Blind Relevance Feedback and Named Entity based Query Expansion for Geographic Retrieval at GeoCLEF 2006

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Outline

- Challenges for Geographic Information Retrieval (GIR) at GeoCLEF 2006
- Our Approach: Geographic expansion via Blind Relevance Feedback (BRF)
- Post submission runs with (Geo)BRF and Boolean Retrieval
- Current Work: Heuristics for expansion

Challenges

GC 048-title: Forest fires in Northern Portugal

- Geo-Parsing: Named Entity Recognition and Classification (NER/NEC)
- Geo-Coding for spatial retrieval and ranking

  or expansion for text retrieval

Some problems:

- NER/NEC, disambiguation and translation
- Resources: availability and coverage of gazetteers
- Heuristics for geographical expansion

Our approach

- Resource problem for topics like *the Middle East*, *the Tropics* or *Northern Portugal*

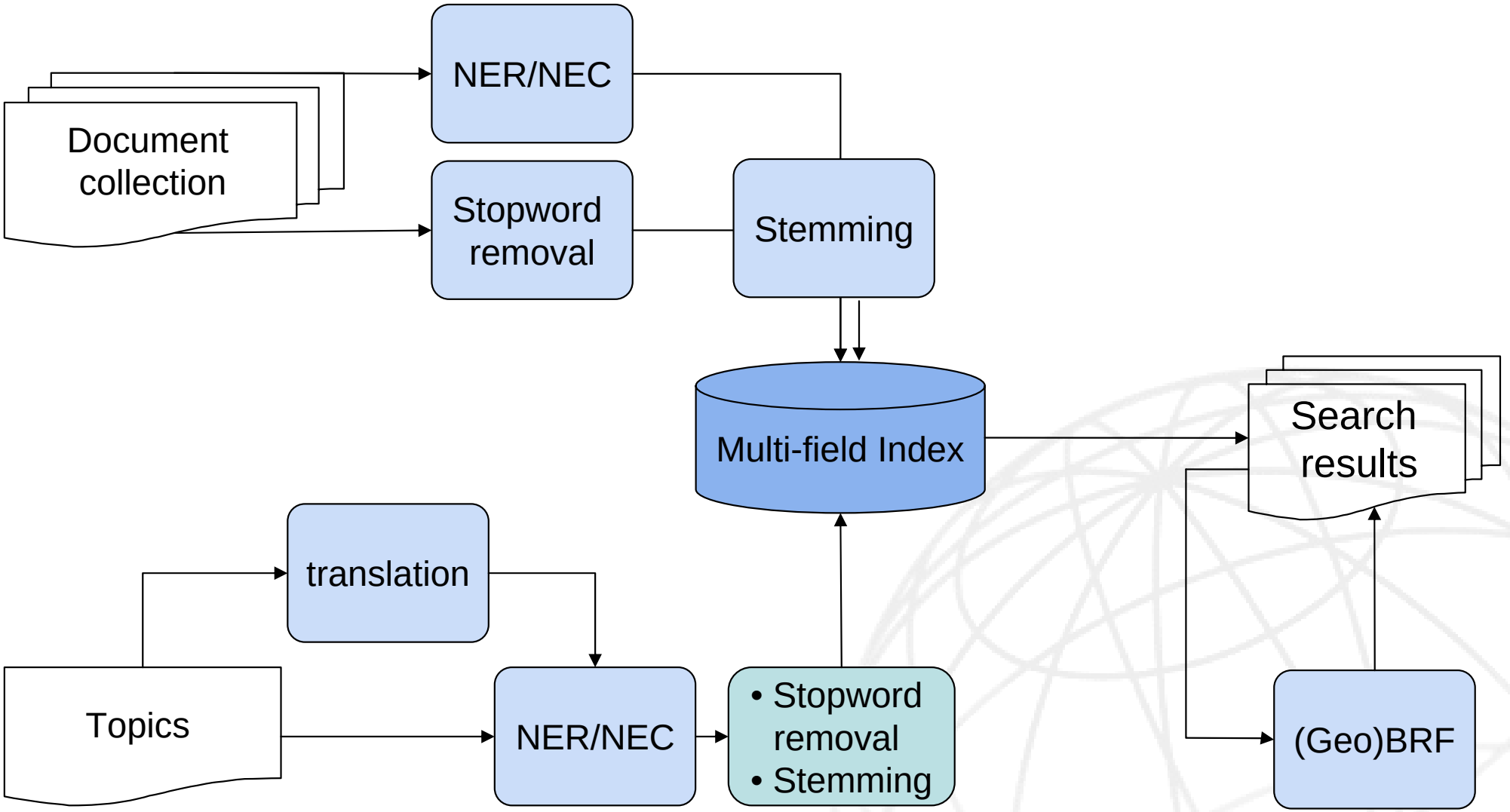
➔ Geographic query expansion via BRF

- Index collection with (geographic) Named Entities (NE)
- Force the addition of geographic NEs from the top-ranked documents within the BRF
- Expand with/without Boolean retrieval

Our approach

- Processing steps and tools used
  - (Translation of topics via Babelfish, Linguatec and FreeTranslation)
  - (NER/NEC via the machine learning tool Alias-I-LingPipe)
  - Stopword removal: lists by the University of Neuchatel‘s
  - Stemming: Lucene for German, Snowball for English
  - Ranked Boolean retrieval via Lucene
  - (BRF or GeoBRF with high weights for geographic NEs)

Our approach



Our approach

- Translation and NER/NEC
  - Translation of NEs often insufficient „*New narrow country*“, „*Vila actually*“ or „*grandmas*“
  - NER should precede a gazetteer lookup for name variants
  - (multiple) translation improved NER/NEC for German
  - Listings and compound names problematic for NER/NEC
- GeoBRF – an example
  - GC 37 *the Middle East*: *Syria*, *Israel*, *Cairo*, *Egypt*, *Lebanon*, *Gaza*, *Jerusalem*, *Beirut*, *Gulf*

Post submission runs

Table 1: Effects of NE-weighting and (Geo)BRF for monolingual German

Fields	BRF (docs,terms)	**MAP**	NEs weighted **MAP**	With GeoBRF **MAP**	NEs weighted and GeoBRF **MAP**
TD	–	25.73	27.67		
TDN	–	23.43	25.65		
TD	5, 25	19.72	23.59	26.43	29.54
TDN	5, 25	22.28	23.33	25.71	25.65
TD	10, 20	21.82	24.72		29.07
TDN	10, 20	21.05	24.70		27.90
TD	10, 30	19.25	24.98	30.34	31.20
TDN	10, 30	21.60	24.03	28.65	28.72

23.73% for manually corrected NEs

33.38% for manually corrected NEs

Post submission runs

Table 2: Effects of NE-weighting and (Geo)BRF for monolingual English

Fields	BRF (docs,terms)	**MAP**	NEs weighted **MAP**	With GeoBRF **MAP**	NEs weighted and GeoBRF **MAP**
TD	–	18.11	20.38	–	–
TDN	–	16.27	18.42	–	–
TD	5, 25	15.71	19.03	19.00	18.65
TDN	5, 25	15.47	18.30	18.12	18.20
TD	10, 20	15.74	18.65	15.69	14.70
TDN	10, 20	16.84	17.70	14.22	14.83
TD	10, 30	14.66	17.88	17.44	17.84
TDN	10, 30	16.41	18.04	15.53	17.50

Post submission runs

Table 3: Effects of NE-weighting and (Geo)BRF with Boolean Retrieval for monolingual English

Fields	BRF (docs,terms)	**MAP**	non-geographic NEs weighted **MAP**	With GeoBRF **MAP**	NEs weighted and GeoBRF **MAP**
TD	–	21.23	21.23	–	–
TDN	–	17.60	19.41	–	–
TD	5, 25	18.09	18.09	14.08	14.22
TDN	5, 25	19.49	19.49	14.91	14.96
TD	10, 20	18.99	18.99		18.07
TDN	10, 20		20.05		20.92
TD	10, 30		18.95	13.49	13.53
TDN	10, 30	20.18	20.18	18.56	18.56

17.41% for manually corrected NEs

21.13% for manually corrected NEs

Current Work

- Intellectual analysis and manual query optimization for GeoCLEF topics 2005 and 2006
  - in order to find good strategies and develop heuristics

- Example heuristic for German for country names:

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if   country is U.S.A or is in Europe
then expand with the biggest cities
if   country equals collection home
then expand with divisions and biggest cities
else no expansion/only capital
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- Factors like proximity, elite nation, relevance may influence publicity of location names

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