Deep Learning

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November 25, 2020

Outline

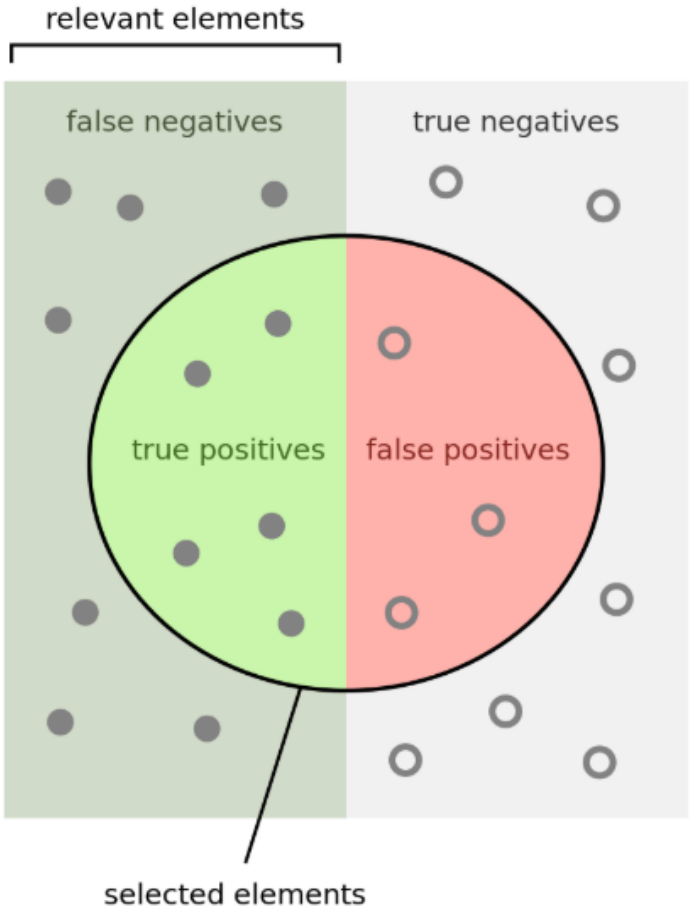
Accuracy

Definition 1

Accuracy in classification problems is the percent of correct predictions made by the model over all kinds predictions made:

$$Accuracy = \frac{Number\ of\ correct\ predictions}{Total\ numbers\ of\ predictions\ made}$$

Precision and Recall



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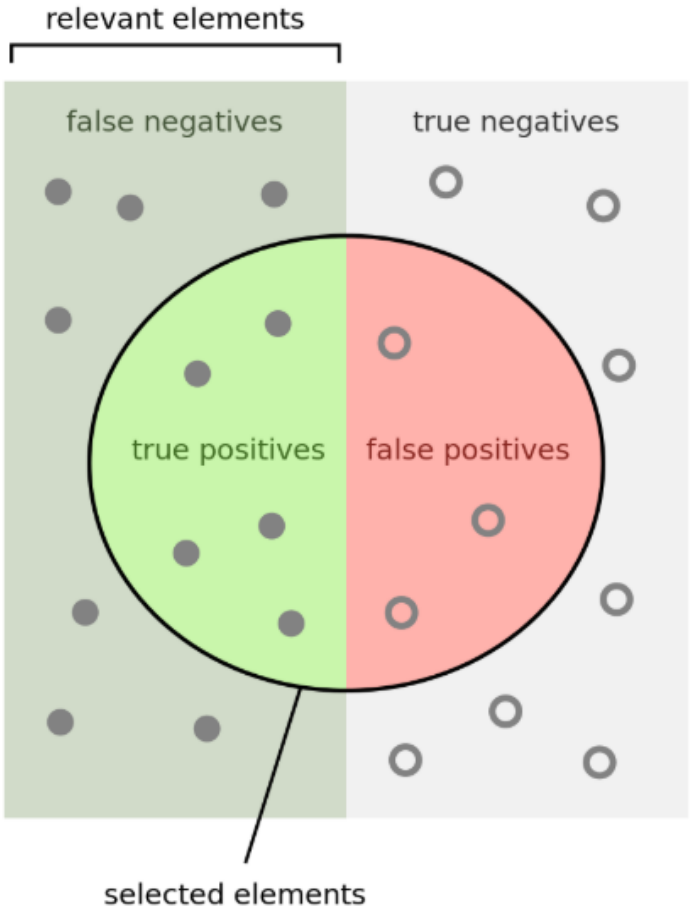

How many selected items are relevant?

$$\text{Precision} = \frac{\text{true positives}}{\text{selected elements}}$$

How many relevant items are selected?

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F1 Score

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Why don't to use arithmetic mean instead of harmonic mean?
Answer: If $Precision = 0.1$ and $Recall = 0.95$, then their mean is equal to 0.525 and $F1 \approx 0.18$.

ROC Curve

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- The diagnostic performance of a test or the accuracy of a test to discriminate diseased cases from normal cases is evaluated using ROC curve analysis.
- A ROC curve is a way to compare diagnostic tests. It is a plot of true positive rate against the false positive rate:

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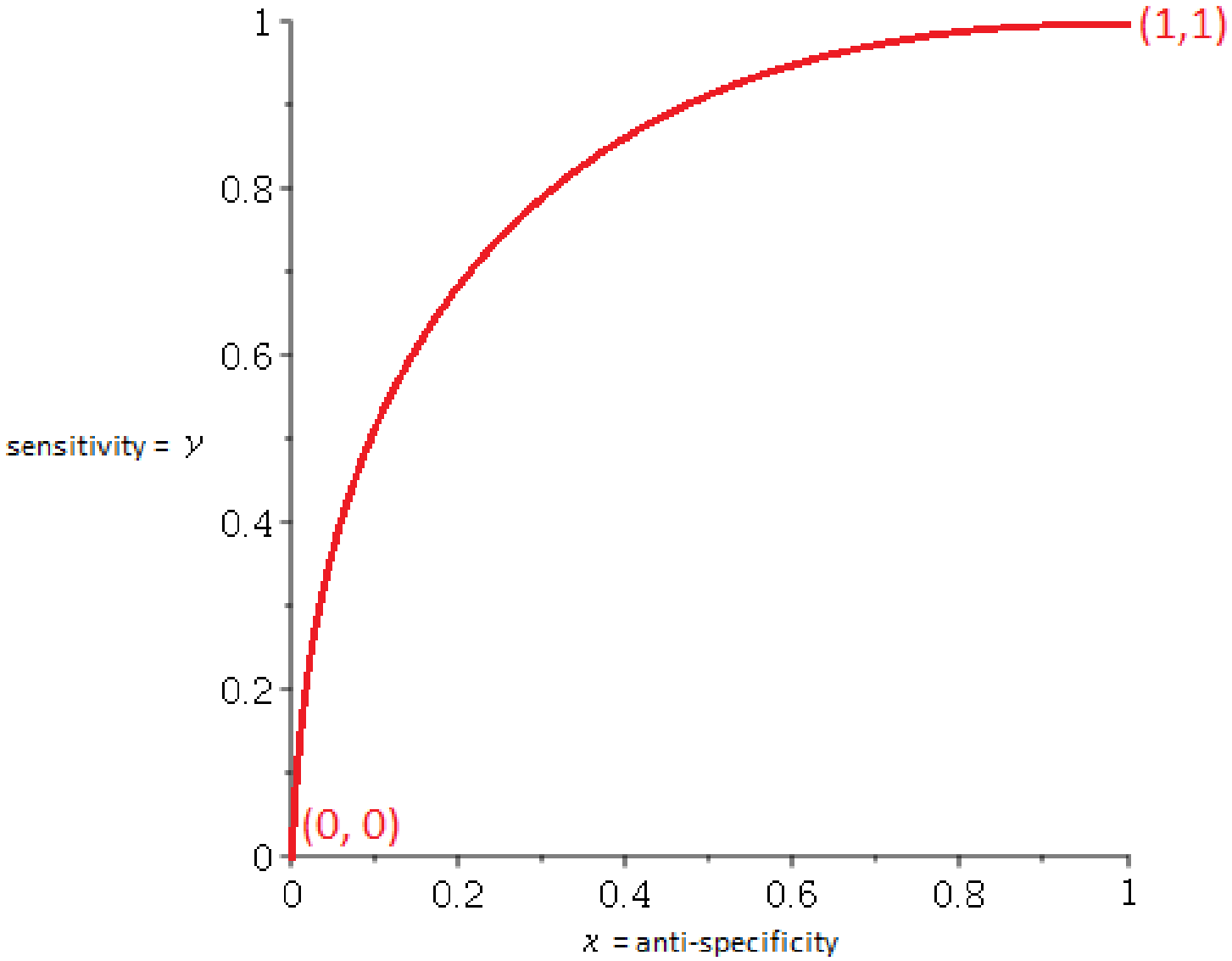
1
0.8
0.6
0.4
0.2
0
sensitivity = y
(1,1)
(0, 0)
0
0.2
0.4
0.6
0.8
1
x = anti-specificity

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- What if $AUC \approx 1$?
- How to choose threshold?
- How to use ROC curve for multi-class model?

Balanced Cross Entropy

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$$L(w) = \frac{1}{n} \sum_{i=1}^{n} \left(-(\alpha * y_i)^T \log f_w(x_i) \right).$$

Where $\alpha^T = [\alpha_1, \ldots, \alpha_k]$, $\alpha_i \in (0,1)$ and $\sum_{i=1}^{k} \alpha_i = 1$.