

## # Day 2: - Evaluating ML Model.

- The train / test / validation split.
  - ↳ Do not train the model on entire dataset.
  - ↳ use 70% for training and 30% for testing.

### • Metrics: -

To evaluate models.

#### ↳ True Positives: -

Observation  $\xrightarrow{\text{belongs}}$  class; it actually does!

#### ↳ True negatives: -

Observation  $\nrightarrow$  class; it doesn't!

#### ↳ False positives:

Observation  $\rightarrow$  class; it doesn't!

#### ↳ False negatives: -

Observation  $\nrightarrow$  class; it actually does!

\* To evaluate a classification model we use accuracy, precision, recall.

• Accuracy =  $\frac{\text{Correct Predictions}}{\text{all predictions}}$ .

• Precision =  $\frac{\text{true positives}}{\text{true +ve} + \text{false +ve}}$

• Recall =  $\frac{\text{true positives}}{\text{true +ve} + \text{false -ve}}$

\* To evaluate Regression Models :-

• Regression Metrics :-

As it is predicting a continuous range, the metrics is different from classification problems.

↳ Explained variance :-

$$\left\{ EV(y_{true}, y_{pred}) = 1 - \frac{Var(y_{true} - y_{pred})}{y_{true}} \right\}$$

↳ Mean squared error :-

$$\left\{ MSE(y_{true}, y_{pred}) = \frac{1}{n_{samples}} \sum (y_{true} - y_{pred})^2 \right\}$$

↳  $R^2$  coefficient :-

$$\left\{ R^2(y_{true}, y_{pred}) = 1 - \frac{\sum (y_{true} - y_{pred})^2}{\sum (y_{true} - \bar{y})^2} \right\}$$



## \* Overfitting and Underfitting :-

- Underfitting → cannot capture the underlying trends of data.
  - Destroys the accuracy of our ML models.
  - It simply means that our

- Overfitting : → overfitted when trained with lots of data.
  - It starts learning from the noise and inaccurate data entries. Then the model does not categorize the data correctly.

## \* To Reduce Underfitting :-

- i) Increase model complexity
- ii) Remove noise from data

## \* To Reduce Overfitting :-

- i) Increase training data
- ii) Reduce model complexity

## \* Good fit :-

When model makes the predictions with 0 error, it is said to have good fit data.