TD 06 – Correction

Evaluation of Information Retrieval Systems

Exercise 01

Given:

- Retrieved = 10
- Relevant Retrieved = 6
- Total Relevant = 15

$$Precision = \frac{6}{10} = 0.6$$

$$Recall = \frac{6}{15} = 0.4$$

Exercise 02

$$F1 = \frac{2 \times 0.6 \times 0.4}{0.6 + 0.4} = \frac{0.48}{1.0} = 0.48$$

Exercise 03

Relevant sequence: {1,0,1,1,0,1,0,1}

$$P@1 = \frac{1}{1} = 1.0$$

$$P@3 = \frac{2}{3} \approx 0.67$$

$$P@5 = \frac{3}{5} = 0.6$$

$$Recall@5 = \frac{3}{6} = 0.5$$

Exercise 04

Relevant positions: 1, 3, 4, 6, 8

$$P@1 = 1/1 = 1.0$$
$$P@3 = 2/3 \approx 0.67$$
$$P@4 = 3/4 = 0.75$$
$$P@6 = 4/6 \approx 0.67$$
$$P@8 = 5/8 = 0.625$$

$$AP = \frac{1 + 0.67 + 0.75 + 0.67 + 0.625}{6} \approx \frac{3.715}{6} \approx 0.62$$

Exercise 05

$$MAP = \frac{0.75 + 0.60}{2} = 0.675$$

Exercise 06

The Precision-Recall curve is decreasing.

Interpretation:

- High precision at low recall
- Precision decreases as recall increases
- Typical behavior of IR systems

Exercise 07

Comparison

- System A: better precision (0.8)
- System B: better recall (0.9)

F1 Scores

$$F1_A = \frac{2 \times 0.8 \times 0.5}{0.8 + 0.5} = \frac{0.8}{1.3} \approx 0.615$$

$$F1_B = \frac{2 \times 0.6 \times 0.9}{0.6 + 0.9} = \frac{1.08}{1.5} = 0.72$$

Conclusion: System B is better overall (higher F1).

Exercise 08

- Precision is important in web search because users focus on top results.
- Recall is important in medical systems to avoid missing relevant information.
- Limitation: Precision and Recall do not consider ranking quality.

End of Correction