NTCIR-16

OVERVIEW OF THE NTCIR-16 SESSION SEARCH (SS) TASK

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Introduction

Multi-query sessions/tasks are common in search process nowadays.

- Considering the **contextual information** within sessions has been proved efficient for user intent modeling in IR communities.
- Existing tasks in NTCIR have not involved **session-based retrieval** yet.

Existing relevant tasks

- TREC Session Track 2011-2014: small-scale datasets, simulated search tasks, only evaluate the last query;
- TREC Dynamic Domain (DD) Track 2015-2017: user simulators, ignore user reformulations.

==> NTCIR-16 Session Search Task

Introduction

To better assess the search effectiveness at both query-level and session-level, we aim to set up two subtasks as follows:

***Fully Observed Session Search (FOSS)*:**

- For a k-length session, we provide full session contexts in the first $(k-1)$ queries.
- NDCG, AP, RBP

Partially Observed Session Search (POSS):

- In this subtask, we truncate all sessions before the last query. For a session with k queries $(k \geq 2)$, we only reserve the session contexts in the first n queries, where $1 \leq n \leq k-1$.
- RS-DCG, RS-RBP

Schedule

Table 1: NTCIR-16 SS timeline (time zone: AOE).

Session Dataset Release	Aug 15, 2021
Formal Run	Oct 1 - Dec 31, 2021
Preliminary Evaluation	Dec, 2021
Relevance Assessment	Feb, 2022
Evaluation Results Release	Mar, 2022

Participation

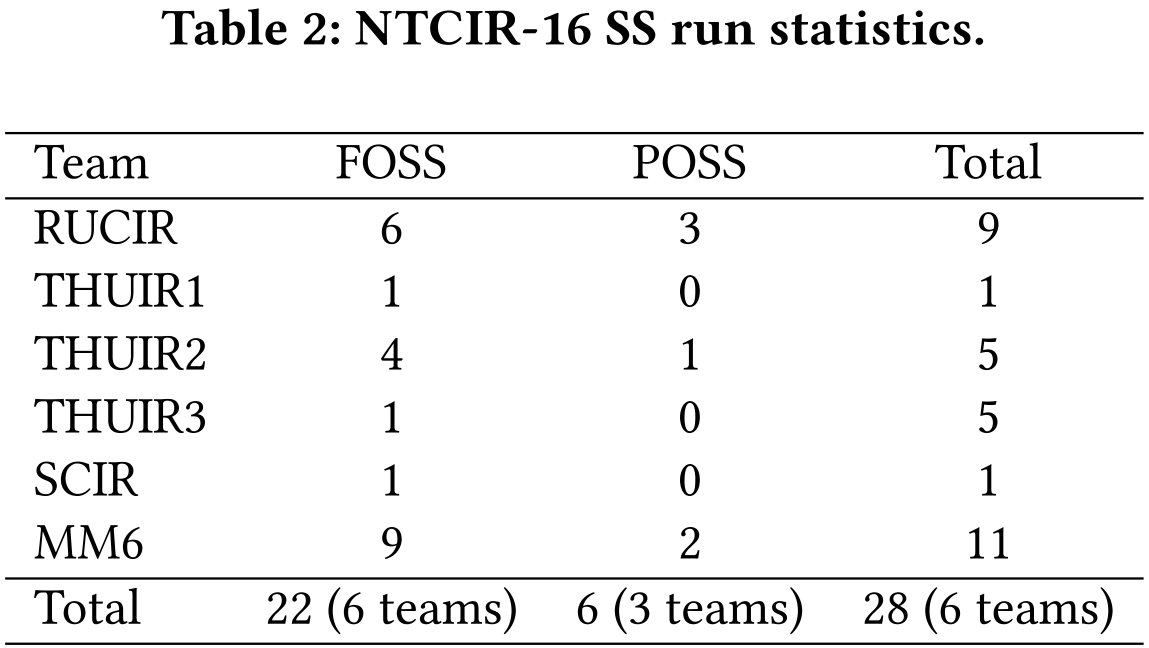


Table 2: NTCIR-16 SS run statistics.

Team	FOSS	POSS	Total
RUCIR	6	3	9
THUIR1	1	0	1
THUIR2	4	1	5
THUIR3	1	0	5
SCIR	1	0	1
MM6	9	2	11
Total	22 (6 teams)	6 (3 teams)	28 (6 teams)

Dataset & Resources

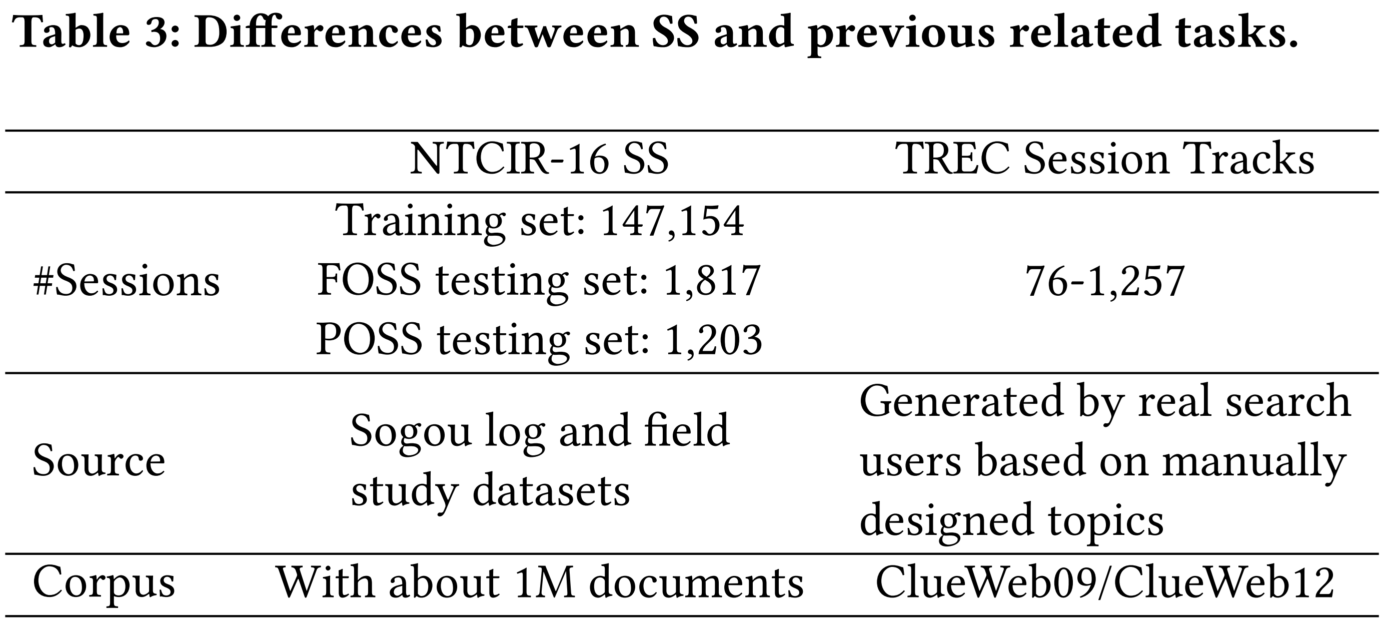
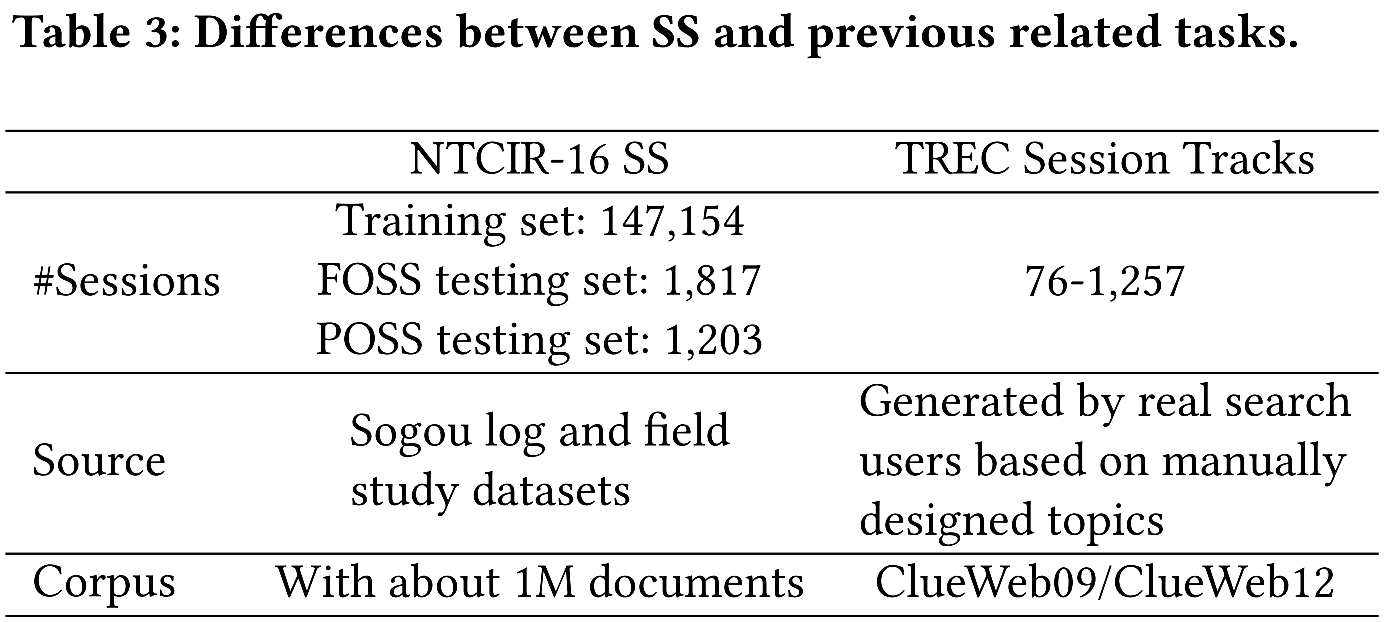


Table 3: Differences between SS and previous related tasks.

	NTCIR-16 SS	TREC Session Tracks
#Sessions	Training set: 147,154 FOSS testing set: 1,817 POSS testing set: 1,203	76-1,257
Source	Sogou log and field study datasets	Generated by real search users based on manually designed topics
Corpus	With about 1M documents	ClueWeb09/ClueWeb12

Dataset & Resources



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Dataset & Resources

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SessionID       87
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画杨桃    q198     1427848224.93
1       http://www.lbx777.com/yw06/x_hyt/kewen.htm      d1882   404     0       -1
2       http://pic.sogou.com/pics?query=%BB%AD%D1%EE%CC%D2&p=40230500&st=255&mode=255   d1883   <unk>   0       -1
3       http://tv.sogou.com/v?query=%BB%AD%D1%EE%CC%D2&p=40230600&tn=0&st=255   d1884   画杨桃-搜索页      0       -1
4       http://baike.sogou.com/v8080089.htm     d1885   画杨桃    0       -1
5       http://www.lspjy.com/thread-112497-1-1.html     d1886   人教版小学三年级下册语文《画杨桃》教学设计优质课教案      0       -1
6       http://weixin.qq.com/   d5      微信，是一个生活方式       0       -1
7       http://wenku.baidu.com/view/fa4903205901020207409c89.html       d1887   【图文】画杨桃_百度文库      0       -1
8       http://www.21cnjy.com/2/8135/   d1888   画杨桃课件_      0       -1
9       http://wenwen.sogou.com/s/?sp=S%E7%94%BB%E6%9D%A8%E6%A1%83      d1889   搜狗搜索  0       -1
10      http://www.aoshu.com/e/20090604/4b8bcabd28495.shtml     d1890   画杨桃_三年级语文下册课件_奥数网      0       -1
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画杨桃ppt课件      q199    1427848230.2
1       http://wenku.baidu.com/view/bfe0c8edf8c75fbfc67db205.html       d1894   【图文】画杨桃ppt课件精品_百度文库      1       1427848232.105
2       http://www.1ppt.com/kejian/8846.html    d1895   《画杨桃》PPT课件  0       -1
3       http://www.1ppt.com/kejian/8851.html    d1896   《画杨桃》PPT课件6        0       -1
4       http://www.xiexingcun.com/xy6/HTML/53403.html   d1897   《画杨桃》公开课ppt课件（24页）-免费高速下载    0       -1
5       http://renjiaoban.21jiao.net/sanxia/huayangtao/ d1898   <unk>   0       -1
6       http://yuwen.chazidian.com/kejian108520/        d1899   画杨桃ppt课件下载  0       -1
7       http://www.docin.com/d-239045.html      d1900   <unk>   0       -1
8       http://www.glzy8.com/show/162484.html   d1901   11画杨桃PPT课件_管理资源吧  0       -1
9       http://www.xiexingcun.com/xy6/HTML/17470.html   d1902   《画杨桃》ppt课件-免费高速下载        0       -1
10      http://www.xiexingcun.com/xy6/HTML/61592.html   d1903   《画杨桃》ppt课件【13页】-免费高速下载        0       -1
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Relevance Assessment

- Annotation company: *Panshidata.com* (盘石数据)
- Relevance assessment
  - 0 (irrelevant) – This HTML page is absolutely irrelevant to the user’s search intent, or it is a spam web page.
  - 1 (marginal relevant) – Users can obtain a small proportion of relevant information from the page
  - 2 (relevant) – This page contains most relevant information to user search intent
  - 3 (highly relevant) – This page should be ranked top among all pages, i.e., the navigational or official page of the query keyword

Relevance Assessment

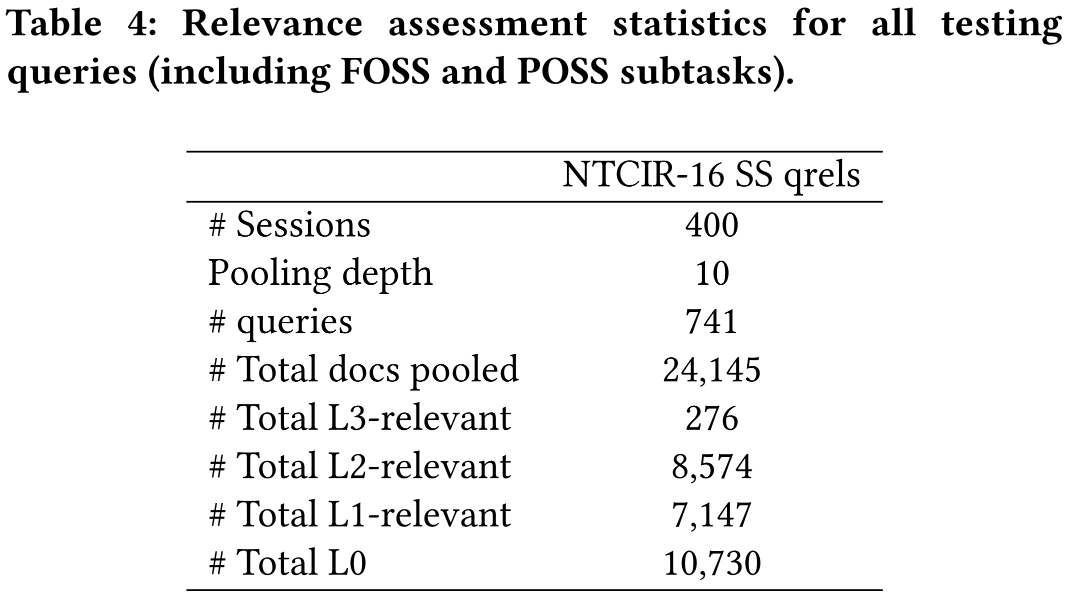


Table 4: Relevance assessment statistics for all testing queries (including FOSS and POSS subtasks).

	NTCIR-16 SS qrels
# Sessions	400
Pooling depth	10
# queries	741
# Total docs pooled	24,145
# Total L3-relevant	276
# Total L2-relevant	8,574
# Total L1-relevant	7,147
# Total L0	10,730

Evaluation Metrics

- FOSS

$$DCG@k = \sum_{i}^{K} \frac{2^{r(i)} - 1}{\log_2(i + 1)},$$

$$NDCG@k = \frac{DCG@k}{IDCG},$$

- POSS

$$RS - DCG = \sum_{m=1}^{M} mem_m \sum_{n=1}^{N} g(r_{m,n}, q_m) \cdot d_{m,n}(sDCG),$$

$$RS - RBP = \sum_{m=1}^{M} mem_m \sum_{n=1}^{N} g(r_{m,n}, q_m) \cdot d_{m,n}(sRBP),$$

$$mem_m = FF(M - m) = e^{-\lambda(M-m)}$$

$$d_{m,n}(sDCG) = \frac{1}{(1 + \log_{b_r} n)(1 + \log_{b_q} m)},$$

$$d_{m,n}(sRBP) = (\frac{p - bp}{1 - bp})^{m-1}(bp)^{n-1},$$

Evaluation Results (Preliminary)

Table 5: Preliminary evaluation results on the FOSS task (Sorted by the NDCG@3 score).

Rank	Run Name	nDCG@3	nDCG@5	nDCG@10
1	THUIR2-FOSS-NEW-5	0.0959	0.1185	0.1380
2	RUCIR-FOSS-REP-21	0.0406	0.0660	0.1043
3	RUCIR-FOSS-REP-31	0.0362	0.0677	0.1264
4	SCIR-FOSS-NEW-1	0.0356	0.0484	0.0609
5	RUCIR-FOSS-REP-3	0.0340	0.0429	0.0849
6	RUCIR-FOSS-REP-22	0.0293	0.0522	0.0864
7	THUIR2-FOSS-NEW-2	0.0225	0.0388	0.0833
8	RUCIR-FOSS-REP-2	0.0202	0.0276	0.0810
9	MM6-FOSS-REP-1	0.0183	0.0276	0.0311
10	THUIR2-FOSS-NEW-6	0.0169	0.0280	0.0683
11	MM6-FOSS-REP-3	0.0160	0.0203	0.0246
12	THUIR3-FOSS-REP-1	0.0156	0.0328	0.0556
13	MM6-FOSS-NEW-15	0.0152	0.0253	0.0414
14	THUIR2-FOSS-NEW-3	0.0130	0.0210	0.0626
15	MM6-FOSS-NEW-1	0.0128	0.0231	0.0419
16	THUIR1-FOSS-REP-1	0.0123	0.0327	0.0897
17	MM6-FOSS-NEW-2	0.0118	0.0200	0.0480
18	MM6-FOSS-REP-2	0.0115	0.0135	0.0170
19	RUCIR-FOSS-REP-1	0.0108	0.0248	0.0746
20	MM6-FOSS-NEW-21	0.0092	0.0176	0.0365
21	MM6-FOSS-REP-4	0.0081	0.0177	0.0428
22	MM6-FOSS-NEW-3	0.0075	0.0153	0.0311

Run Name	Description
MM6-POSS-REP-1	Hierarchical Behavior Aware Transformers
MM6-POSS-REP-2	HBA without history information
RUCIR-FOSS-REP-1	bert-base with ad-hoc fine-tune
RUCIR-FOSS-REP-2	BERT+Contrastive Learning
RUCIR-FOSS-REP-21	BERT+CL
RUCIR-FOSS-REP-22	BERT+CL+no-revise
RUCIR-FOSS-REP-3	BERT+CL+BM25
RUCIR-FOSS-REP-31	BERT+CL+BM25
RUCIR-POSS-REP-1	BERT+CL+BM25
RUCIR-POSS-REP-2	BERT+CL
RUCIR-POSS-REP-3	BERT+CL+BM25
SCIR-FOSS-NEW-1	First try with pyserini
THUIR1-FOSS-REP-1	naive bm25
THUIR2-FOSS-NEW-2	bm25 + tf-idf + f1-exp
THUIR2-FOSS-NEW-3	Bert with Ad-hoc Data Fine-tune
THUIR2-FOSS-NEW-4	Bert with Click Model Fine-tune
THUIR2-FOSS-NEW-5	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR2-FOSS-NEW-6	Bert with Session Data Fine-tune
THUIR2-POSS-NEW-1	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR3-FOSS-REP-1	THUIR3-BM25-test

Evaluation Results (Preliminary)

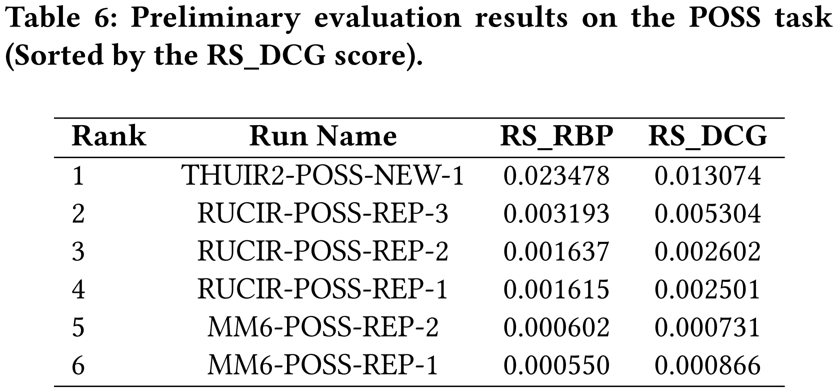
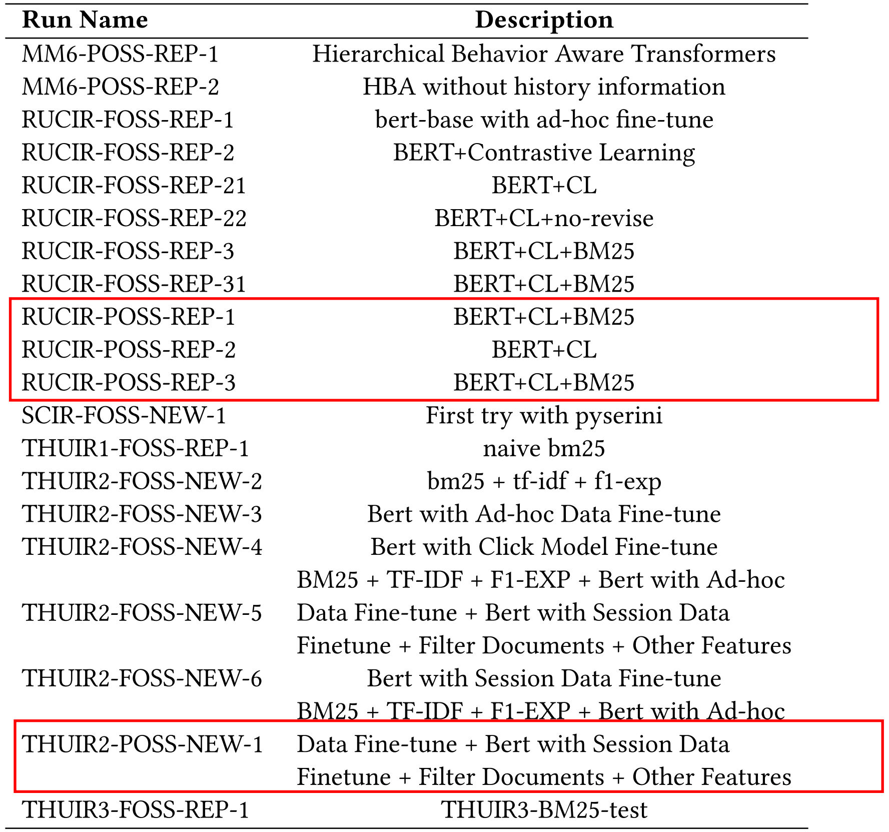


Table 6: Preliminary evaluation results on the POSS task (Sorted by the RS_DCG score).

Rank	Run Name	RS_RBP	RS_DCG
1	THUIR2-POSS-NEW-1	0.023478	0.013074
2	RUCIR-POSS-REP-3	0.003193	0.005304
3	RUCIR-POSS-REP-2	0.001637	0.002602
4	RUCIR-POSS-REP-1	0.001615	0.002501
5	MM6-POSS-REP-2	0.000602	0.000731
6	MM6-POSS-REP-1	0.000550	0.000866



Run Name	Description
MM6-POSS-REP-1	Hierarchical Behavior Aware Transformers
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RUCIR-FOSS-REP-22	BERT+CL+no-revise
RUCIR-FOSS-REP-3	BERT+CL+BM25
RUCIR-FOSS-REP-31	BERT+CL+BM25
RUCIR-POSS-REP-1	BERT+CL+BM25
RUCIR-POSS-REP-2	BERT+CL
RUCIR-POSS-REP-3	BERT+CL+BM25
SCIR-FOSS-NEW-1	First try with pyserini
THUIR1-FOSS-REP-1	naive bm25
THUIR2-FOSS-NEW-2	bm25 + tf-idf + f1-exp
THUIR2-FOSS-NEW-3	Bert with Ad-hoc Data Fine-tune
THUIR2-FOSS-NEW-4	Bert with Click Model Fine-tune
THUIR2-FOSS-NEW-5	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR2-FOSS-NEW-6	Bert with Session Data Fine-tune
THUIR2-POSS-NEW-1	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR3-FOSS-REP-1	THUIR3-BM25-test

Evaluation Results (Final)

Table 8: Final evaluation results on the FOSS task (Sorted by the NDCG@10 score).

Rank	Run Name	nDCG@3	nDCG@5	nDCG@10
1	RUCIR-FOSS-REP-31	0.5525	0.5623	0.5693
2	RUCIR-FOSS-REP-21	0.5365	0.5406	0.5570
3	THUIR2-FOSS-NEW-2	0.5229	0.5419	0.5525
4	RUCIR-FOSS-REP-3	0.4783	0.4785	0.4939
5	THUIR3-FOSS-REP-1	0.4805	0.4735	0.4636
6	MM6-FOSS-REP-1	0.4253	0.4420	0.4572
7	SCIR-FOSS-NEW-1	0.4620	0.4544	0.4309
8	THUIR2-FOSS-NEW-5	0.4068	0.4203	0.4156
9	MM6-FOSS-NEW-21	0.3642	0.3850	0.4029
10	MM6-FOSS-NEW-15	0.3587	0.3730	0.3925
11	THUIR2-FOSS-NEW-6	0.3431	0.3597	0.3684
12	THUIR1-FOSS-REP-1	0.1618	0.1785	0.1933

Run Name	Description
MM6-POSS-REP-1	Hierarchical Behavior Aware Transformers
MM6-POSS-REP-2	HBA without history information
RUCIR-FOSS-REP-1	bert-base with ad-hoc fine-tune
RUCIR-FOSS-REP-2	BERT+Contrastive Learning
RUCIR-FOSS-REP-21	BERT+CL
RUCIR-FOSS-REP-22	BERT+CL+no-revise
RUCIR-FOSS-REP-3	BERT+CL+BM25
RUCIR-FOSS-REP-31	BERT+CL+BM25
RUCIR-POSS-REP-1	BERT+CL+BM25
RUCIR-POSS-REP-2	BERT+CL
RUCIR-POSS-REP-3	BERT+CL+BM25
SCIR-FOSS-NEW-1	First try with pyserini
THUIR1-FOSS-REP-1	naive bm25
THUIR2-FOSS-NEW-2	bm25 + tf-idf + f1-exp
THUIR2-FOSS-NEW-3	Bert with Ad-hoc Data Fine-tune
THUIR2-FOSS-NEW-4	Bert with Click Model Fine-tune
THUIR2-FOSS-NEW-5	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR2-FOSS-NEW-6	Bert with Session Data Fine-tune
THUIR2-POSS-NEW-1	BM25 + TF-IDF + F1-EXP + Bert with Ad-hoc Data Fine-tune + Bert with Session Data Finetune + Filter Documents + Other Features
THUIR3-FOSS-REP-1	THUIR3-BM25-test

Evaluation Results (Final)

Table 9: Final evaluation results on the POSS task (Sorted by the RS_DCG score).

Rank	Run Name	RS_RBP	RS_DCG
1	RUCIR-POSS-REP-3	0.543875	0.746603
2	THUIR2-POSS-NEW-1	0.537723	0.648428
3	RUCIR-POSS-REP-1	0.473753	0.628068
4	RUCIR-POSS-REP-2	0.435542	0.563962
5	MM6-POSS-REP-2	0.326737	0.423102
6	MM6-POSS-REP-1	0.299660	0.379261

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THANK YOU!

We thanks all the NTCIR organizers and participants

for their sufficient support to our task!