

Reranking Experts using Topical Profiles

Krisztian Balog, Maarten de Rijke

Approach — Expert Finding

- Determine probability of candidate ca being an expert given topic q
- Use Bayes' Theorem to rank candidates in proportion to $p(q|ca)$

$$p(q|ca) \propto \sum_d p(q|d)p(ca|d)$$

- First find documents that are relevant to the query topic; then score each candidate by aggregating over all documents associated with candidate

Approach — Expert Profiling

- Topical profile: record of types and areas of skills and knowledge of and individual, together with levels of “competency” in each

$$profile(ca) = \langle score(ca, q_i), \dots, score(ca, q_n) \rangle$$

$$score(ca, q_i) = \sum_{d \in D_{q_i}, a(d, ca) > 0} p(q_i|d)$$

- D_{q_i} : query-biased subset of documents

I. Retrieving documents

- Determine $p(q|d)$ using standard language modeling techniques (probability of a query q being generated from a document model)

$$p(q|\theta_d) = \prod_{t \in q} \{(1 - \lambda)p(t|d) + \lambda p(t)\}^{n(t, q)}$$

- Present set-up: flat bag-of-words representation
- Future set-up: exploit document structure

II. Document-candidate associations

- Estimate the strength of the association between document d and candidate ca :

$$p(ca|d) = \frac{a(d, ca)}{\sum_{ca' \in C} a(d, ca')}$$

$$a(d, ca) = 0.55 \cdot NAME_MATCH(d, ca) + 0.45 \cdot EMAIL_MATCH(d, ca)$$

III. Reranking Using Profiles

- Rank candidates high ...
 - that are knowledgeable about the topic (compared to others),
 - moreover their work is focused on the given area

$$rank(ca, q_i) = \frac{1}{rank_{EF}(ca, q_i)} \cdot \frac{1}{rank_{PR}(ca, q_i)}$$

Results

TREC 2005	MAP	R-prec	bpref	P@5	P@10	P@20	RR1
EF	0.196	0.251	0.464	0.336	0.332	0.269	0.531
EP	0.163	0.203	0.460	0.320	0.272	0.202	0.518
EF+EP	0.209	0.251	0.464	0.396	0.326	0.267	0.659
TREC 2006	MAP	R-prec	bpref	P@5	P@10	P@20	RR1
EF	0.328	0.377	0.368	0.395	0.408	0.377	0.506
EP	0.381	0.425	0.401	0.722	0.632	0.556	0.839
EF+EP	0.466	0.495	0.470	0.661	0.587	0.495	0.851

Main conclusion

- Profiling helps expert search
- Are expert finding and profiling different tasks?

References

- K. Balog, L. Azzopardi, and M. de Rijke. Formal models for expert finding in enterprise corpora. In: *SIGIR 2006*
- K. Balog and M. de Rijke. Determining expert profiles (With an application to expert finding). In: *IJCAI 2007* (to appear)

