Helping BootCaT to catch the Babel fish: Getting encoding, content and language right

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Motivation

1. support for western-European languages / encodings only
2. BTE content extractor rather old, many more sophisticated extractors available
    - DOM parser
    - multiple heuristics
3. Bing bad in language identification

- basic idea – take mature tools/API-s for all three problems and rewrite the script for retrieving documents and extracting text
- what programming language? – Perl, Java? – Java!

Encoding guessing and content extraction

- BoilerPipe, `http://code.google.com/p/boilerpipe/`, Apache License 2.0
- decision trees on number of words and link density of blocks
- alternative in Python – chared and justext
- evaluation from Ljubešić and Erjavec (2011)

	precision	recall	F1
ContentExtractor	0.979	0.707	0.821
BTE	0.570	0.955	0.713
BoilerPipe	0.847	0.921	0.882
justext	0.778	0.914	0.841

Language identification

- language-detection, `http://code.google.com/p/language-detection/`, Apache License 2.0
- language profiles as distributions of n-graphs, Naïve Bayes classifier
- 55 language profiles out-of-the-box
- simple to add new language profiles or remove existing ones
- 100% accuracy on most predefined languages
- confusion on Danish (da=179, no=14, en=7), Norwegian (no=199, da=1)

Demo

Experiments

- domain
    - health corpus in English – BTE vs. Boilerpipe
    - corpus of ICT domain in Croatian – BootCaT vs. hrWaC

    1. define one general language corpus and one domain corpus
    2. extract single-word domain terms with CollTerm – seed terms
    3. collect corpora with various BootCaT settings
    4. calculate "domainness" – corpora as tf-idf models, dice similarity to initial domain corpus
- language identification
    - Bing API evaluation
    - Slovene vs. Croatian
    - Croatian vs. Serbian

Health corpus

- 100Mw of ukWaC as reference corpus, 4Mw from health.com as domain corpus
- extract terms from the health.com corpus with CollTerm via tf-idf, reference corpus for idf statistic
- take 100 strongest terms, create 500 trigram queries – entry point for BootCaT
- collect URL-s – 4793 URL-s after cleanup
- retrieve corpora with old and new tool
- measure distance to the initial domain corpus - tf-idf + dice

	#ofDocs	#ofTokens	avg#Tokens	distDom
BTE	4,269	6,225,680	1458	0.738
BP.Default	4,567	6,145,941	1346	0.743
BP.Article	4,577	4,508,944	985	0.758

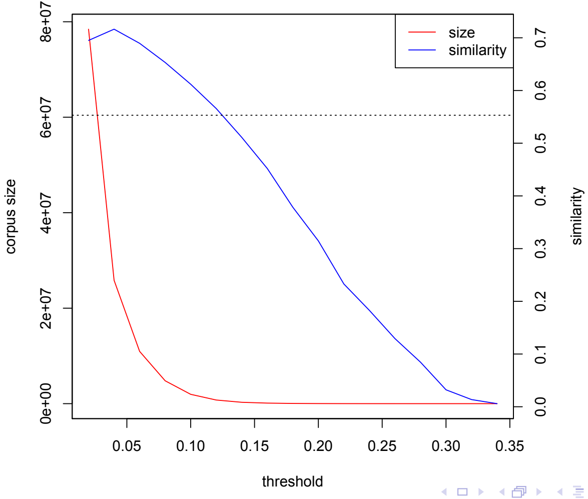
Croatian corpus of ICT

- 35Mw from vecernji.hr as reference corpus
- 10Mw from bug.hr as domain corpus

	#ofDocs	#ofTokens	avg#Tokens	distDom
BTE	3,593	3,098,422	862	0.459
BP.Default	4,261	9,513,564	2232	0.517
BP.Default.hr	3,114	7,664,719	2461	0.553
BP.Article	4,264	6,318,224	1482	0.483
BP.Article.hr	3,171	5,108,200	1610	0.515

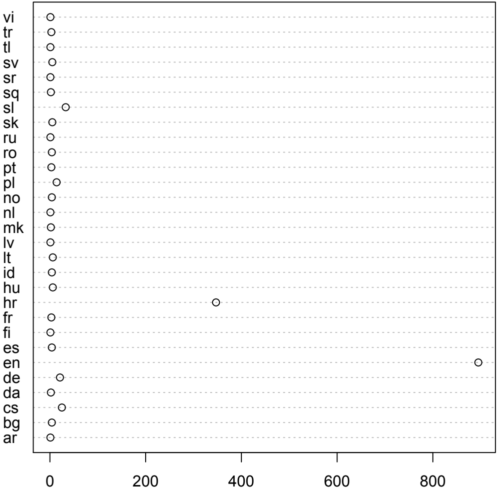
BootCaT vs. WaC

- extract documents containing seed terms from hrWaC



Language identification of Bing API

- "nasty" task for Bing API – germanisms in Croatian



Discriminating between similar languages with langdetect

1. Croatian and Slovene
    - vecernji.hr urls-a from hrWaC and delo.si url-s from slWaC, 3000 documents each
    - use built-in language profiles
    - only 2 Slovene documents annotated as Croatian – near 100% accuracy
2. Croatian and Serbian
    - vecernji.hr urls-a from hrWaC and b92.rs url-s from srWaC
    - two new language profiles – parallel data from SETimes
    - accuracy – Croatian 98.8%, Serbian 99%

Conclusion

- improvements on BootCaT
- encoding guessing – non-Western European languages
- improved content extraction – better domain coverage, cleaner corpora as well
- language identification
  - no need for frequent words lists
  - discrimination between similar languages
  - simple control of profiles
  - adding new profiles
- BootCaT vs. WaC – building whole web corpora becoming quite simple
- SpiderLing + chared + justext + onion
- domain corpora as subcorpora of web corpora

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