Your Name:

Your Andrew ID:

Homework 3

0   Introduction

0.1   Collaboration and Originality

1. Did you receive help <u>of any kind</u> from anyone (other than the instructor or TAs) in developing your software for this assignment (Yes or No)? 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 <u>of any kind</u> 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. Did you examine anyone else's software for this assignment (Yes or No)? Do not describe software provided by the instructor.

4. Are you (or the course instructor) the author of <u>every line</u> of source code submitted for this assignment (Yes or No)? 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.

5. Are you the author of <u>every word</u> 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.

0.2 Instructions

1 Learning to Rank Baselines

Use your learning-to-rank software to train four models that use different groups of features.

1.1 Experimental Results for Learning to Rank Baselines

Your .zip / .tgz file must include files named HW3-Exp-1.1a.qry, HW3-Exp-1.1a.param, etc., in the QryEval directory. The experimental results shown above must be reproducible by these files and the parameter values shown in the table.

	SVM$_{rank}$				
	BM25 (Exp-1.1a)	Indri SDM (Exp-1.1b)	IR Fusion (Exp-1.1c)	Content-Based (Exp-1.1d)	LTR Base (Exp-1.1e)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000

	Coordinate Ascent				
	BM25	Indri SDM	IR Fusion (Exp-1.2c)	Content-Based (Exp-1.2d)	LTR Base (Exp-1.2e)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000

	ListNet				
	BM25	Indri SDM	IR Fusion (Exp-1.3c)	Content-Based (Exp-1.3d)	LTR Base (Exp-1.3e)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000

1.2 Parameters for Learning to Rank Baselines

Briefly describe the parameter settings that were used to obtain these results.

1.3   Discussion for Learning to Rank Baselines

Discuss the trends that you observe; whether the learned retrieval models behaved as you expected; how the learned retrieval models compare to the baseline methods; and any other observations that you may have.

2   Custom Features

2.1   Descriptions of Custom Features

Describe each of your custom features, including what information it uses and its computational complexity. Explain the intuitions behind your choices. This does not need to be a lengthy discussion, but you need to convince us that your features are reasonable hypotheses about what improves search accuracy, and not too computationally expensive to be practical.

2.2 Experimental Results for Custom Features

Your .zip / .tgz file must include files named HW3-Exp-2.2a.qry, HW3-Exp-2.2a.param, etc., in the QryEval directory. The experimental results shown above must be reproducible by these files and the parameter values shown in the table.

		SVM$_{rank}$				
	LTR Base (Exp-2.1a)	LTR Base + f$_{17}$ (Exp-2.1b)	LTR Base + f$_{18}$ (Exp-2.1c)	LTR Base + f$_{19}$ (Exp-2.1d)	LTR Base + f$_{20}$ (Exp-2.1e)	LTR Base + f$_{17}$-f$_{20}$ (Exp-2.1f)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

		Coordinate Ascent				
	LTR Base (Exp-2.2a)	LTR Base + f$_{17}$ (Exp-2.2b)	LTR Base + f$_{18}$ (Exp-2.2c)	LTR Base + f$_{19}$ (Exp-2.2d)	LTR Base + f$_{20}$ (Exp-2.2e)	LTR Base + f$_{17}$-f$_{20}$ (Exp-2.2f)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

		ListNet				
	LTR Base (Exp-2.3a)	LTR Base + f$_{17}$ (Exp-2.3b)	LTR Base + f$_{18}$ (Exp-2.3c)	LTR Base + f$_{19}$ (Exp-2.3d)	LTR Base + f$_{20}$ (Exp-2.3e)	LTR Base + f$_{17}$-f$_{20}$ (Exp-2.3f)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

2.3   Parameters for Custom Features Experiments

Briefly describe the parameter settings that were used to obtain these results.

2.4 Discussion of Custom Features Experimental Results

Discuss the trends that you observe; whether the learned retrieval models behaved as you expected; how the learned retrieval models compare to the baseline methods; and any other observations that you may have.

3   Experiment 3: Feature Combinations

3.1   Experiment Table

Your .zip / .tgz file must include files named HW3-Exp-3.1a.qry, HW3-Exp-3.1a.param, etc., in the QryEval directory. The experimental results shown above must be reproducible by these files and the parameter values shown in the table.

	All (Baseline) (Exp-3.1a)	Comb$_1$ (Exp-3.1b)	Comb$_2$ (Exp-3.1c)	Comb$_3$ (Exp-3.1d)	Comb$_4$ (Exp-3.1e)
P@10	0.0000	0.0000	0.0000	0.0000	0.0000
P@20	0.0000	0.0000	0.0000	0.0000	0.0000
P@30	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@10	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@20	0.0000	0.0000	0.0000	0.0000	0.0000
NDCG@30	0.0000	0.0000	0.0000	0.0000	0.0000
MAP	0.0000	0.0000	0.0000	0.0000	0.0000

3.2   Parameters

Briefly describe the parameter settings that were used to obtain these results. Be sure to specify which learning algorithm you used.

3.3   Discussion

Describe each of your feature combinations, including its computational complexity.   Explain the intuitions behind your choices, including the learning algorithm.   This does not need to be a lengthy discussion, but you need to convince us that your combinations are investigating interesting hypotheses about what delivers good search accuracy.   Were you able to get good effectiveness from a smaller set of features, or is the best result obtained by using all of the features?   Why?

Be sure to discuss the effectiveness of your custom features.   This should be more insightful than "They improved P@10 by 5%".   Discuss the effect on your retrieval experiments, and if there is variation in the metrics that are affected (e.g., P@k, MAP), how those variations compared to your expectations.