An Introduction to Text Classification

Exercises

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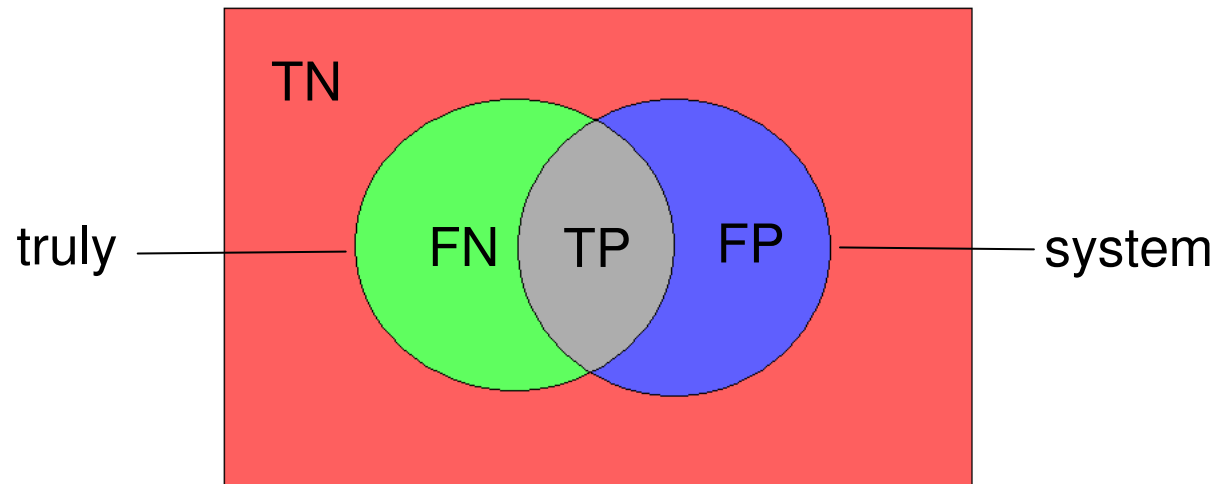# Classification Evaluation

- Possible results of a binary classification

	truly YES	truly NO
system YES	true positives	false positives
system NO	false negatives	true negatives

truly — TN, FN, TP, FP — system

Evaluation Measures

- ## Precision
  - ➤ percentage of documents correctly identified as belonging to the category

$$precision \ = \ \frac{true\ positives}{true\ positives\ +\ false\ positives}$$

- ## Recall
  - ➤ percentage of documents found belonging to the category

$$recall \ = \ \frac{true\ positives}{true\ positives\ +\ false\ negatives}$$

Evaluation Measures

- F-Measure combines both precision and recall in one value

$$F_\beta = \frac{(\beta^2 + 1) \times precision \times recall}{\beta^2 \times precision + recall}$$

  - ➢ β allows different weighting of precision and recall
  - ➢ for equal weighting: β = 1
  - ➢ Precision twice as important as Recall: β = 0.5
  - ➢ Recall twice as important as Precision: β = 2

Exercise 1
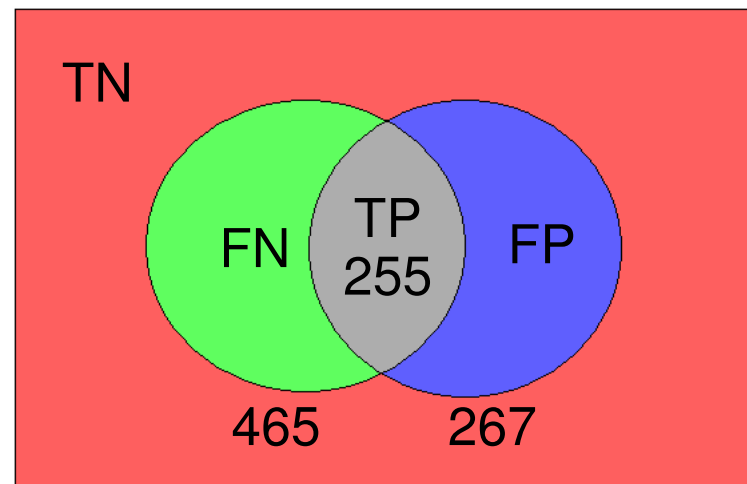
- True Positives: 322
- False Positives: 386 − 322 = 64
- False Negatives: 465 − 322 = 143
- Precision: 322/(322 + 64) = 0.83
- Recall: 322/(322 + 143) = 0.69
- F1-Measure: (2 x 0.83 x 0.69)/(0.83 + 0.69) = 0.75
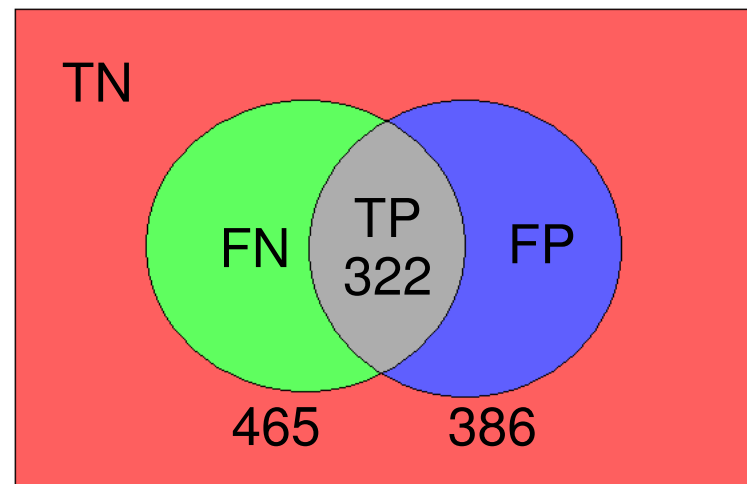
Exercise 2

- True Positives: 255
- False Positives: 267 − 255 = 12
- False Negatives: 465 − 255 = 210
- Precision: 255/(255 + 12) = 0.96
- Recall: 255/(255 + 210) = 0.55
- F1-Measure: (2 x 0.96 x 0.55)/(0.96 + 0.55) = 0.70

Exercise 3

- F1-Measure Ex.1:

  $(2 \times 0.83 \times 0.69)/(0.83 + 0.69) = 0.75$

- F0.5-Measure Ex.1:

  $(1.25 \times 0.83 \times 0.69)/(0.25 \times 0.83 + 0.69) = 0.80$

- F1-Measure Ex.2:

  $(2 \times 0.96 \times 0.55)/(0.96 + 0.55) = 0.70$

- F0.5-Measure Ex.2:

- $(1.25 \times 0.96 \times 0.55)/(0.25 \times 0.96 + 0.55) = 0.83$