

# The Confusion Matrix

Stu Field

		Predicted	
		-ve	+ve
Actual	-ve	$tn$	$fp$
	+ve	$fn$	$tp$

## Classification Measures:

Measure	Focus
Sensitivity (Recall)	Identification of Positive Classes
Specificity	Identification of Negative Classes
Precision (PPV)	Truth Agreement with a Positive Prediction
Negative Predictive Value (NPV)	Truth Agreement with a Negative Prediction
Accuracy	Total Proportion of Correct Predictions

Measure	Defined by	Equation
Sensitivity (Recall)	$Pr(+\text{prediction} \mid +ve)$	$\frac{tp}{tp+fn}$
Specificity	$Pr(-\text{prediction} \mid -ve)$	$\frac{tn}{tn+fp}$
Precision (PPV)	$Pr(+ve \mid +\text{prediction})$	$\frac{tp}{tp+fp}$
NPV	$Pr(-ve \mid -\text{prediction})$	$\frac{tn}{tn+fn}$
Accuracy	$Pr(+ve \text{ or } -ve \text{ prediction} \mid +ve \text{ or } -ve)$	$\frac{tp+tn}{tp+tn+fp+fn}$

## In Hypothesis Testing:

		Prediction	
		accept $H_o$	reject $H_o$
Actual	$H_o = \text{true}$	TN $(1 - \alpha)$	Type I $(\alpha)$
	$H_o = \text{false}$	Type II $(\beta)$	TP $(1 - \beta)$

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