

Notes

Arthur Lui

10 March 2014

1 Sensitivity

$$\frac{\text{Number of true positives}}{\text{Number of true positives} + \text{Number of false positives}}$$

2 Specificity

$$\frac{\# \text{ of true -ve}}{\# \text{ of true -ve} + \# \text{ of false +ve}}$$

3 1 - Specificity

$$\frac{\# \text{ of false +ve}}{\# \text{ of true -ve} + \# \text{ of false +ve}}$$

4 ROC Curve

Plot Sensitivity vs. 1-Specificity

Higher Area Under the Curve (AUC) greater is better

Curve should be above x=y. Otherwise, better to flip a coin.

AUC = Probability that a classifier will rank a randomly chosen positive instance higher than a randomly chosen negative one.

low cutoff \Rightarrow lots of false +ve and few false -ve

high cutoff \Rightarrow lots of false -ve and few false +ve

5 Time-dependent ROC Curves

Classify subjects

Classify based on the risk score

Vary threshold C

Base Sensitivity/Specificity on whether subject has actually experienced event by time T

$D(t) = 1$ if subject has experienced event

$D(t) = 0$ otherwise.

Specificity = $P[X > c | D(t) = 1]$

Sensitivity = $P[X \leq c | D(t) = 0]$

X = risk score = $e^{x'\beta}$

Time-varying component: calculate AUC at all t

Look for:
One AUC curve higher than another to select models.