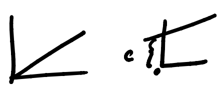
LR 3

Wednesday, November 26, 2025 9:08 PM

Recap

ML
→ Supervised.
→ Linear Regression

- $y = mx$
- m = Slope → If I change x how much my y would change
- $y = mx + \boxed{c}$



- x → Max ~~out~~ power
  y → selling.

1000 2000

→ $\boxed{\hat{y} = m\underline{x} + c}$

Random value of m
Random value of c

$m = 4$
$c = 0.4$

x	y	$\hat{y} = mx + c$	$\hat{y}$
1000	2	$4 \times 1000 + 0.4 =$	1.3
1200	2.3	4×1200	1.7
1300	1.7		1.7
150	2.7		1.9
1500	3.9		2.3

error	e^2	
2 − 1.3	$(0.7)^2 =$	0.49
2.3 − 1.7	$(0.3)^2 =$	0.34
	$(0.7)^2$	0.79
	(0.4)	0.83
	(-0.3)	0.53

$\Sigma\ \frac{3.54}{5}$

$\boxed{m} = \boxed{c} = $ MSE $\boxed{2.3}$

$\boxed{GD}$

$\frac{\partial MSE}{\partial m}$ $\frac{\partial MSE}{\partial c}$ $\boxed{x^2}$ ✓

$$\boxed{\begin{aligned} m &= m - 0.1\,\frac{\partial MSE}{\partial m} \\ c &= c - 0.1\,\frac{\partial MSE}{\partial c} \end{aligned}}$$

Lowest

• → LR Trained

9 – 11

11.15

9 – 11.30

Revision

11:00

Code

MSE → $\frac{\sum (A - P)^2}{n}$

$\frac{x + y + z}{3}$

$MSE = \frac{\sum (y - (mx + c))^2}{n}$

A - B

x y z

$= \frac{\partial MSE}{\partial m}$ If I change M how many MSE will change keeping c const

$= [x]^2 = 2x.$

$x^2 = 2x$

$= \frac{\sum (y - (mx + c))^2}{n}$

$\frac{\sum}{n} 2 * (y - (mx + c)) \times \frac{\partial (y - (mx + c))}{\partial m}.$

$$\frac{MSE}{m} \quad \frac{\Sigma}{n} 2*(y-(mx+c)) \times \frac{\partial(\cancel{y}-(mx+\cancel{c}))}{\partial m}$$

Term that does have m is const will can cancel them.

$$\frac{MSE}{m} = \frac{\Sigma}{n} 2*(y-(mx+c)) \times \frac{\partial -\cancel{m}x}{\cancel{m}}$$

$$\boxed{\frac{\partial MSE}{\partial m} = \frac{-2\Sigma}{n}(y-(mx+c)) \times (-)x}$$

$$\frac{2\Sigma(\qquad)}{n}$$

$$y = mx + c$$

$$m(23+2)$$

Deri

$$\frac{MSE}{c} = \frac{\Sigma(y-(mx+c))^2}{n}$$

$$\frac{\partial MSE}{\partial c} = \frac{2\Sigma}{n}(y-(mx+c)) \times \frac{\partial(\cancel{y}-(\cancel{mx}+c))}{\partial c}$$

$$\frac{2\Sigma}{n}(y-(mx+c)) \times \frac{\partial -\cancel{c}}{\cancel{c}}$$

$$\boxed{\frac{\partial MSE}{\partial c} = \frac{2\Sigma}{n}(y-(mx+c)) \times -1}$$

$$\frac{\partial MSE}{\partial c} = \frac{2\Sigma}{n} \left(y - (\ldots \ldots) \right)$$

n - len y

y — Price

x — Area

m

c

m	c	MSE
0.7	3	7.9
⋮		

100

1000

1000.2

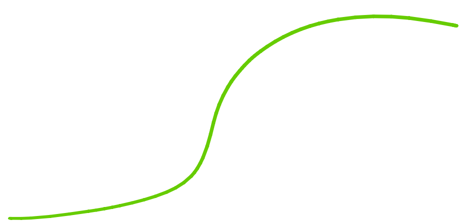
Python ←

A	P
20	10

$$\frac{\Sigma(20-10)^2}{n} \quad \text{error} \downarrow$$

$$\frac{\Sigma(y - mx + c)^2}{n}$$

$$\boxed{y = mx + c}$$



m c

m

c

loss = 0.7

x

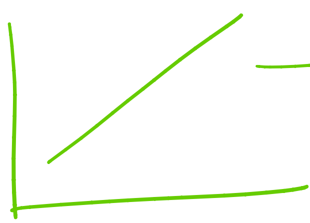
Are

$$\boxed{\text{Sales} = m \times \text{area} + c}$$

$$\boxed{y = mx + c}$$

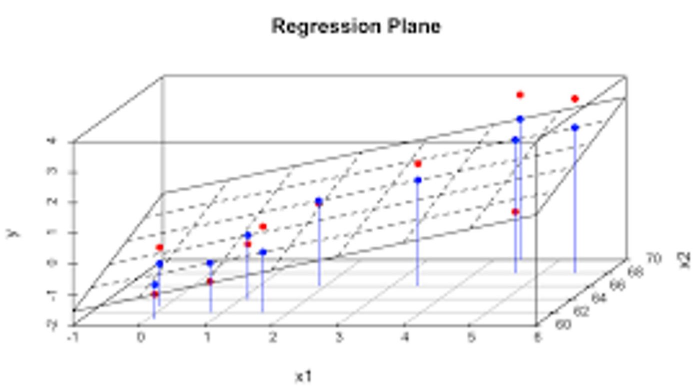
$$y = m x_1 + m_2 x_2 + m_3 x_3 \ \ldots \ m_{12} x_{12} + c$$

$$\frac{\partial MSE}{\partial m_1} \quad \ldots \quad \frac{\partial MSE}{\partial m_{12}}$$



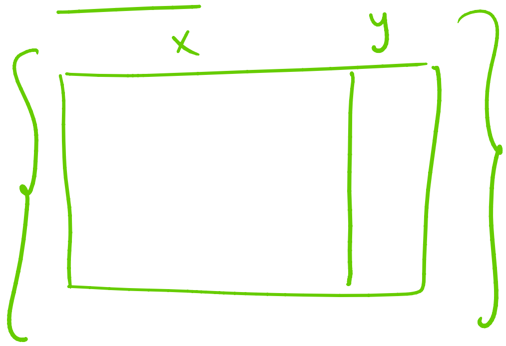
$\rightarrow$ Plane 3 D.

$c_1 \quad c_2 \quad \ldots$



Rest.

$\boxed{R^2}$



$\xrightarrow{\text{Train}}$ $\boxed{LR}$

MSE

$\boxed{0.31}$

$\boxed{R^2}$

✓ 90%   10%

90% > 9.0

Comparision — base is same

$\frac{90}{100} > \frac{9}{100}$

$\boxed{R^2}$

$gd = \boxed{\underset{0.5}{m}, \underset{0}{c}}$

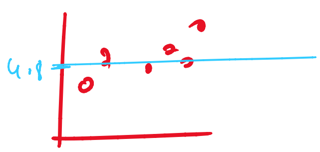
$m = 0.5$
$c = 0$

X	Y	Predicted Y value	Error	Error Squared	Distance between Y and Y mean	Distance Squared
Bed	Price	$mx + c$	$y - \hat{y}$	$(y-\hat{y})^2$	$(y - y_{avg})$	$\rightarrow (y - y_{avg})^2$
1	3	$0.5 \times 1 + 0 = 0.5$	2.5	6.25	$3 - 4.8 = -1.8$	3.24
2	4	$0.5 \times 2 + 0 = 1$	3	9	$4 - 4.8 = -0.8$	0.64
2	5	$0.5 \times 2 = 1$	4	16	$5 - 4.8 = 0.2$	0.04
3	6	0.5×3 1.5	4.5	20.25	$6 - 4.8 = 1.2$	1.44
4	6	2	4	16	$6 - 4.8 = 1.2$	1.44
Mean	4.8			67.5		6.8 = TSS

6.25
9.
16
20.25
16
50

3+4+5+6+6

RSS
$\Sigma(\text{error}^2)$

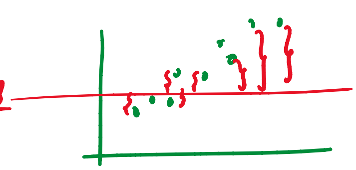


$$R^2 = 1 - \frac{RSS}{TSS}$$

RSS → error that our Model Made.

TSS → Avg Model

alegry ×



Average Model

3 4 9
7 . 2
8

$$\frac{3+7+2+4+9+8}{6}$$

5.5

$$1 - \frac{RSS}{TSS} = \boxed{1 - \frac{67.5}{6.8}}$$

9.926

1 TSS 6.8

1 — 9.926

$GD = m, c \Big\}$ Model error $= 67.5$

$\boxed{R^2 = -8.926}$

TSS $\cancel{m}$ $\cancel{c}$ Avg. } error $= 6.8$

$$\boxed{R^2 = 1 - \frac{RSS}{TSS}}$$

Avg =
In comparision to Avg Model how is your Model performing.

$$RSS = TSS = R^2 \Rightarrow 1 - \frac{RSS\ \cancel{6.8}}{TSS\ \cancel{6.8}}$$

$= 1 - 1 = 0$

$$R^2 = 1 - \frac{RSS}{TSS}$$ 6.8 / 65.7

Deno ↑

1 − low

$\boxed{R^2 = 1}$

$\frac{1}{10}$ ↓ $\frac{1}{100}$ ↑

0.1 0.01

$$1 - \frac{RSS}{TSS} \qquad \frac{1}{65.7} \qquad 0.1$$

1 − 0.1

$\boxed{0.9}$ ∴ 90%.

$$1 - \frac{RSS}{TSS} \quad \frac{0}{\cdot} \quad 0$$

$$1 - 0 = 1$$

R^2

↓

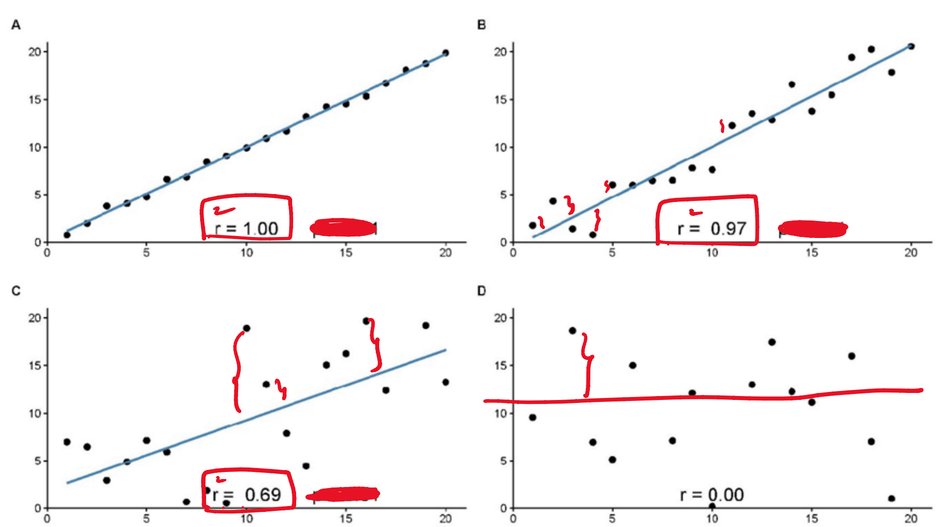
How good is your Model perform.

$-\infty$ ↓ we are performing super bad then avg Mode.

0 ↓ your Model is as good as Avg Model

1 → No error

Best Model



$R^2 = \underline{0.68}$ ✓

68% Data can be explained by My Model.

68

R^2

Loc	Sqm	Bed	Pool	Price
Rural	1700	3	0	20L
M	600	2	0	2CR
Rur	2000	7	0	80L
M.C	400	2	0	2.3CR.

Senior ~~Staff~~ Role

ML

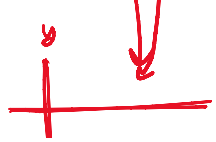
$\boxed{R^2 = 0 - 1}$ ← $\boxed{99\%}$

$\boxed{-\infty \quad +1}$

$\boxed{\text{1 session}}$ behind

$R = 1 - \boxed{\dfrac{RSS}{TSS}} = 1 \qquad RSS = TSS$

=



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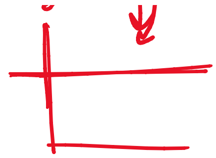


Cpany → Factset $\boxed{-0.2}$ → $\boxed{0.78}$

0 100

68% R-squared, or the **coefficient of determination**, measures the proportion of the variance in a dependent variable that is predictable from the independent variable(s) in a linear regression model. y

From <https://www.google.com/search?client=firefox-b-d&q=r2+defination+in+linear+regression>

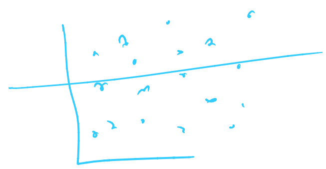
Swimming wet — water

★ 1 Lear — Code → Extra Mark — Doubts

X $\boxed{\text{Book}}$ X 15-20 X

$\boxed{R^2 = 1 - \frac{RSS}{TSS}}$ = 60 - 80

AIML - Mag - yolo CNN 4



Magic

Nor.

Target y

0-1

0.7 X

0

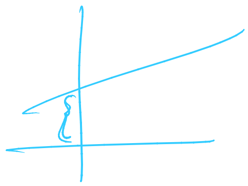
R^2

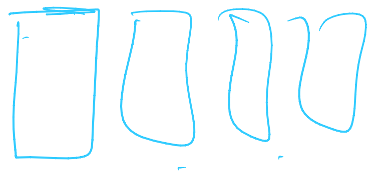
2.3 → 0.07

7.9 →

17.8

0 ✓





7.7 — 0.07

7.9 — 0.7

18.3 — $\boxed{0.02}$ — 18.3