SciKit Learn

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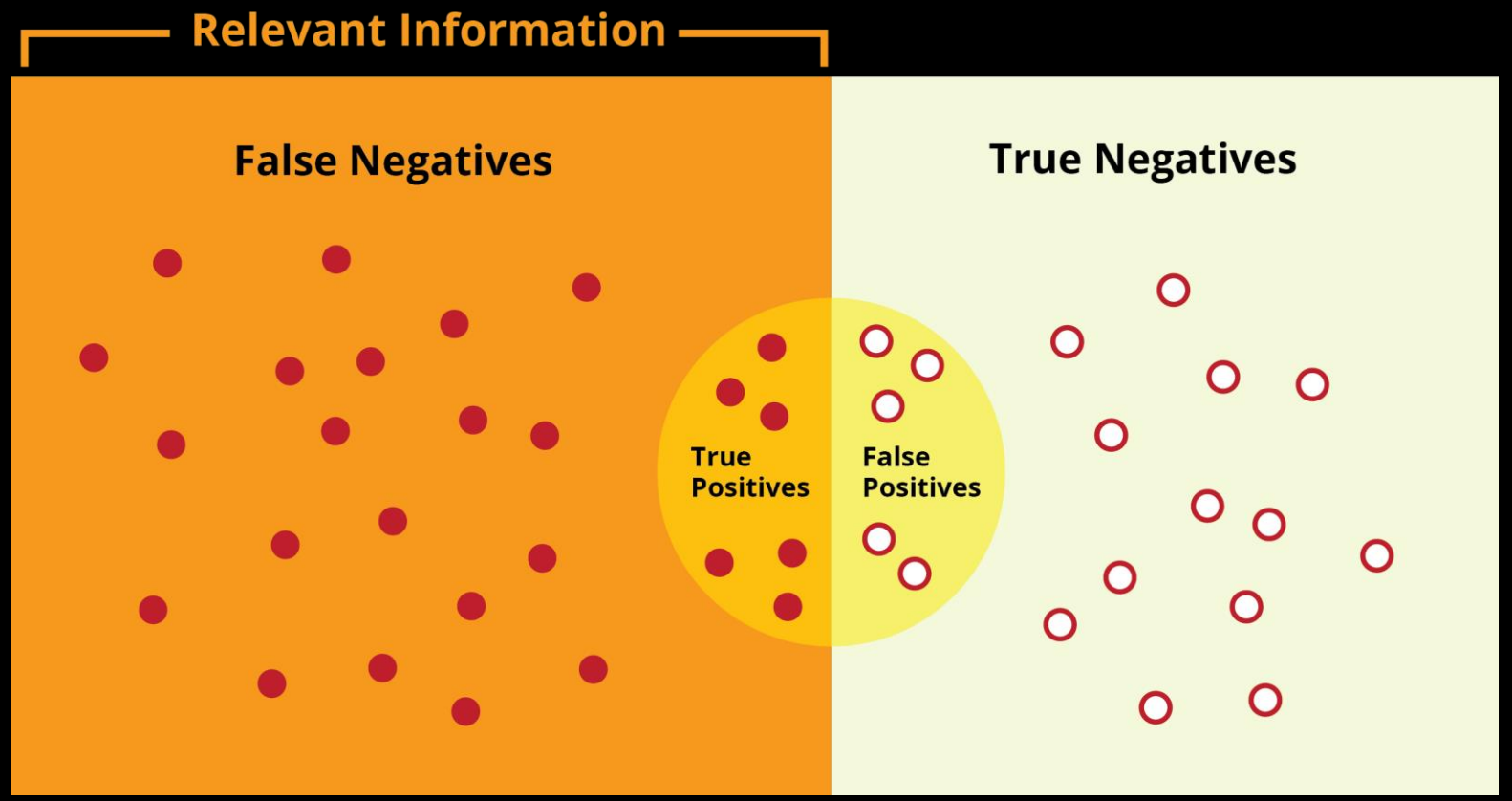
Accuracy

- Y true (left hand) equals the number of true cases we have in our data.
- Y pred (right hand) equals the number of predicted cases we have in our data.
- This will always be a value between 0 and 1.

$$A = y - \hat{y}$$

True and False

- The circle is the positive predictions the square outside the circle is the negative predictions.
- The orange side are actual positives. The white side are actual negatives.



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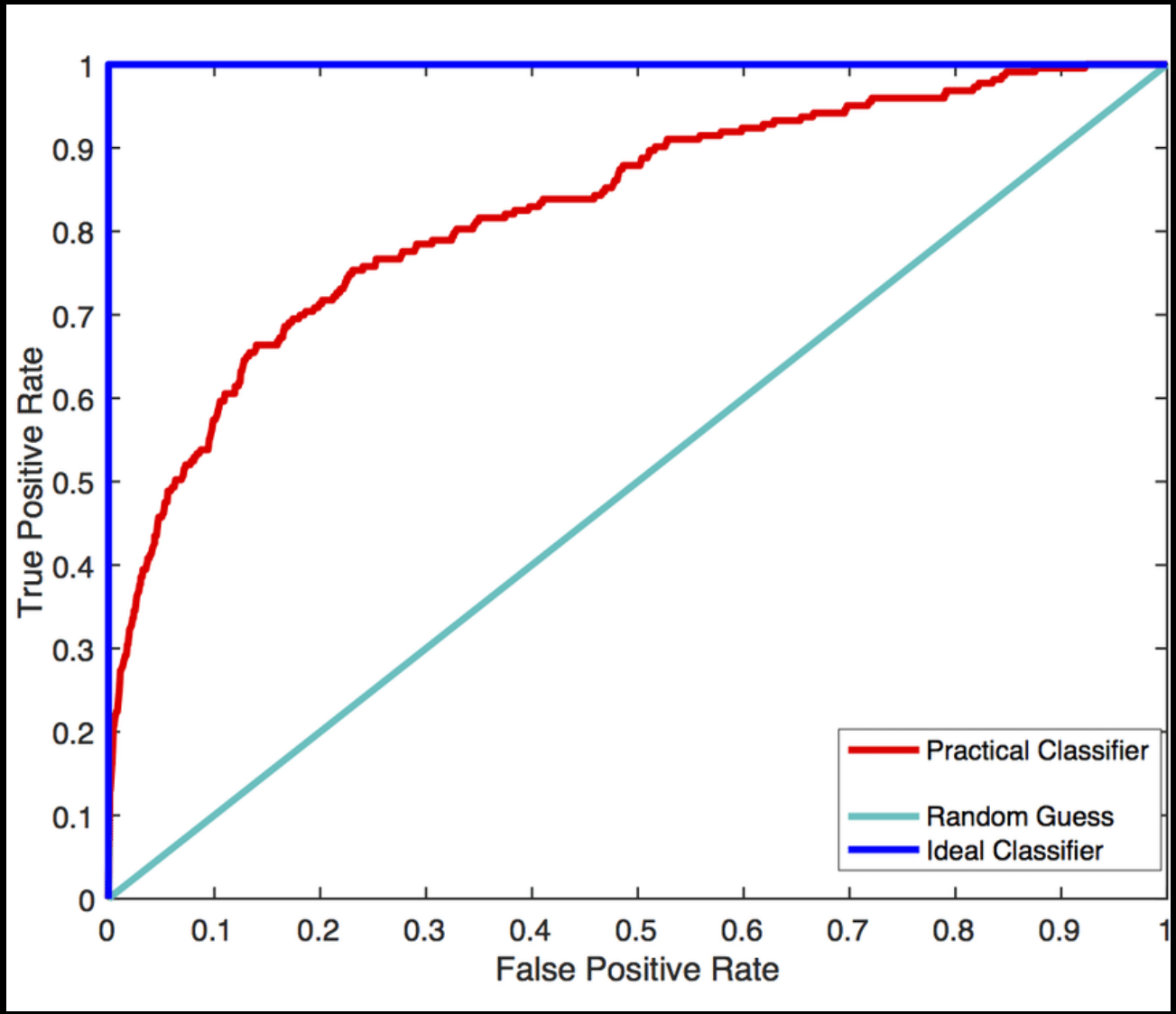
ROC curve

- Perfect classifications are at (0, 1).
- The worst classifications are at (1, 0).



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Confusion matrix

	Predicted (0)	Predicted (1)
Actual (0)	TN	FP
Actual (1)	FN	TP

True Positive (TP)

Patient has pneumonia
Model predicts: pneumonia

Number of occurrences: 1

False Positive (FP)

Patient is healthy
Model predicts: pneumonia

Number of occurrences: 1

False Negative (FN)

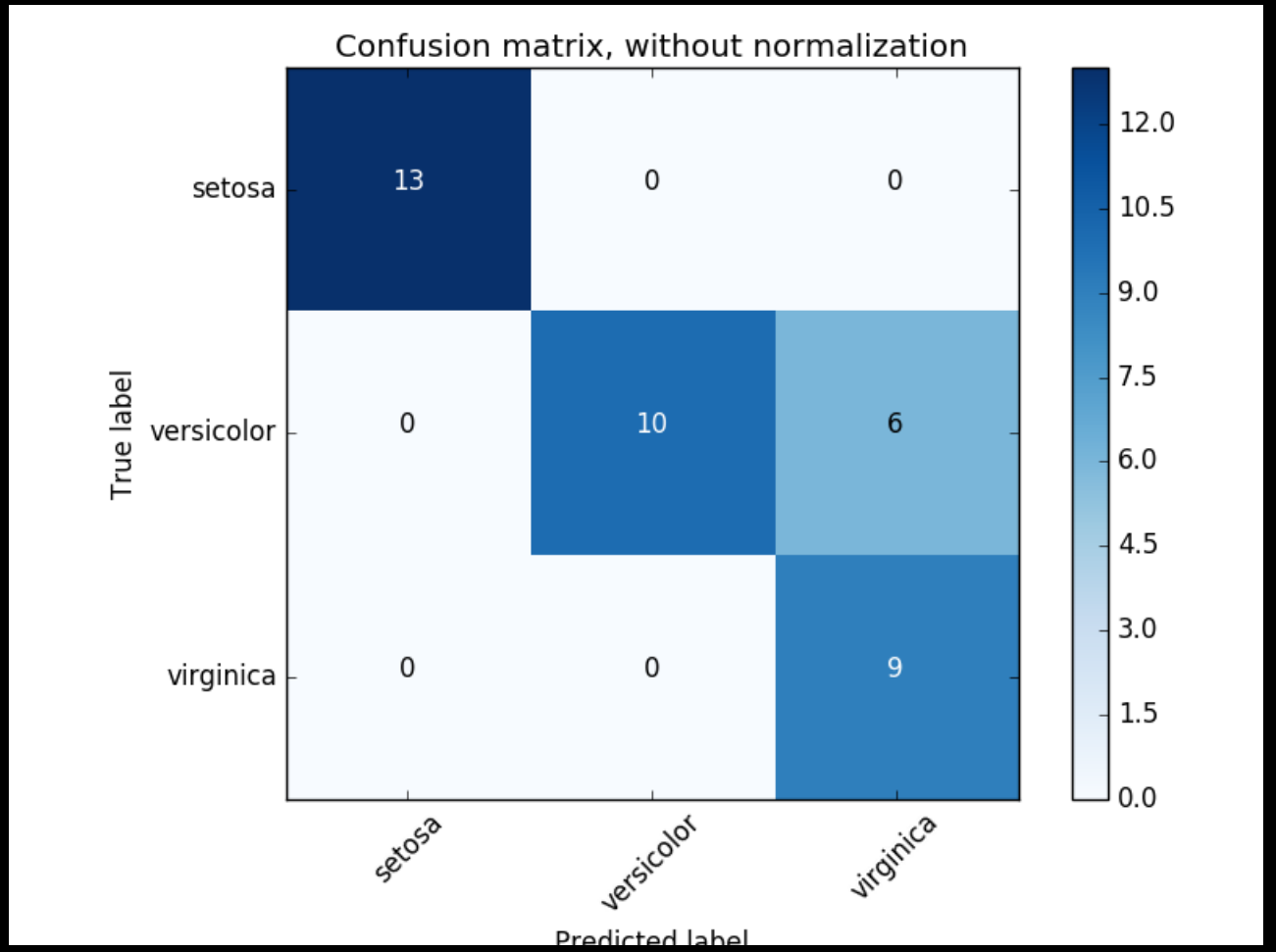
Patient has pneumonia
Model predicts: healthy

Number of occurrences: 8

True Negative (TN)

Patient is healthy
Model predicts: healthy

Number of occurrences: 90



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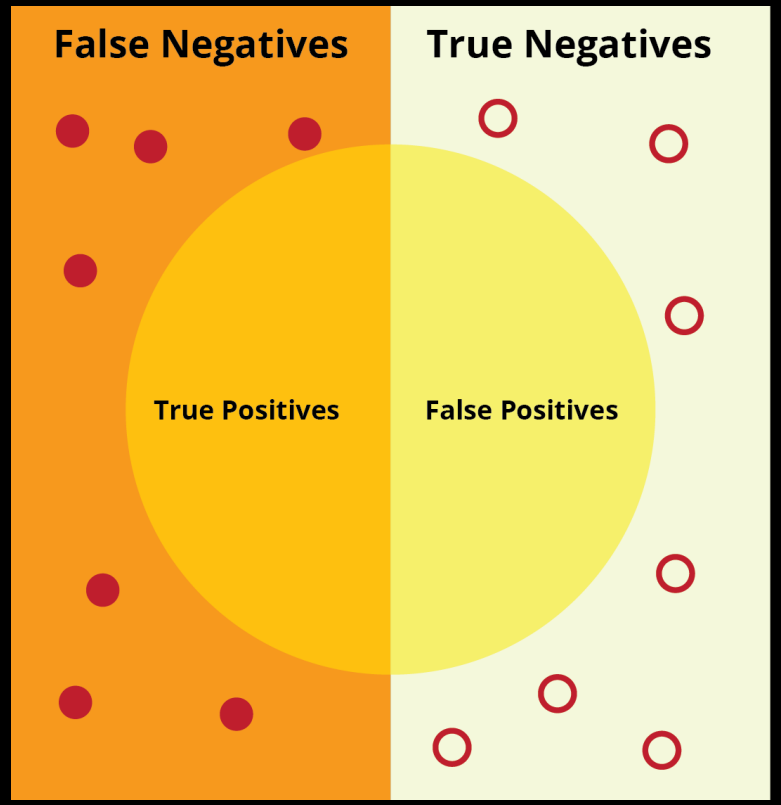
Precision vs Recall



How many selected items are relevant?

$$\text{Precision} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Positives}}$$

How many relevant items are selected?

$$\text{Recall} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Negatives}}$$

Mean Squared Error

- Very sensitive to outliers.
- Better alternative is mean squared error.

$$MSE = \frac{1}{n}\Sigma\underbrace{\left(y - \hat{y}\right)}^{2}$$

The square of the difference between actual and predicted

Cross Entropy (Log Loss)

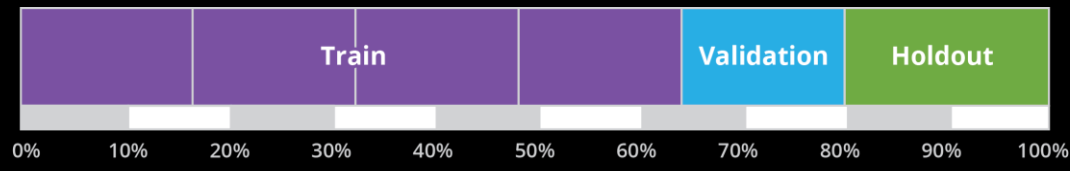
$$H_p(q) = -\frac{1}{N}\sum_{i=1}^{N} y_i \cdot log(p(y_i)) + (1 - y_i) \cdot log(1 - p(y_i))$$

Binary Cross-Entropy / Log Loss

Cross Validation

Iteration 1	Test	Train	Train	Train	Train
Iteration 2	Train	Test	Train	Train	Train
Iteration 3	Train	Train	Test	Train	Train
Iteration 4	Train	Train	Train	Test	Train
Iteration 5	Train	Train	Train	Train	Test

Holdout Testing



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