Classification metrics

ACCURACY:-

- It depends on the problem we are solving is determines how much accuracy is good.
- $(Numberofcorrect Prediction)/(Total Numberofprediction)$
- Imbalanced dataset gives not well accuracy i.e. it is misleading.

Confusion metrics:-

	predicted (1)	**(0)**
Actual(1)	**True Positive**	**False Negative**
(0)	**False Positive**	**True Negative**

Type 1 error:-

- **number of false positive is type 1 error.**

Type 2 error:-

-number of false negative is type 2 error.

precision:-

- From predicted positive how many are actual positive.
- $TP/(TP+FP)$

Recall:-

- From actual positive how many model caught positive.
- $TP/(TP+FN)$

F1-Score:-

- It is harmonic mean of precision and recall.
- $2*Precision*Recall/(Precision+Recall)$
- Harmonic mean always penalize model if there is low precision or recall.
- Simple mean or average calculate middle value.

Multiclass Precision and Recall:-

- in binary we focus on only positive or 1 for precision and recall.

			Predicted			
		cat	dog	rabbit	total	
	cat	25	5	10	40	
Actual	dog	0	30	4	34	
	rabbit	4	10	20	34	
	total	29	45	34		

- For Precision of every class :-
    - Precision of Cat = $(Actual Cat) /(Predicted Cat)$ = $25/29$
    - Precision of Dog= $(Actual Dog) /(Predicted Dog)$ = $30/45$
    - Precision of Rabbit= $(Actual Rabbit) /(Predicted Rabbit)$ = $20/34$
    - Macro Precision=Average of all precision
    - Weighted Precision=$Sum of all((Total of class/All class total)*Precision of that class)$
- For Recall of every class :-
    - Recall of Cat = $(Predicted Cat) /(Actual Cat)$ = $25/40$
    - Recall of Dog= $(Predicted Dog) /(Actual Dog)$ = $30/34$
    - Recall of Rabbit= $(Predicted Rabbit) /(Actual Rabbit)$ = $20/34$
    - Macro Recall=Average of all Recall
    - Weighted Recall=$Sumofall ((Total of class/All class total)*Recall of that class)$