Assignment 2 Solutions

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Task 4

Comparing retrieval algorithms using evaluation metrics

Short query

Evaluation metric	Your algorithm: EasySearch	Vector Space Model	BM25	Language Model with Dirichlet Smoothing	Language Model with Jelinek Mercer Smoothing
P@5	0.0000	0.6000	0.6000	0.8000	0.6000
P@10	0.0000	0.6000	0.5000	0.6000	0.5000
P@20	0.0000	0.4000	0.3000	0.3500	0.3000
P@100	0.0000	0.0900	0.1000	0.1000	0.1000
Recall@5	0.0000	0.0968	0.0968	0.1290	0.0968
Recall@10	0.0000	0.1935	0.1613	0.1935	0.1613
Recall@20	0.0000	0.2581	0.1935	0.2258	0.1935
Recall@100	0.0000	0.2903	0.3226	0.3226	0.3226
MAP	0.0000	0.2124	0.2032	0.2345	0.1807
MRR	0.0000	1.0000	1.0000	1.0000	1.0000
NDCG@5	0.0000	0.6844	0.7227	0.8688	0.6844
NDCG@10	0.0000	0.6621	0.6208	0.7084	0.5959
NDCG@20	0.0000	0.4992	0.4361	0.4945	0.4209
NDCG@100	0.0000	0.3974	0.4102	0.4352	0.3968

Long query

Evaluation metric	Your algorithm: EasySearch	Vector Space Model	BM25	Language Model with Dirichlet Smoothing	Language Model with Jelinek Mercer Smoothing
P@5	0.0000	0.6000	0.6000	0.0000	0.4000
P@10	0.0000	0.5000	0.4000	0.2000	0.3000
P@20	0.0000	0.3000	0.3000	0.2500	0.3000
P@100	0.0000	0.1200	0.1000	0.1000	0.1100
Recall@5	0.0000	0.0968	0.0968	0.0000	0.0645
Recall@10	0.0000	0.1613	0.1290	0.0645	0.0968
Recall@20	0.0000	0.1935	0.1935	0.1613	0.1935
Recall@100	0.0000	0.3871	0.3226	0.3226	0.3548

MAP	0.0000	0.1403	0.2522	0.0796	0.1068
MRR	0.0000	0.3333	0.5000	0.1667	0.3333
NDCG@5	0.0000	0.4469	0.5148	0.0000	0.3156
NDCG@10	0.0000	0.4346	0.3977	0.1478	0.2832
NDCG@20	0.0000	0.3128	0.3291	0.2046	0.2899
NDCG@100	0.0000	0.3481	0.3230	0.2522	0.3081

Summary:

It is clear from initial observation that the custom implementation of retrieving documents using the sum of Tf-Idf of individual terms is not adequate as it considers each terms occurrence separately instead of a group. Language Model with Dirichlet Smoothing has the best performance across all the factors while considering both short and long queries. In general, retrieval using a shorter query has better performance across all the retrieval algorithms than using a longer query.