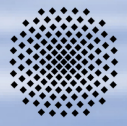

University of Stuttgart
Germany

Introduction to corpora and phonetic databases and how to access them

Katrin Schweitzer Kerstin Eckart Markus Gärtner

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70569 Stuttgart

MGK academic courses

April 17th, 2015

The INF-project: Information Infrastructure

- PIs: Jonas Kuhn, Grzegorz Dogil, Sebastian Pado
- Researchers: Kerstin Eckart, Markus Gärtner, Katrin Schweitzer

Project responsibilities

- accumulate large collection of language data
- support optimal exploitation of these data
- making them available to the research community

Thematic focus

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This course will not . . .

- provide a general introduction to corpus linguistics theory
  ⇒ cf. e.g. [Lemnitzer and Zinsmeister, 2006]
- include hands-on instructions for one specific corpus, database or query tool
  ⇒ follow-up training possible

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- to provide you with the ability to find available corpora/ phonetic databases and assess their usefulness for your task
- to make you come up with new ideas regarding what can be done using corpus data

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- to provide you with the ability to find available corpora/ phonetic databases and assess their usefulness for your task
- to make you come up with new ideas regarding what can be done using corpus data
- to at least provide you with some useful links

Overview

Defining corpora

A corpus is a collection of written or spoken utterances. Corpus data have typically been digitized, i.e. they are machine-readable and stored on a computer. A part of a corpus, i.e. a text, consists of [primary] data as well as possible metadata to describe the [primary] data and linguistic annotations attached to the [primary] data.

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In this course we take a broad pragmatic view:

- A corpus is a resource, based on primary data (textual, audio, video, multi-modal, ...) $\Rightarrow$ including phonetic databases

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- There are no restrictions with regard to context (phoneme, sentence, utterance, text, . . .)
- The primary data has or has not been annotated (yet) ⇒ details on linguistic annotation layers to come in the next courses

Primary data, metadata, annotations

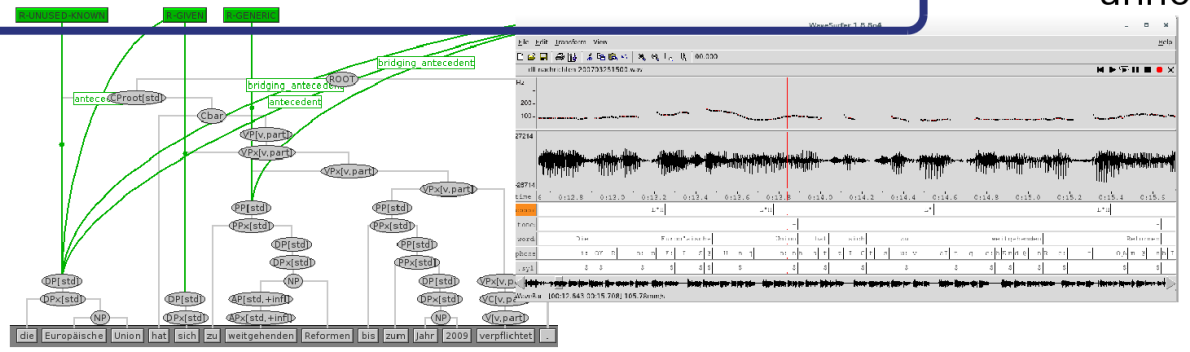
Example: The DIRNDL corpus

metadata

ResourceTitle	Discourse Information Radio News Database for Linguistic analysis
Modalities	spoken written
Topic	radio news
Project	SFB 732 A1
TotalSize	5 hours 3221 sentences
Spaker Demographics	professional speakers 5 male, 4 female

primary data

annotations



Classification criteria

What is the “right” corpus for my study?
Define requirements based on classification criteria:

- Modality
- Temporal origin of the primary data
- Language
- Genre
- Balance
- Degree of Planning (for spoken data)
- Size
- Context size
- State of annotation
- Technical representation

Classification criteria

- Modality
  - speech
  - text
  - gesture
  - multimodal
  - . . .

Classification criteria

- Temporal origin of primary data

Independent dimensions:

- historical vs. contemporary
- diachronic vs. synchronic
- static vs. monitor corpus

Classification criteria

- Temporal origin of primary data

historical	vs.	**contemporary**
Fuerstinnen-korrespondenz 1.1	**example corpora**	Corpus of Comparisons in Product Reviews
Analysis of social networks	**example studies**	Sentiment analysis

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historical	vs.	**contemporary**
Fuerstinnen-korrespondenz 1.1	**example corpora**	Corpus of Comparisons in Product Reviews
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Fuerstinnenkorrespondenz 1.1

- letters of 15 princesses and their male correspondence partners
- from 1546 to 1756

Classification criteria

- Temporal origin of primary data

historical	vs.	**contemporary**
Fuerstinnen-korrespondenz 1.1	**example corpora**	Corpus of Comparisons in Product Reviews
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Corpus of Comparisons in Product Reviews

- camera reviews (1707 annotated sentences)
- written between 2005 and 2009

Classification criteria

- Temporal origin of primary data

diachronic	vs.	**synchronic**
several (historical) stages of a language		one stage
Deutsche Diachrone Baumbank (DDB)	**example corpus**	British National Corpus (BNC)
language change	**example studies**	parser training

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DDB

- three sub corpora
- Old High German, Middle High German, Early New High German

Classification criteria

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several (historical) stages of a language		one stage
Deutsche Diachrone Baumbank (DDB)	**example corpus**	British National Corpus (BNC)
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BNC

- only texts starting from 1975
- some imaginative works with continued popularity date back till 1964

Classification criteria

- Temporal origin of the primary data

static	vs.	**monitor corpora**
TIGER Corpus	**example corpora**	Corpus of Contemporary American English (COCA)
grammar extraction/ induction	**example studies**	identification of new words

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TIGER Corpus	**example corpora**	Corpus of Contemporary American English (COCA)
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TIGER Corpus

- newspaper texts
- 1990s

Classification criteria

- Temporal origin of the primary data

static	vs.	monitor corpora
TIGER Corpus	**example corpora**	Corpus of Contemporary American English (COCA)
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COCA

- content equally divided among spoken data, fiction, popular magazines, news papers, academic texts
- 20 million words per year

Classification criteria

- Language
  - monolingual
  - multilingual: parallel/comparable/other

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- Language
  - monolingual
  - multilingual: parallel/comparable/other

parallel translations in different languages, often aligned at sentence or word level
e.g. Europarl v7, DCEP

	en	de	el	pl
29733339	It is your task , Commissioner Frattini - especially as the Commissioner responsible for human rights - to defend the principles of the European Union and not to promote yourself again as a **minister** in a future Italian Government when required .	Ihre Aufgabe , Herr Kommissar Frattini , ist es - gerade als Grundrechtekommissar - , die Prinzipien der Europäischen Union zu verteidigen und nicht sich bei Bedarf als Minister einer zukünftigen italienischen Regierung wieder empfehlen zu wollen .	Έχετε υποχρέωση , Επίτροπε Frattini -δεδομένου ιδίως ότι είστε αρμόδιος Επίτροπος για τα ανθρώπινα δικαιώματα- να προασπίζετε τις αρχές της Ευρωπαϊκής Ένωσης και να μην προωθείτε πάλι τον εαυτό σας ως υποψήφιο υπουργό μιας μελλοντικής ιταλικής κυβέρνησης εφόσον χρειαστεί .	Pańskim zadaniem jest , panie komisarzu Frattini , szczególnie jako komisarza odpowiedzialnego za prawa człowieka , bronić zasad Unii Europejskiej , jeżeli to konieczne , a nie promować się na przyszłego ministra w rządzie włoskim .
30278006	Although this ambitious scheme seems to have fitted into a proper technocratic mould , I	Obwohl für dieses ehrgeizige Vorhaben die passende technokratische Form gefunden worden zu sein scheint , frage ich	Ενώ όλο αυτό το μεγαλεπήβολο σχέδιο φαίνεται να έχει μπει σε ένα σωστό τεχνοκρατικό καλούπι ,	Choć ten ambitny plan wpasował się w odpowiedni wzorzec technokratyczny ,

OPUS multilingual search interface, Europarl `http://opus.lingfil.uu.se`

Classification criteria

- Language
  - monolingual
  - multilingual: parallel/comparable/other

parallel translations in different languages, often aligned at sentence or word level

comparable similar in different languages wrt size, context size, genre, (topic)

e.g. MULTEXT-East cesDoc corpus
Comparable components: fiction, news
wrt number and size of texts

Classification criteria

- Genre

  news corpus few errors, fixed register — TIGER 2.1, DIRNDL

  web corpus noise, missing context, user created content — deWaC, ENCOW14

  literary corpus author corpus, historical journal, . . . — Goethe-Korpus, AAC-FACKEL

  conversation corpus — SCoSE, GECO

  language acquisition data / learner corpus data produced by L1 or L2 learners, often includes target hypotheses — CHILDES, Falko

  specialized language instruction manuals, law texts, medical texts, . . . **fieldwork data** e.g. under-resourced languages . . . **experiment data** e.g. eye-tracking, reaction times . . .

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  with respect to language varieties, genre, topic, size . . .
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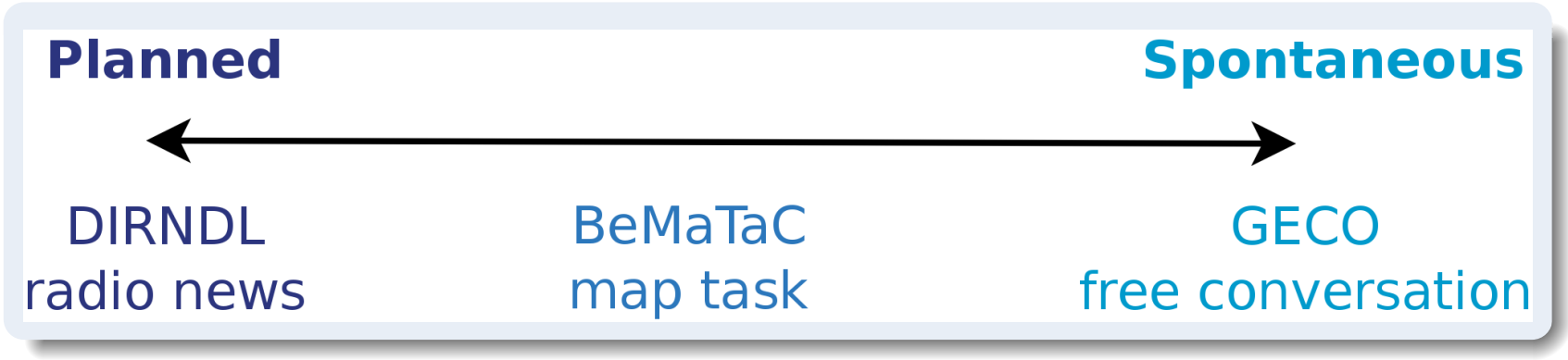
- Degree of Planning (for spoken data)



Classification criteria

- Size

Text based

English Gigaword Fifth Edition		**TIGER Corpus 2.1**
4,032,686,000	(word) tokens	~900,000

Sound based

GECO		**DIRNDL**
~19	hours	~5

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  document, sentence, utterance, word, . . .
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  - annotations:
    phonological, prosodic, morpho-syntactic, semantic, . . .
- Technical representation
  - sampling rate
  - character encoding / scripts
  - specific format (XML, plain text, .wav)
  - inline / stand-off annotation

Motivation for using a corpus

Passives of reflexives (PoR) [Zarrieß et al., 2013]

- German is one of the few languages where reflexive verbs can passivize
  BUT: sparse phenomenon

(1) Erst wird sich geküsst, dann wird geheiratet.
first is REFL *kissed, then is married*
'First one kisses, then one marries.'

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- Which verbs can form a PoR?

SdeWaC-v3

- web corpus
- 880 million (word) tokens
- automatic syntactic annotations available

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SdeWaC-v3

- web corpus
- 880 million (word) tokens
- automatic syntactic annotations available

- 134 verbs with PoR were identified
- General proportions of reflexive uses were extracted
- Evidence from the corpus study: formation of PoRs seems to be lexically restricted
  $\Rightarrow$ only available for inherently and naturally reflexive verbs

Motivation for using a corpus

Study on backchannels in spontaneous conversations

[Schweitzer and Lewandowski, 2012]

GECO database

- 46 dialogs (~25mins)
- unacquainted female speakers
- ratings for mutual liking and competence

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  - more sympathy towards interlocutor / more assumed competence of the interlocutor → more backchannels
  - but: if someone produces more backchannels, they are not rated as more likeable or competence
  - more backchannels produced → rated less competent! (statistical tendency)

Motivation for using a corpus

Other catchy corpus studies 

- Does the Queen speak the Queen's English?
  [Harrington et al., 2000]
  (spoiler: *Nope*)
- Predicting U.S. Presidential Election Outcomes
  [Gregory and Gallagher, 2002]
  (spoiler: *Losers' speech converges to winners')*
- Natural dialog behaviour in user companion interaction?
  [Rösner et al., 2012]
  (spoiler: *Somewhere between human and machine)*

Corpora at the IMS

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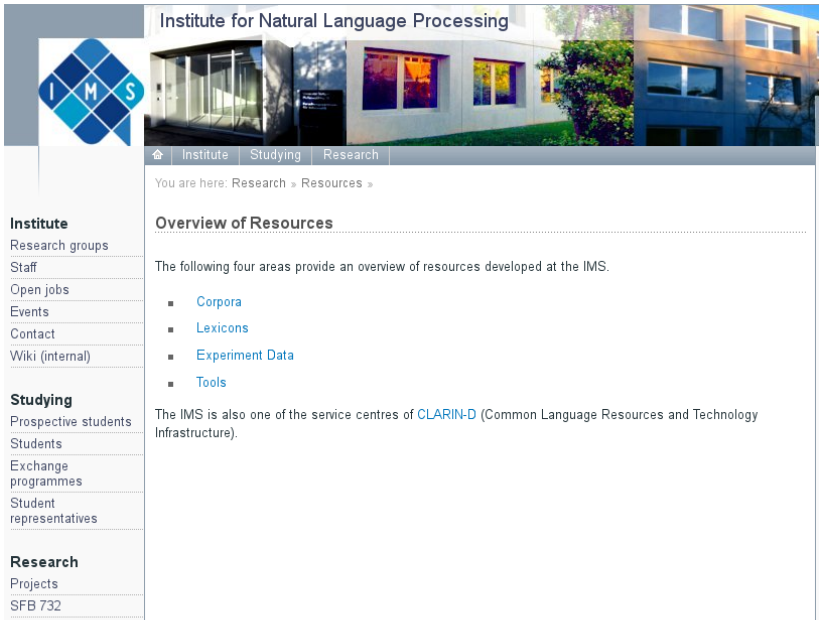
- Online information
  about corpora created or adapted at the IMS:
  `http://www.ims.uni-stuttgart.de/forschung/ressourcen/korpora/index.en.html`



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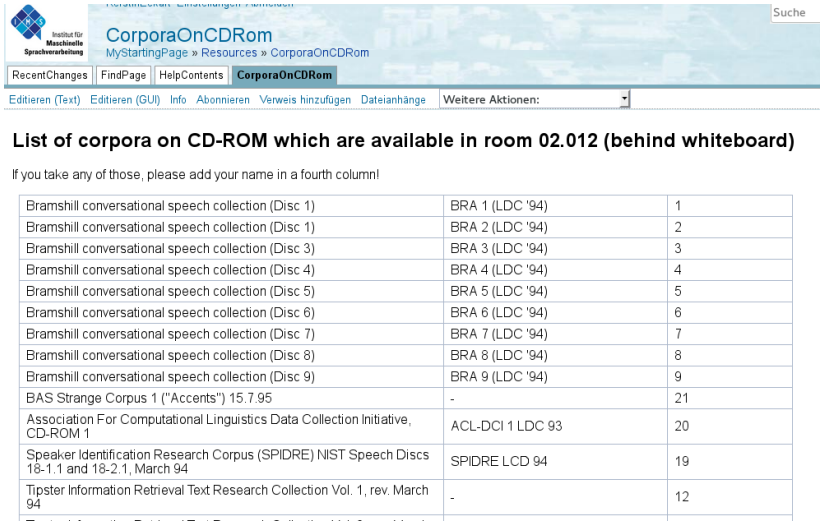

CorporaOnCDRom
MyStartingPage » Resources » CorporaOnCDRom

RecentChanges | FindPage | HelpContents | CorporaOnCDRom

Editieren (Text) Editieren (GUI) Info Abonnieren Verweis hinzufügen Dateianhänge Weitere Aktionen:

List of corpora on CD-ROM which are available in room 02.012 (behind whiteboard)

If you take any of those, please add your name in a fourth column!

Bramshill conversational speech collection (Disc 1)	BRA 1 (LDC '94)	1
Bramshill conversational speech collection (Disc 1)	BRA 2 (LDC '94)	2
Bramshill conversational speech collection (Disc 3)	BRA 3 (LDC '94)	3
Bramshill conversational speech collection (Disc 4)	BRA 4 (LDC '94)	4
Bramshill conversational speech collection (Disc 5)	BRA 5 (LDC '94)	5
Bramshill conversational speech collection (Disc 6)	BRA 6 (LDC '94)	6
Bramshill conversational speech collection (Disc 7)	BRA 7 (LDC '94)	7
Bramshill conversational speech collection (Disc 8)	BRA 8 (LDC '94)	8
Bramshill conversational speech collection (Disc 9)	BRA 9 (LDC '94)	9
BAS Strange Corpus 1 ("Accents") 15.7.95	-	21
Association For Computational Linguistics Data Collection Initiative, CD-ROM 1	ACL-DCI 1 LDC 93	20
Speaker Identification Research Corpus (SPIDRE) NIST Speech Discs 18-1.1 and 18-2.1, March 94	SPIDRE LCD 94	19
Tipster Information Retrieval Text Research Collection Vol. 1, rev. March 94	-	12

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In case that you want to use the corpora on the IMS servers but do not have access yet, please drop by the administration office: 00.008.
To get an account for the IMS Wiki, see
`http://wiki.ims.uni-stuttgart.de/HowToGetAnAccount`

External Catalogues/Initiatives

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- Web corpora
  - WaCky, up to now: de, en, fr, it
    `http://wacky.sslmit.unibo.it`
  - COW – COrpora from the Web, up to now: de, en, es, fr, nl, sv
    `http://corporafromtheweb.org/`

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- CHILDES – Child Language Data Exchange System
  `http://childes.psy.cmu.edu/`

How to use

- Access and query

- Additional preparation steps

How to use

- Access and query
  - ⇒ depend on
    - available annotation layers and their granularity:
      “Only what has been annotated can be searched for.”
    - tagsets (i.e. vocabulary, granularity)
    - representation format
    - query language

- Additional preparation steps

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  - ⇒ can be done by
    - command line tools (UNIX, CQP,
      Praat scripts (course to come), Festival. . .)
    - database management systems (XML, SQL. . .)
    - visualisation tools (vpf, TigerSearch, ANNIS, **ICARUS**. . .)
    - web interfaces (**CQPweb**, OPUS, COSMAS II, Colibri^2. . .)
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- Additional preparation steps
  - annotation (manual/automatic)
  - extraction of (phenomenon-specific) sub corpus

Showcases

- CQPweb
- ICARUS

Help and training provided by project INF

– please contact us!

Tips

- When utilizing a corpus
  - cite the resource (e.g. via PID) along with its exact version
    $\Rightarrow$ sustainability of results
    $\Rightarrow$ reproducibility
  - have a look at the licensing information (if available)

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    $\Rightarrow$ sustainability of results
    $\Rightarrow$ reproducibility
  - have a look at the licensing information (if available)
- When preparing a corpus
  - do not change the primary data (use additional layers, stand-off annotation)
  - document your workflow
  - make it available and persistent (if possible)

  $\Rightarrow$ be as restrictive as needed for your task,
  but keep in mind that this could be a helpful resource for others as well

Corpora in Phase 3 of the SFB

Silver-standard collection

- non-canonical
- dynamic
- suitable for both large-scale and instance-based exploration

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Up to now:

- radio interviews (DE)

To come:

- radio conversations (FR)
- web data

Further information on the mentioned corpora I

AAC-FACKEL Austrian Academy Corpus DIE FACKEL
http://www.aac.ac.at/apps_digied_fackel.html

BeMaTaC Berlin Map Task Corpus http://u.hu-berlin.de/bematac
[Giesel et al., 2013, Sauer and Rasskazova, 2014]

BNC The British National Corpus, version 3 (BNC XML Edition). 2007. Distributed by Oxford University Computing Services on behalf of the BNC Consortium.
http://www.natcorp.ox.ac.uk/

CHILDES Child Language Data Exchange System http://childes.psy.cmu.edu/

Corpus of Comparisons in Product Reviews http://www.ims.uni-stuttgart.de/forschung/ressourcen/korpora/reviewcomparisons/index.html
[Kessler and Kuhn, 2014]

Corpus of Contemporary American English (COCA) http://corpus.byu.edu/coca/
[Davies, 2010]

DCEP Digital Corpus of the European Parliament
https://ec.europa.eu/jrc/en/language-technologies/dcep
[Hajlaoui et al., 2014]

DDB Deutsche Diachrone Baumbank
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