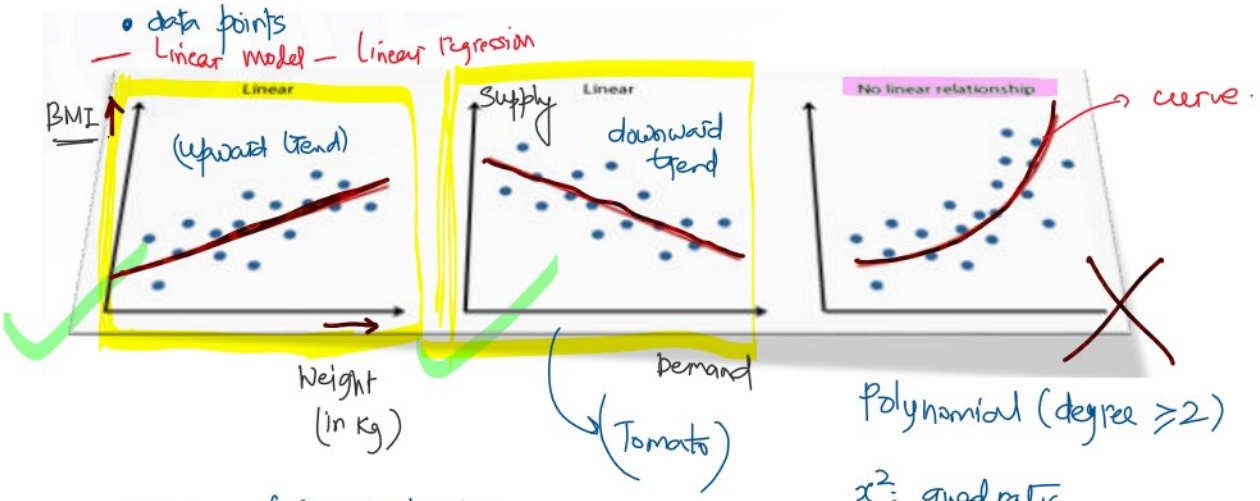
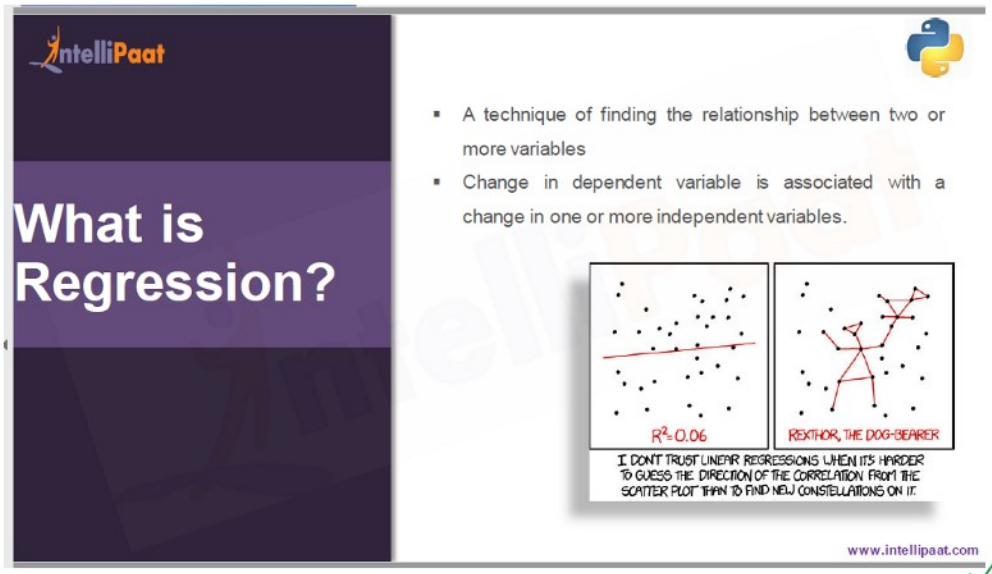
Linear Regression

11 February 2024 22:15

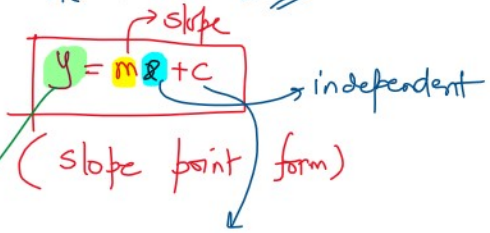


$BMI = f(weight, height)$



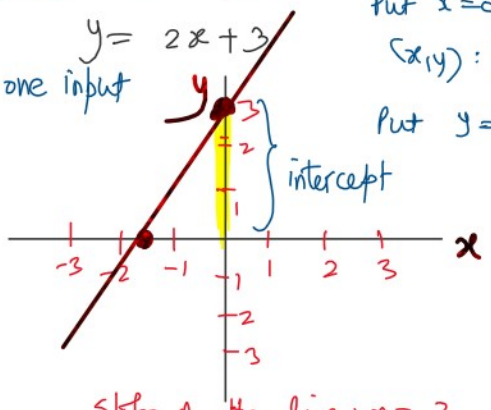
$y = f(x_1, x_2, x_3 \cdots x_n)$

- a functional mapping
- to find the relationship between y and two or more x variables.



[Simple Linear Regression]

it has only one input



Put $x=0$, $y = 2\times0+3 = 3$

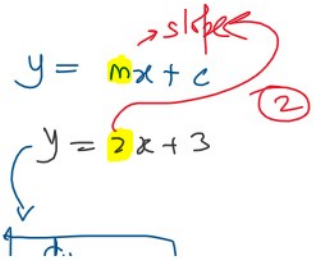
$(x, y) : (0, 3)$

Put $y=0$, $x = -\frac{3}{2} = -1.5$

$(x, y) : (-\frac{3}{2}, 0)$

slope of the line : $m = 2$

intercept of the line : $c = 3$



Slope of the line: $m = 2$

intercept of the line: $c = 3$

(Multiple Linear Regression)

$$y = 3 + 2x_1 + 5x_2 + 3.7x_3 - 0.8x_4$$

$$\frac{dy}{dx} = 2$$

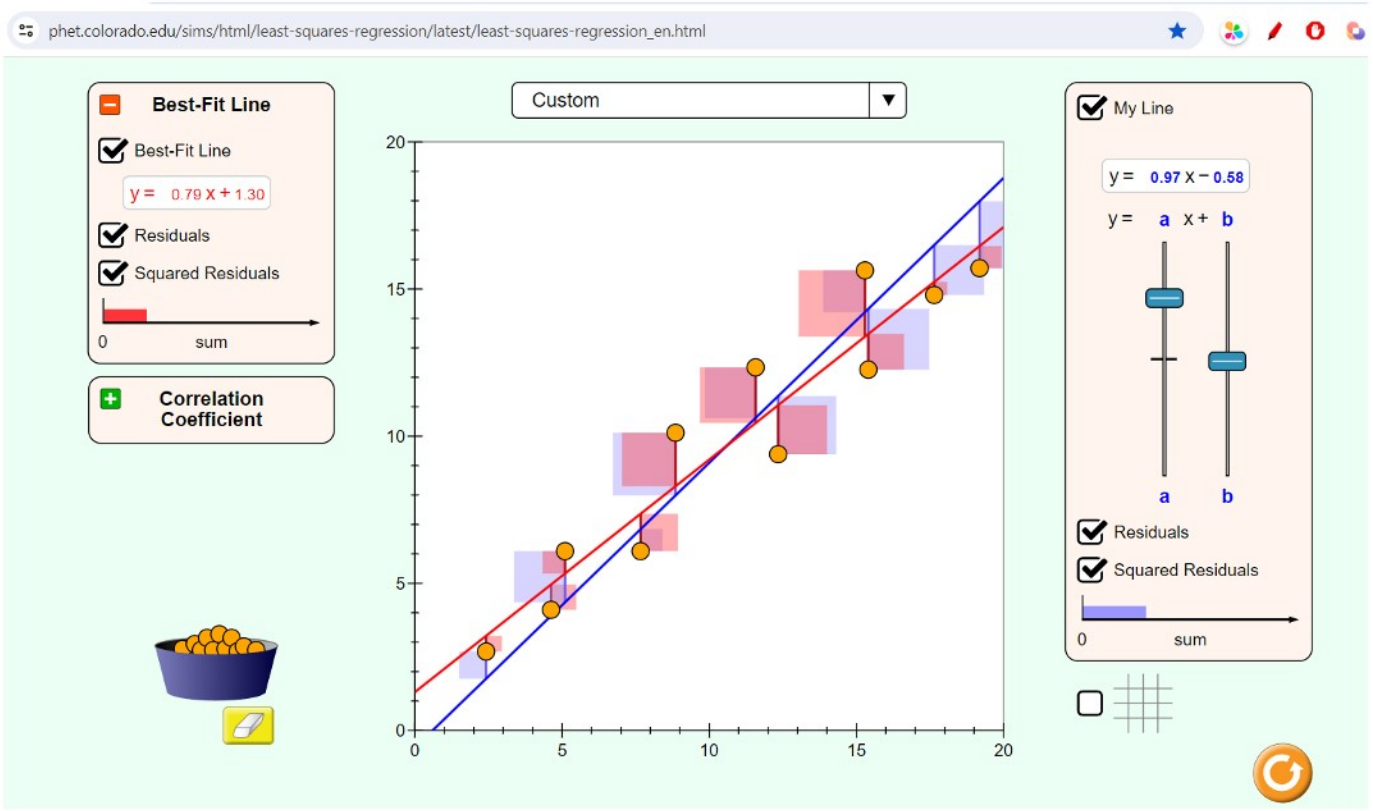
First order derivative is slope which is 2.

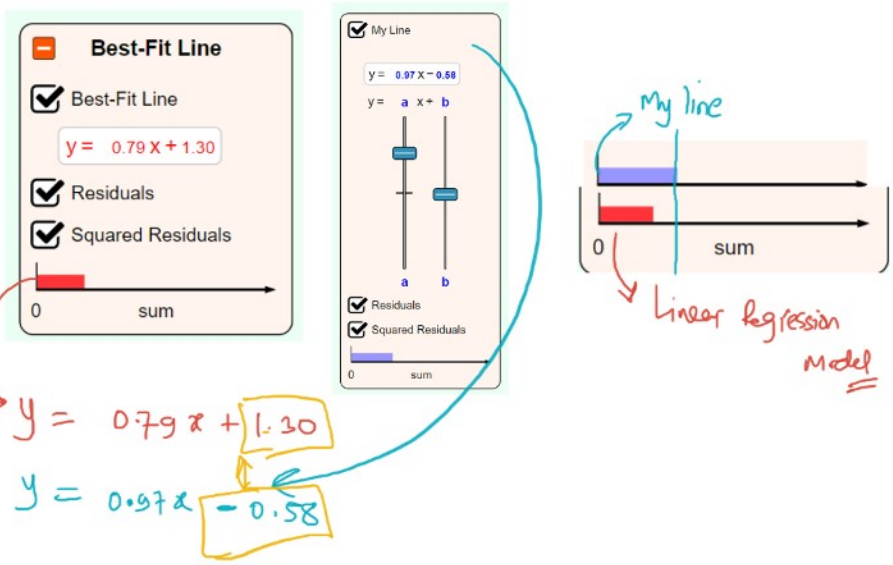
Notations

x : input variable | features | independent | predictor

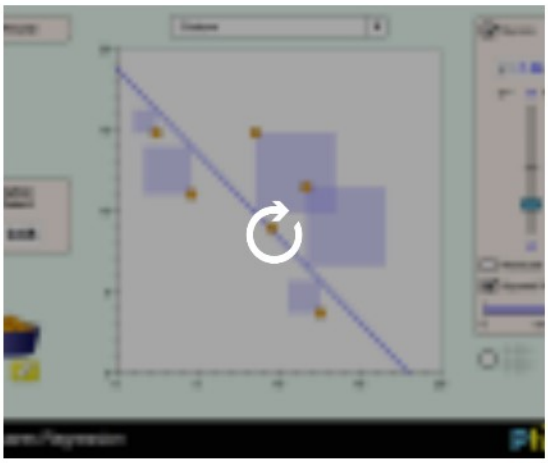
y : output variable | target | dependent | response

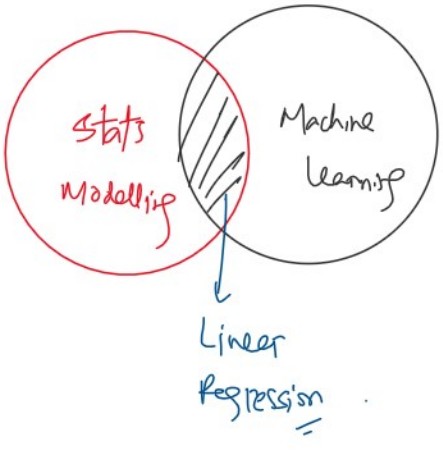
Intuition behind Linear Regression:

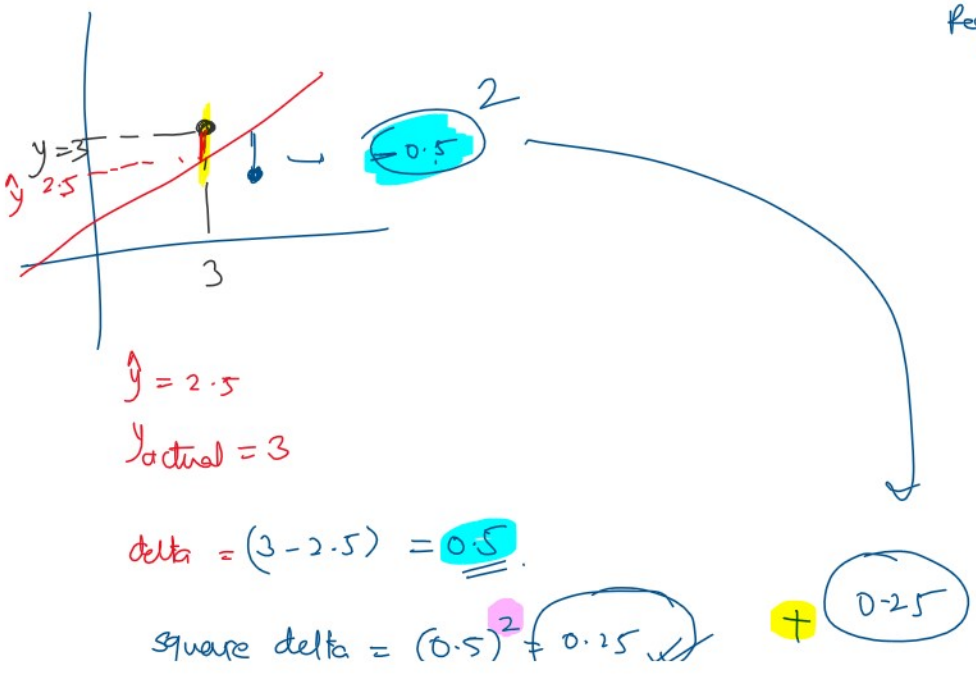




[Least-Squares Regression]







square delta = $(0.5)^2 = 0.25$ + 0.25

Sum of square residuals

$y = mx + c$ (linear)

$m = -2$

$2x + y = 18$

18

$y = -2x + 18$