**Assignment 2**

**Task 4:**

**Short Query**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Evaluation metric | Your algorithm | Vector Space Model | BM25 | Language Model with Dirichlet Smoothing | Language Model with Jelinek Mercer Smoothing |
| P@5 | 0.08 | 0.292 | 0.3 | 0.344 | 0.28 |
| P@10 | 0.094 | 0.298 | 0.296 | 0.324 | 0.278 |
| P@20 | 0.082 | 0.258 | 0.267 | 0.286 | 0.242 |
| P@100 | 0.0596 | 0.1636 | 0.1668 | 0.1682 | 0.1594 |
| Recall@5 | 0.0141 | 0.0529 | 0.0468 | 0.061 | 0.0514 |
| Recall@10 | 0.0382 | 0.094 | 0.0859 | 0.0985 | 0.0901 |
| Recall@20 | 0.0569 | 0.1396 | 0.1338 | 0.1437 | 0.1292 |
| Recall@100 | 0.1516 | 0.3518 | 0.3522 | 0.3428 | 0.328 |
| MAP | 0.0595 | 0.1943 | 0.1971 | 0.2039 | 0.1908 |
| MRR | 0.1558 | 0.4596 | 0.4672 | 0.4785 | 0.4637 |
| NDCG@5 | 0.0798 | 0.3043 | 0.3149 | 0.3486 | 0.2994 |
| NDCG@10 | 0.0931 | 0.3121 | 0.3136 | 0.34 | 0.298 |
| NDCG@20 | 0.0932 | 0.3003 | 0.3068 | 0.3299 | 0.2867 |
| NDCG@100 | 0.1191 | 0.3153 | 0.3199 | 0.328 | 0.3085 |

**Long Query:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Evaluation metric | Your algorithm | Vector Space Model | BM25 | Language Model with Dirichlet Smoothing | Language Model with Jelinek Mercer Smoothing |
| P@5 | 0.04 | 0.224 | 0.244 | 0.248 | 0.2 |
| P@10 | 0.022 | 0.216 | 0.22 | 0.224 | 0.192 |
| P@20 | 0.023 | 0.189 | 0.205 | 0.205 | 0.18 |
| P@100 | 0.0208 | 0.1278 | 0.1374 | 0.1384 | 0.1226 |
| Recall@5 | 0.0111 | 0.0204 | 0.0298 | 0.0367 | 0.0294 |
| Recall@10 | 0.0113 | 0.0447 | 0.0539 | 0.0563 | 0.0528 |
| Recall@20 | 0.0179 | 0.0769 | 0.0908 | 0.0991 | 0.0858 |
| Recall@100 | 0.0439 | 0.2554 | 0.2848 | 0.3038 | 0.2434 |
| MAP | 0.0102 | 0.1245 | 0.1387 | 0.1341 | 0.1215 |
| MRR | 0.0921 | 0.3579 | 0.3651 | 0.2896 | 0.3124 |
| NDCG@5 | 0.0362 | 0.2388 | 0.2514 | 0.2294 | 0.2009 |
| NDCG@10 | 0.0258 | 0.2288 | 0.2336 | 0.2212 | 0.1996 |
| NDCG@20 | 0.028 | 0.2112 | 0.2271 | 0.2194 | 0.1992 |
| NDCG@100 | 0.0386 | 0.2269 | 0.245 | 0.243 | 0.2166 |

From the results we can see that only tf-idf implementation (My algorithm) does not fare well. For short as well as long queries, Language model with dirichlet smoothing seems to work the best. BM25 and vector space model have almost similar performance measures with BM25 faring a little better.