Fundamentals of Machine Learning

Assignment-7

1. Table shows the output y, and the probability of the predicted output y-pred.

Find the predicted output class for threshold 0.6

		Actual Values	
		Positive	Negative
Predicted values	Positive	560	60
	Negative	50	330

Calculate the following

a) True Positive

$$TP = 560$$

- True Positives are the cases where the model predicted +ve and the actual value was also +ve

b) True Negative

$$TN = 330$$

- True -ve are the cases where the model predicted -ve and the actual value was also -ve

c) False Positive (FP)

FP = 60

- False +ve are the cases where the model predicted +ve but the actual values was -ve

d) False Negative (FN)

FN = 50

- False negatives are the cases where the model predicted -ve but the actual values was +ve

e) Accuracy:-

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

$$= \frac{560 + 330}{560 + 330 + 60 + 50}$$

Accuracy = 0.89

Recall:-

$$\text{Recall} = \frac{TP}{TP + FN}$$

$$= \frac{560}{560 + 50}$$

Recall = 0.9180

Precision:-

$$\text{Precision} = \frac{TP}{TP + FP}$$

$$= \frac{560}{560 + 60}$$

Precision = 0.9032

F1-Score:-

$$\text{F1-Score} = 2 \times \frac{\text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}$$

$$= 2 \times \frac{0.9032 \times 0.9180}{0.9032 + 0.9180}$$

$$= 2 \times \frac{0.8291}{1.8212}$$

F1-Score = 0.9104

⇒ when will you prefer accuracy or Precision or recall or f-1 Score

- Accuracy :- when the class distribution is balanced and both false positive and false -ve carry equal cost. it provides a general overview of how well the model performs.
- Precision :- Preferred when false tve are more costly or high
- Recall :- Preferred when false Negative are more costly or high
- F1- Score :- Preferred when you need a balance blw Precision & recall, Especially when the class distribution is imbalanced.

FML

Assignment 7 :- Confusion Matrix

Submitted by :- Karthik. E

Reg. NO :- 24015801 6