Why do Nigerian Scammers Say They are from Nigeria?

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Outline
- ROC curves
- Detection results
- ROC curve intro
- Error rates: ROC curve

Detection results
- True positive: detector says yes, reality is yes
- True negative: detector says no, reality is no
- False positive: detector says yes, reality is no
- False negative: detector says no, reality is yes
- Note: terminology may flip based on detecting good or bad

Why a trade-off?
- Imperfect methods have a trade-off between avoiding FPs and avoiding FNs
- Sometimes a continuous trade-off (curve), e.g. based on a threshold
  - E.g., spam detector “score”
  - May need to choose both a basic mechanism and a threshold

Two ratios to capture the trade-off
- True positive rate:
  \[ \text{TPR} = \frac{TP}{P} = \frac{TP}{TP + FN} = 1 - \text{FNR} \]
- False positive rate:
  \[ \text{FPR} = \frac{FP}{N} = \frac{FP}{FP + TN} = 1 - \text{TNR} \]

ROC curve intro
- Error rates: ROC curve
- COVID test ROC curve

Source: https://commons.wikimedia.org/wiki/File:ROC_curves.png CC-BY-SA 3.0 "Sharpe"