HomeWork-1 Report Template

Score of Top Relevant File of a Sample Query for each Retrieval Model

Model	Score
ES (built-in)	16.208858
Okapi TF	2.166921556244696
TF-IDF	6.498238341838686
Okapi BM-25	149.7713335926415
Unigram LM with Laplace smoothing	-29.65959987198159
Unigram LM with Jelinek-Mercer smoothing	-9.628089864841813

Inference on the above results

The score of the top document for query #56 differed for each retrieval model because they were different ways of calculating the relevance for each query. The okapi tf and tf idf results are on the lower end because the formulas were pretty similar in that they both “used” okapi tf. Almost all the retrieval models use term frequency and log. The language models have lower scores since they use log and low numbers, which results in negative numbers.

Retrieval Model Performance -

[Highlight the scores more than 0.28]

Model	Average Precision	Precision at 10	Precision at 30
ES (built-in)	0.3288	0.4720	0.3920
Okapi TF	0.2724	0.4320	0.3480
TF-IDF	0.3098	0.4480	0.3680
Okapi BM-25	0.1711	0.3600	0.2613
Unigram LM with Laplace smoothing	0.2678	0.4320	0.3320
Unigram LM with Jelinek-Mercer smoothing	0.2356	0.3440	0.2880

Inference on above retrieval model results

I got the above retrieval model results from experimentation with the queries. After parsing, stemming, and removing stop words from each of the queries and documents, I looked at the query term and doc frequencies to decide which words to keep. Some terms might've been more valuable to have for some models but not for others. Depending on the query terms I chose to keep or delete, the retrieval model scores differed.

Pseudo-relevance Feedback Improvements[ONLY MS STUDENTS]

[The highlighted scores that indicate an improvement in the average precision score of the model]

1. Result after adding the top 5 distinctive terms to each query.

Model	Average Precision	Precision at 10	Precision at 30
ES (built-in)			
Okapi TF			
TF-IDF			
Okapi BM-25			
Unigram LM with Laplace smoothing			
Unigram LM with Jelinek-Mercer smoothing			

2. Results after adding top 5 significant terms from Elasticsearch aggs to each query.

Model	Average Precision	Precision at 10	Precision at 30
ES (built-in)			
Okapi TF			
TF-IDF			
Okapi BM-25			
Unigram LM with Laplace smoothing			
Unigram LM with Jelinek-Mercer smoothing			

Inference on the above pseudo-relevance results

Table showing the Query used for Evaluation

Query number	93	58	57	56	54
Original Query	identify supporters of the National Rifle Association (NRA), or its assets.	predict or anticipate a rail strike or report an ongoing rail strike.	how MCI has been doing since the Bell System breakup.	a prediction about the prime lending rate, or will report an actual prime rate move.	the signing of a contract or preliminary agreement, or the making of a tentative reservation, to launch a commercial satellite.
Processed Query	National Rifle Association (NRA)	rail strike	MCI Bell	prime lending rate	contract or preliminary agreement, reservation, to launch a commercial satellite.
Processed Query - Pseudo RF **(Only MS students)**					