11 May 2023 21:17

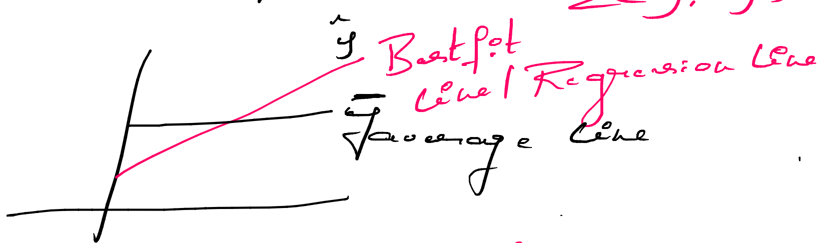
Metrics to measure the performance of the model.

① R2-Score / R^2-Score / R-squared.

It is used to measure strength of the model

* R^2 Score Compares Regression line with average line.

$$R^2 = 1 - \frac{RSS}{TSS} = 1 - \frac{\sum (y_i - \hat{y}_i)^2}{\sum (y_i - \bar{y})^2}$$



Range of $R^2 = [-1, 1]$

If R^2 is near to "1", we say its good model.

If R^2 is near to "0", we say bad model.

Python

r2_score(y_test, y_pred).

② Adjusted R^2-Score

Disadvantage of R^2

R^2 score increases as the number of independent variables increases which has very less relationship with target variable.

To overcome above issue we use adjusted R^2

Adjusted R^2 will measure the performance of the model by ignoring Columns which has very less relationship with target.

$$\text{adj } R^2 = 1 - \frac{(1 - R^2)(N-1)}{N - P - 1}$$

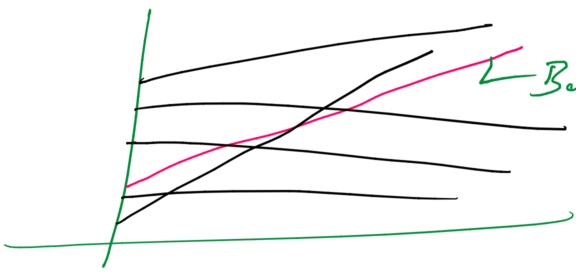
$R^2 \rightarrow R^2$ - score

$N \rightarrow$ No of observation

$P \rightarrow$ No of independent variables.

Note

Adjusted $R^2 \propto R^2$ - score, then we say its good model.



How to select the Best line?

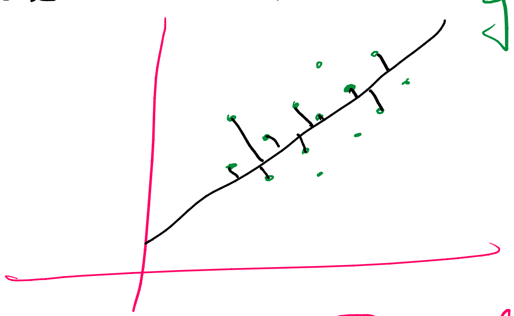
Best line $\longrightarrow$ Based on Error

$$\text{Cost function} = J = \frac{\sum (y_i - \hat{y}_i)^2}{2n}$$

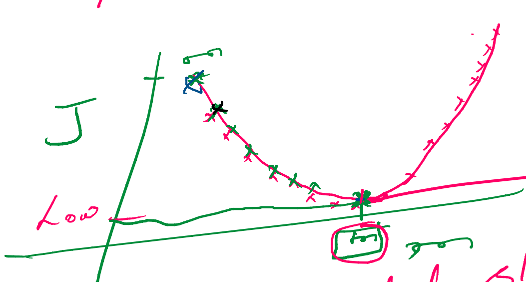
* what if error is very high?

Gradient Descent

Gradient Descent is one of the optimization technique which minimizes error / loss by choosing optimal values for slope and intercept.



How Gradient Descent works?



Global minima

* Gradient Descent starts with random slope and works iteratively to reach global minima.

Global minima is a point where error is less

Equ to update slope and intercept.

$$m_{new} = m_{old} - \eta \frac{\partial J}{\partial m}$$

$\eta \rightarrow$ Learning rate

How many steps model has

equation of

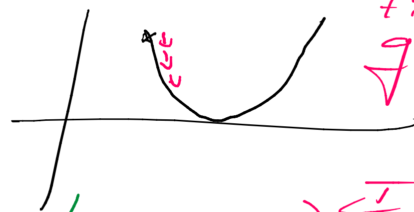
$$m_{new} = m_{old} - \eta \frac{\partial J}{\partial m}$$

$$C_{new} = C_{old} - \eta \frac{\partial J}{\partial C}$$

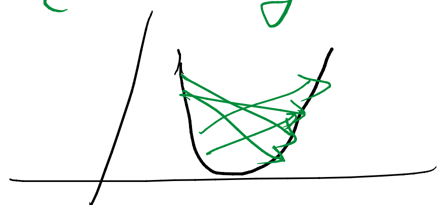
$\eta \rightarrow$ Learning rate

How many steps model has taken to reach global minima.

η is small $\rightarrow$ It will take more time to reach global minima. ×



η is Large. $\rightarrow$ It will overshoot that means it will never reach global minima.



How to choose η?

Initially take larger steps and take smaller steps when near to global minima..