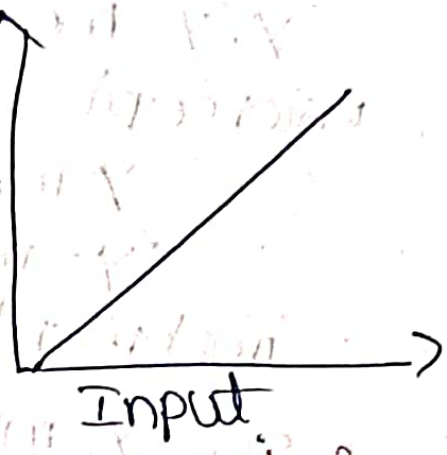
Mathematical Intuition

$y = mx + C$ → Intercept

slope

input

output



Main twist is we can deploy line like this

Why this equation ($y = mx + C$) only?

Because it represents simplest relationship between 2 variables – a straight line.

Ex:

Salary (y)	experience (x)
100	10
200	20
50	8

experience in years.

Important: y is dependent on features & feature means columns used to derive output.

In above example salary is y & experience is feature.

$y = mx + C$

we know $m = \frac{(x - \bar{x})(y - \bar{y})}{(x - \bar{x})^2}$

why square means sometime "+" & "-" ve clashes leads to zero

Implement (m) $y = (m)(x) + (C)$ → ?

Input

we know ~~$y = mx + c$~~ $\Rightarrow \bar{y} = m\bar{x} + c$

$\bar{y}, \bar{x}$ means mean of y & x

Intercept is same for ① & ②

$y = mx + c \rightarrow ①$

$\bar{y} = m\bar{x} + c \rightarrow ②$

implement ② we got c

∴ so $\boxed{y = mx + c}$ we got it

R^2 (R Squared)

Suppose you Implement $y=mx+c$ & plot it in x vs y graph

we know linear regression. we fit our line in Best position. So we use $y=mx+c$.

After plotting.

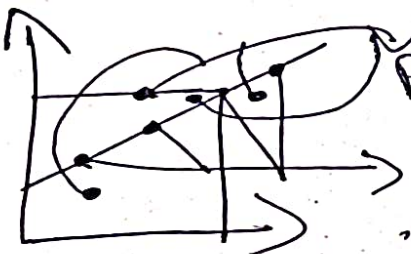
you have doubt is it my line is correct.

To check that you use formula

$$R^2 = 1 - \frac{\Sigma(y-\hat{y})^2}{(\Sigma(y-\bar{y})^2)} = 1 - \frac{SSR}{SST}$$

∴ squaring Because +ve & -ve clash leads to zero sometimes.

How it works



∴ Error = Diff b/w actuals & predictions

∴ numerator = $(y-\hat{y})$ represents your total error By predictions

∴ denominator = $(y-\bar{y})$ represents your Mean error.

Simply if you deploy Model how much error got in numerator. if you not deploy Model how much error got in denominator.