Term and Collocation Extraction by means of complex Linguistic Web Services

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Overview

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- Conclusion – Future Work

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  - Extraction of regionalism candidates
- Tools based on standard corpus processing techniques:
  Tagging – parsing – pattern-based extraction – lexicostatistics
- Tools wrapped and provided as chains of web services:
  - to assess possibilities of creating complex linguistic web services
  - to test the processing of non-trivial amounts of data via web services

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- Type II: extraction of multiword expressions (MWEs)
  - to find collocations (cf. Weller & Heid, this session)
  - to find multiword terms and phraseology of specialized domains
  - to find collocations typical of a "region" (D – A – CH – ST)

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  - *Stuttgarter Zeitung* (1992/1993) 36 M
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- Specialized language (taken from the OPUS Website):
  - European Medecine Agency (EMEA): pharmaceuticals tests 10 M
- National or regional variants of German:
  - Austria (excerpts from the DeReKo corpus of IdS Mannheim) 180 M
  - Switzerland (dito: DeReKo) 180 M
  - South Tyrol (Eurac/Athesia publishers) ca. 60 M

Procedures for single word term candidate extraction

Based of relative frequency relationships

"Weirdness scores" Ahmad et al. 1992

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- Output:
  1. items occurring *only* in the specialized text
  2. items more frequent in the specialized text than elsewhere

Procedures for single word term candidate extraction

Scenario type I: typical results – term candidates from EMEA

term candidates	f (abs.)
Durchstechflasche	5638
Injektionsstelle	3489
Pharmakokinetik	3426
Hämoglobinwert	3395
Fertigspritze	3271
Ribavirin	3234
Gebrauchsinformation	2801
Dosisanpassung	2580
Epoetin	2302
Hydrochlorothiazid	2128

Only EMEA (not FR)

term candidates	weirdness	f (abs.)
Filmtablette	25522	6389
Injektionslösung	19854	4970
Packungsbeilage	14710	7365
Niereninsuffizienz	14233	3563
Verkehrstüchtigkeit	13558	3394
Leberfunktion	8385	2099
Hypoglykämie	8353	2091
Toxizität	7957	1992
Einnehmen	7035	7045
Hypotonie	6823	1708

EMEA and FR

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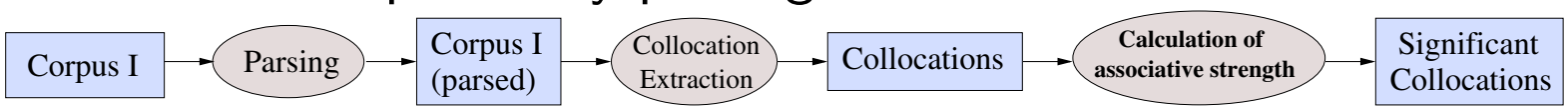
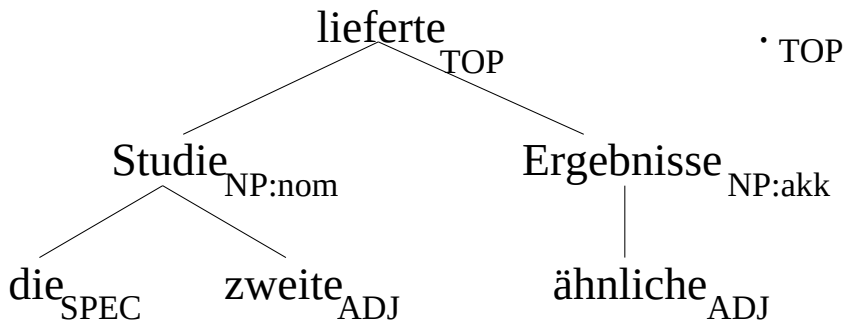


Procedures for collocation candidate extraction

Sample dependency analysis

Use of FSPar

Schiehlen 2003



0	Die	ART	d	|	2	SPEC
1	zweite	ADJA	2.	|	2	ADJ
2	Studie	NN	Studie	Nom:F:Sg	3	NP:1
3	lieferte	VVFIN	liefern	3:Sg:Past:Ind*	−1	TOP
4	ähnliche	ADJA	ähnlich	|	5	ADJ
5	Ergebnisse	NN	Ergebnis	Akk:N:Pl	3	NP:8
6	.	$.	.	|	−1	TOP

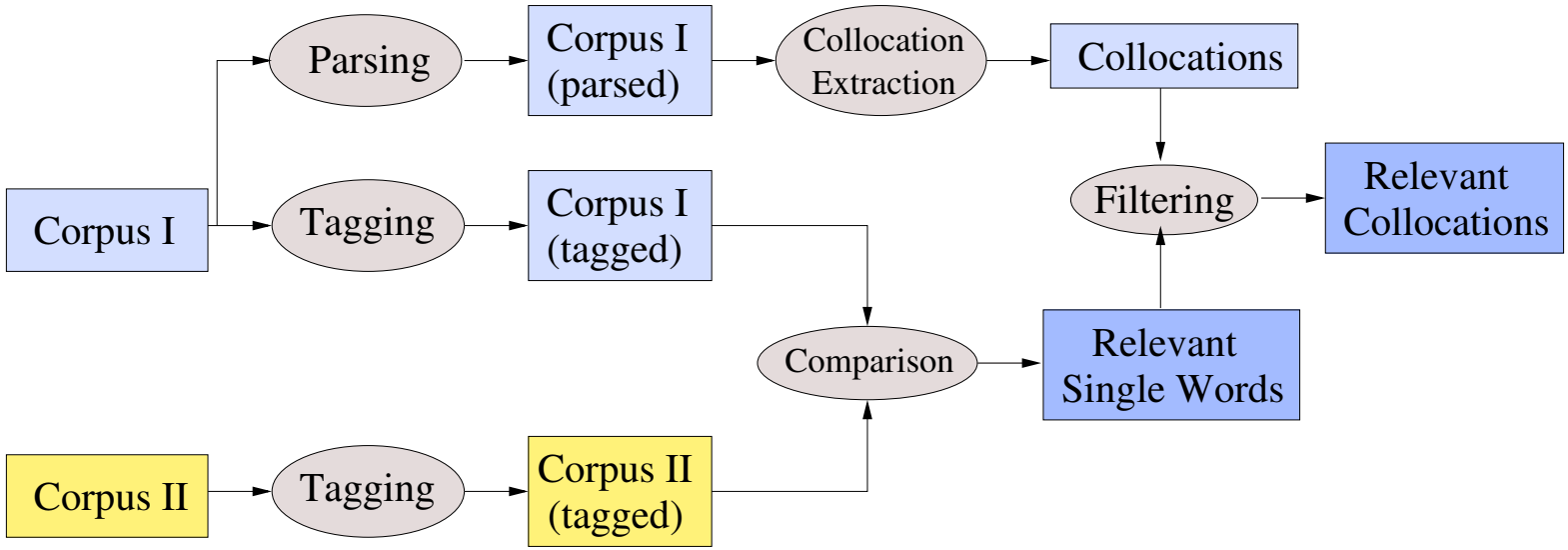
Procedures for collocation candidate extraction

Scenario type II: typical results – verb+object pairs from Swiss newspapers

Abklärung	treffen	96
Abklärung	vornehmen	91
Anlaß	besuchen	73
Anlaß	durchführen	199
Anlaß	organisieren	367
Beschwerde	gutheißen	88
Bilanz	deponieren	82
Busse	aussprechen	72
Defizit	budgetieren	94
Einsitz	nehmen	295
Einsprache	erheben	262
Entscheid	fällen	79
Gegensteuer	geben	143
Gesuch	bewilligen	90

Combining the two scenarios

Extraction of specialized collocations



Steps:

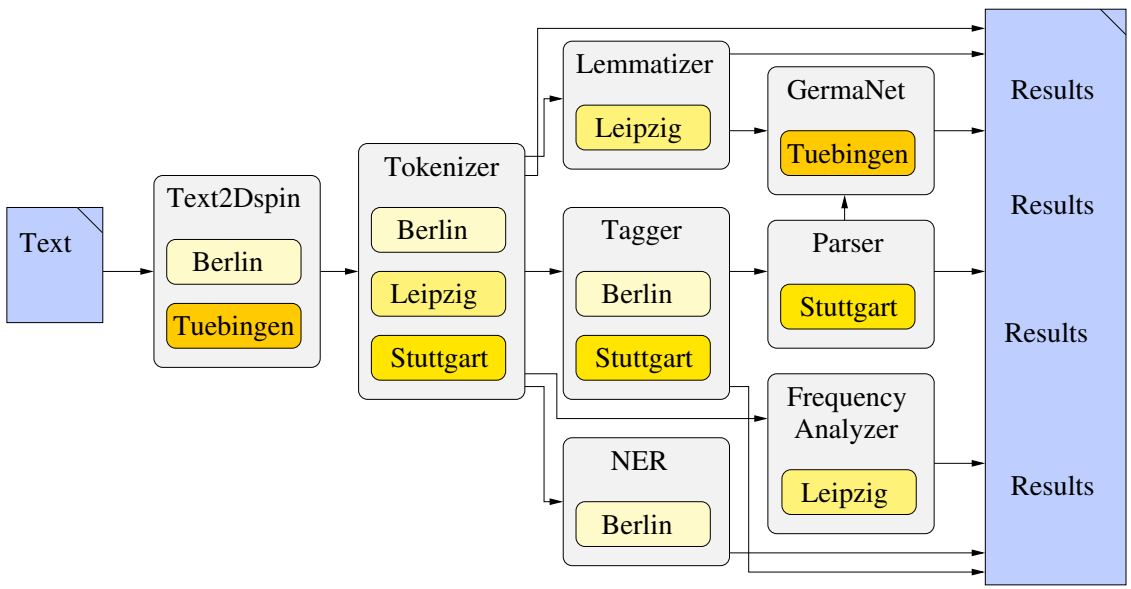
1. Find relevant single word terms (e.g. from EMEA or regional texts)
2. Extract collocation candidates only for these items
3. Output: candidates:
   - EMEA: domain-specific collocations
   - collocations of regionalisms (e.g. from CH)

The extraction as a web service

Framework

D-SPIN web service tool chain: *WebLicht* Hinrichs et al. 2010

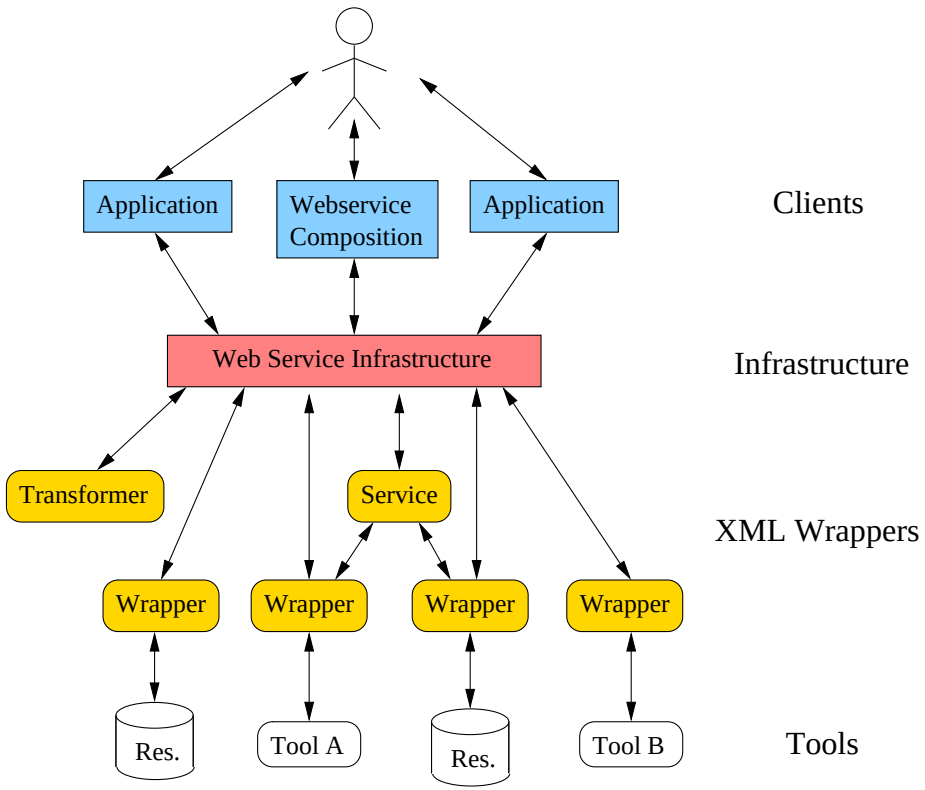
- Experiments with chaining of different corpus processing tools
- Joint effort: Universities of Tübingen, Leipzig, BBAW Berlin and others



The extraction as a web service

Architecture principles

- Tool and resource wrappers: tools unchanged with respect to stand-alone version
- Slim format for data exchange between chained components: D-SPIN Text Corpus Format, TCF Heid et al. 2010
- *WebLicht* used as:
  - Chaining tool and interface
  - Workflow infrastructure



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Technical problems to be addressed wrt the extraction scenarios

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- Scenario I: comparison of two corpora
  - Uploading both corpora (e.g. in one 'file')
  - Or: keeping comparison data (e.g. from one journal) as an internal resource

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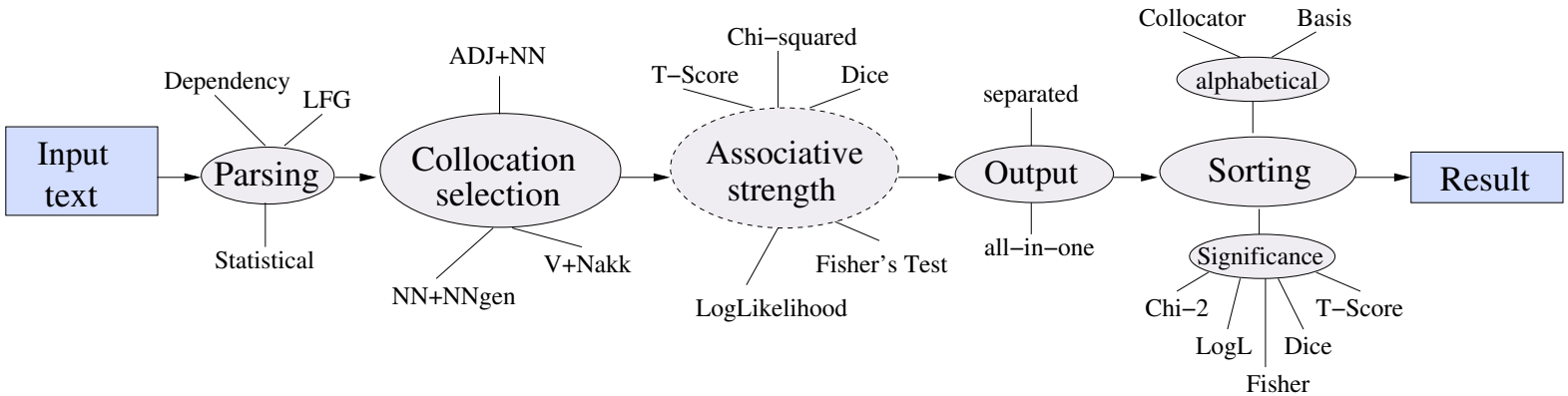
Technical problems to be addressed wrt the extraction scenarios

- Scenario I: comparison of two corpora
  - Uploading both corpora (e.g. in one 'file')
  - Or: keeping comparison data (e.g. from one journal) as an internal resource
- Scenario II: parsing of large amounts of data
  - Time-consuming (10 M words on a LINUX PC: ca. 30 min)
  - Web service should alert user when processing is done

The extraction as a web service

Open problems: parameterizing a complex web service



Users may wish to select options

- Tool-related options:
  parser – association measures – collocation types ... to be used
  $\Longrightarrow$ Parameters to be given to the individual component tools
- Output-related options:
  sorting of collocation candidates – format of the output
  $\Longrightarrow$ Possibly need for extra post-processing components

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  - needs to be registered for *WebLicht* Hinrichs et al. 2010
  - open questions wrt parameterization

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- Experiments of web service use:
  - works fine (version at IMS Stuttgart)
  - needs to be registered for *WebLicht* Hinrichs et al. 2010
  - open questions wrt parameterization
- Future Work
  - Further development of extraction components Weller/Heid 2010
  - Integration of components into specific tool chains, e.g. for provision of raw material to lexicographers
  - Web service parameterization and pertaining user interfaces