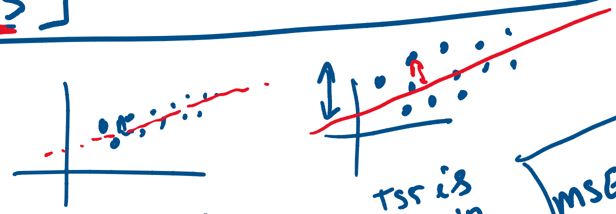
R2-Score we use this metric to evaluate linear model performance. It is used as accuracy.

$\boxed{ACC = 1 - Error}$ $Error \in [0,1]$

$$\boxed{\text{Residual Sum of Square Error [RSS]} = \sum_{i=0}^{m} (\hat{y}_i - y_i)^2}$$

Prediction Error

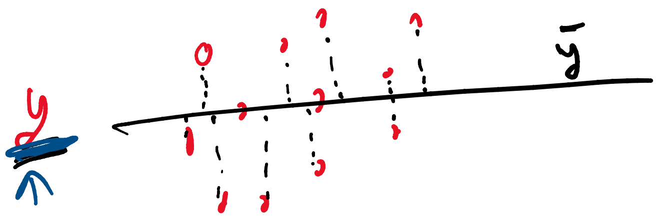
$(\hat{y}_i - y_i)$



TSS is low RSS will be low

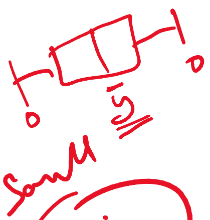
TSS is High RSS is High

$$\boxed{MSE = \frac{RSS}{m}}$$



→ Total Sum of Square Error

$$\frac{10}{10} \to \frac{0-1}{1}$$



Small

$$TSS = \sum_{i=1}^{m} (\bar{y} - y_i)^2$$

$\bar{y} \to 20$

$$\text{Total Error} = \frac{RSS}{TSS} \to$$

in general $\boxed{TSS > RSS}$

$TE \in [0,1]$

$\bar{y}$

$$\boxed{TSS == RSS}$$

$\hat{y} \approx \bar{y}$

X →

25

1

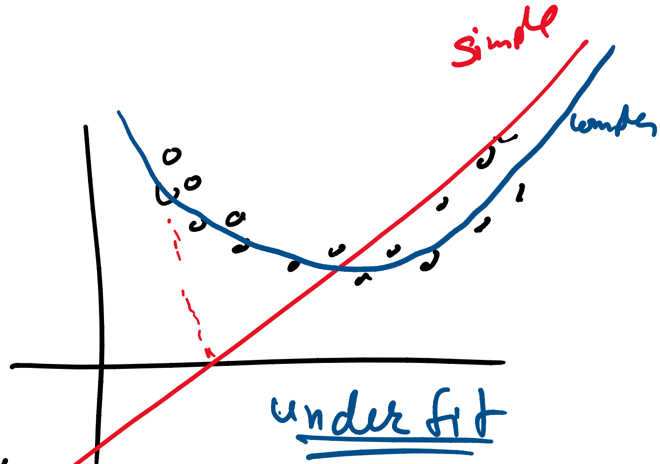
$\boxed{\text{model}}$

1

$$R2\text{-}score = 1 - \frac{RSS}{TSS}$$

$$R2\_score = 1 - \frac{\sum_{i=1}^{m}(\hat{y}_i - y_i)^2}{\sum_{i=1}^{m}(\bar{y} - y_i)^2}$$

⇒ underfitting



Training Accuracy
and Test Accuracy
Both will be very low

Train Error very High
Test Error very High] → chances of underfitting

$X \longrightarrow$ poly features

2^0

$$[X, X^2] \xrightarrow{fit} \boxed{\text{model}}$$

LR

$$[x_1 \quad x_2 \quad x_3]$$

↓

Transform 2°

↓

$$[x_1, x_2, x_3, x_1^2, x_2^2, x_3^2, x_1 \cdot x_2, x_2^2 x_1 \ldots\ldots]$$

no of features

Increase Exponentially

wrt degree of polynomial

$n = 3$

$d = 2$

$$\text{no of few} = \frac{(n+d)!}{n!\,d!}$$

$$\frac{5!}{3!\,2!} = \frac{5 \times 4 \times 3!}{3! \times 2!} = \boxed{10}$$

$3 \xrightarrow{2^{\circ}} 10$

col → no of N > no of m ← row