Machine Learning In Python

Subject : Evaluating the model (Confusion Matrix)

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Evaluating the model (Confusion Matrix)

Confusion Matrix :

- Suppose you trained a binary class supervised learning model.
- A confusion matrix is a method to describe the performance of a binary classification model.
- This presentation aims at:
  - What the confusion matrix is and why you need to use it.
  - How to calculate a confusion matrix for a binary class classification problem.
  - How to create a confusion matrix in Python.

Evaluating the model (Confusion Matrix)

Confusion Matrix :

- Suppose we have a binary class

- The identification of Positive samples is more necessary than negative samples.

Evaluating the model (Confusion Matrix)

Confusion Matrix :

- Suppose we have a binary class

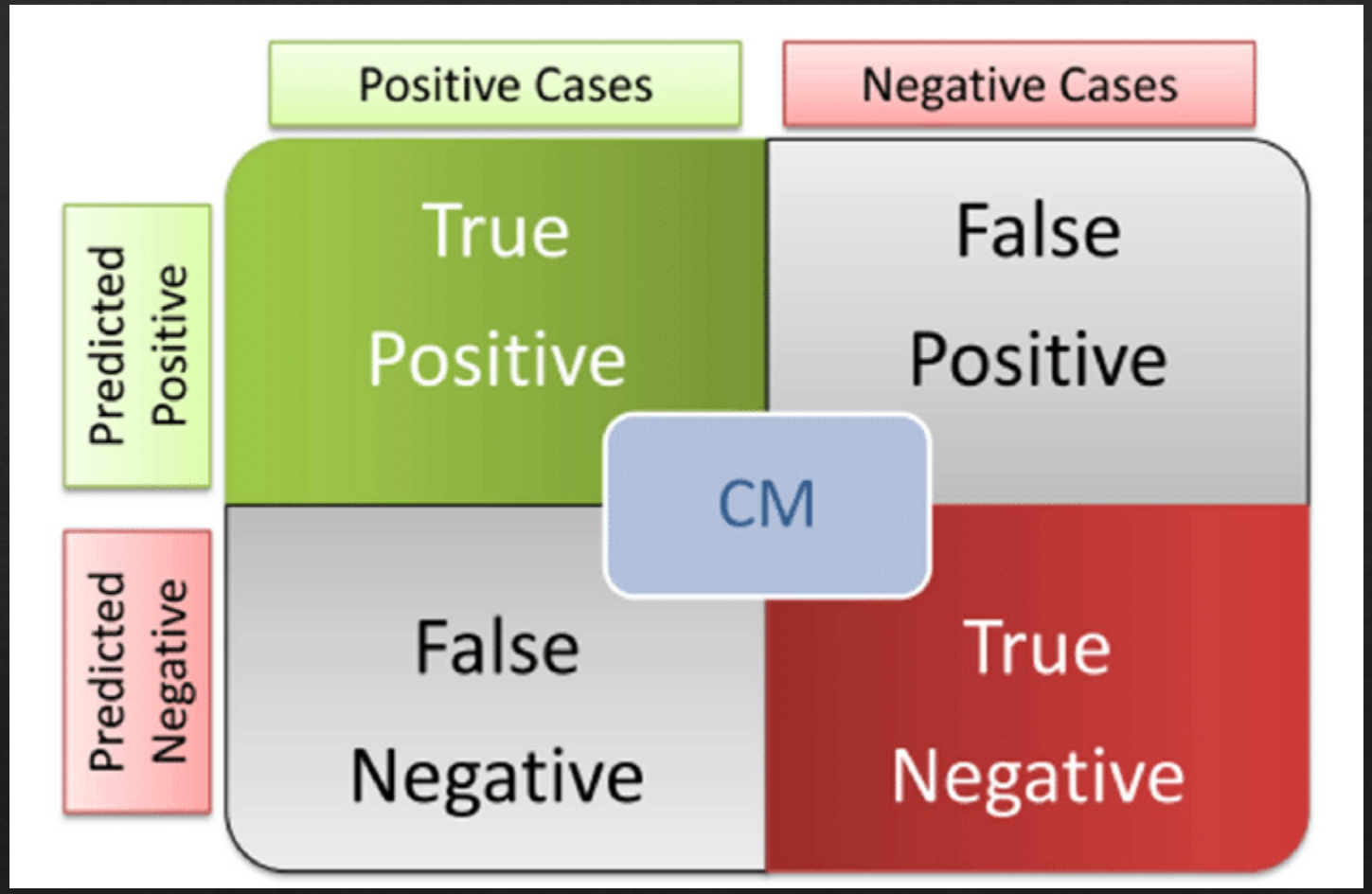
- True classification result means that the sample is classified correctly.
- False classification result means that the sample is classified incorrectly.

Evaluating the model (Confusion Matrix)

Confusion Matrix :

- **True Positive (TP) : A positive sample that is correctly classified as positive.**
- **True Negative (TN) : A negative sample that is correctly classified as negative.**
- **False Positive (FP) : A negative sample that is incorrectly classified as positive.**
- **False Negative (FN) : A positive sample that is incorrectly classified as negative.**

Evaluating the model (Confusion Matrix)



Evaluating the model (Confusion Matrix)

Confusion Matrix :

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

$$Loss = 1 - Accuracy$$

Evaluating the model (Confusion Matrix)

Confusion Matrix :

$$Sensitivity = TPR = \frac{N_{TP}}{N_{TP} + N_{FN}}$$

$$Specificity = TNR = \frac{N_{TN}}{N_{TN} + N_{FP}}$$

$$F1 - score = \frac{2N_{TP}}{2N_{TP} + N_{FP} + N_{FN}}$$

Evaluating the model (Confusion Matrix)

Confusion Matrix :

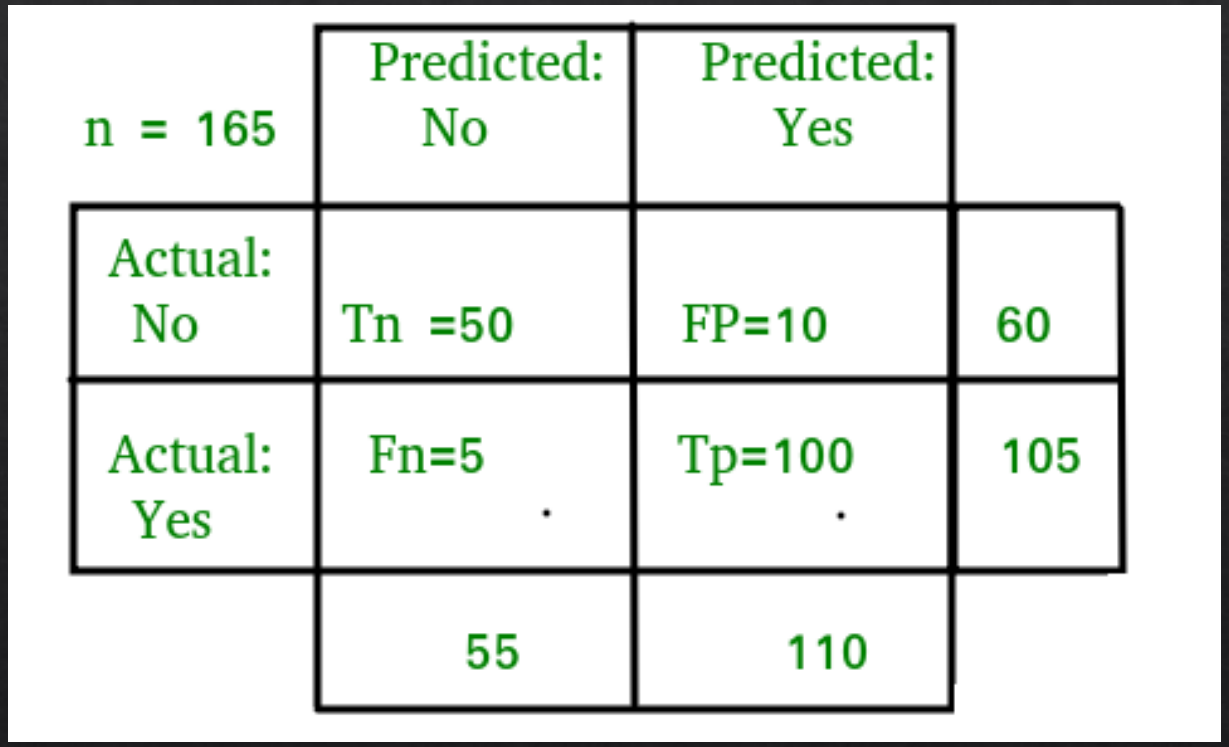
$$Accuracy = \frac{100 + 50}{100 + 50 + 5 + 10} = 0.9$$

$$Loss = 1 - 0.9 = 0.1$$

$$Sensitivity = TPR = \frac{100}{100 + 5} = 0.95$$

$$Specificity = TNR = \frac{50}{50 + 10} = 0.83$$

$$F1 - score = \frac{2 * 100}{(2 * 100) + 10 + 5} = 0.93$$



n = 165	Predicted: No	Predicted: Yes	
Actual: No	Tn =50	FP=10	60
Actual: Yes	Fn=5	Tp=100	105
	55	110	