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**Homework 5**

# Statement of Assurance

*You must certify that all of the material that you submit is original work that was done only by you. If your report does not have this statement, it will not be graded.*

# Experiment: Baselines

Provide information about the effectiveness of your system in three baseline configurations.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **BM25** | **Indri**  **BOW** | **Indri**  **SDM** |
| **P@10** | 0.0000 | 0.0000 | 0.0000 |
| **P@20** | 0.0000 | 0.0000 | 0.0000 |
| **P@30** | 0.0000 | 0.0000 | 0.0000 |
| **MAP** | 0.0000 | 0.0000 | 0.0000 |

Document the parameter settings that were used to obtain these results.

# 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.

# Experiment: Learning to Rank

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **IR**  **Fusion** | **Content-**  **Based** | **Base** | **All** |
| **P@10** | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **P@20** | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **P@30** | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **MAP** | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

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.

Also, discuss the effectiveness of your custom features. This should be a separate discussion, and it 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.

# Experiment: Features

Experiment with four different combinations of features.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **All**  **(Baseline)** | **Comb1** | **Comb2** | **Comb3** | **Comb4** |
| **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 |
| **MAP** | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Describe each of your feature combinations, including 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 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?

# Analysis

Examine the model files produced by SVMrank. Discuss which features appear to be more useful and which features appear to be less useful. Support your observations with evidence from your experiments. Keep in mind that some of the features are highly correlated, which may affect the weights that were learned for those features.

Some of this discussion may overlap with your discussion of your experiments. However, in this section we are primarily interested in what information, if anything, you can get from the SVMrank model files.