MSE, MAE, RMSE [cost function] → Performance Metrics

MSE ⇒ Mean Squared Error

MAE ⇒ Mean Absolute Error

RMSE ⇒ Root Mean Squared Error

$$MSE = \sum_{i=1}^{n} \frac{(y - \hat{y})^2}{n}$$

⇒ cost function

→ This is the Quadratic equation.

Advantages:

① Differentiable

② It has one local minima and one global minima

③ converges faster

Disadvantages

① not robust to outliers

② It is no longer in the same unit

Let's consider,

experience	salary
x	y (unit in Lacs)
-	-
-	-
-	-

when computing $(y_i - \hat{y}_i)^2$ ⇒ results in $(\text{lac})^2$

here the units itself getting changed.

MAE

$$MAE = \frac{1}{n} \sum_{i=1}^{n} |y - \hat{y}|$$

Advantages

1. Robust to the outliers
2. It will be is the same unit

Disadvantages

1. convergence usually takes more time — optimization is the complex task
2. Time consuming

RMSE

$$RMSE = \sqrt{MSE}$$

∴ It can be written as

$$RMSE = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(y-\hat{y})^2}$$

Advantages

1. Same unit
2. Differiciable

Disadvantages

1. Not robust to outliers.