

Mid Term Examination
CSE 571
Information Retrieval

Q1. Let us assume you have two different information retrieval systems. The first system has a Mean Average Precision score of 0.5 and the second system has a Mean Average Precision Score of 0.55. Can we draw a conclusion that the second system is better than first system? Also explain the reasoning behind your answer. (5)

Q2. Given a query 'q', the IR system A returns following document ids= {d11, d12, d13, d14, d15, d16, d17}. For the same query 'a', the IR system B returns the following document ids = {d41, d32, d13, d16, d25}.

We ask a user to assign scores to relevant documents: 1 as excellent match, 2 very good match, 3 as good match, 4 as fair match, and 0 as non relevant.

The following scores are assigned to the documents:

Doc Id	Relevance Score	Doc id	Relevance Score	Doc Id	Relevance Score
d11	1	d22	0	d33	0
d12	0	d23	0	d34	0
d13	4	d24	0	d35	0
d14	0	d25	0	d36	0
d15	0	d26	0	d37	0
d16	2	d27	0	d38	0
d17	0	d28	0	d39	0
d18	0	d29	0	d40	0
d19	3	d30	0	d41	2
d20	0	d31	0	d42	0
d21	1	d32	0	d43	0

Calculate Average Precision, [P@5](#), and NDCG for both systems? (10)

Q3. Consider three documents

d1 : "A B C"

d2: "A B D"

d3: "E F C"

and query, q = "A A C"

calculate $\text{cos-sim}(d1, q)$, $\text{cos-sim}(d2, q)$, and $\text{cos-sim}(d3, q)$? (10)

Q4. Consider a user query, $q = \text{"A B A C D A B"}$.

The SE returns two documents

D1 = "B E A B"

D2 = "A F C"

What would be the new query if

- a) user finds D1 as relevant and D2 as irrelevant
- b) user finds D2 irrelevant and D1 as relevant
- c) user finds both documents as relevant
- d) user finds both documents as irrelevant

Traditionally, the feedback in relevance feedback is given as "Relevant" and "non-Relevant", i.e., the feedback is binary. Explain how you can extend the system to account for three levels of feedback "Relevant", "Neutral & Non-Relevant"? *For extra credit: Provide the extensions where relevance is provided at N levels.* (5 + 10) + 10 extra credit

Q5. Study popular search engines and identify three features which you would like to improve or add to the platform. For one of the identified feature, provide an outline of algorithm or approach. *For extra credit: Provide code for one of the extensions. You can use any publically available APIs.* (5+10) + 10 extra credit