Linear Regnession Assignment

Weight (x)	Price (4)
2	35
4	60
5	20
3	50
6	50
5	55
ヌ	60

Your objective is to manually compute the slope (m) & 7- intercept (c) wring Ordinary Least Squares Linearc Regression. Once determined, apply these values to priedict the price when the vegetable weight is 6.

(5-4,6)= 0,16

(iv) calculates

Soln: $\Sigma(x-\bar{x})(y-\bar{y}) = (0.4-\bar{x})$ $\Sigma(x-\bar{x})(y-\bar{y}) = (0.4-\bar{x})$

$$(i) \overline{\chi} = \frac{\sum \chi}{N} = \frac{2+4+5+3+6+5+7}{7} = \frac{4\cdot6}{5\cdot6} = \frac{12\cdot14}{5\cdot6} = \frac$$

(i)
$$\bar{y} = \frac{\Sigma y}{N} = \frac{35+60+20+50+55+60}{\bar{z}} = 4\bar{z} \cdot 14$$

$$(2-4.6)(35-47.14)=31.56$$

$$(4-4.6)(60-47.14)=-7.72$$

$$(5-4.6)(20-47.14)=-10.86$$

$$(7-4.6)$$
 $(60-47.14) = 30.86$

		A STATE OF THE STA
(ir) calculate ∑ (x-x)2:		
	Place (y)	(E) the Cold
x lour (2-4.6) = 6.760 smol		(8)
the slope (m) & 1 interest (c) when the continuous of (d.4-4) Ordinary Least squares Linears Regression. Once the continuous of the conti	00	
Ordinary Least Squares Linearc	0.0	
(5-4.6) = 0.16	03	8
sing on (3-4.6) = 2.56 We will be sent	03	6
+ 16 7 4:6) = 1.96 wh		ਟੋ
[19] [2] 그리아 아이는 아이들이 되는 그렇지 않는 이 그릇이 하는 것이 모든 그리아	99	1 7
$(5-4.6)^2 = 0.16$ $(7-4.6)^2 = 5.76$ $(7-1)(7-1)$) 3	:6705

$$\sum (x-\bar{x})^2 = 6.76+0.36+0.36+0.16+2.56+1.96+0.46+5.76$$

$$\therefore \sum (x-\bar{x})^2 = 17.72$$

$$\leq |x-\bar{x}|^2 = |x-\bar{x}| =$$

32-18+ BT. I + 00 4.480+ + 38 Or - SF. F-68.8 = (P-V)(R-10) Z:

frof for the

(7-4,6) (60-47,24)=30,86

Foremula fore intercept C:

If $\overline{y} = m\overline{x} + e$: M/09

Then, $C = \overline{y} - m\overline{x}$ $\Rightarrow C = 47.14 - (2.51*4.6) = 0.00 = 0.00$ $\therefore C = 35.594$ $\Rightarrow C = 35.594$

... Now, predict price when the regetable weight is 6.

Y=mn+e

Herre, n=6

Ea. 2+ = 1/2= 250.654 - 1 Le.s = Prout CA = x + E

Ams; The slope, M = 2.51

-2.51

-2.51

-2.51

-2.51

-2.51

when the regetable weight is 6 -500 y= 50.654

Price
35
60
20
50
50
55 \
60

Compute the residuals for each data point.

16

0

0

0

(3)

(H) (H)

Soln; We get from Task-01:

Producted Result!

2 - 20

If x=2, then \$= mx+C = 2.51*2+35.594 = 40.61

1. SE 13€ 13€ 186 - A <=

J+KIM=Y

If x = A, then $\hat{y} = 2.51*A + 35.594 = 45.63$ If x = 5, then $\hat{y} = 2.51*5 + 35.594 = 48.14$ If x = 3, then $\hat{y} = 2.51*3 + 35.594 = 43.12$ If x = 6, then $\hat{y} = 2.51*6 + 35.594 = 50.654$ If x = 5, then $\hat{y} = 2.51*5 + 35.594 = 48.14$ If x = 7, then $\hat{y} = 2.51*7 + 35.594 = 53.164$

459.09 =4

We know that,

1

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6

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(C)

(0)

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12

9

(B)

Residual = Observed value - Predicted Value

时 Residual Result:

Residual forc x=2; 35-40.61 = -5.61

Residual forc x = 4; 60-45.63 = 14.37

Residual forc x = 5; 20-48.14 = -28.14

Residual forc $x=3 \pm 50 - 43.12 = 6.88$

Residual for n=6 30 50 - 50.654 = = 0.654

Residual for x=53 55-48.14= 6.86: 1=X

Residual fore x = 7; 60-53. 164= 6.836 = 5

1, Ed-03) f (Hrist-ed) f (He3,02-02)+

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Weight(x)	Price (4)	ŷ (Predicted)	Residuals (y-ŷ)
2	35	40.61	-5.61
4	60	45.63	14.37
5	20	48.14	-28.14
3	56	43.12	Worlt 6.88 3M
6	50	50.654	-0.654
<u> </u>	55	48.14.000	alustas 63861 III
OC)+7-081-	0.60	53,164	6.836

Ans:

Toto,

.. MSE = 167. 3.t

weighte	Price (4)	Task-03: bolt want SM			
2	35	Calculate both the Mean Squared Ennon (mue			
4	60	[[대한 : 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			
5	.20	& Mean Absolute Enror (MAE).			
3	50				
6	50	Residual Parc $x=2$; 35-40.61 = -			
5	55	President first oc=45 60-15.63=.			
7	60				
	-28,14	Residued forc x = 5 ; 20 - 48.24 =			
Solu:	88.9	Residual forc $x=3$ 5 50 - 43.12 =			
Forc, x= 2: 4= 35 1209 = 40.61 d = 50 515 lambies					
χ=	X=4; 4=60+8.9=45.63 == x 018 loubicas				
η=	7=5; 7=20 & 9= 48.14 = x 316 loubison				
x-2: 4-50 80 0 - 43.12					
(++) dies	biesid	34 31 - 43.12 34 31 - 50 654 325 (3) 70830W			
13.3	- F ' V- T	55 8 7 = 48.14			
-4.37	7 1 - 5	4 60.43			
28.44	7 7 7=6	0 8 9 = 53,164			
We know	We know that, $m = \sum_{i=1}^{n} (\sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{n} \sum_{i=1}^{n} \sum_{j=1}^{n} \sum_{j=1}^{$				
M. G. Bay	E= n _ i=1	11-11) 130,03 150,03			
I MSE Calculation: 1.84		5 55 48.14,C			
$MSE = \frac{1}{7} ((35 - 40.61)^{2} + (66 - 45.63)^{2} + (20 - 48.14)^{2} + (50 - 43.12)^{2}$					
/2	+(50-50.654)+(55-48.14)2+(60-53,164)				

., MSE = 167.34

Again, we know that, $MAE = \frac{1}{\eta} \sum_{i=1}^{m} \left| Y_i - \hat{Y}_i \right|$

MAE Calculation:

 $MAE = \frac{1}{7} (135 - 40.61 + 160 - 45.63 + 126 - 48.14 + 150 - 43.12) + 150 - 50.654 + 155 - 48.14 + 160 - 53.164)$

: MAE = 9.91

Ans: MSE = 167,34 & MAE = 9,91