15.01.2022

1 ARR > 0 for 37 Companies

ARR = 0 for 2 Companies

1 Company having zero return.

X

Rate of return

AROR > 0

86

61 X1 X2 . . . X86

ROR.

60 months

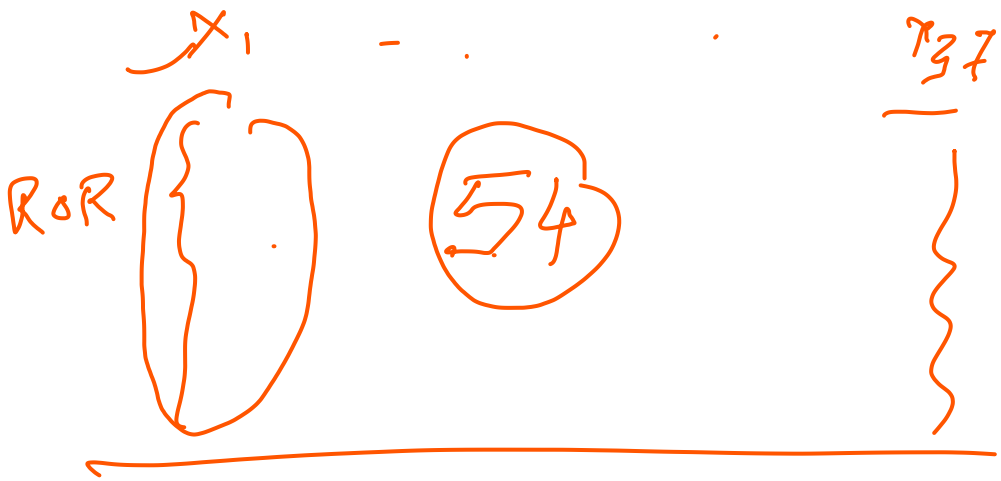
AROR

86 AROR.

AROR > 0

86

37



SSE ROR

Bivariate analysis.

Two variables

Example.

1) Demand of cold drinks (y) depending on Temp. (x).

2) Selling Price of House (y) depending on size of the house (x).

3) Current salary of an employee (y) depending on Working Beginning

(i) — Dependent variable

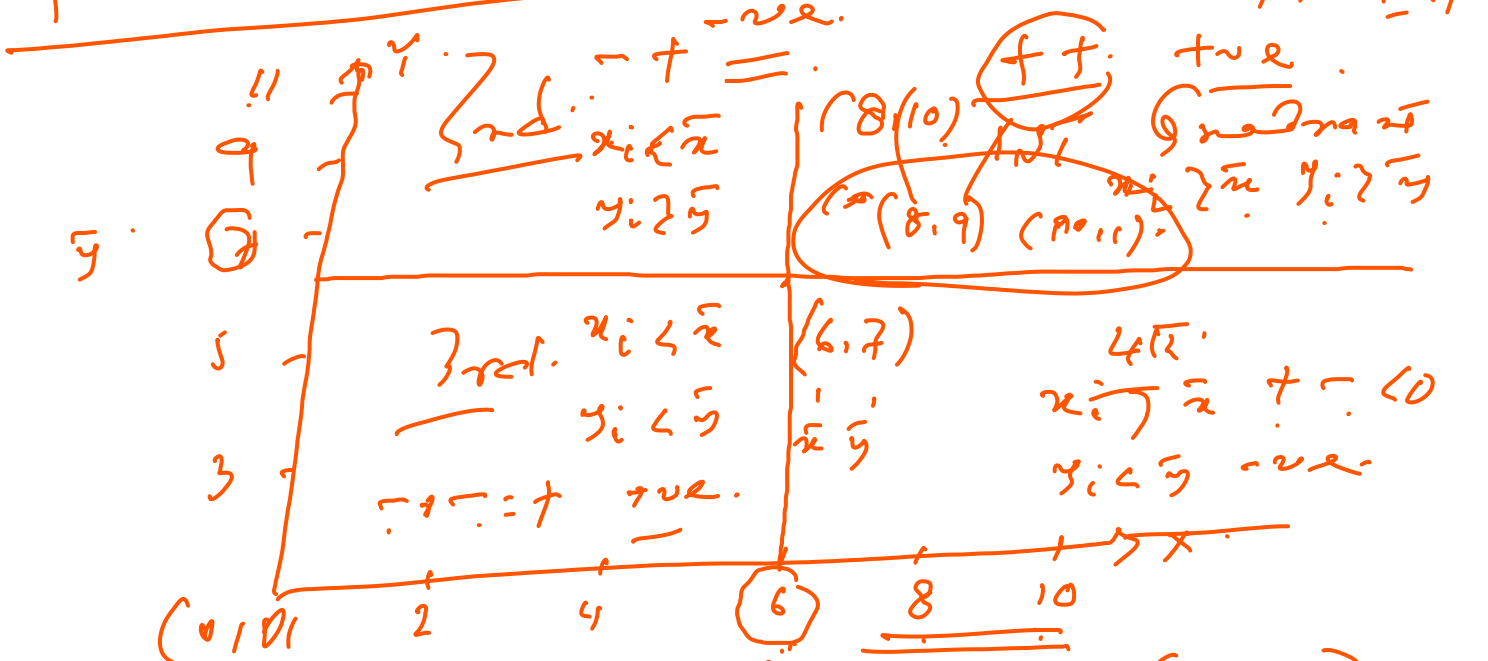
(i) — Independent variable

Ind. (X)	2	4	6	8	10	$n=5$
Dep (Y)	3	5	7	9	11	

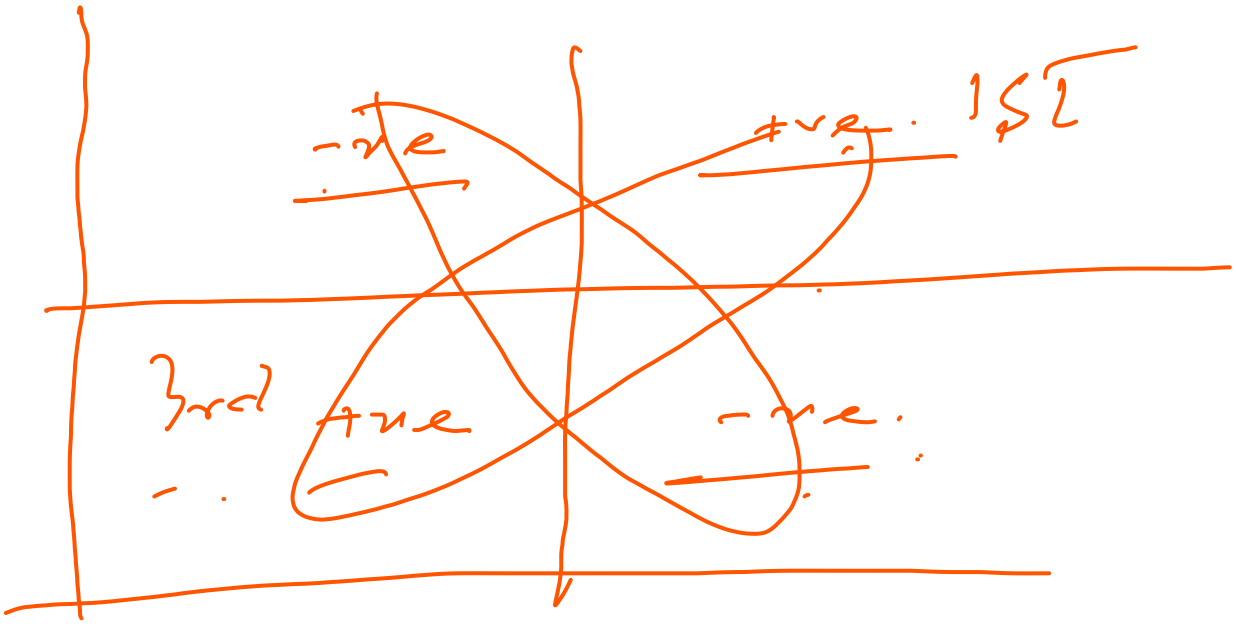
Step (1): First we compute mean of x & mean of y.

$\bar{x} = 6$. $\bar{y} = 7$.

plot the data graphically

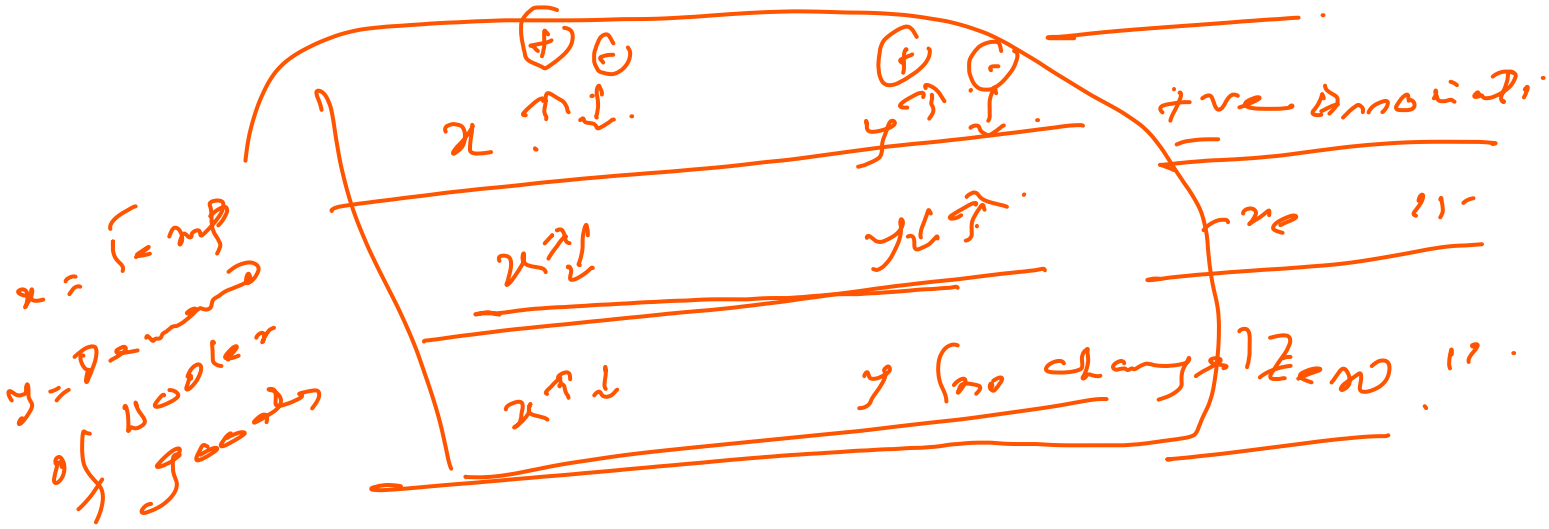


Taking the Product of $(x_i - \bar{x}) \times (y_i - \bar{y})$



x = Temp.

y = Demand of cold drinks



x = Temp
y = Demand of woollen clothes

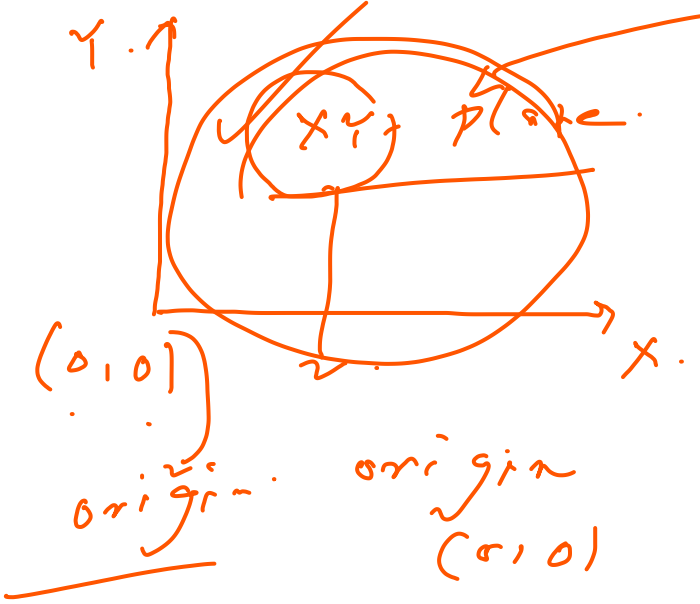
For association, there is a measure in statistics

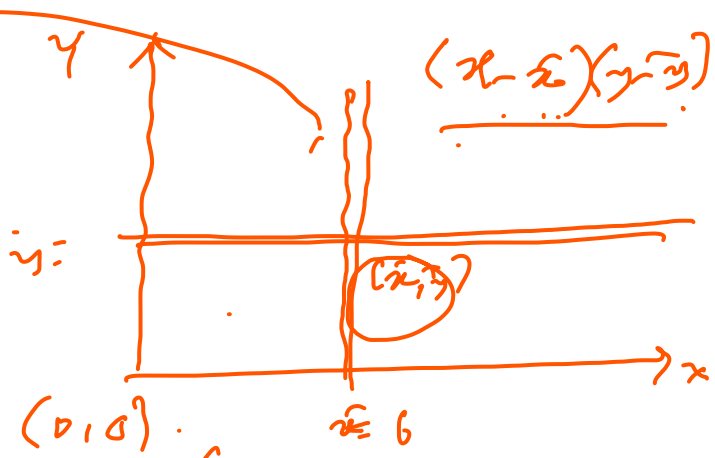
Covariance.

variance

= Square of SD.

→ Univariable

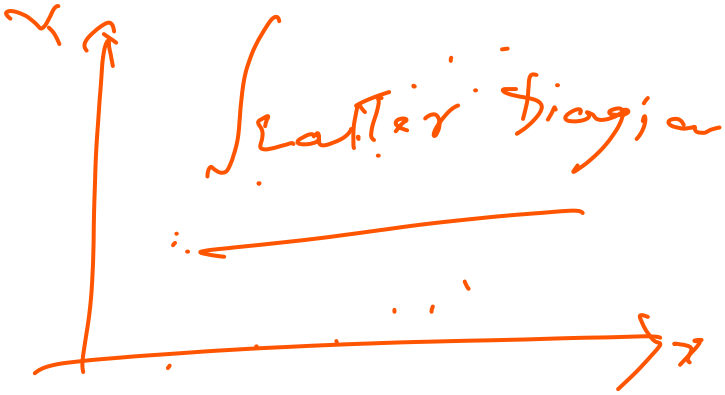


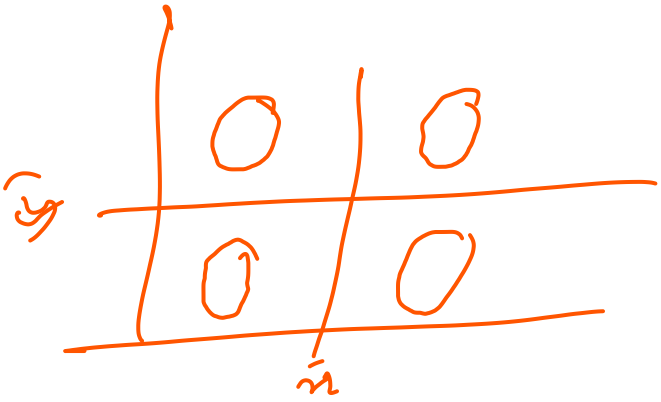


$(x-\bar{x})(y-\bar{y})$

origin $(\bar{x},\bar{y})$

origin $(0,0)$





$$\sum (x-\bar{x})(y-\bar{y})$$

x	y	$(x-\bar{x})$	$(y-\bar{y})$	$(x-\bar{x})(y-\bar{y})$
2	3	-4	-4	16
4	5	-2	-2	4
6	7	0	0	0
8	9	+2	+2	4
10	11	+4	+4	16
$\bar{x}=6$	$\bar{y}=7$			$\sum (x-\bar{x})(y-\bar{y}) = 40$

$$\text{Covariance}(xy) = \text{Cov}(xy)$$

$$= \frac{1}{n} \sum (x-\bar{x})(y-\bar{y}) = \frac{40}{5} = 8$$

For n obs. ⟶ $\frac{\sum (x-\bar{x})(y-\bar{y})}{n} = 40$

value of Cov(x,y) is true.

" " " is -ve. true association

" " " is low -ve "

" " " is zero "

Statistics. unbiased measures

For unbiased measures

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

n is very large. $Cov(x,\bar{x}) = 0$

n $n-1$

σ^2 Sample variance.

$\tilde{\sigma}$: population

" not known.

Can we estimate pop variance with the help of Sample variance

$\bar{x}$: Sample mean.

$\tilde{x}$: population "

Can we estimate population mean with the help of Sample mean!

population. Parameter Sample

Statistic

If we can estimate population parameter with the help of sample statistic with observations ⇒ unbiased

But in case of variance as well as covariance to make unbiased we need $(n-1)$ of n.

$$s^2 = \frac{1}{(n-1)} \sum (x_i - \bar{x})^2$$

$$E(\bar{x}) = \mu$$

$$E(T) = \theta$$

To make unbiased sample size is large.

$n - 1 \approx n$

$n = 5$, $\frac{1}{n-1}$

RT PCR.

N = 60000

60 years

TNC =

N = (1, 2, 3, 4)

N = pop^n size

A B C D.

n = 2 cinema Tickets

AB AC AD BA CA DA

BC BD CD CB DB DC

Screen

12 Days.

A = 4

A B

B A.

AB = BA

BC = CB

DC = CD

AB ≠ BA.

	A	B	C	D
A	AA	AB	AC	AD
B	BA	BB	BC	BD
C	CA	CB	CC	CD
D	DA	DB	DC	DD

n = 2

TNC = 2^2 = 4 = n^n.

Permutation = $\binom{4}{2} = 6$

TNC = $\binom{N}{n}$ order is not important