

Sensitivity & Specificity

- Sensitivity (aka recall, True Positive Rate – TPR) is the frequency of positive predictions (tests) within the positive class (**NOT VICE VERSA** – see PPV)

$$TPR = \frac{TP}{P} = \frac{TP}{TP + FN} = 0.9$$

- Specificity (aka negative recall, True Negative Rate – TNR) is the frequency of negative predictions within the negative class (**NOT VICE VERSA** – see NPV)

$$TNR = \frac{TN}{N} = \frac{TN}{TN + FP} = 0.8$$

Predictive values

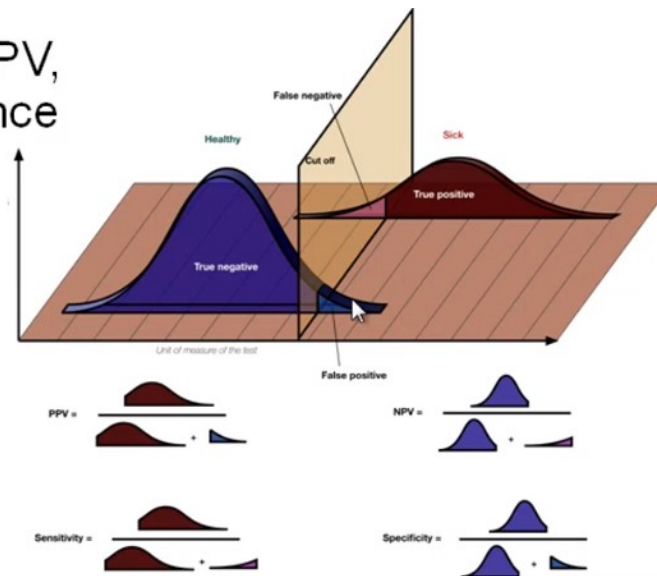
- Precision (aka Positive Predictive Value – PPV) is the frequency of true predictions within the positive predictions (**NOT VICE VERSA** – see TPR)

$$PPV = \frac{TP}{TP + FP} = 0.82$$

- Negative Predictive Value (NPV) is the frequency of true predictions within the negative predictions (**NOT VICE VERSA** – see TNR)

$$NPV = \frac{TN}{TN + FN} = 0.89$$

TRP, TNR, PPV,
NPV at a glance



Other common metrics

- Accuracy is frequency of true predictions within the population

$$ACC = \frac{TP + TN}{P + N} = 0.85$$

- Balanced accuracy is the mean of sensitivity and specificity ($BA = ACC$ in perfectly balanced sets)

$$BA = \frac{TPR + TNR}{2} = 0.85$$

- F-score is the harmonic mean of sensitivity and precision

$$F_1 = 2 \frac{TPR \cdot PPV}{TPR + PPV} = 0.86$$

Changing the threshold

- Metrics change according to the rearranged confusion matrix
- The number of effective thresholds corresponds to the population size + 1

