

Your Name: Chih-Wei Chang

Your Andrew ID: cchang3

Homework 5

Collaboration and Originality

1. Did you receive help of any kind from anyone in developing your software for this assignment (Yes or No)? It is not necessary to describe discussions with the instructor or TAs.

If you answered Yes, provide the name(s) of anyone who provided help, and describe the type of help that you received.

2. Did you give help of any kind to anyone in developing their software for this assignment (Yes or No)?

If you answered Yes, provide the name(s) of anyone that you helped, and describe the type of help that you provided.

3. Are you the author of every line of source code submitted for this assignment (Yes or No)? It is not necessary to mention software provided by the instructor.

If you answered No:

- a. identify the software that you did not write,
- b. explain where it came from, and
- c. explain why you used it.

4. Are you the author of every word of your report (Yes or No)?

If you answered No:

- a. identify the text that you did not write,
- b. explain where it came from, and
- c. explain why you used it.

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Instructions

You must analyze the experimental results. Don't just summarize the numbers contained in the table – we can read the table ourselves. Instead, explain what conclusions you can reach based on the experiment. You could discuss how one algorithm compares with the other; stability of results across different parameter settings; effects on Precision or Recall; accuracy vs. computational effort; or other aspects of the experimental results that interest you. You may find it helpful to provide information about a few example queries to make your points, for example queries that had the most dramatic change in performance (good or bad) from diversification, but do not provide information about every query individually. We are primarily interested in your observations about general trends, not quirky queries. Usually a good analysis addresses several issues. Show that you understand what the results mean, based upon what we have discussed in class.

Instructions are shown in a red italic bold font. Do not include instructions in your report. We will deduct points for leaving instructions in your final report.

1 Experiment: Diversity baselines

1.1 Experimental results

	Indri	Indri + PM2	Indri + xQuAD	BM25	BM25+ PM2	BM25+ xQuAD
P-IA@10	0.153000	0.353000	0.194500	0.135833	0.352667	0.319167
P-IA@20	0.185583	0.304417	0.241333	0.152500	0.305333	0.293417
αNDCG@20	0.368240	0.513797	0.387914	0.396076	0.581289	0.538643

1.2 Parameters

For Indri, we set $\mu=2500$, $\lambda=0.4$; for BM25, we set $k_1=1.2$, $b=0.75$, and $k_3=0.0$. For all diversification algorithm, we set the `maxInputRankingsLength` to 100, `maxResultRankingLength` to 50, and λ to 0.5.

1.3 Discussion

Analyze the experimental results.

2 Experiment: The effect of diversification on relevance

2.1 Experimental results

	Indri	Indri + PM2	Indri + xQuAD	BM25	BM25+ PM2	BM25+ xQuAD
P@10	0.2600	0.5000	0.3100	0.2200	0.5300	0.4600
P@20	0.3000	0.4650	0.3650	0.2650	0.4900	0.4750
P@30	0.2667	0.4300	0.3433	0.2700	0.4433	0.4133
MAP	0.1499	0.1841	0.1197	0.1319	0.1629	0.1516

2.2 Discussion

Analyze the experimental results.

3 Experiment: Effect of λ

3.1 Experimental results

	$\lambda=0.0$	$\lambda=0.2$	$\lambda=0.4$	$\lambda=0.6$	$\lambda=0.8$	$\lambda=1.0$
Indri + PM2						
P-IA@10	0.328667	0.348833	0.358000	0.353000	0.355833	0.292167
P-IA@20	0.288167	0.295250	0.302750	0.311250	0.307917	0.277250
α NDCG@20	0.504577	0.527529	0.526524	0.513794	0.495983	0.508505
Indri + xQuAD						
P-IA@10	0.153000	0.163000	0.164500	0.214500	0.294500	0.361500
P-IA@20	0.185583	0.190083	0.208833	0.251333	0.274833	0.313667
α NDCG@20	0.368240	0.380079	0.380228	0.389942	0.423560	0.534654

	$\lambda=0.0$	$\lambda=0.2$	$\lambda=0.4$	$\lambda=0.6$	$\lambda=0.8$	$\lambda=1.0$
BM25 + PM2						
P-IA@10	0.349167	0.339833	0.341000	0.368500	0.357333	0.326167
P-IA@20	0.299667	0.312750	0.315333	0.296833	0.303083	0.295333
α NDCG@20	0.548394	0.583820	0.574348	0.541070	0.648361	0.575574
BM25 + xQuAD						
P-IA@10	0.135833	0.282500	0.324167	0.332667	0.340167	0.344333
P-IA@20	0.152500	0.253833	0.293167	0.292417	0.306167	0.311167
α NDCG@20	0.396076	0.521226	0.537857	0.532311	0.564793	0.570836

3.2 Discussion

Analyze the experimental results.

4 Experiment: The effect of the re-ranking depth

4.1 Parameters

Indri's lambda = pm2 0.6, x 1.0. BM25's lambda = 0.8.

4.2 Experimental results

	25 / 25	50 / 25	100 / 25	100 / 50	200 / 100
Indri + PM2					
P-IA@10	0.00000	0.00000	0.00000	0.00000	0.00000
P-IA@20					
αNDCG@20					
Indri + xQuAD					
P-IA@10	0.00000	0.00000	0.00000	0.00000	0.00000
P-IA@20					
αNDCG@20					

	25 / 25	50 / 25	100 / 25	100 / 50	200 / 100
BM25 + PM2					
P-IA@10	0.00000	0.00000	0.00000	0.00000	0.00000
P-IA@20					
αNDCG@20					
BM25 + xQuAD					
P-IA@10	0.00000	0.00000	0.00000	0.00000	0.00000
P-IA@20					
αNDCG@20					

4.3 Discussion

Analyze the experimental results.