Data Mining, CSCI 347, Fall 2019
Evaluation – Counting Costs, Nov. 13

Recall from the section on rules:

> Coverage (support) of a rule – number of instances rule predicts correctly (sometimes given as a fraction of the total number of instances)
>
> Accuracy (confidence) of a rule – number of instances the rule predicts correctly divided by the number of instance to which the rule applies, p/t

Confusion matrix – a table used to describe the performance of a classifier on a set of test data for which the true values are known.

Confusion matrix for a binary classifier:

		Predicted	
		Yes	**No**
Actual	**Positive**	TP	FN
	Negative	FP	TN

Kappa statistic– relative improvement of our model over a random predictor

A value greater than 0 means that your classifier is doing better than chance.

Kappa statistic $\dfrac{D_{observed} - D_{random}}{D_{perfect} - D_{random}}$

Where D is the summation of the diagonal of the given confusion matrix.

Lift score – measure of the performance a model provides when compared against a random guess

Lift charts – shows the changes in lift scores

x axis - % sampled

y axis – number responding

F1 score (also called the F score or the F Measure) - usually more useful than accuracy, especially with an uneven class distribution. It conveys the balance between the precision and the recall.

Precision/recall

precision – when a positive value is predicted, how often is the prediction correct?

$$\frac{\text{true-positive}}{\text{true-positive + false-positive}}$$

In the medical world this is called the test specificity.
When the test predicts the person has the disease, how often is it true?

recall – when the actual value is positive, how often is the prediction correct?

$$\frac{\text{true-positive}}{\text{true-positive + false-negative}}$$

In the medical world this is called the test sensitivity.

F1 score – weighted average of the "precision" and "recall" so takes both false positives and false negatives into account.

$$\frac{2 * \text{precision} * \text{recall}}{\text{precision + recall}}$$