F1-Score for Multi-label Classification Model Evaluation

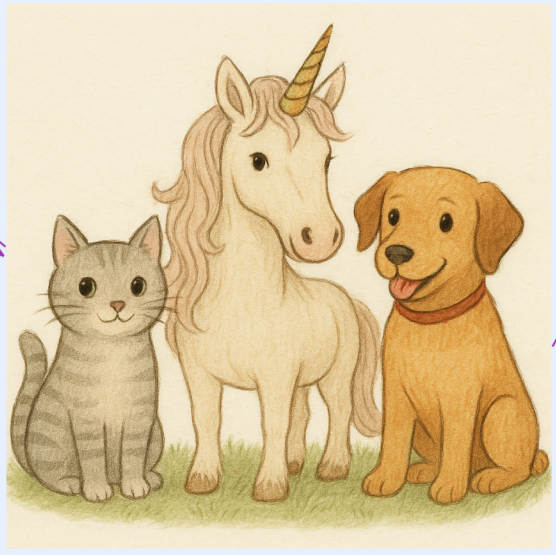

Image instance

{cat: True, dog: True, Unicorn: True}

True labels for the instance

Any cat?

(True, True, True)

Y_i
(1, 1, 1)

Any dog?

Any unicorn?

$\hat{Y}_i$
(0, 1, 1)

Predicted labels for the instance

How many classes does the model correctly predict that instance i belongs to?

$$\text{F1-score}_{\text{samples}} = \frac{1}{N}\sum_{i=1}^{N}\frac{2\cdot|Y_i \cap \hat{Y}_i|}{|Y_i| + |\hat{Y}_i|}$$

How many classes does instance i belong to?

How many classes does the model predict instance i belongs to?

@AIinMinutes

N = number of samples

F1-Score for Multi-label Classification Model Evaluation

True Labels	Predicted Labels		
(1, 0, 1)	(0, 1, 0)	F1 = 0	The predicted classes do not match the instance's true classes at all.
(1, 0, 0)	(0, 1, 1)	F1 = 0	
(1, 1, 0)	(1, 1, 1)	F1 = 4/5	The model predicts all the true classes correctly, but also includes additional classes the instance does not belong to.
(1, 1, 0)	(0, 1, 1)	F1 = 2 / 4	The model predicts only some of the true classes the instance belongs to, but misses one or more true classes.

(1, 0, 0)	(1, 0, 0)	F1 = 1	The predicted classes exactly match the instance's true classes.
(1, 1, 0)	(1, 1, 0)	F1 = 1	

```
from sklearn.metrics import f1_score

y = [(1, 0, 1), (1, 0, 0), (1, 1, 0), (1, 1, 0), (1, 0, 0), (1, 1, 0)]

y_hat = [(0, 1, 0), (0, 1, 1), (1, 1, 1), (0, 1, 1), (1, 0, 0), (1, 1, 0)]

f1_score(y, y_hat, average='samples')
0.5499999999999999
```