

Why is accuracy a poor performance measure?

Suppose we have 100 students and 1 student has COVID, and 99 do not. The covid test comes back negative for everyone.

The results showing combinations of true target values and predictions can be tabulated and arranged in a **contingency table**.

True / Predicted	Negative	Positive	TOTAL
Negative	99	0	99
Positive	1	0	1
TOTAL	100	0	100

This table says, for example, that out of all patients who are really negative (the first row), 99 tested negative.

What is the accuracy? Total Correct / Total Number of Predictions = $(99 + 0) / 100 = 99\%$

What is the recall for a person who has COVID (positive)?

Number of positive individuals correctly predicted / total number of positive individuals =

$$0 / 1 = 0\%$$

What is the recall for a person who is negative?

Number of negative individuals correctly predicted / total number of negative individuals =

$$99 / 99 = 100\%$$

Balanced accuracy here is the average (mean) of the recall values:

$$(100\% + 0\%) / 2 = 50\%$$

The balanced accuracy is what the accuracy would be if the number of individuals in each class (e.g., positives and negatives) were the same.