



# **CONFUSION MATRIX**

## **LET'S NOT CONFUSE MUCH**

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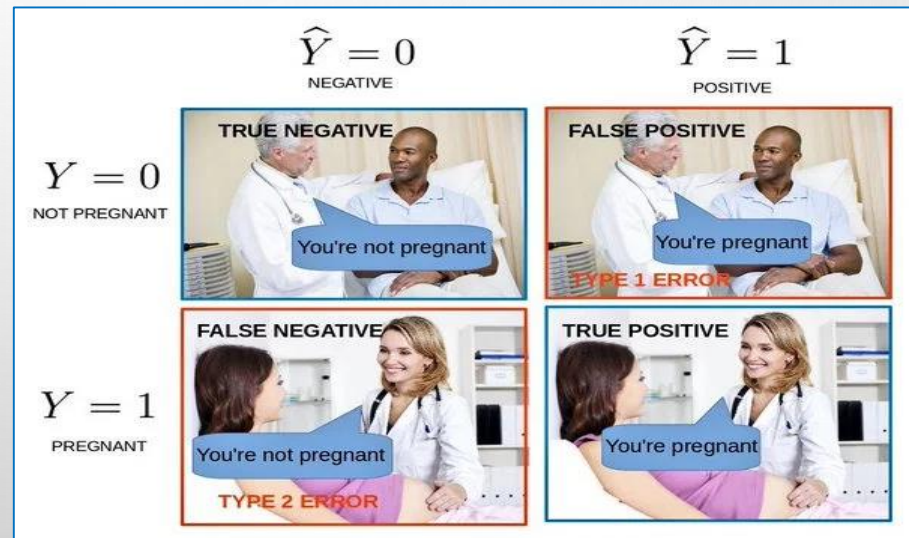
# CONFUSION MATRIX: Necessities

Normally “accuracy” has been considered for a Classification model evaluation.

However, this alone can be misleading if there are an unequal number of observations in each class or more than two classes are present in the datasets.

Let’s say the “true” (or “Positive”) target presents less than 10% in the original dataset and model predicted all outcome as “Negative”; then the model accuracy value could be >90% which is deceiving regarding the acceptability of the model.

The above issue could be addressed by the help of,  
**“Confusion matrix”**  
**“Precision”**  
**“Recall”**  
**“F1-Score”**



# CONFUSION MATRIX: Parameters

Actual Values		Predicted Values	
True	False	Positive	Negative
Actual Values		Positive (1)	Negative (0)
Predicted Values	Positive (1)	TP	FP
	Negative (0)	FN	TN

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

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

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

$$F1 - score = \frac{2}{\frac{1}{Recall} + \frac{1}{Precision}}$$

## True Positive (TP)

- The predicted value matches the actual value
- The actual value was positive and the model predicted a positive value

## True Negative (TN)

- The predicted value matches the actual value
- The actual value was negative and the model predicted a negative value

## False Positive (FP) – Type 1 error

- The predicted value was falsely predicted
- The actual value was negative but the model predicted a positive value
- Also known as the **Type 1 error**

## False Negative (FN) – Type 2 error

- The predicted value was falsely predicted
- The actual value was positive but the model predicted a negative value
- Also known as the **Type 2 error**

“ Precision tells us how many of the correctly predicted cases actually turned out to be positive.

“ Precision is a useful metric in cases where False Positive is a higher concern than False Negatives.

“ Recall tells us how many of the actual positive cases we were able to predict correctly with our model.

“ Recall is a useful metric in cases where False Negative trumps False Positive.



# Thanks for reading!

Lets collaborate and happy to receive any  
feedback/suggestion/comment at.....

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