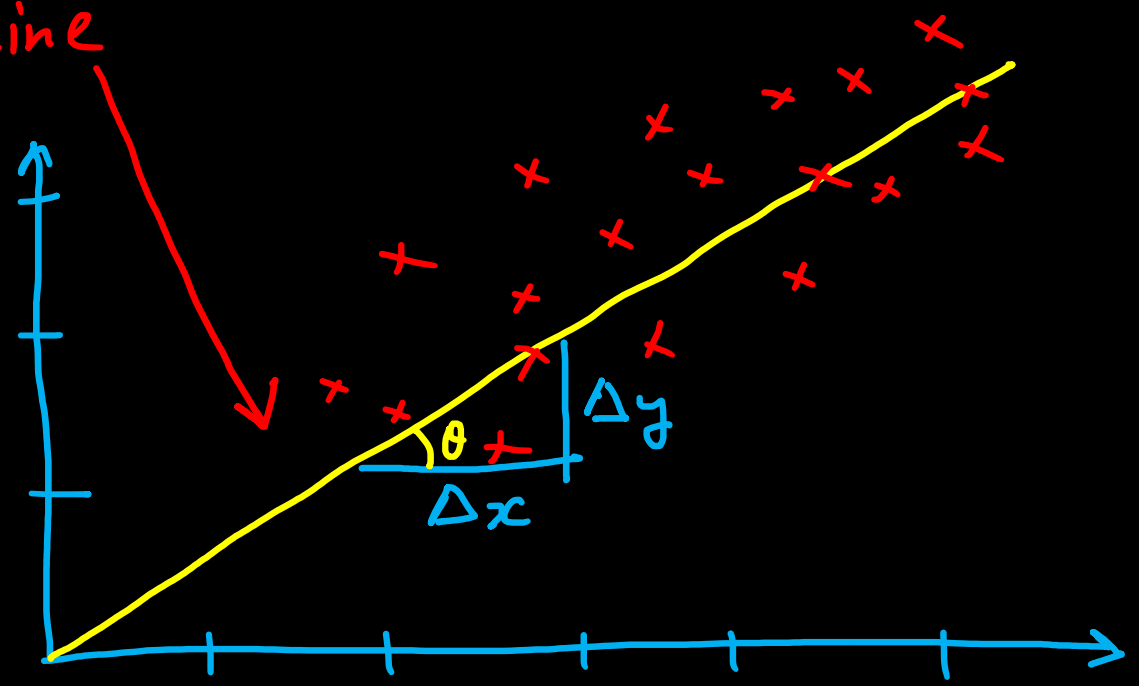
LR – Math Intuition

Rep. of line → $y = mx + C$

m = slope = $\tan\theta = \frac{\Delta x}{\Delta y}$

C = intercept (value of y when $x = 0$)

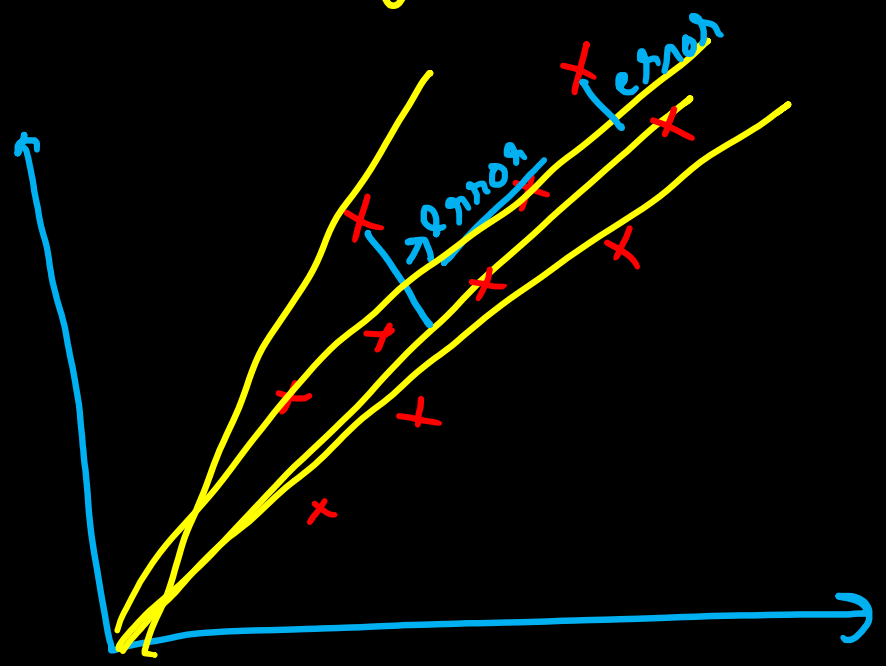
Also Best Fit line



$\tan\theta$ = How much y-changes on x-change.

LR – Math Intuition

Selection of Best Fit Line



Find submission of error and the line which gives minal error on submission is basically the best fit line.

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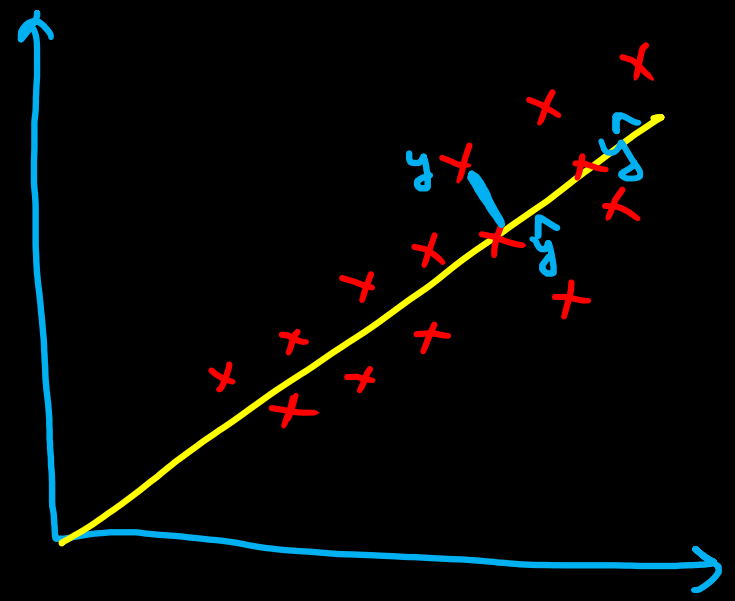
$$\hat{y} = mx + c$$



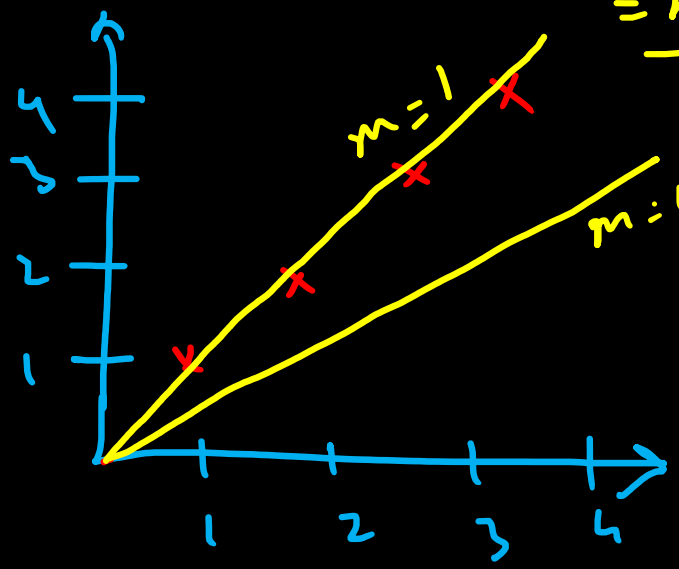
$$\text{Cost function} = \frac{1}{2m} \sum_{i=1}^{m} (\hat{y} - y)^2$$

m = no of point (Actual)

We can't find cost function for milion number of lines to find min. cost func.

This will be time consuming.

LR – Math Intuition



$\hat{y} = mx + c$

$= mx$ $\quad c = 0$

let $m = 1$ $\quad \therefore \hat{y} = x$

$x = 1$	$\hat{y} = 1$
$x = 2$	$\hat{y} = 2$
$x = 3$	$\hat{y} = 3$
$x = 4$	$\hat{y} = 4$

$$\text{Cost function} = \frac{1}{2m} \sum_{i=1}^{m} (\hat{y} - y)^2$$

$$= \frac{1}{2m} [(1-1)^2 + (2-2)^2 + \dots]$$

$$= \frac{1}{2m}$$

$$= \boxed{0}$$

let $m = 0.5$ $\quad \therefore \hat{y} = 0.5x$

$x = 1$	$\hat{y} = 0.5$
$x = 2$	$\hat{y} = 1$
$x = 3$	$\hat{y} = 1.5$

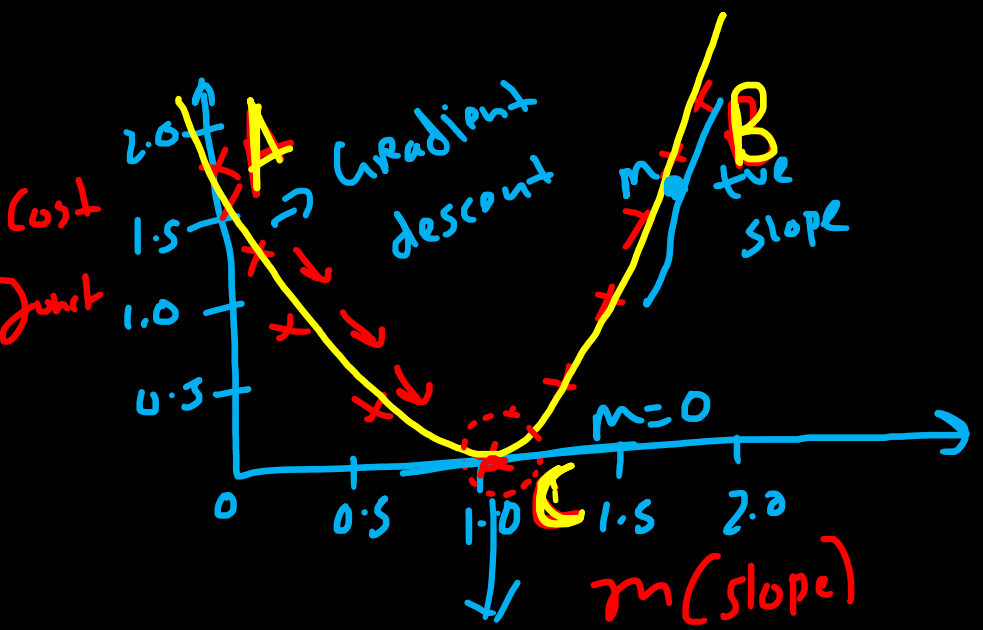
$$\text{Cost function} = \frac{1}{2m} \sum_{i=1}^{m} (\hat{y} - y)^2$$

$$= \frac{1}{2\times 3} [(0.5-1)^2 + (1-2)^2 + \dots]$$

$$= \boxed{0.58}$$

LR – Math Intuition

For diff slope we are getting diff cost function



To reach towards Global minimum, we have to move downwards, for this we need Convergence Theorem.

$$m = m - \left(\frac{\delta m}{dm}\right) \times \alpha \quad (\text{Learning Rate})$$

+ve ← −ve

α - Small – So that m should not surpass Global minima.

For A

$m = m - (-ve) * \alpha$

$m = m + \alpha$

For B

$m = m - (+ve) \times \alpha$

$m = m - \alpha$

Towards GM

For C

$m = m - 0 \times \alpha$ (STOP Here)

BFL Gloal minima point