Why is Accuracy Not Enough?

Bookmark this page

Which model is best?

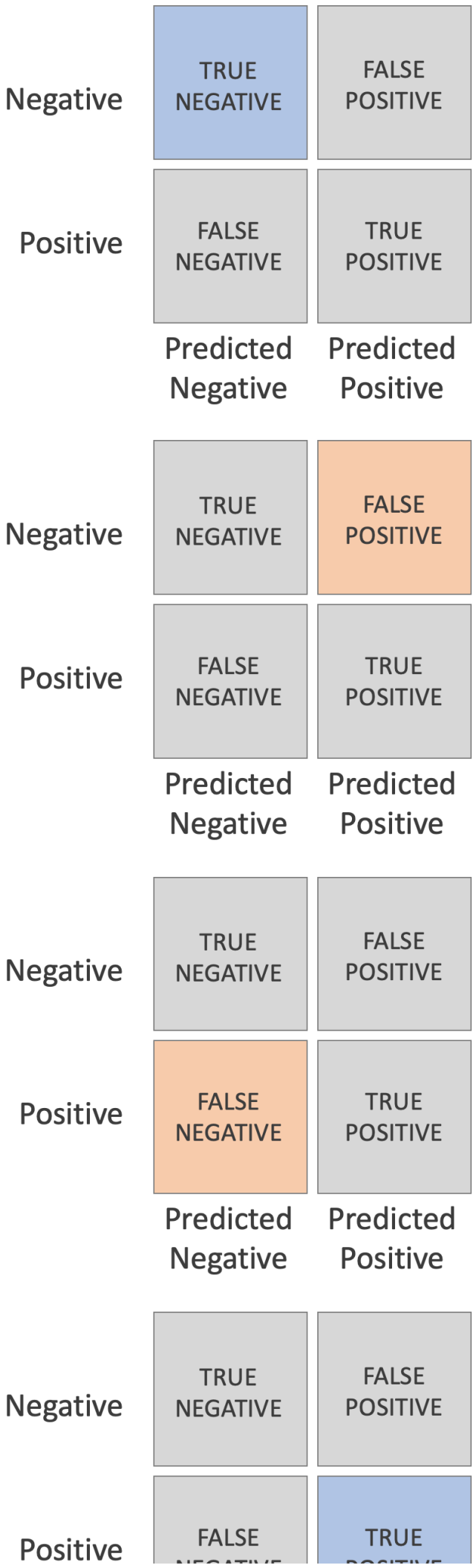
For the two models (Logistic Regression and kNN Classification) trained previously, we can now compute the values for each metric discussed.

Why is accuracy not enough?

- Imbalanced data: If one class has 99% of the data then a simple model that predicts that class would give us 99% accuracy. Though this indicates that the model trained has high performance, in reality this is not ideal.
- There exist different mistakes for different classes. It is difficult to distinguish between these mistakes.
- Utility: Is accuracy the metric I care about the most?

The Confusion Matrix

The **Confusion Matrix** shows the number of correct and incorrect predictions for each class, arranging them by True Negative (upper left), False Positive (upper right), False Negative (bottom left), and False Positive (bottom right).



TRUE NEGATIVE (TN)

- Samples that are negative and that the classifier predicts as negative are called True Negatives.
- Example: a negative COVID test result would be a TRUE NEGATIVE if you actually don't have COVID.

FALSE POSITIVE (FP)

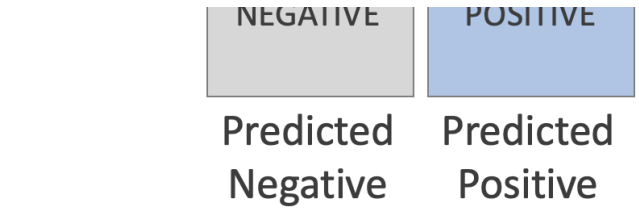
- Samples that are negative and that the classifier predicts as positive are called False Positives.
- Example: a positive COVID test result would be a FALSE POSITIVE if you actually don't have COVID.

FALSE NEGATIVE (FN)

- Samples that are negative and that the classifier predicts as positive are called False Negatives.
- Example: a negative COVID test result would be a FALSE NEGATIVE if you actually have COVID.

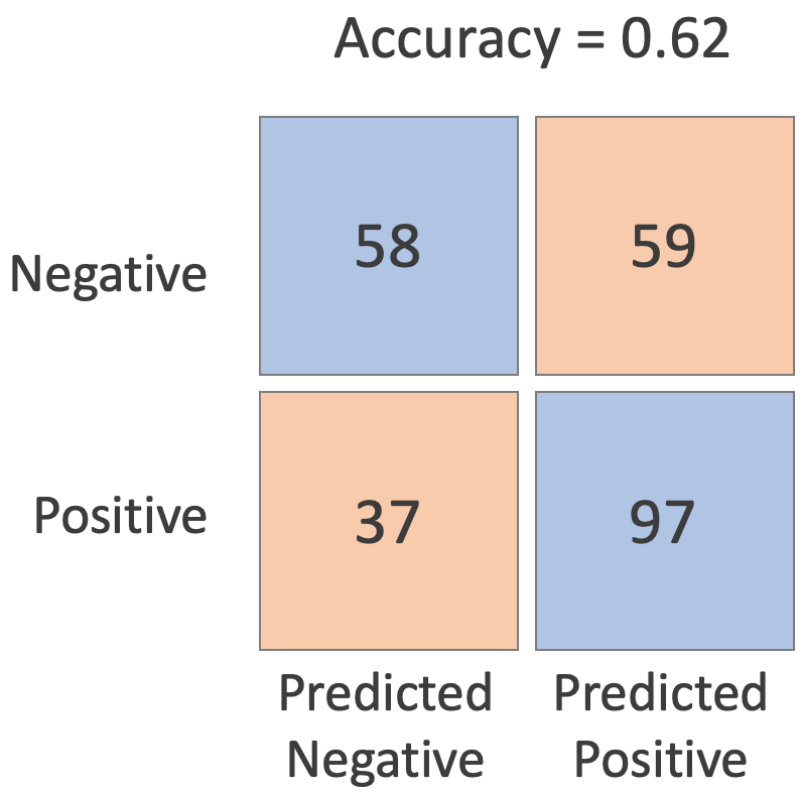
TRUE POSITIVE (TP)

- Samples that are positive and that the classifier predicts as positive are called True Positives.
- Example: a positive COVID test result would be a TRUE POSITIVE if you actually have COVID.

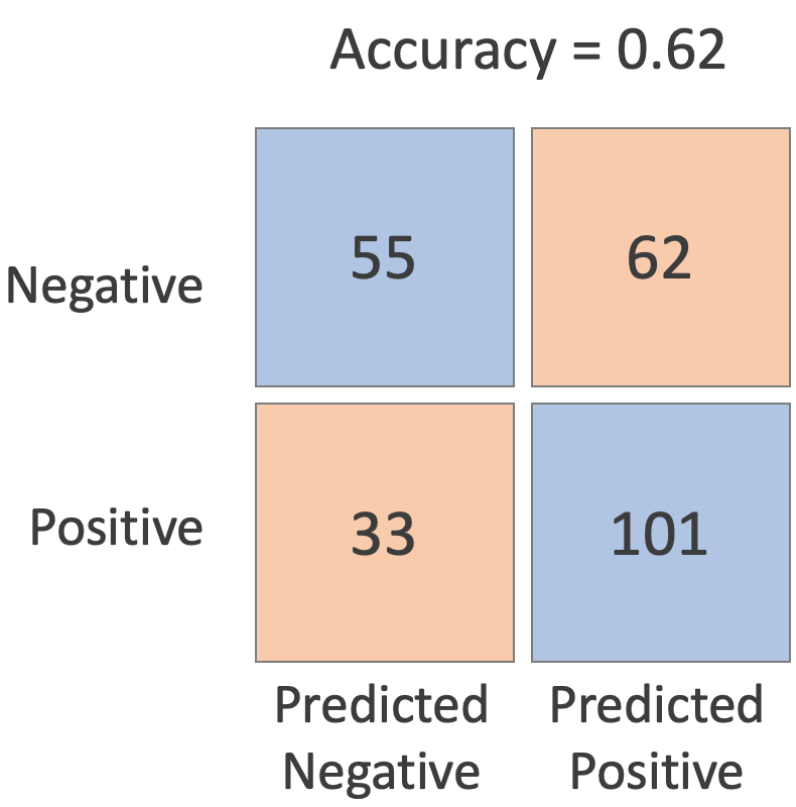


Confusion matrix results

The confusion matrix for each class in the prediction vs. the true label for **Logistic Regression** has results as follows:



The confusion matrix for each class the prediction vs. the true label for **kNN Classification** has results as follows:



Both models have slightly different confusion matrices, but identical accuracies.

Measurements

ACCURACY can be expressed in terms of different parts of the confusion matrix as follows:

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

SENSITIVITY or RECALL or TRUE POSITIVE RATE: This metric helps to examine how we do on the actual TRUE samples:

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

Calculator

FALSE NEGATIVE RATE is used for the

FALSE NEGATIVE RATE is used for the same purpose as the previous metric.

$$\text{FNR} = \frac{FN}{TP + FN}$$

TRUE NEGATIVE RATE: This metric helps us examine how we do on the actual FALSE samples.

$$\text{TNR} = \frac{TN}{TN + FP}$$

FALSE NEGATIVE RATE is used for the same purpose as the previous metric.

$$\text{FPR} = \frac{FP}{TN + FP}$$

PRECISION is used to evaluate how we do when we predict TRUE.

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

F-1 SCORE is a score that tries to capture all is the F-1 score which is really appropriate for imbalanced datasets.

$$\text{F1 Score} = \frac{2 \cdot precision \cdot recall}{precision + recall}$$

Based on these formulae, the accuracy for the logistic regression model is 0.62 - and the accuracy for the kNN classification model is also 0.62.

Discussion Board (External resource)

Haga clic en Aceptar para que su nombre de usuario y dirección de correo electrónico se envíen a una aplicación de terceros.

Aceptar

‹ Previous Next ›

Your Privacy Choices

Connect

Idea Hub
Contact Us
Help Center
Security
Media Kit

Calculator