Information Retrieval Galápagos Tortoise
WiSe 23/24 FSU Jena

Report - Milestone 3 November 29, 2023

We took this milestone as an opportunity to explore some of the features of information retrieval provided by `pyterrier`. Unfortunately, our knowledge in the field is still very limited, hence, we were not always able to assess the relevance of the measures taken. `Pyterrier`'s experiments provided some assistance, but with quite some evaluation criteria at hand, it was hard to decide which one we should strive to maximize.
Below we briefly outline our retrieval pipeline.

1. Initial retrieval with `PL2`.
   We wanted to expore some alternatives to retrieval with `BM25`.
2. Tune hyperparameter c of `PL2`.
   We tested several values for `PL2`'s c parameter and visualized the mean average precision (`map`) depending on the choice of c. Setting $c = 1.4$ yielded the best result.
3. Second retrieval with `BM25`.
   With `BM25` we introduced a second ranking function.
4. Experiment with query expansion for `BM25`.
   `Pyterrier` provides several query expansion models. We tested Bose-Einstein statistics (`Bo1`) and Kullback-Leibler divergence (`KL`). The first one yielded better results on our training data.
5. Combine multiple retrieval systems linearly.
   We combined our two retrieval models (`PL2` and `BM25` with `Bo1` query expansion) linearly, weighting `BM25`'s score twice as much, as it seemed to be the stronger model. Yet, we hoped to benefit from their respective strengths by combining them linearly.
6. Run experiments to evaluate performance.
   The combination of `PL2` and `BM25` with `Bo1` query expansion performed best.
7. Rerank with transformer.