

World Atlas of Language Structures

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unless otherwise stated

Multilingual Natural Language Processing



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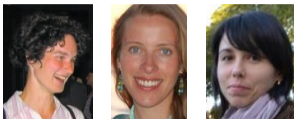
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<http://ufal.mff.cuni.cz/courses/npfl120>




Variability of Languages in Time and Space





- NPFL100
- Sister course of this one
 - You have attended \Rightarrow advantage
 - You haven't \Rightarrow no disaster... but take it next year :-)
- They: more linguistics, less computation
- We: less linguistics, more computation
 - ... today is an exception :-)




Why Multilingual Processing?

- A blatantly incomplete study:
 - ACL main conference proceedings
 - Paper title contains “parsing”
- ACL-COLING 1998 (Montréal, Canada) 
 - 9 papers
 - 3 languages: English (4×), Spanish (1×), German (1×)
 - 4× no evaluation/language
 - English often implicitly, without mentioning it!

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- ACL 2007 (Praha, Czechia) 
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 - 13 languages: en (7×), de (3×); ar, cs, da, eu, ja, nl, pt, sl, sv, zh
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- ACL 2016 (Berlin, Germany) 
 - 24 papers
 - 24 languages: en (18×), de (6×), zh (5×); ar, bg, ca, cs, da, el, es, eu, fr, he, hu, it, ja, ko, ml, nl, pl, pt, sl, sv, tr
 - Max 18 langs/paper; average 3.1 langs/paper

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- Trend:
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 - But usually one language per paper
 - Evaluation on multiple languages
 - Still skewed towards a few families
 - “Big languages” of Eurasia
 - Indo-European, Uralic, Turkic, Semitic, Chinese, Japanese, Korean
 - Resource-poor languages

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- Is my algorithm language-independent?
 - Not likely!
 - Test on 4 IE languages does not prove it!
 - Many families missing or underrepresented
 - Some with hundreds of millions of speakers (Austronesian, Niger-Congo)
 - **Those languages behave quite differently!**

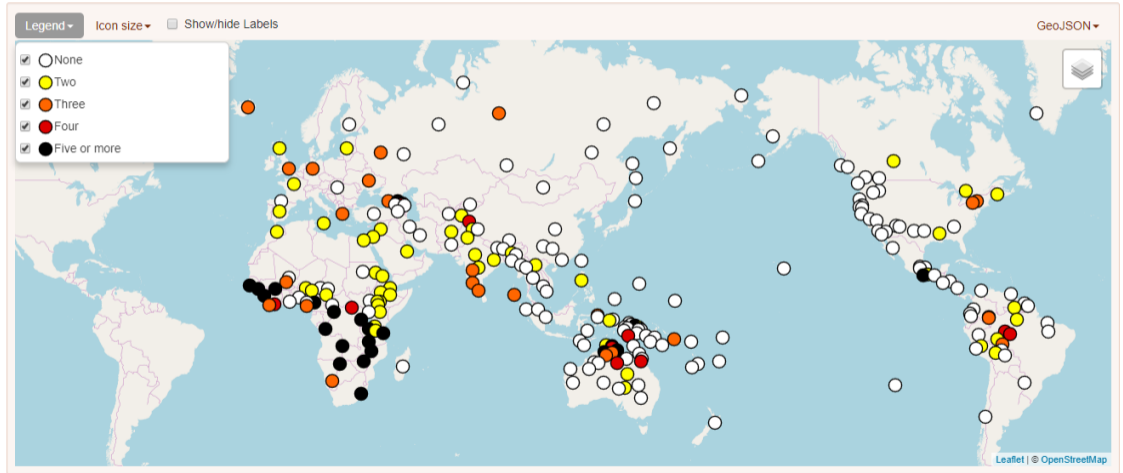
How Many Languages?

- Often cited: 7000 (Ethnologue / SIL)
 - Criticized (Dixon): SIL's aim is translating the Bible
 - Language vs. dialect? Living vs. extinct?
- More realistic: about 4000?
- Many of them endangered

Language Codes

- ISO standard (paid; but unofficial lists are easily obtainable)
- ISO 639-1: two-letter; only major languages
- ISO 639-2: three-letter; more languages; a mess, don't use :-)
 - T-codes: ces, deu, fra, nld, zho, ...
 - B-codes: cze, ger, fre, dut, chi, ...
 - group codes: sla (Slavic), ine (Indo-European), ...
- ISO 639-3: three-letter
 - copy from 639-2/T if exists
 - for other languages: Ethnologue
 - special: mul (multiple langs), mis (langs without code), und (undetermined/unknown), zxx (no linguistic content, e.g. animal sounds)
- Some people/tools use always 639-3
- RFC4646: use 639-1 if available, use three-letter otherwise (e.g. Wiki)
- Glottolog codes: four letters + four digits
 - 8475 entries (<http://glottolog.org/glottolog/language>)

Number of Genders



WALS: Is It Useful for NLP?

- Yes!
- Database of language features is downloadable
 - Currently 192 features (WALS chapters)
- **Similar languages** – needed in cross-lingual projection
- But not all features are helpful everywhere!
 - We process text
 - Features 1A to 19A are about phonology
 - E.g. 1A: Consonant Inventories = Moderately small
 - Features 129 to 138 are about lexicon
 - Those that matter may not all have the same weight
- Some features are useful but sparsely annotated
 - Writing system: only indicated for 5 languages

- Lexical category of nouns
- Agreement or cross-reference elsewhere:
 - Pronouns
 - Adjectives, determiners (inflection)
 - Verbs (inflection)
 - ... or a subset thereof
- Data:
 - Ukrainian and Russian: 3 genders (not 4, with animacy)
 - Czech and Slovak not shown at all
 - English: 3 genders; although only in pronouns!
 - 2 is more similar to 4 than 0 is to 2

Potentially Important Features

- Word order features (18)
- Verbal person marking (4)
- Locus of marking (head marking vs. dependent marking)
- Case (7)
- Endemic function words
 - Copula
 - Question particles in polar questions

- **Prediction of typological features**
- <https://sigtyp.github.io/st2020.html>
- SIGTYP 2020 workshop at EMNLP, November 11/12, Punta Cana, Dominican Republic
 - Workshop paper submission deadline: 15.7.2020
 - (but the deadline for the shared task might be different)
- ⇒ possible replacement of homework in this course?