95.0	NaN	98.0

Encoding

Food Name
Apple
Chicken
Broccoli

→

Apple	Chicken	Broccoli
1	0	0
0	1	0
0	0	1

Scaling

Data Preprocessing

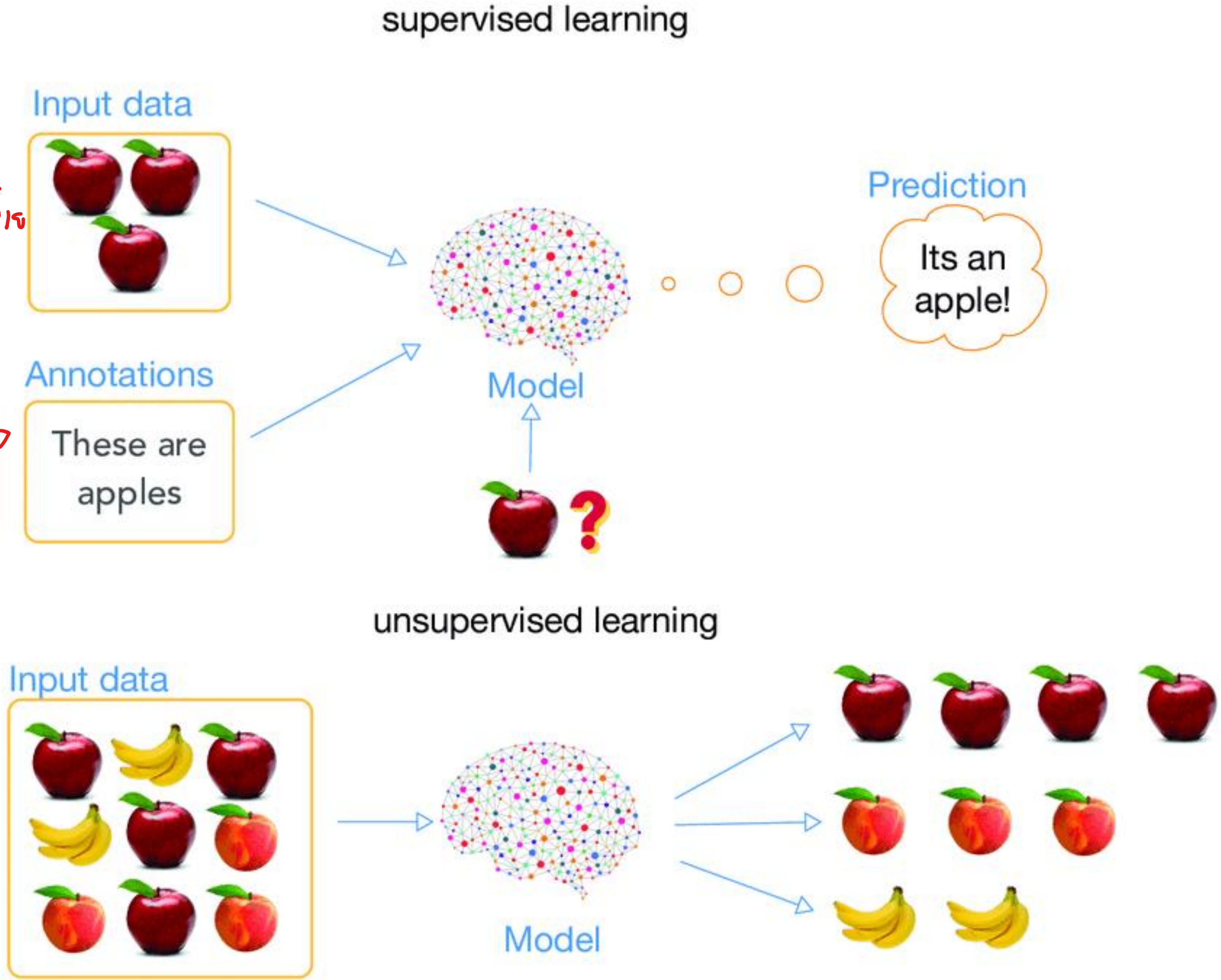
INVESTIC

Classified by Type

เอาเฉลยใส่ไปด้วย

เอาเฉลยไป

ว่าเป็นอะไร
ทั้งนั้น



ใส่ input ไป

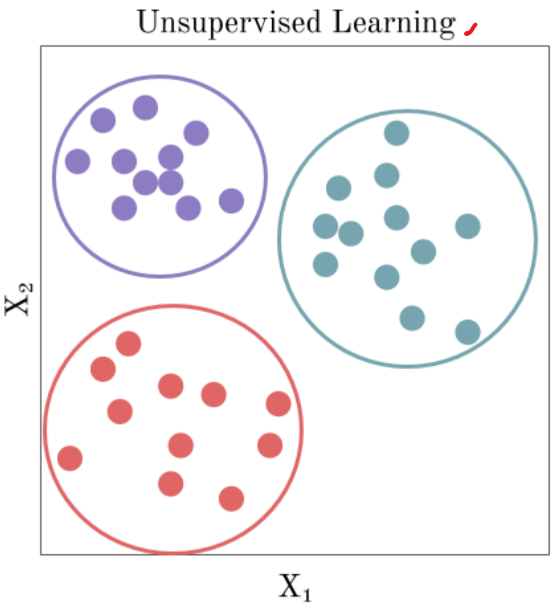
มันแยกแยะ

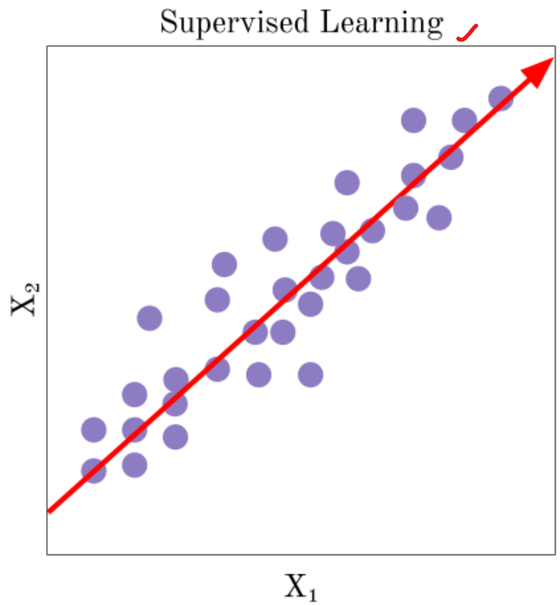
เอง

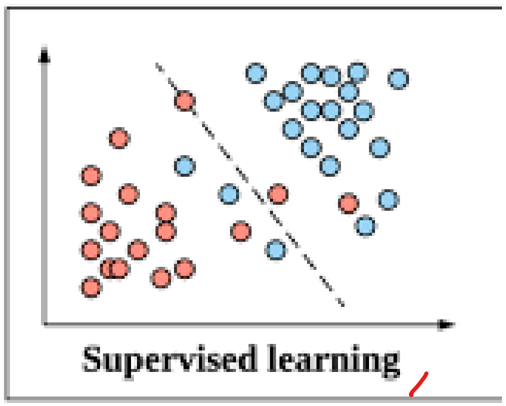
เช่น Linkage

INVESTIC

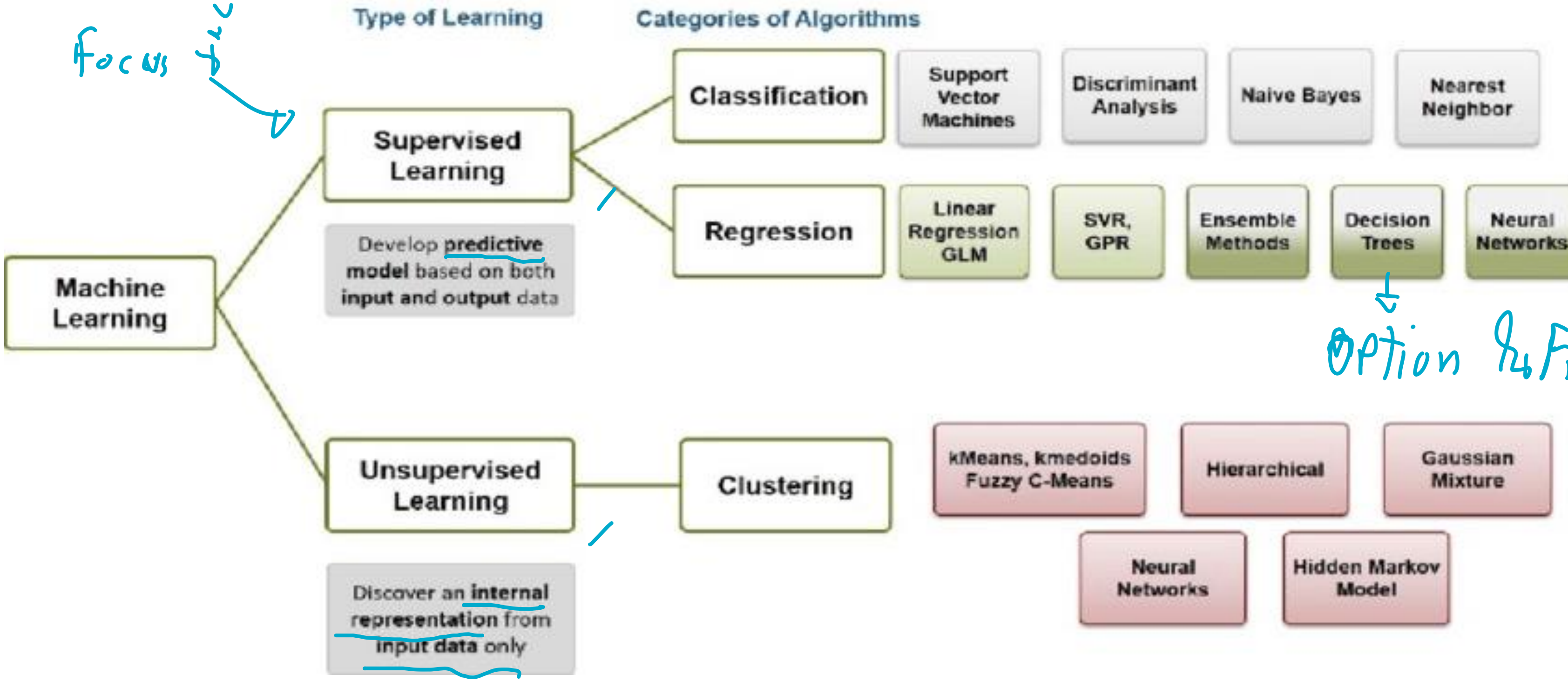
Which is which







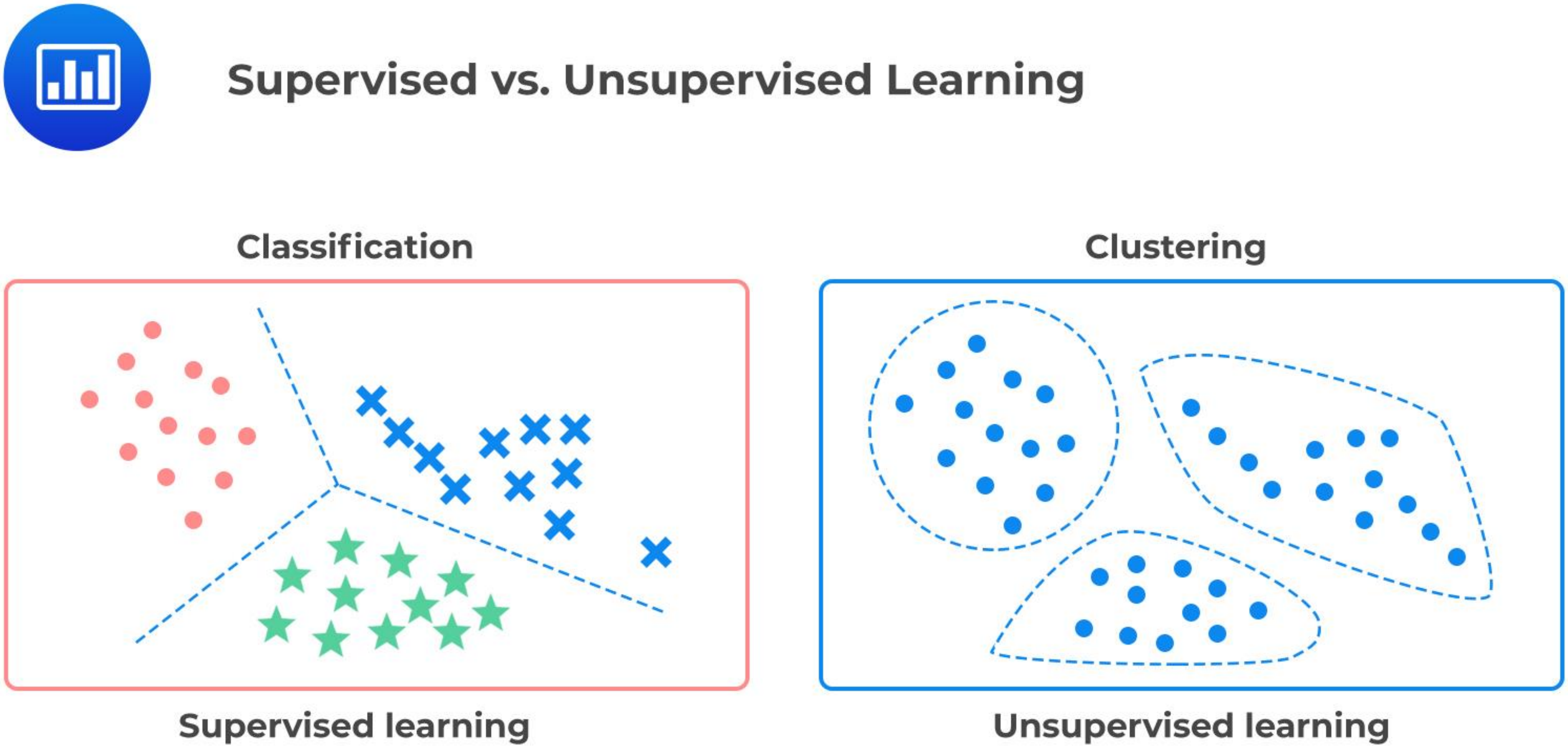
Regression & Classification



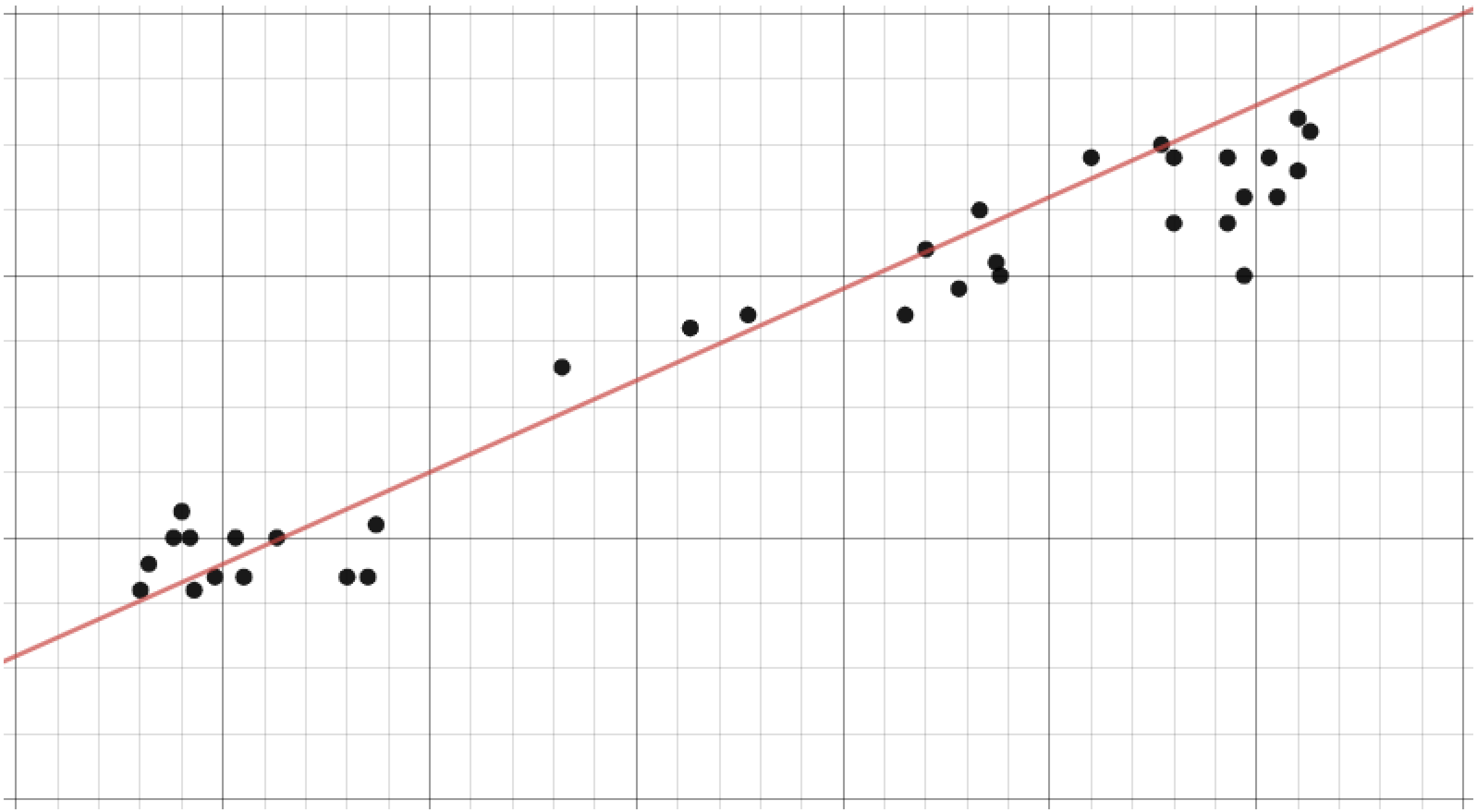
Focus to

Option to Finance

Classification vs Clustering

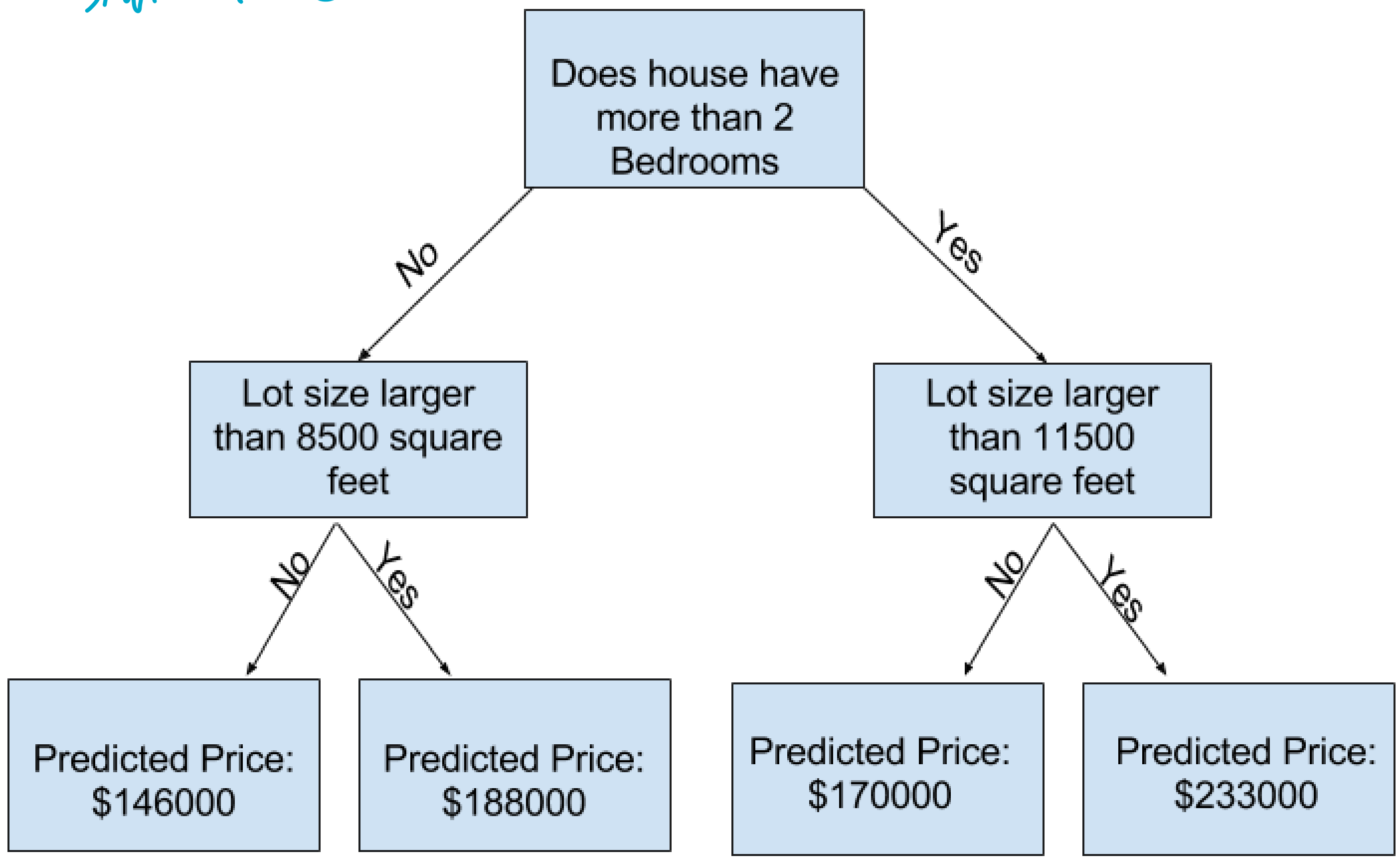


Regression Learning Model



Regression Learning Model

Decision Tree



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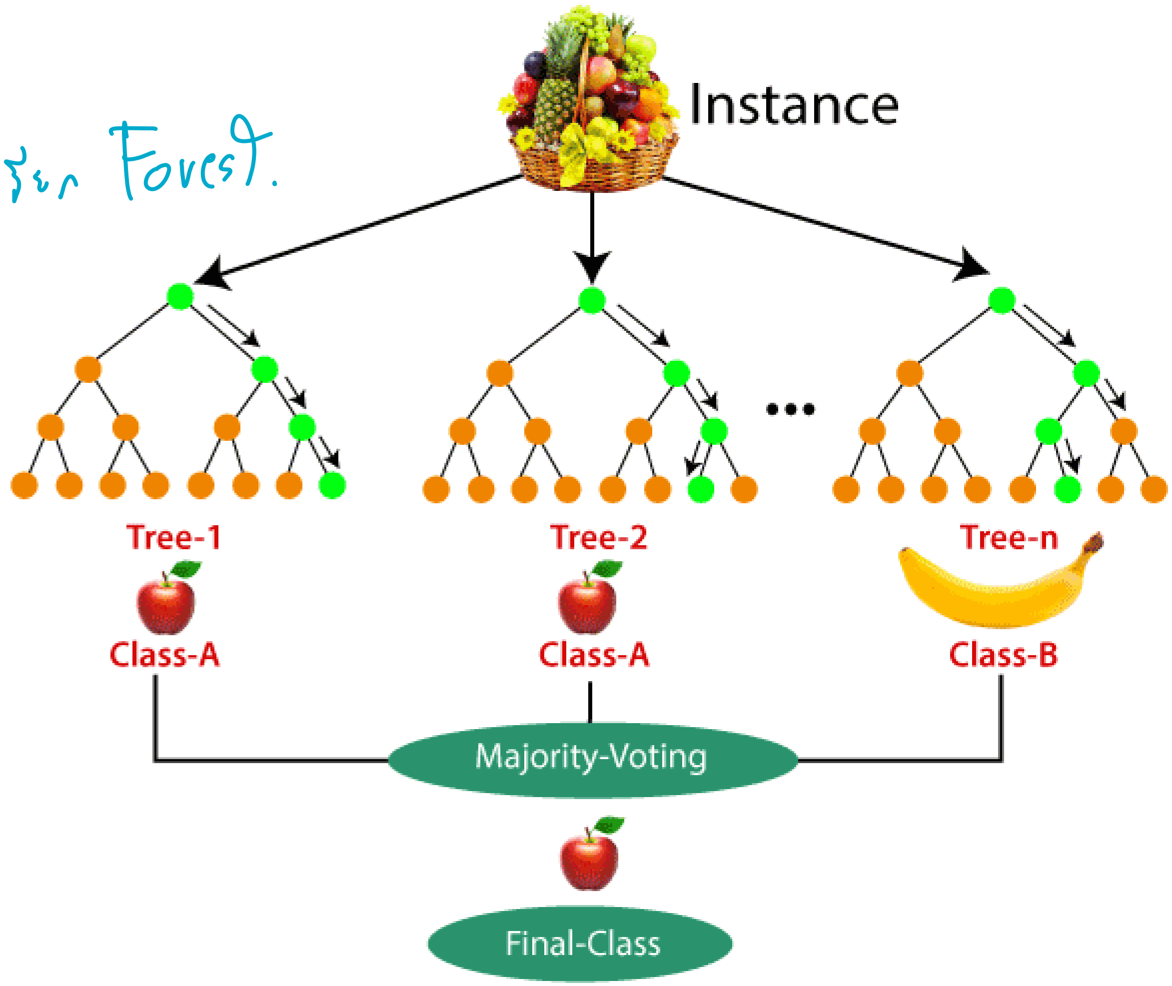
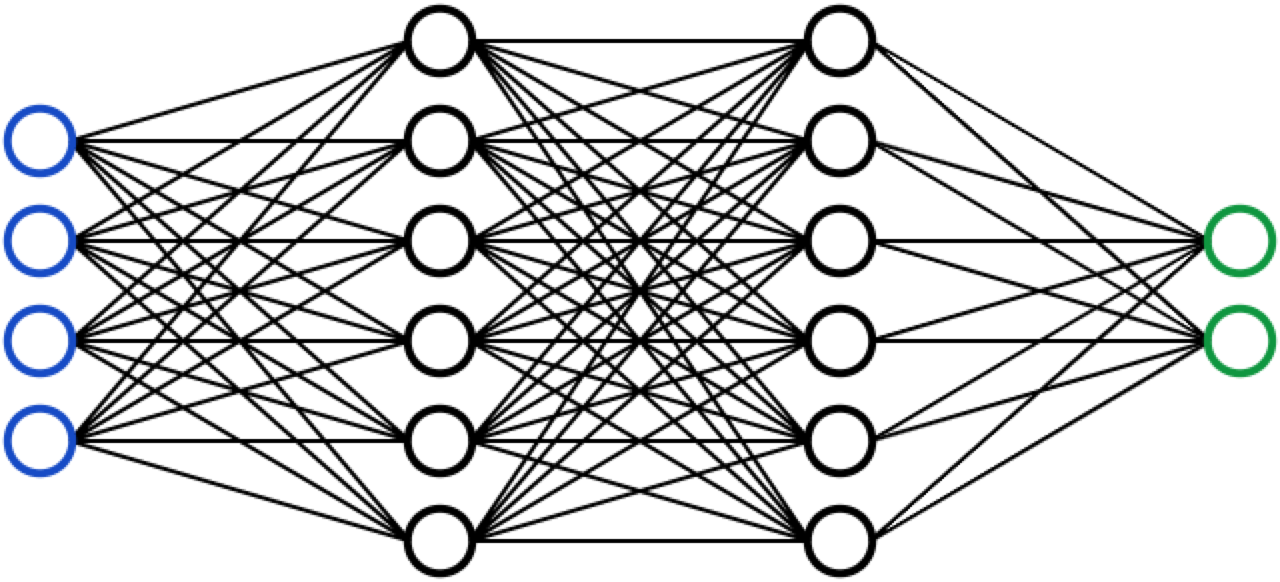
Regression Learning Model

ต้นไม้เยอะๆ เรียก Forest.



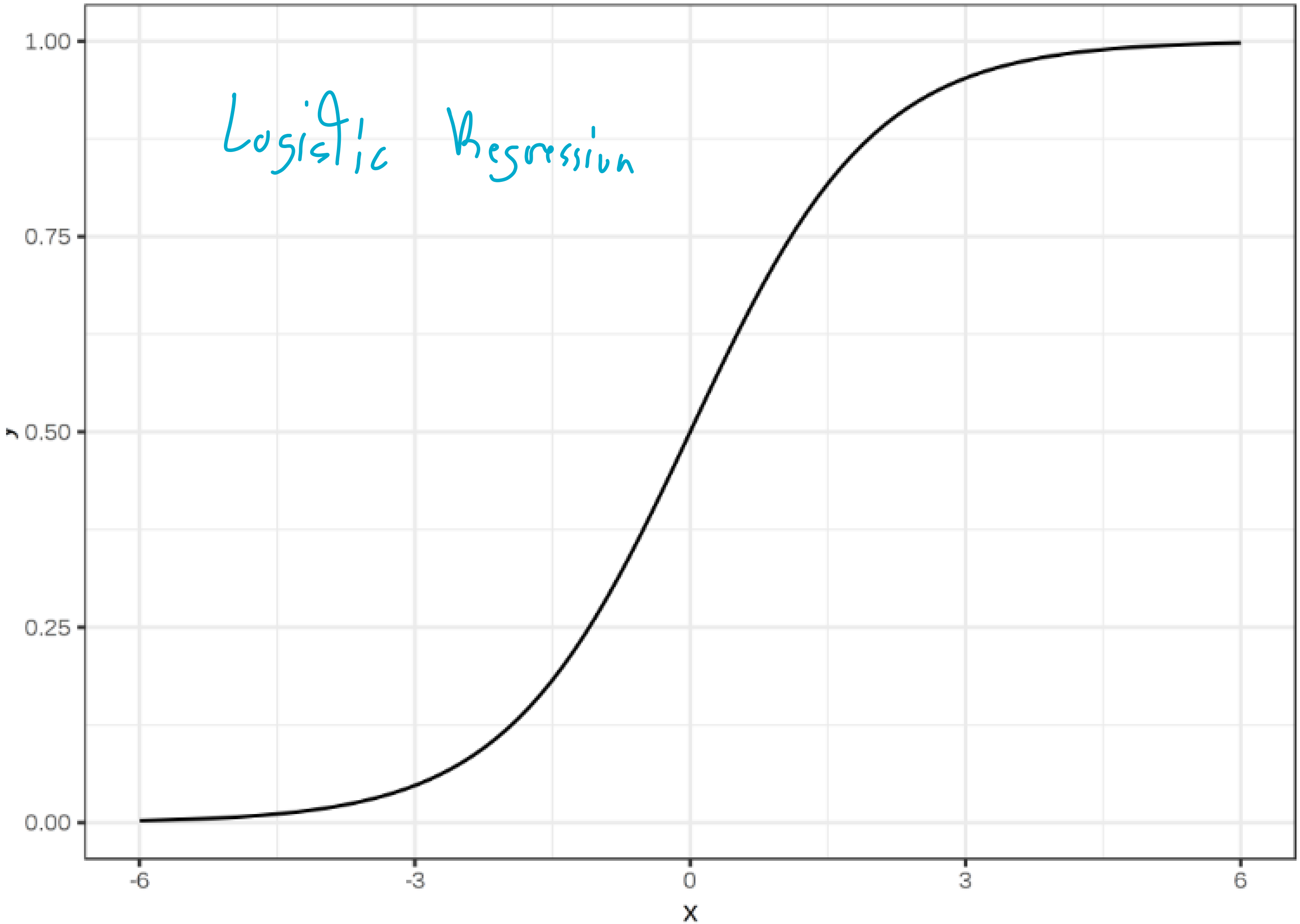
Regression Learning Model

Neural Network



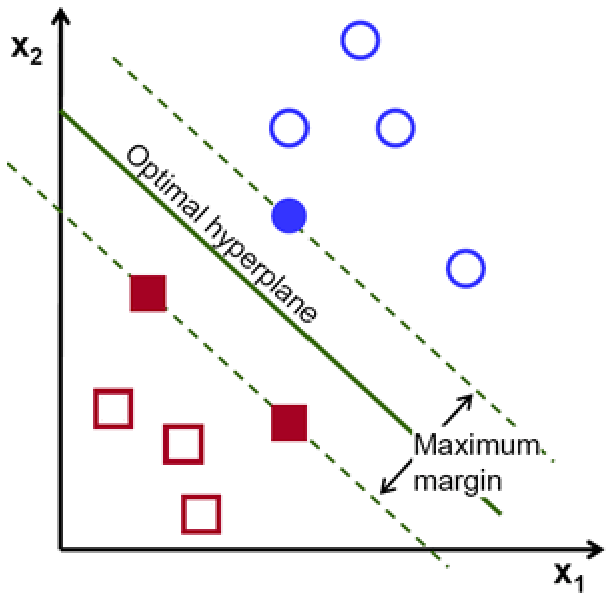
Classification Learning Model

ช้อ2



INVESTIC

Classification Learning Model

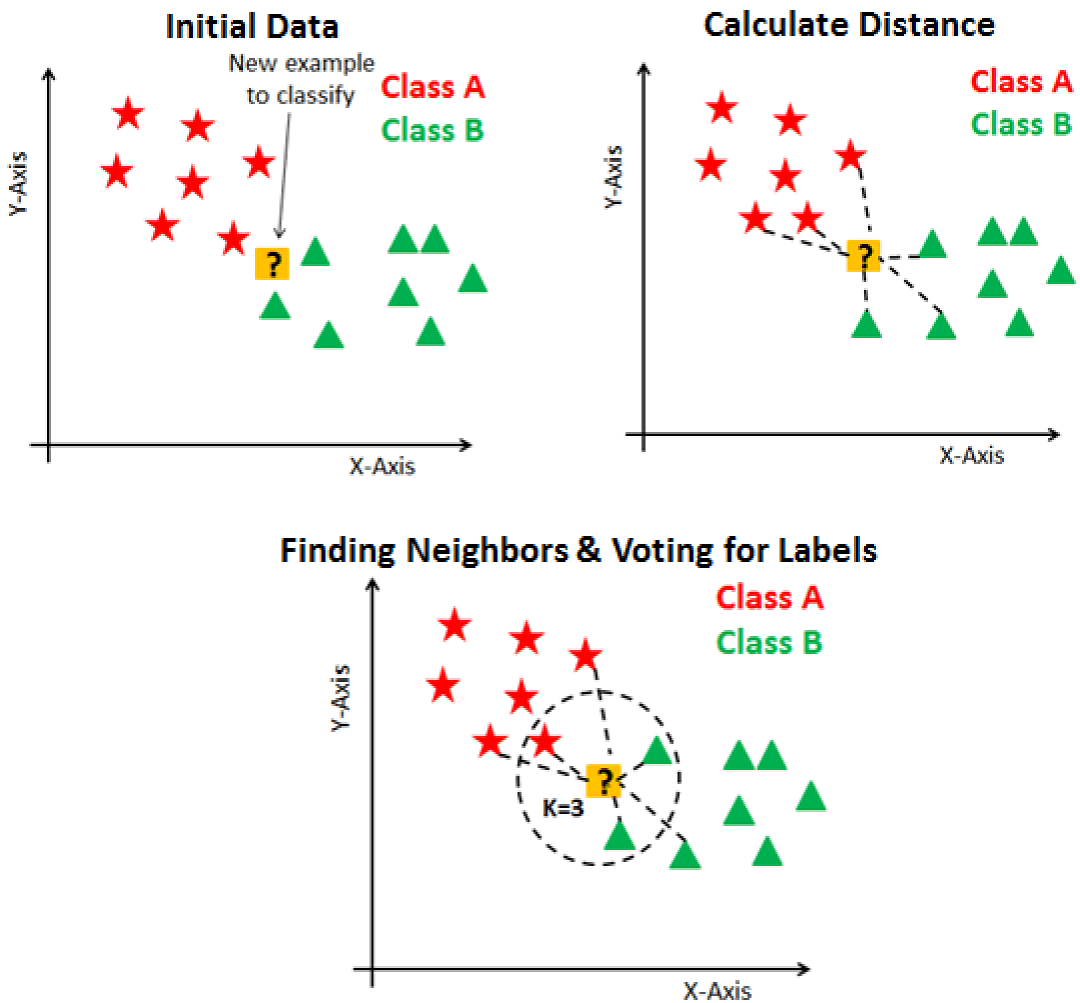


Classification Learning Model

KNN

K- Neurest

Neighbors



Classification Learning Model

Naive Bayes ใช้เยอะมาก

แบบ ~~se~~cenario.

$$P(y|X) = \frac{P(X|y) * P(y)}{P(X)}$$

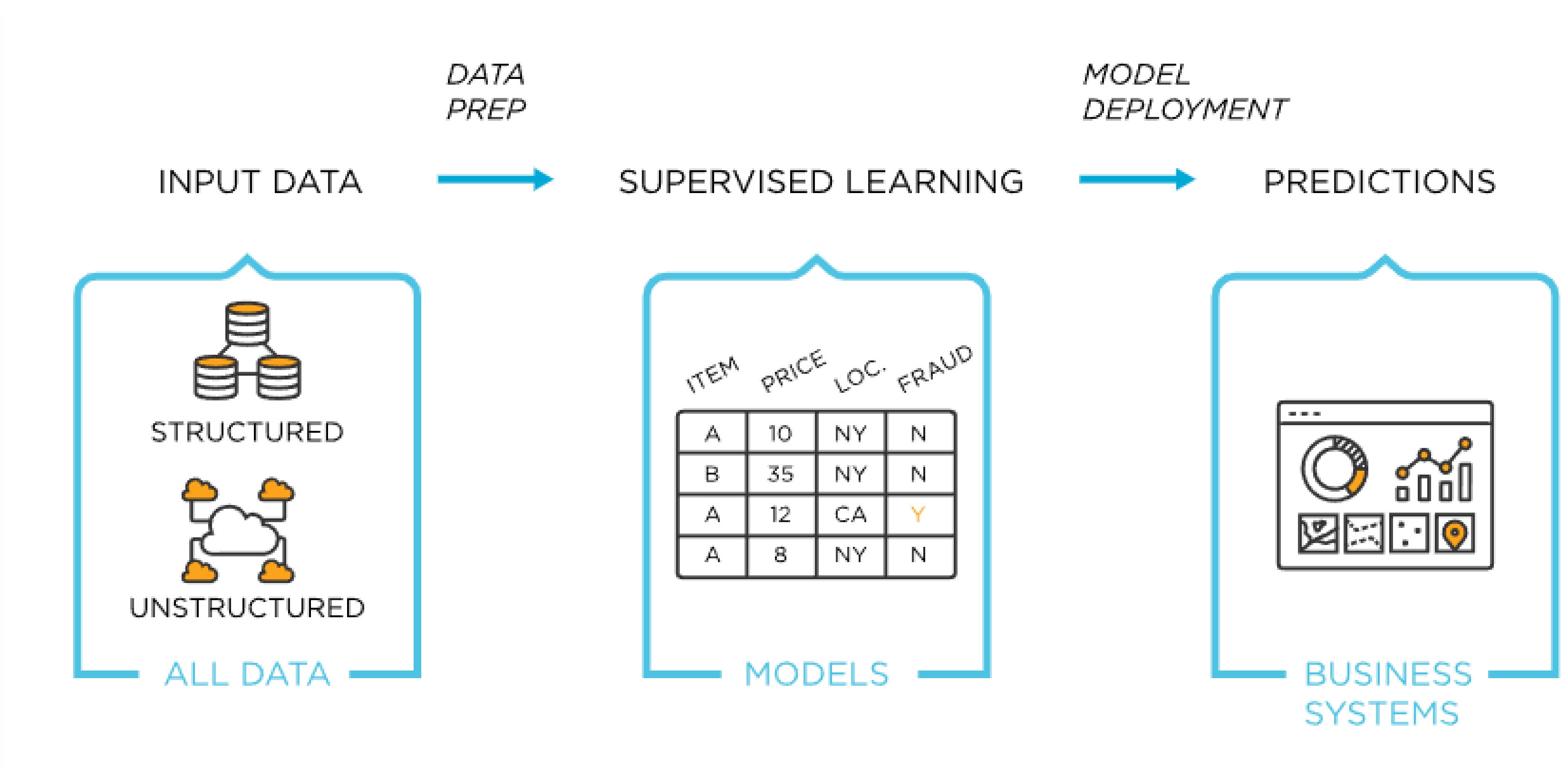
"What is the probability of y given X?"

$$P(y|X) \propto P(X|y) * P(y)$$

The goal is to find the class y with the maximum proportional probability.

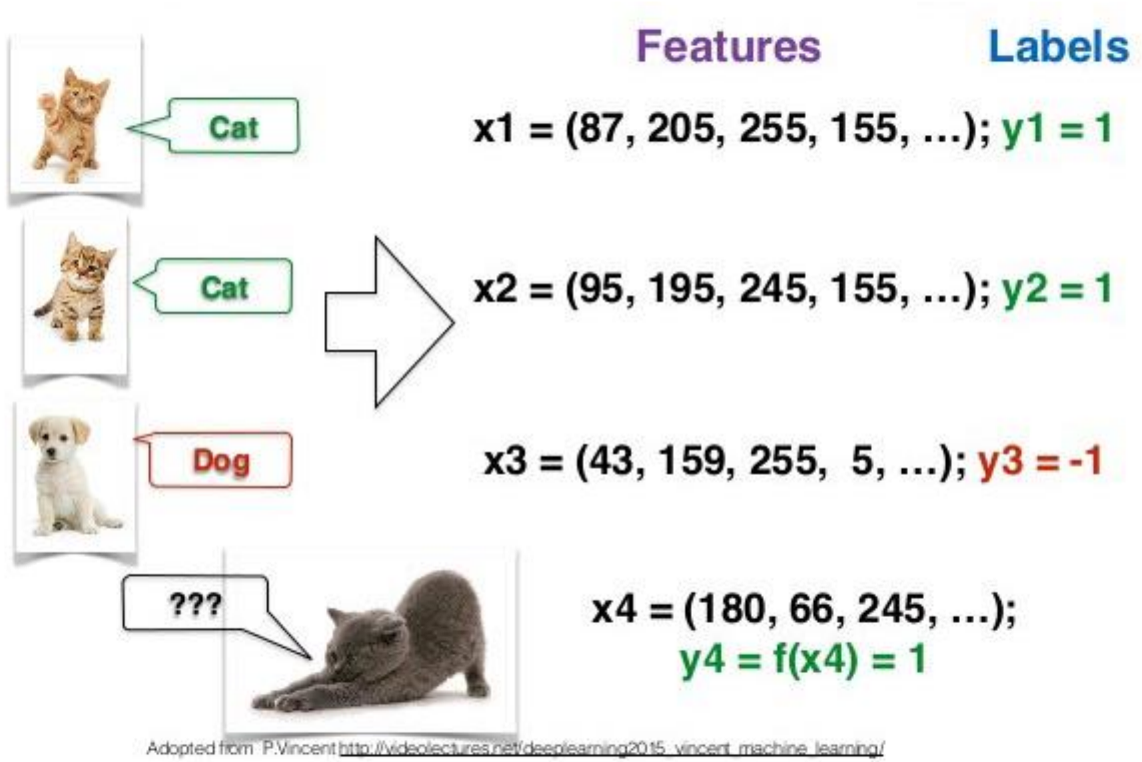
INVESTIC

Supervised Learning

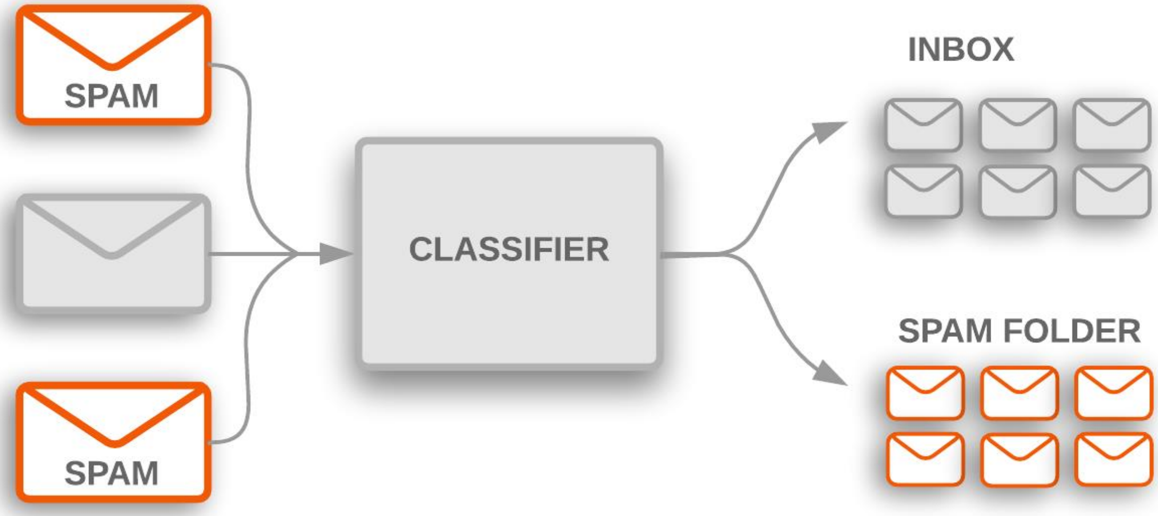


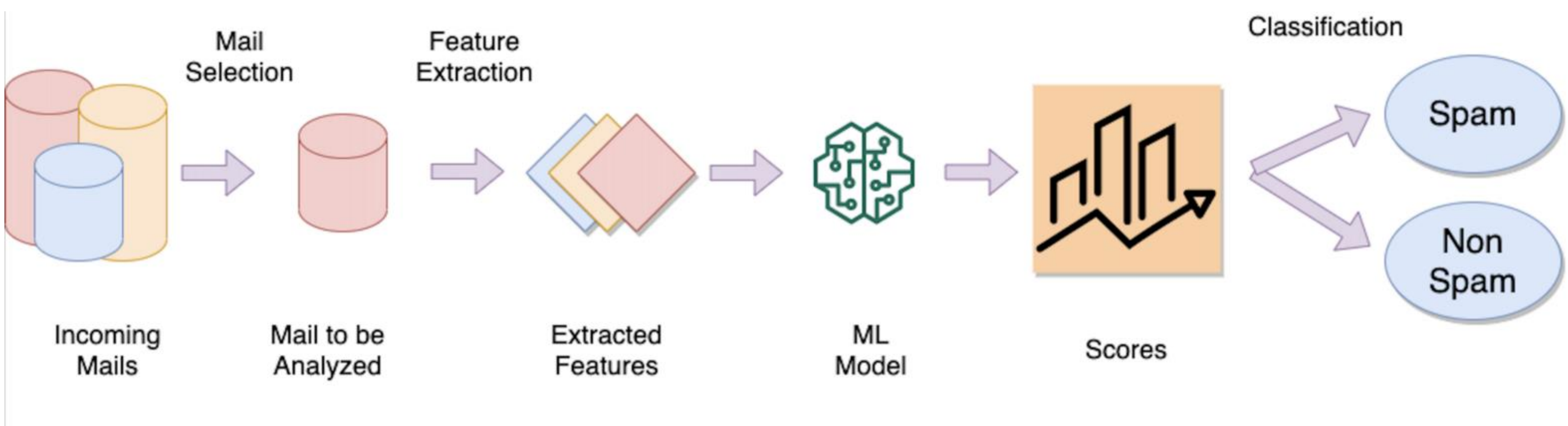
INVESTIC

Supervised Learning



Complete picture





INVESTIC

ML Process

1. Prepare & Transform Data
   1. Normalizing/standardizing
   2. Label Encoding
2. Modeling
3. Evaluating

ML Process

1. Prepare & Transform Data
    1. Outlier
    2. Feature Scaling
        1. Normalization
        2. Standardization
    3. Label encoding/ One hot encoding

INVESTIC

ML Process Simple

1. Prepare & Transform Data
2. Model
3. Rumble !!
4. Backtest

Example

INVESTIC

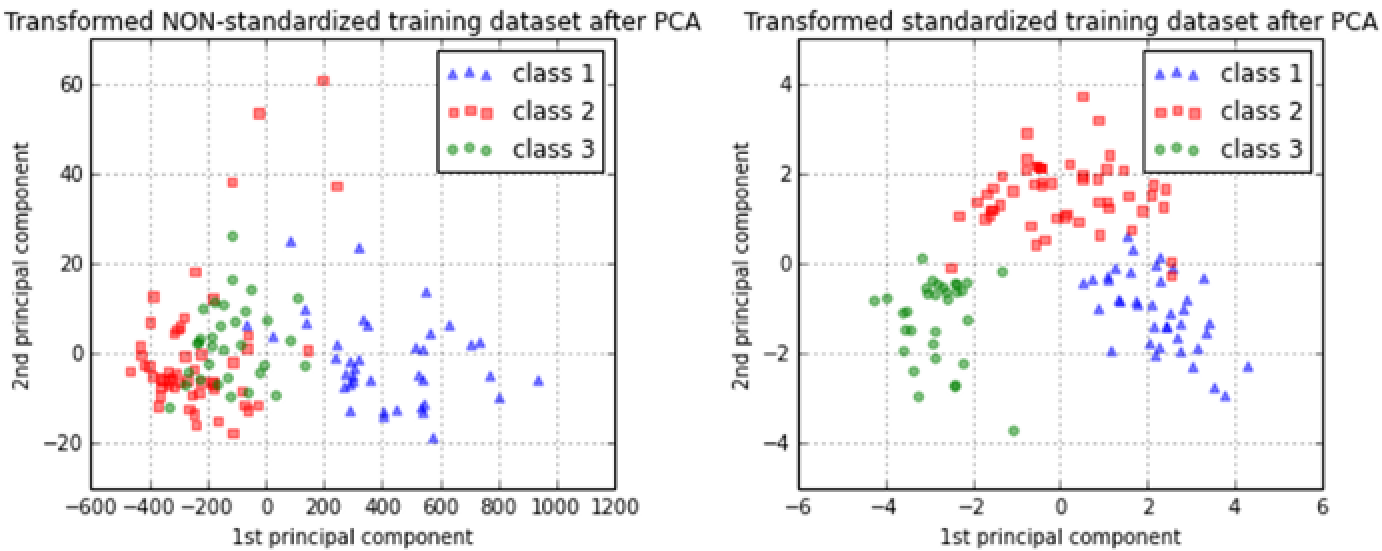
ML Process

1. Prepare & Transform Data
    1. Outlier
    2. Feature Scaling
        1. Normalization
        2. Standardization
    3. Label encoding/ One hot encoding
2. Split Train/ Test Data

INVESTIC

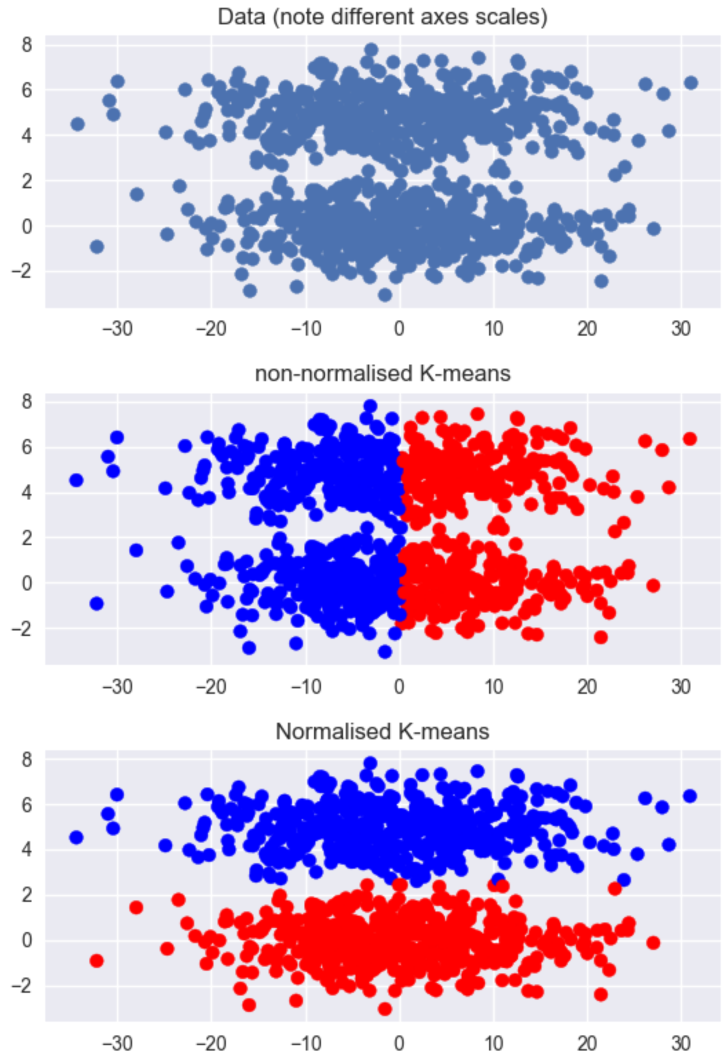
Is feature scaling that matter??

standardized แล้ว แบ่งง่ายขึ้น



INVESTIC

Is feature scaling that matter??



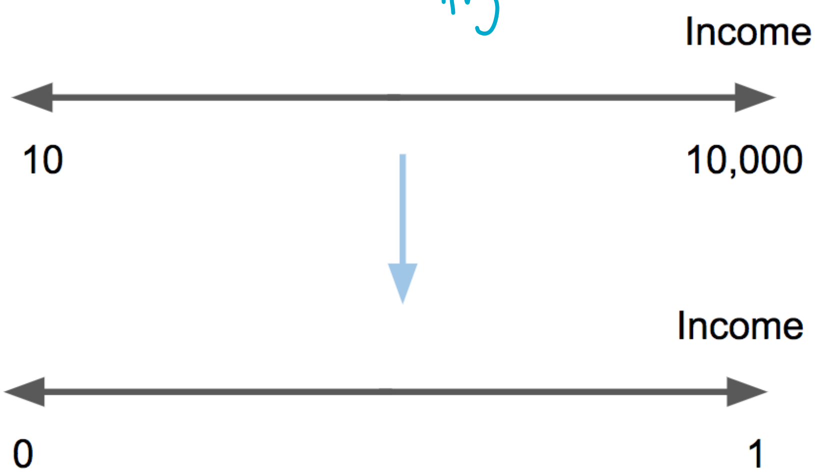
Feature Scaling

ไม่ นำ $\bar{x}$ มาคิด

เอา $\bar{x}$ มา คิดด้วย

Normalize

ของ่ายเมื่อทำ min max scaling



หรือ Rescale

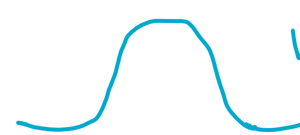
Standardize

ทำ standard → center and scaling

$$z = \frac{x - \mu}{\sigma}$$

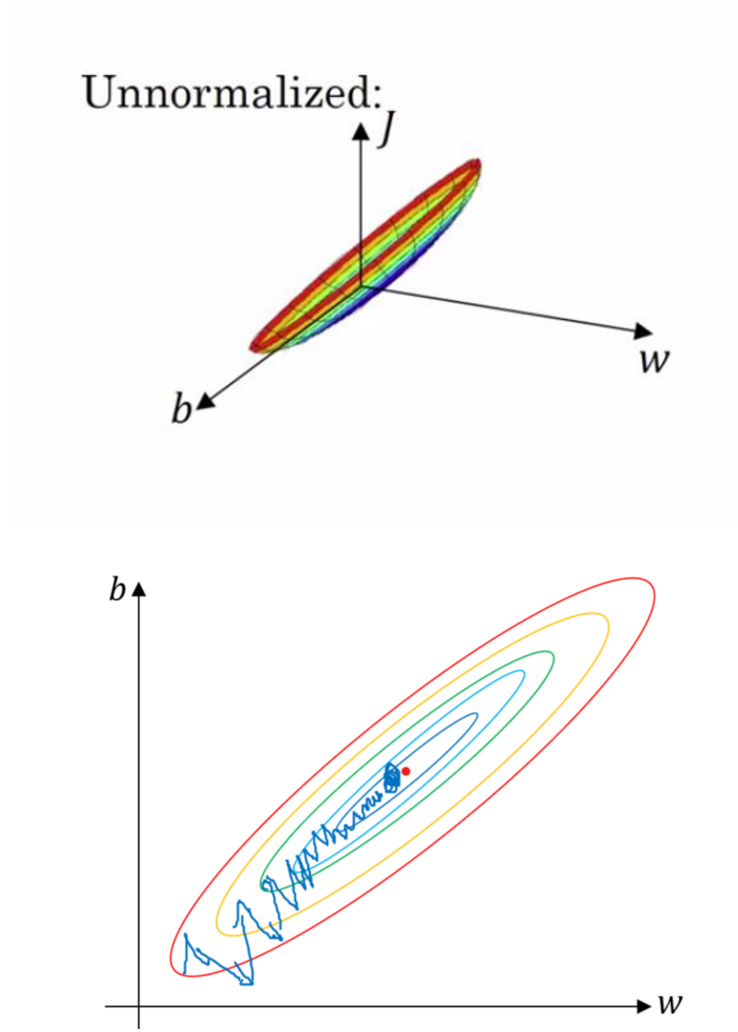
μ = Mean

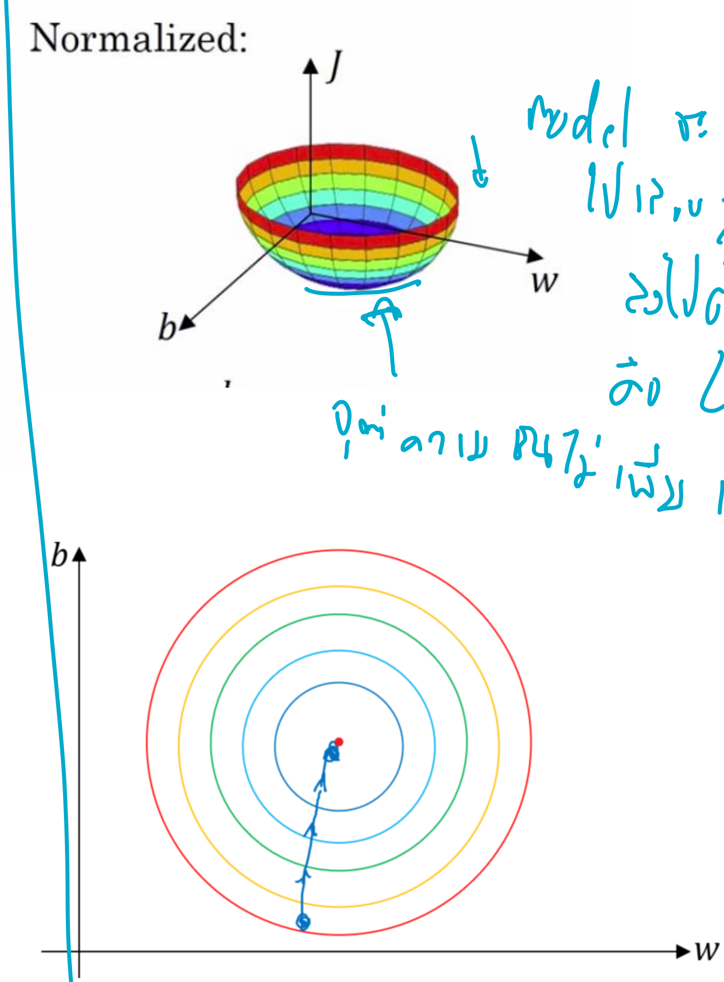
σ = Standard Deviation



หา Z score

Why Normalized



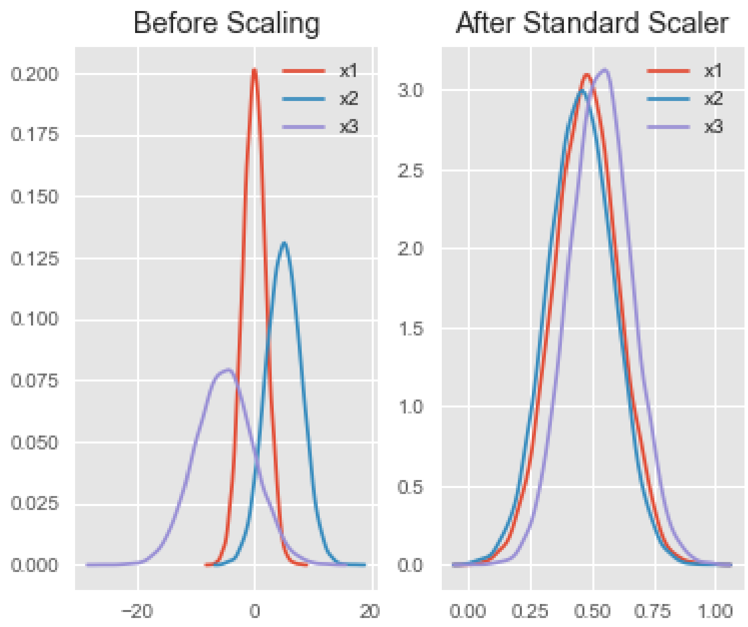


Model จะ Minimize ไปเรื่อยๆ จน จะไปต่อไม่ได้ คือ Loss ต่ำสุด

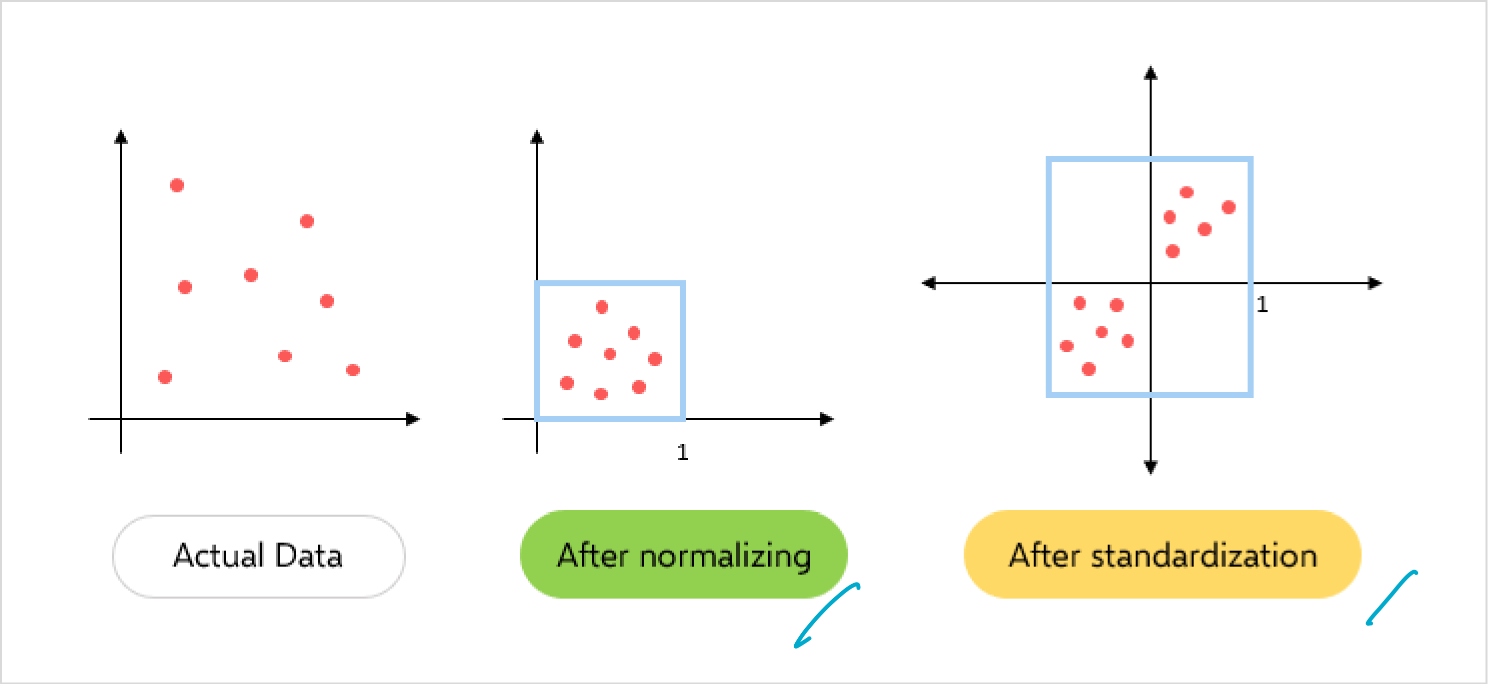
จุดที่ความชันไม่เพิ่มแล้ว

Why Standardized

ทำไมต้อง Standard เดียวกัน



Normalized vs Standardized



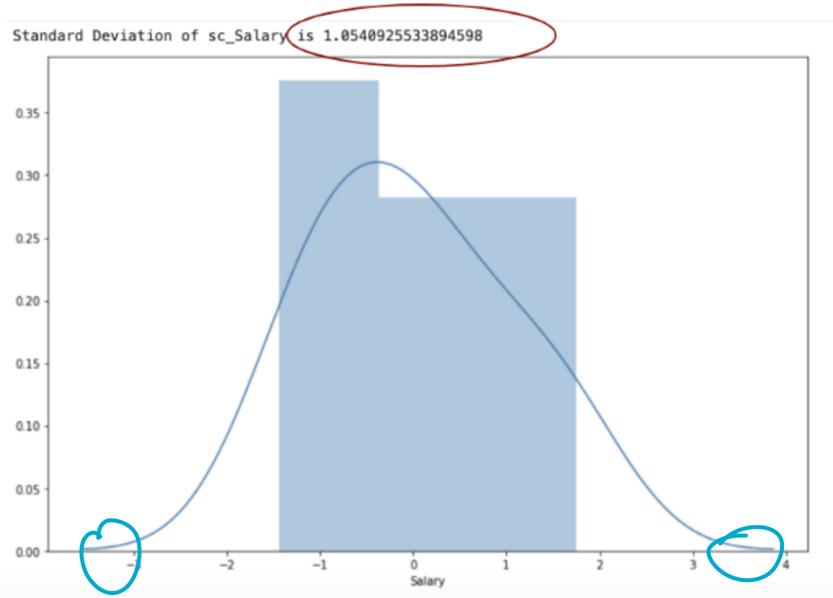
Normalized vs Standardized

· ตัด outlier ง่ายกว่า ex. ตัด <-3, >3

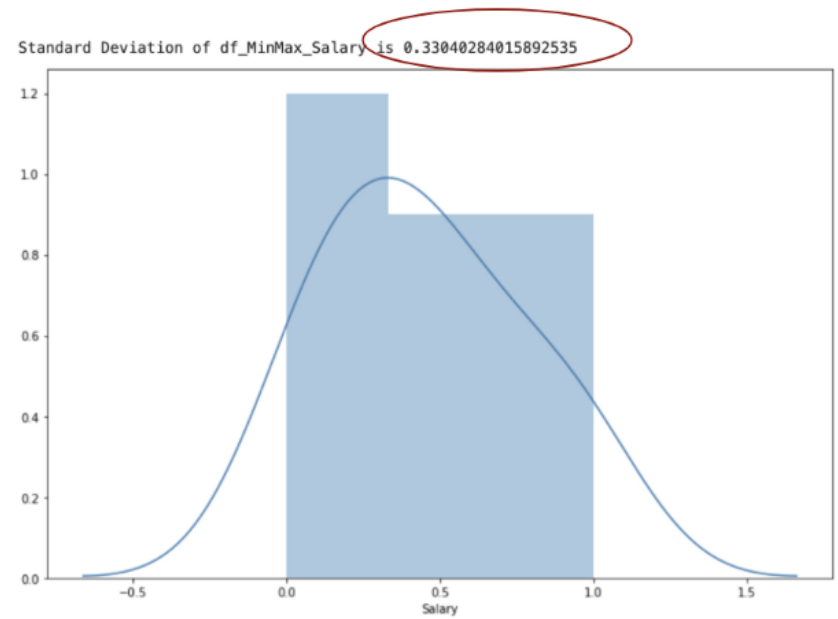
Column: Salary

Standard Deviation (Salary):
Max-Min Normalization (0.33) < Standardisation (1.05)

Standardisation



Max-Min Normalisation



* ต้องรู้ว่า Data follow Normal distribution หรือไม่

INVESTIC

Sklearn Class

Name	Sklearn_Class
StandardScaler	StandardScaler
MinMaxScaler	MinMaxScaler
MaxAbsScaler	MaxAbsScaler
RobustScaler	RobustScaler
QuantileTransformer-Normal	QuantileTransformer(output_distribution='normal')
QuantileTransformer-Uniform	QuantileTransformer(output_distribution='uniform')
PowerTransformer-Yeo-Johnson	PowerTransformer(method='yeo-johnson')
Normalizer	Normalizer

Normalized vs Standardized

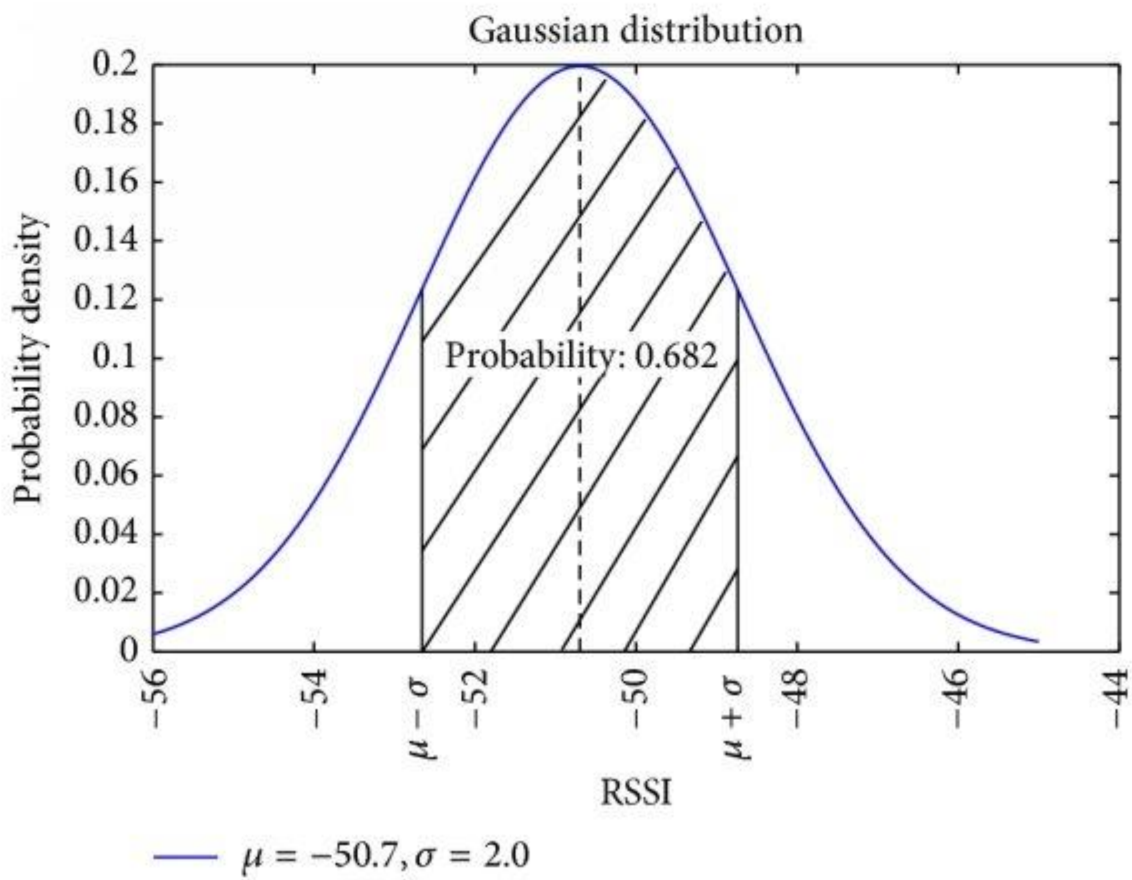
Normalization is good to use when you know that the distribution of your data does not follow a Gaussian distribution

ใช้ ถ้า ไม่ Distribution N ใช้ standardize

This can be useful in algorithms that do not assume any distribution of the data like K-Nearest Neighbors and Neural Networks.

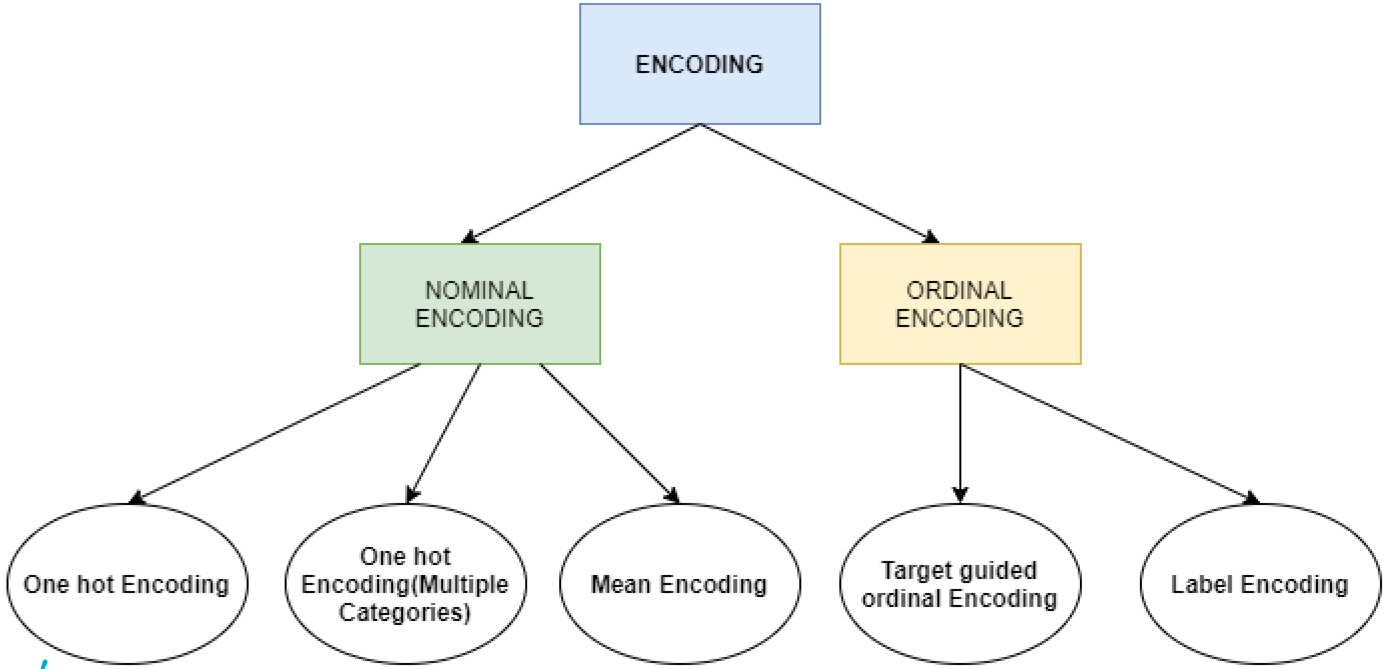
~~ใช้ได้ทุกที่~~

Gaussian = Normal Distribution



INVESTIC

Encoding



ป้องกันไม่ให้การเกิดอันดับเลข ซึ่งผลต่อ Model
ใช้กับข้อมูลที่ไม่ใช่ Ordinal

Encoding

Nominal categorical variables are those for which we do not have to worry about the arrangement of the categories.

ใช้ One hot ได้ครับ

Male and Female.

Different states like NY, FL, NV, TX

Ordinal categories are those in which we have to worry about the rank. These categories can be rearranged based on ranks.

education level (PHD-1, masters-2, bachelors-3).

จะต้องทำ เรียง

ML Process

1. Prepare & Transform Data
    1. Outlier
    2. Feature Scaling
        1. Normalization
        2. Standardization
    3. Label encoding/ One hot encoding

INVESTIC

Label Encoding

Btech
Master's
High School
PHD

PHD	4
Master's	3
Btech	2
High School	1

One Hot Encoding

Red
Blue
Green

Red	Blue	Green
1	0	0
0	1	0
0	0	1

Other Encoding

Target guided ordinal categories

Column	O/P
Btech	1
PHD	1
Master's	0
High School	0
PHD	1
Btech	0
Master's	0
High School	0
High School	1

Mean of Btech = 0.5

Mean of PHD = 1

Mean of Master's = 0

Mean of High School = 0.33

Column	Rank
Btech	2
PHD	1
Master's	4
High School	3
PHD	1
Btech	2
Master's	4
High School	3
High School	3

Mean Encoding

Pincode	O/P
753001	1
753002	1
753003	0
753001	0
753004	1
753002	0
753002	1
753001	0
753003	1

Column	Mean
753001	0.33
753002	0.66
753003	0.5
753004	1

Other Encoding

Target guided ordinal categories

Column	O/P
Btech	1
PHD	1
Master's	0
High School	0
PHD	1
Btech	0
Master's	0
High School	0
High School	1

Mean of Btech = 0.5

Mean of PHD = 1

Mean of Master's = 0

Mean of High School = 0.33

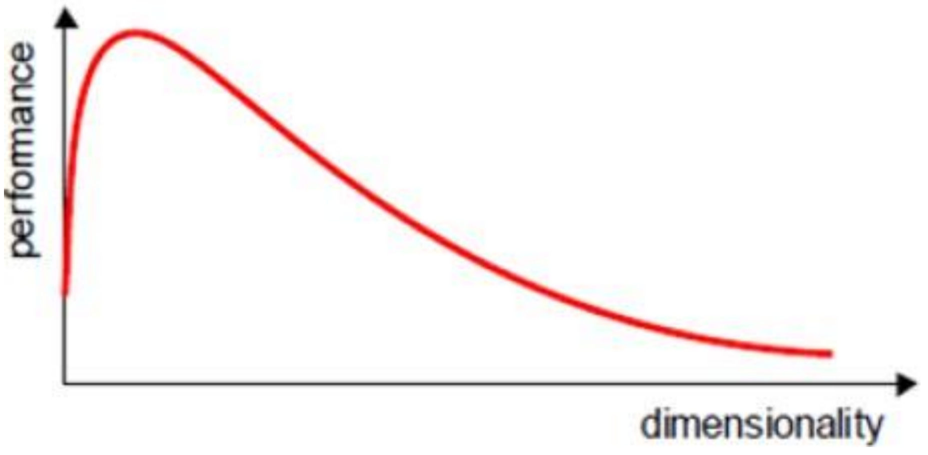
Column	Rank
Btech	2
PHD	1
Master's	4
High School	3
PHD	1
Btech	2
Master's	4
High School	3
High School	3

Mean Encoding

Pincode	O/P
753001	1
753002	1
753003	0
753001	0
753004	1
753002	0
753002	1
753001	0
753003	1

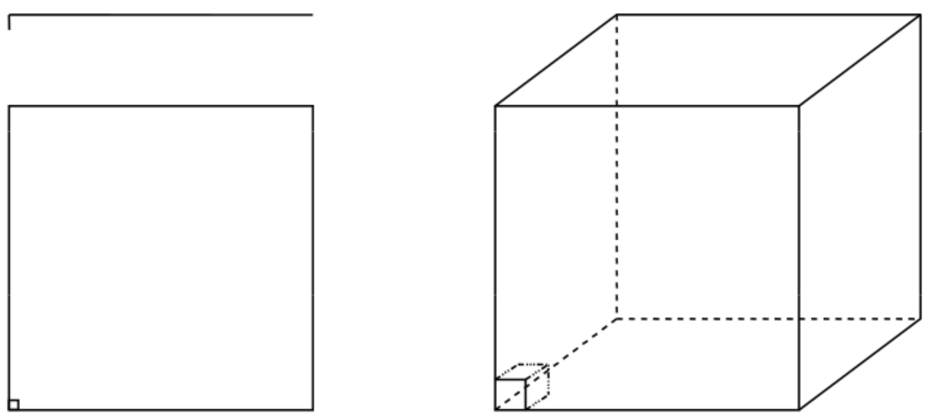
Column	Mean
753001	0.33
753002	0.66
753003	0.5
753004	1

Curse of dimensity



Curse of dimensity

- kNN breaks down in high-dimensional space
  - "Neighborhood" becomes very large.
- Assume 5000 points uniformly distributed in the unit hypercube and we want to apply 5-nn. Suppose our query point is at the origin.
  - In 1-dimension, we must go a distance of 5/5000 = 0.001 on the average to capture 5 nearest neighbors
  - In 2 dimensions, we must go $\sqrt{0.001}$ to get a square that contains 0.001 of the volume.
  - In d dimensions, we must go $(0.001)^{1/d}$



Source: mathematics stack exchange

Curse of dimensity

Curse of Dimensionality

- Low dimension ➔ good performance for nearest neighbor.
- As dataset grows, the nearest neighbors are near and carry similar labels.
- Curse of dimensionality: in high dimensions, almost all points are far away from each other.

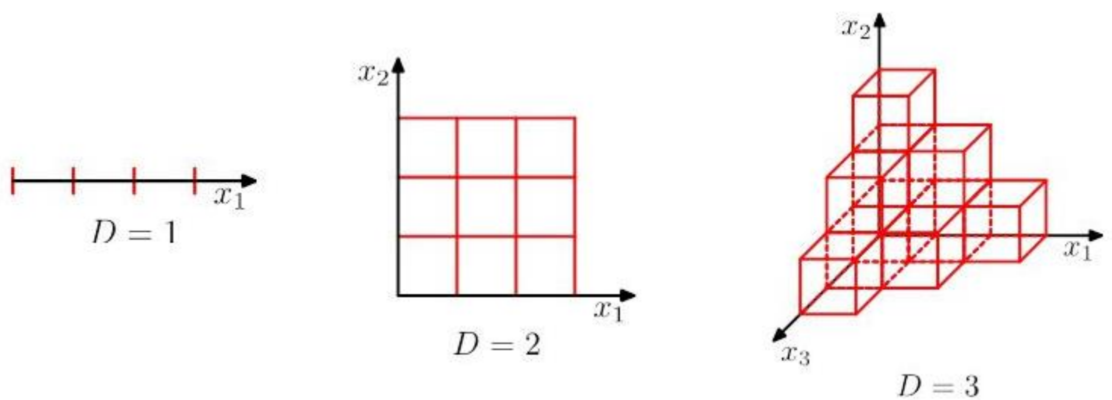


Figure Bishop 1.21