Introduction to ROC Curve

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February 23, 2016

Data and A Binary Classifier

Subject	Disease	Predicted probability
1	0	0.513
2	1	0.921
3	1	0.203
4	1	0.840
5	0	0.143
⋮	⋮	⋮
459	1	0.397

$\Rightarrow$

	Disease present	Disease absent
Test positive	207	42
Test negative	88	122

- True positive rate (TPR) = TP / (TP + FN)
- False positive rate (FPR) = FP / (FP + TN)

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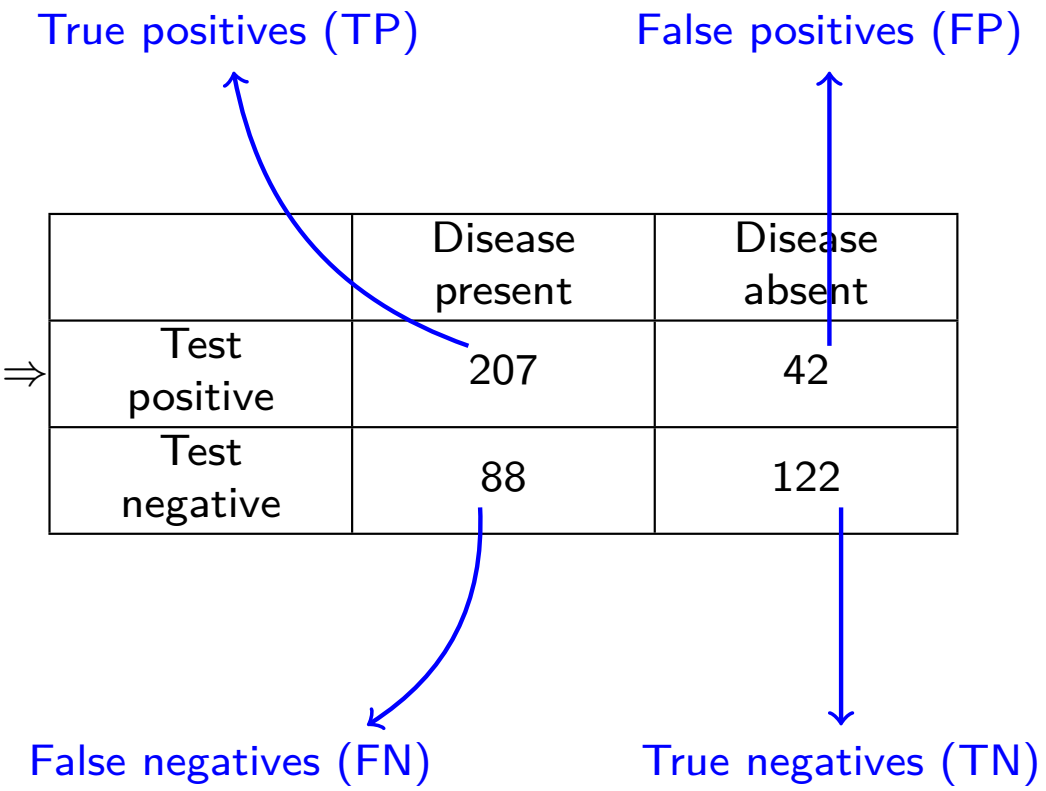

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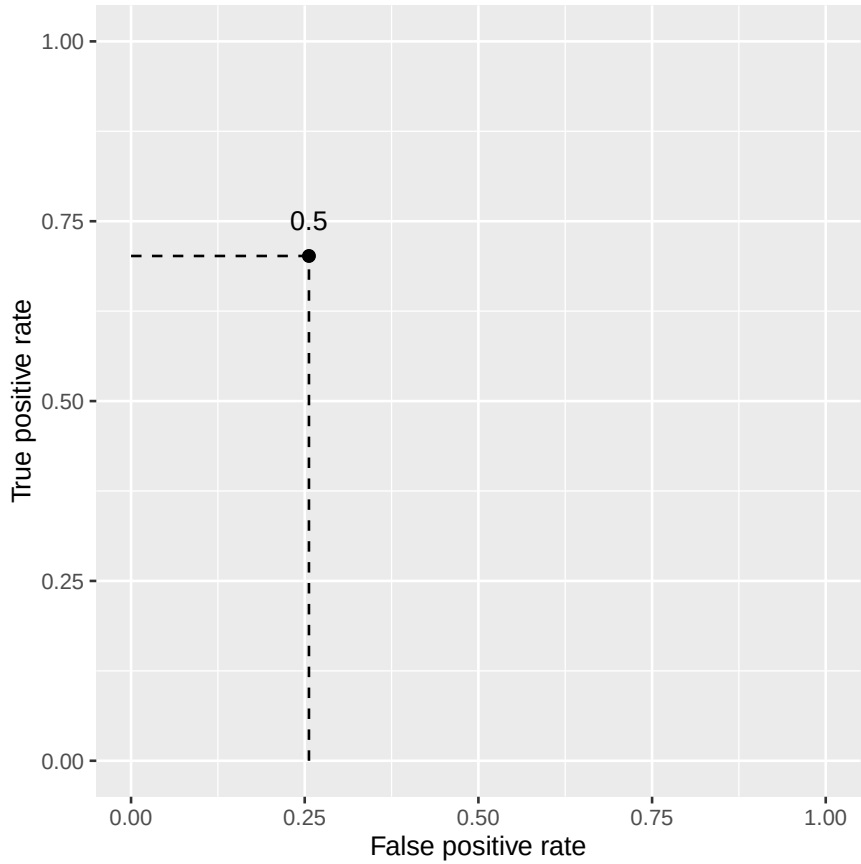
True positive rate and False positive rate

Cutpoint	TPR	FPR
0.3	0.831	0.433
0.5	0.702	0.256
0.8	0.325	0.067

$\Rightarrow$



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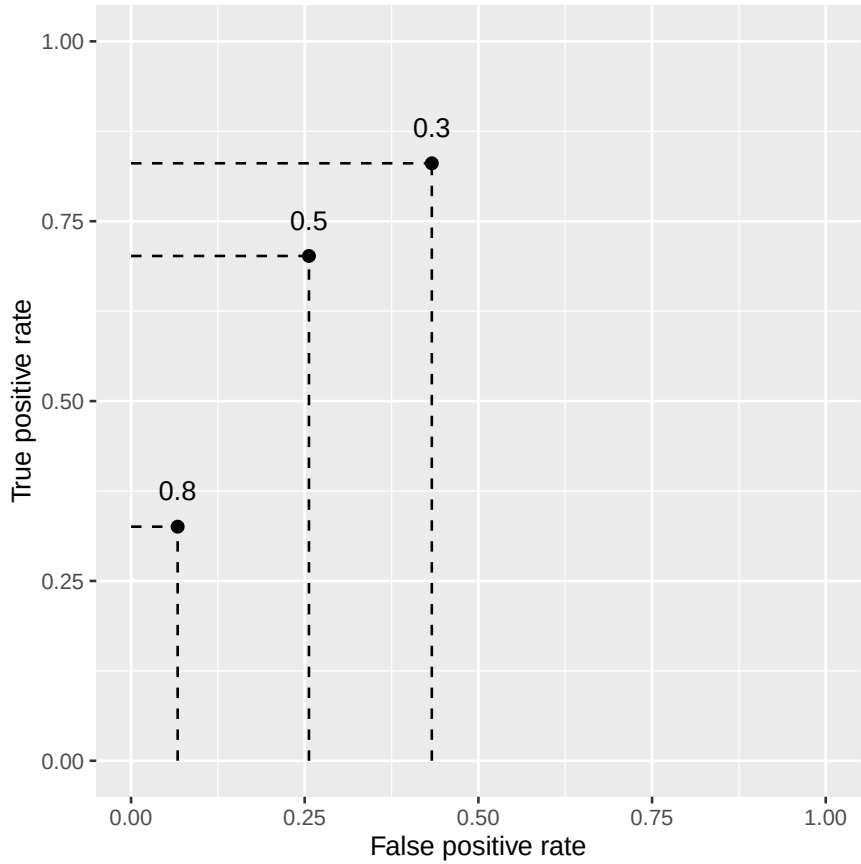
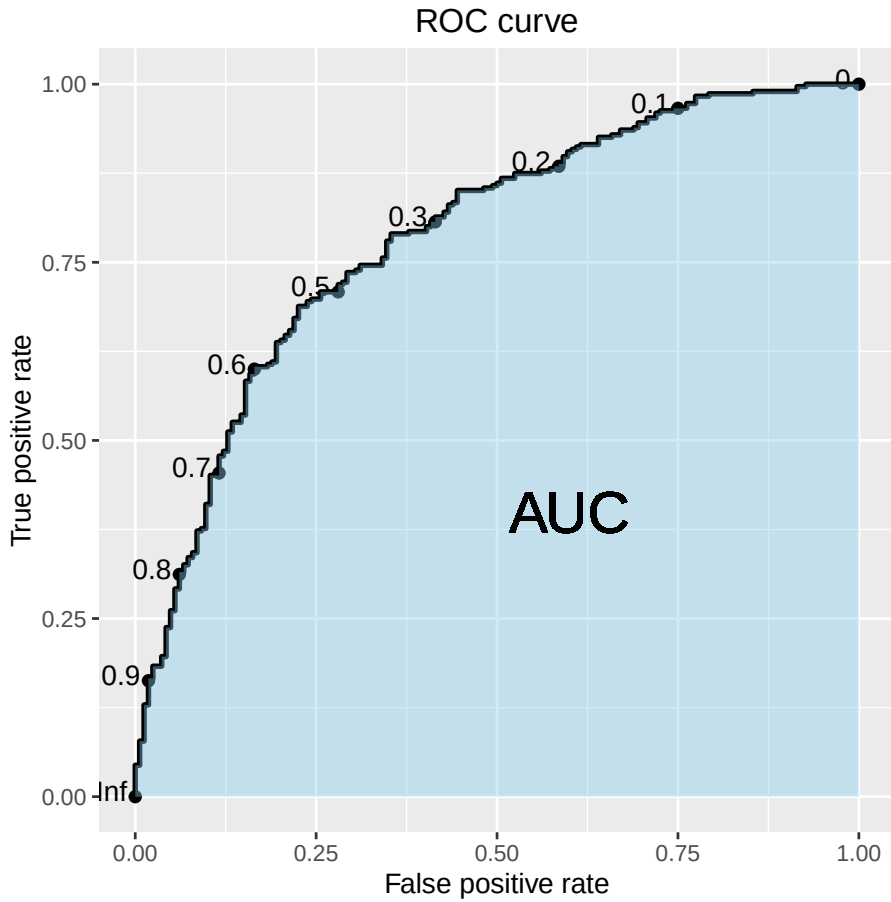


Receiver Operating Characteristic (ROC) Curve



The area under the curve (AUC) is the probability that the model correctly classifies the two subjects in a randomly drawn pair.

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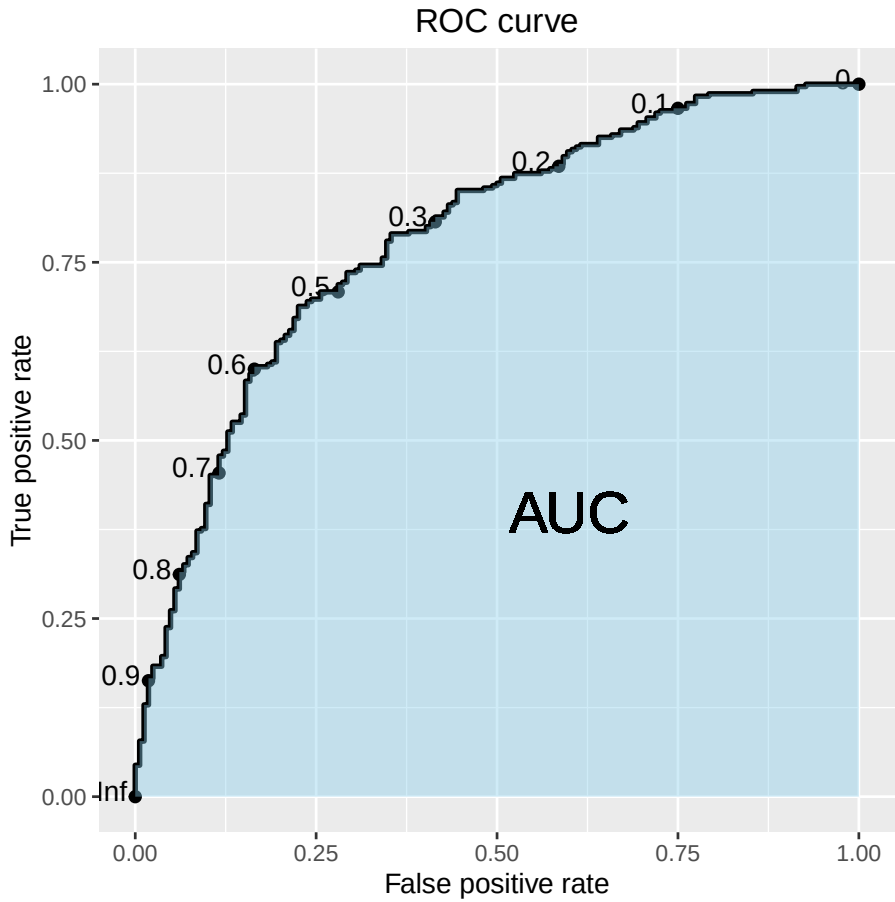

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Receiver Operating Characteristic (ROC) Curve

The higher the AUC, the higher accuracy of the model.
Which model is better, Model 1 or Model 2?