

Evaluation Metrics: Multi Class x x x Y Y Z Classification

Actual

Values:



```
Actual X X X Y Y Y Z
Values: Z
Predicted Values X X X X Y Y Z
: Z
```

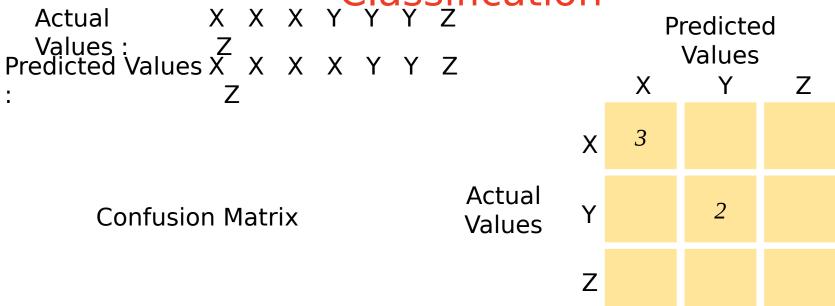


Actual Predicted Values X Actual Confusion Matrix Values

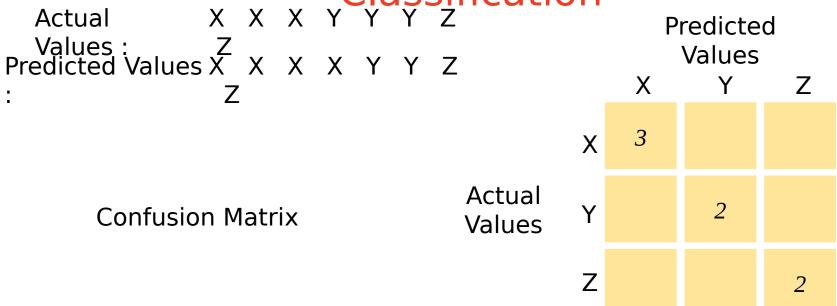


Actual Predicted Values 3 Actual Confusion Matrix Values











Actual X X X Y Y Y Z Values: Z Predicted Values X X X X Y Y Z : Z	_		redicte Values Y	d Z
Actual Confusion Matrix Values	X	3	0	0
	Y	1	2	0
	Z	0	0	2



Actual X X X Y Y Y Z Values: Z Predicted Values X X X X Y Y Z : Z	_		redicte Values Y	
Accuracy Actual Values	X	3	0	0
	Υ	1	2	0
	Z	0	0	2



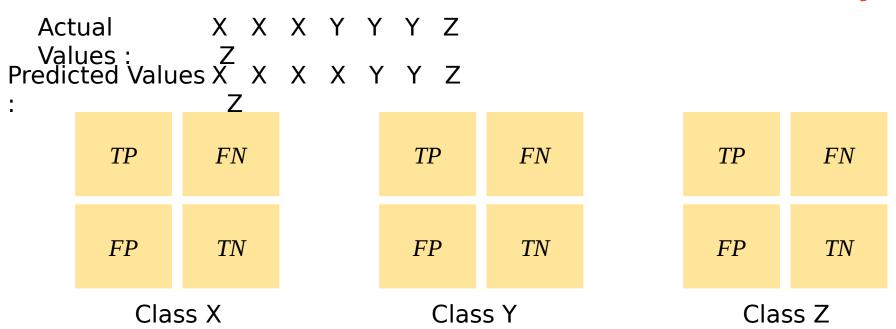
Actual X X X Y Y Y Z
Values: Z
Predicted Values X X X X Y Y Z
: Z

Accuracy
$$\frac{7}{8} = 0.875$$

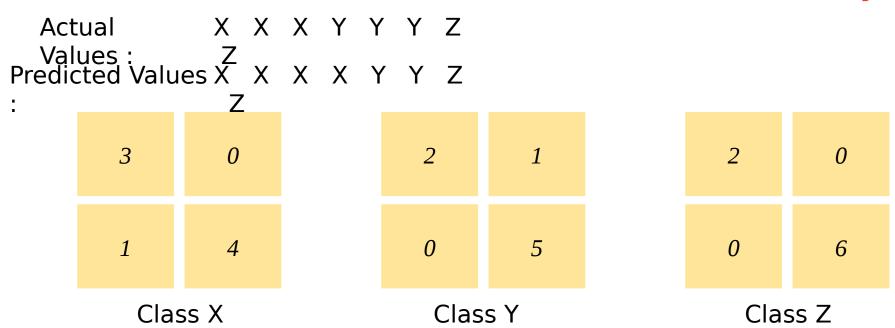
Predicted

Values

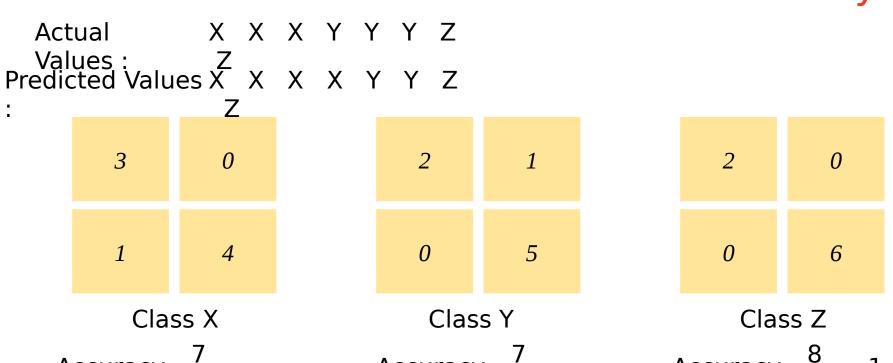












Accuracy
$$\frac{7}{8} =$$
 Accuracy $\frac{7}{8} =$ Accuracy $\frac{8}{8} = 1$ Accuracy $\frac{8}{8} = 1$ Analytics Vid

Actual X X X Y Y Y Z Average Accuracy
$$\frac{0.875 + 0.875 + 1}{3} = \frac{2}{0.917}$$

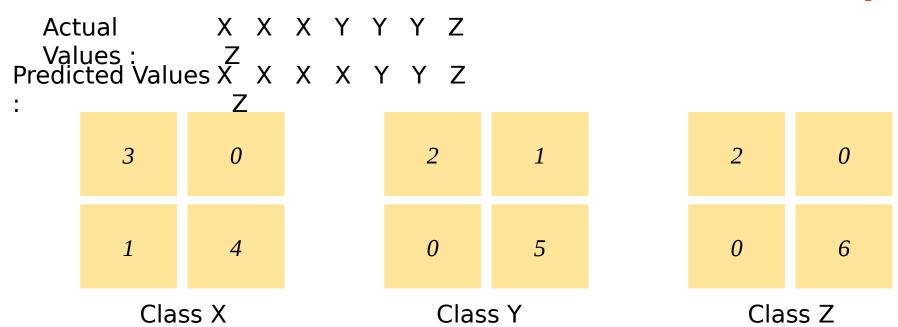
Predicted Values X X X X Y Y Z

3 0.917

2 1 2 0

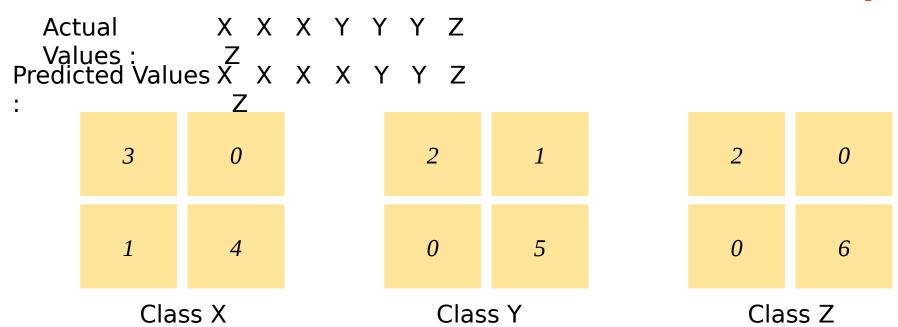
Class X Class Y Class Z

Accuracy $\frac{7}{8} = \frac{7}{8} = \frac{2}{8} = \frac{2}{8} = 1$



Weighted Average Accuracy





Weighted Average Accuracy $\frac{3*0.875 + 3*0.875 + 2}{*1} =$



$$F_1 = \frac{2}{\frac{1}{\text{precision}} + \frac{1}{\text{recall}}}$$



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precision =
$$\frac{TP}{TP + FP}$$



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precision =
$$\frac{TP}{TP + FP}$$

$$recall = \frac{TP}{TP + FN}$$



Weighted
$$F1 = F1_{class1} * W_1 + F1_{class2} * W_2 + ... + F1N_{classN} * W_N$$



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$$F1 = F1_{class1} * W_1 + F1_{class2} * W_2 + ... + F1N_{classN} * W_N$$

Here W_1 , W_2 ,..., W_N are the weights that depends on the number of true labels of each class.



Log loss
$$-\frac{1}{N}\sum_{i=1}^{N} \frac{(y_i * \log(p_i) + (1-y_i) *}{\log(1-p_i))}$$



Log loss =
$$-\frac{1}{N}\sum_{i=1}^{N} \frac{(y_i * \log(p_i) + (1-y_i) * \log(1-p_i))}{\log(1-p_i)}$$

Log loss = $-\frac{1}{N}\sum_{i=1}^{N} \frac{(y_{i1} * \log(p_{i1}) + y_{i2} * \log(p_{i2}))}{\log(p_{i2})}$



Log loss =
$$-\frac{1}{N}\sum_{i=1}^{N} \frac{(y_i * \log(p_i) + (1-y_i) *}{\log(1-p_i))}$$

Log loss = $-\frac{1}{N}\sum_{i=1}^{N} \frac{(y_{i1} * \log(p_{i1}) + y_{i2} *}{\log(p_{i2}))}$

- When the actual class is 1:
 - $y_{i1} = 1, y_{i2} = 0$
- When the actual class is 0:
 - $y_{11} = 0, y_{12} = 1$
- pi1 and pi2 : probability of first and second class



$$logloss = -rac{1}{N}\sum_{i}^{N}\sum_{j}^{M}y_{ij}\log(p_{ij})$$

- N is the number of rows
- M is the number of classes



Thank You!

