Inferential statistics

** Covariance and correlation

Covariance -

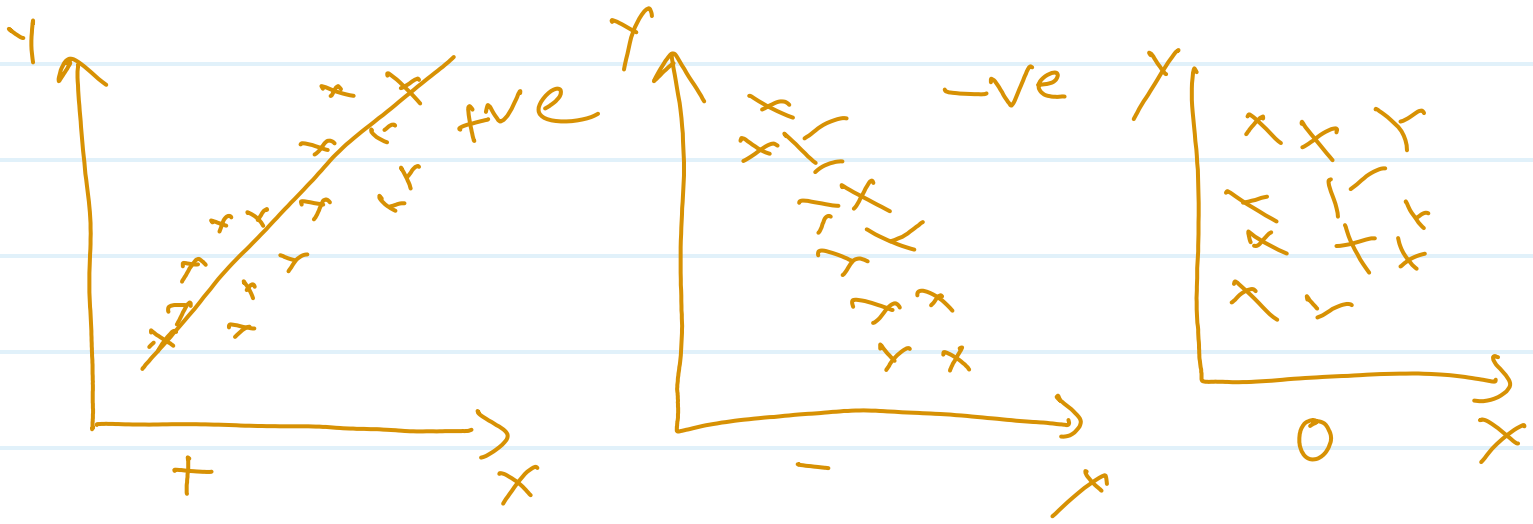
X	Y
age	hight
5	80cm
10	100cm
15	120cm
20	150cm

$X_1\ X_2\ X_3\ X_4\ X_5\ X_6$ | Y

$X\uparrow\ Y\uparrow \mid X\downarrow\ Y\downarrow$ = Positive cova.

$X\downarrow\ Y\uparrow \mid X\uparrow\ Y\downarrow$ = negative cova.

$X\uparrow\ Y- \mid X\downarrow\ Y-$ = Zero Cova.



limit $(+\infty, -\infty)$

$$Cov(x,y) = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{n-1}$$

Co-relation — Relation as well as strength.

$$Cor(X,Y) = \frac{Cov(X,Y)}{\sigma_X \sigma_Y}$$

Range co-relation $= -1$ to $+1$

Positive corr = +1

zero corr = 0

Negative corr = -1

Type correlation

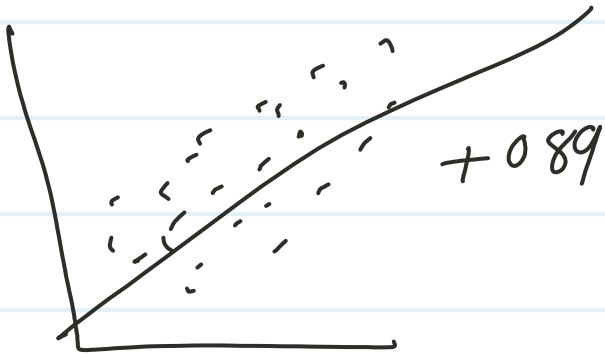
1. Pearson's correlation coefficient
2. Spearman's Rank correlation coefficient

1. Pearson's –

It describe the linear relation b/w quantitative/Numby variable.

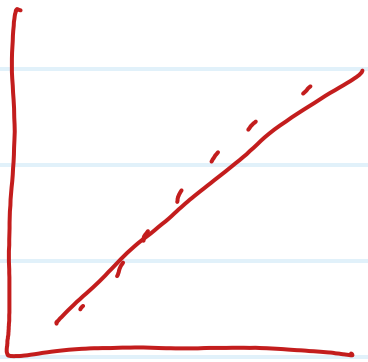
$$P(x,y) = \frac{Cov(x,y)}{\sigma_x \sigma_y}$$

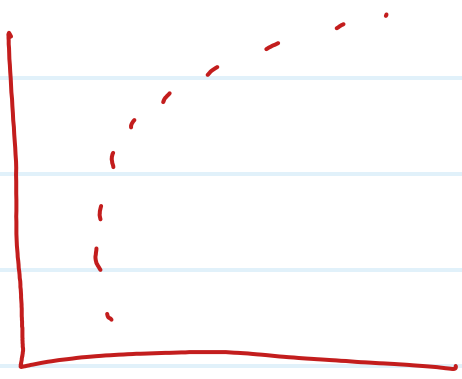
Disadvantage — It doesn't work on non-linear relation variable

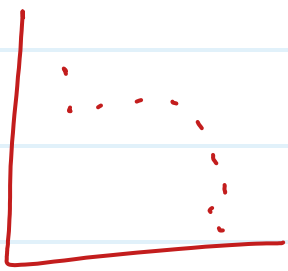


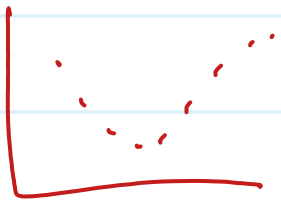
② Spearman's Rank corr. coefficient

Formula $\gamma_{(X,Y)} = \frac{cov(X,Y)}{R_{ox} R_{oy}}$









X_1	X_2	X_3	X_4	Y
0	10	100	1000	—
$\vdots$	$\vdots$	$\vdots$	$\vdots$	—
10	100	1000	10000	—

$\frac{0.1}{10000} = 0.00001$

$\frac{5}{1000} = 0.0005$

$\frac{5000}{10000} \Rightarrow 0.5$

$\frac{500}{10000} = 0.0500$

$\frac{50}{10000} = 0.005$

$\frac{10000}{10000} = 1$

0 - 1

Center limit theorem

No of sample = 40

{ Sample size >= 30 }

$(n_1, n_2, n_3 \; - \; - \; - \; - \; - \; n_{40})$

$(\bar{x}_1, \bar{x}_1, \bar{x}_3 \; - \; - \; - \; - \; - \; - \; \bar{x}_{40})$

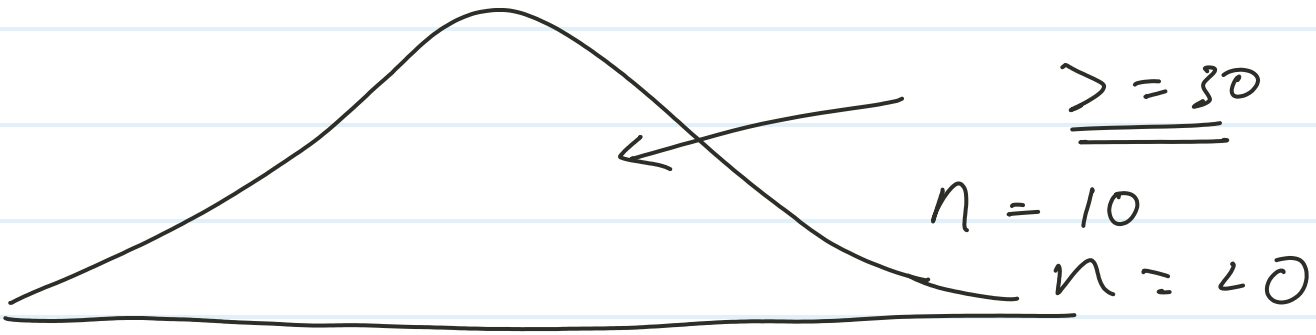
Dataset $(x_1, x_2, x_3 \; - \; - \; - \; x_{40})$

max no. of sample will lead to normalize the data curve.

Population = 10000

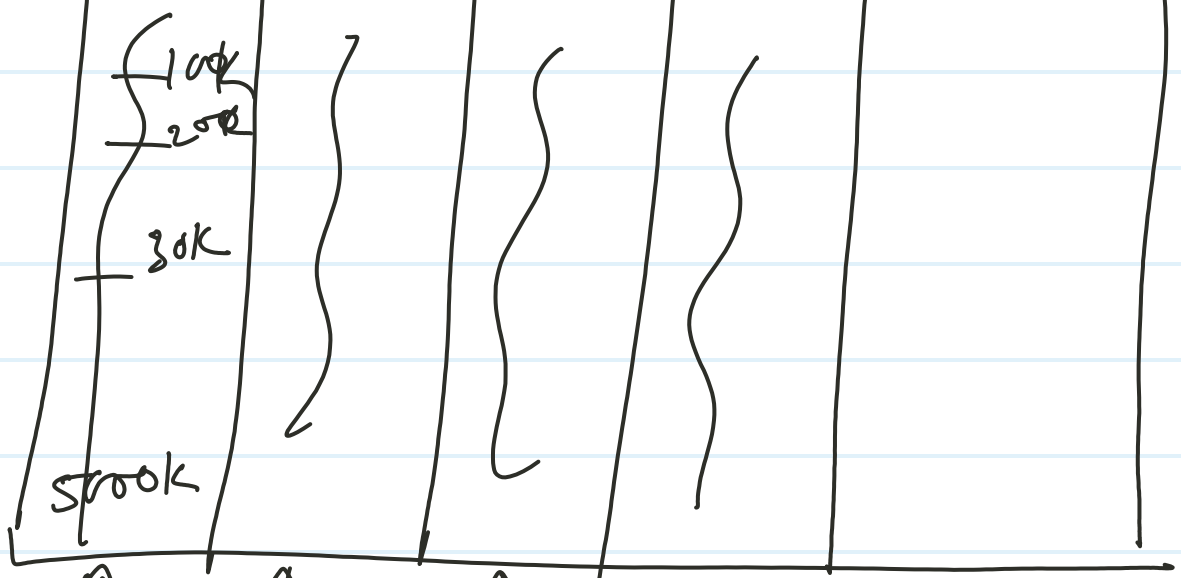
n = 30 - 30 - 30 - 30

$\bar{x}$ = 12 - 15 - 16 - 11 - ..



Inde feature → | Annual Income | credit | Salu self. | Type loan | Loan Amount

X_1	X_2	X_3	X_4	Y → Depe

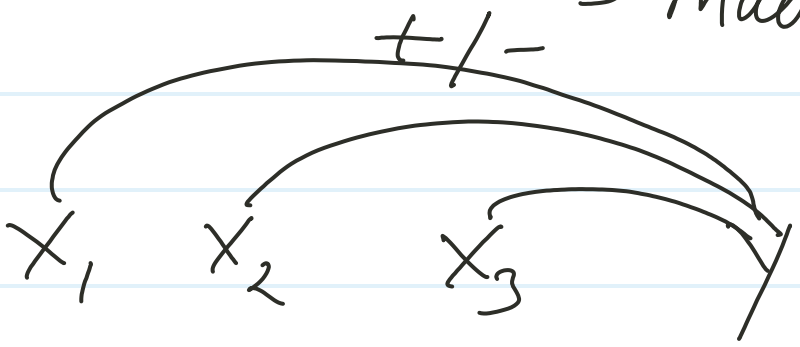


ND ND ND ND

A B C D

Data transform → Data Analysis

↘ machine learning.



M = 1
F = 0

Gender	Marital	G.	M.
M	S	1	0
F	M	0	1
F	M	0	1
M	S	1	0
M	M	1	1