Eesti Keele Instituut

Example sentences in Estonian learners' dictionaries

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General outline

- Short overview of functions of the IEL
  - Dictionary projects
- Estonian Collocations Dictionary
  - Automatic extraction of the dictionary database
- Example sentences in learners' dictionaries
  - Good Dictionary EXample (GDEX)
- Future plans

Institute of the Estonian Language

- National Research and Development institution
- Researches modern Estonian, the history of the Estonian language, Estonian dialects and Finno-Ugric cognate languages
- Guarantees the norms of the Estonian standard language
- Has the status of the Office of Onomastic Expertise

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Public funtions of the IEL

- Compilation and upgrading dictionaries and databases
- Free public language advice
- Language care and language planning
- Coordination of nationwide terminological work
- The collection and development of language archives
- Services for people with special needs: speech technology (speech synthesis), dictionaries of sign language
- Online services for language learners

Dictionary projects (1)

- „Estonian Dictionary of Word Families“ (2012)
  - 9000 word families
  - For linguists, lexicographers, teachers of Estonian, language enthusiasts
- „Basic Estonian Dictionary“ (BED) (2014)
  - For learners of Estonian at levels A2-B1
  - 5000 headwords
  - Auxiliary materials (picture pages, study pages, table of countries, peoples, languages, grammar tables)
  - Audio files, speech synthesis

Dictionary projects (2)

- „Estonian Collocations Dictionary“ (ECD) (2018)
  - Corpus-based monolingual online scholarly dictionary
  - For learners of Estonian at levels B2-C1
- Team:

PhD Jelena Kallas
project manager, scientific secretary-somputational lexicographer

Maria Tuulik
lexicographer-junior researcher, PhD student

Kristina Koppel
lexicographer-junior researcher, PhD student

PhD Geda Paulsen
Senior-lexicographer

Collocations

- Semantically transparent, meaningful and statistically significant combinations of content words with other lexical units, e.g. *ilus ilm* ‘beautiful weather’, *tugev vihm* ‘heavy rain’, *koer haugub* ‘the dog barks’

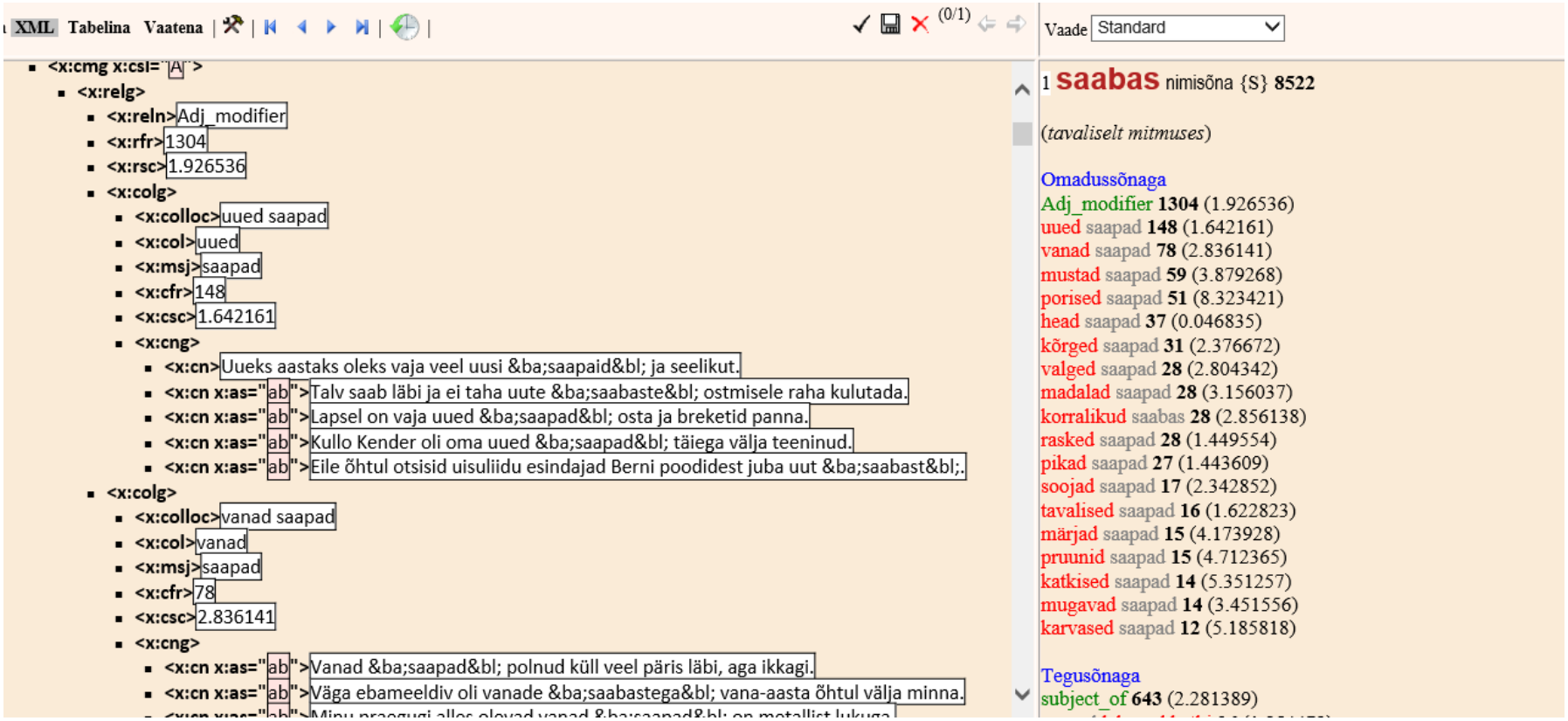
Automatic extraction of the ECD database

- Generated semi-automatically
- CQS Sketch Engine
- Estonian National Corpus (463 million words)
- XML-based in-house DWS EELex

- a selection of lemmas
- Sketch Grammar
- GDEX configuration
- API script

- 10,939 headwords
  - 82,678 gramrels
- 493,971 collocates
- 2,469,855 example sentences

saabas ‘boot’ in EELex



rahvalaul ‘folk song’ in online version of ECD

rahvalaul nimisõna **2841** 2015-12-18T13:57:45

Omadussõnaga Näited

•

Adj_modifier **427**

vaimulik rahvalaul
▪ Vaimulikud **rahvalaulud** on midagi enamat kui lihtsalt vaimuliku sisuga laulud.

regivärsiline rahvalaul

vana rahvalaul

riimiline rahvalaul

lõppriimiline rahvalaul

traditsiooniline rahvalaul

mitmehäälne rahvalaul

ehe rahvalaul

lüüriline rahvalaul

müütiline rahvalaul

iidne rahvalaul

•

participle_modifier **65**

tuntud rahvalaul

Tegusõnaga Näited

•

subject_of

rahvalaul kõlab
▪ Kontserdil kõlavad lüürilised rahvalaulud mõisahärradest, lossipreilidest ja armastusest .

•

object_of **72**

rahvalaule laulma

rahvalaule esitama

rahvalaule koguma
▪ Ta kogub **rahvalaule**.

rahvalaule teadma

rahvalaule õppima

Nimisõnaga Näited

•

omastav_modifies **468**

rahvalaulude töötlus
▪ Laulupeo programm koosnes **rahvalaulude** töötlustest ja kaasaegsete heliloojate loomingust.

rahvalaulude kogumik

rahvalaulude kogumine

rahvalaulude laulmine

rahvalaulude esitamine

rahvalaulu viis

ja/või Näited

•

ja/või **145**

muusika ja rahvalaul
▪ Kavas oli põhiliselt eesti vaimulik muusika ja **rahvalaul**.

rahvaluule ja rahvalaul

Good Dictionary Example (GDEX)

- software part of Sketch Engine
- evaluates syntactic and lexical features
- scores and sorts the sentences

```
formula: >
    (50 * is_whole_sentence() * blacklist(words, illegal_chars) * blacklist(lemmas, parsnips)
    + 50 * optimal_interval(length, 10, 14)
    * greylist(words, rare_chars, 0.1)
    * greylist(tags, pronouns, 0.1)
    ) / 100
variables:
    illegal_chars: ([<|\]\[>/\\^@])
    rare_chars: ([A-Z0-9'.,!?)(;:-])
    pronouns: PRON.*
    parsnips: ^(tory, whisky, jesus, cowgirl, meth, commie, bacon)$
```

Syntax of GDEX configuration files

GDEX for Estonian (1)

- **2014**: Pilot study on sentences in BED, Dictionary of Estonian, web corpus etTenTen13
  - Dictionary examples – gold standard
  - Web corpus sentences – fully authentic

- ?sentence length, word length, the number of subordinate clauses, keyword position etc.

- First configuration → extraction of example sentences for ECD

GDEX for Estonian (2)

- **PhD thesis**: „Parameters of example sentences for Estonian learners' dictionaries“ (supervisors: Jelena Kallas, Raili Pool)

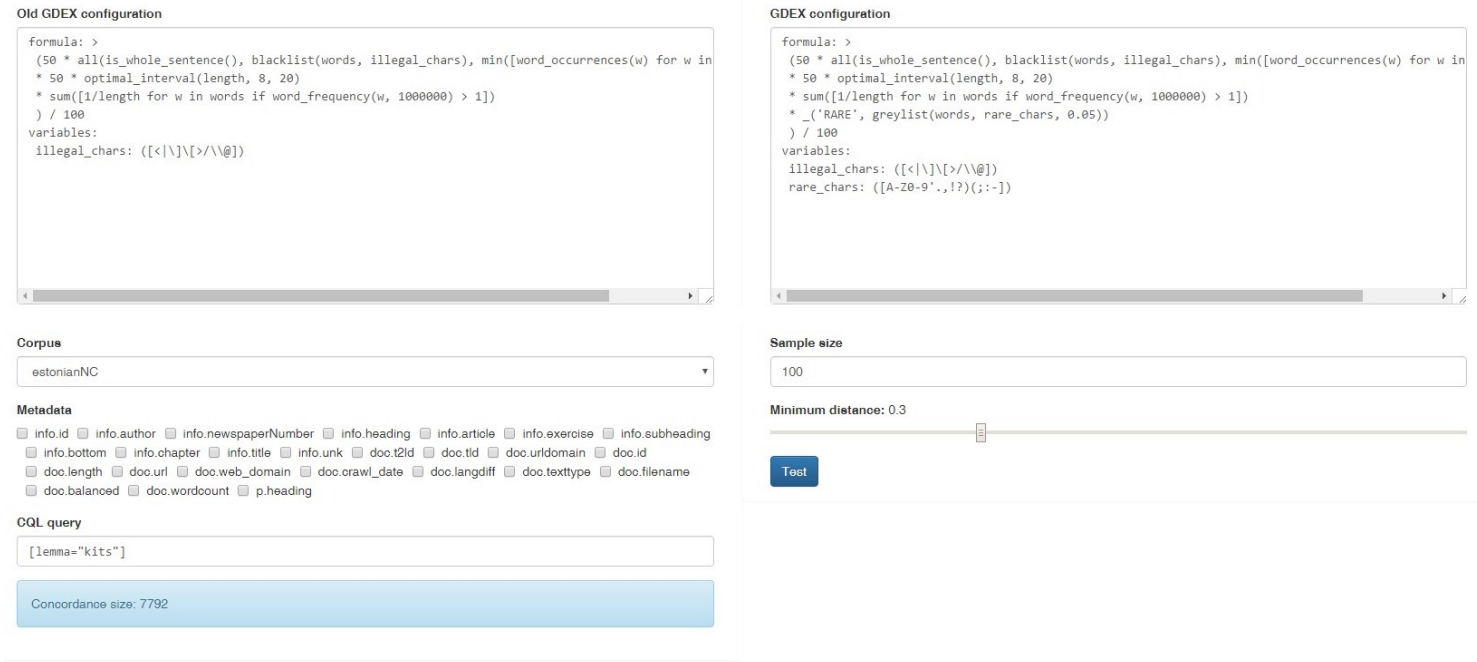
- **2015**: second configuration
  - Corpus containing only sentences picked out by GDEX

- **2016**: STSM in Ljubljana University/Trojina Institute (host: Iztok Kosem) → third configuration

GDEX for Estonian (3)

- Two training datasets:
  - selected examples
  - rejected/non-selected examples
- A script for extracting features of datasets:
  - sentence length
  - sentence initial word (determined by word class)
  - keyword position
  - number of pronouns, adverbs, numerals, commas etc. in the sentence

GDEX editor



Old rank	Rank	Sentence	Old score	Score	RARE
1	1	Kibe töö vähese arvu töölistega ei anna laulmiseks mahti .	0.99	0.98	0.85
2	10	Alates aprillist on traataiaga piiratud platsil iga päev käinud kibe töö .	0.99	0.94	0.50
3	13	Kibe töö käib 13. korrusel tervisekeskuses , kus sebib kümmekond ehitajat .	0.94	0.93	0.75
4	6	Kohe algas ka kibe töö staari imago kujundamisel .	0.89	0.98	0.80
5	18	Päike on juba ammu looja läinud , aga kunstiakadeemia õmblustoas käib kibe töö .	0.89	0.91	0.85
6	16	Balti jaamas käib kibe töö , sest perroonide uuendamine peab lõppema enne jõule .	0.89	0.92	0.90
7	44	Samal ajal käib Kautla baaslaagris kibe töö , et kogu retk edukalt kulgeks .	0.86	0.37	0.55
8	17	Ma saan ainult ette kujutada kui kibe töö käib mängude , veebilehtede etc .	0.85	0.91	0.95
9	24	Praegu käib tõllakuuris kibe töö ja tundub , et restaureerida on veel üsna palju .	0.85	0.88	0.85
10	23	Keset kibedat tööd varises ta California põletavale rannaliivale .	0.83	0.89	0.80

What are good example sentences

- Ideally short
- Syntactically and grammatically not complex
- No low-fequency words
- Headword/collocation in its typical context
- Help to understand the meaning of an unknown word

Parameters of example sentences for Estonian (1)

- full sentence
- sentence length 4-20 tokens
- optimal length 6-12 tokens
- contains a verb
- word length <20 characters
- some characters are prohibited (e.g. <|\]\[>/\\}{^@•·*#_~), some penalized (e.g. ;:“„”«»"’×…§-)
- certain words (e.g. *pigem* ‘rather’, *seetõttu* ‘for that reason’), word pairs (e.g. *seda enam* ‘even more’, *teiste sõnadega* ‘in other words’), sentence initial tags (e.g. conjunction, abbreviation, interjection) are prohibited in the beginning of the sentence

Parameters of example sentences for Estonian (2)

- words with a frequency of <5 are prohibited
- lemmas with a frequency of <1000 are penalized
- keyword repetition is prohibited
- some pronouns, words from graylist (inc. sensitive words, profanities), abbreviations, proper names, certain non-finite constructions are penalized
- sentences containing more than 2 verbs, more than 1 adverb, more than 1 pronoun, more than 1 conjunction, more than 1 proper name, more than 1 number and more than 1 comma are penalized

GDEX output in SkE

What the future holds
for ECD and GDEX

- Integrate corpora with ECD
  - User clicks on a collocate → concordances picked out by GDEX will be shown
- Estonian-Finnish online dictionary (2018)
  - Joint project of Institute for the Languages of Finland and Institute of the Estonian Language
  - Using automated lexicography
- Linking the ECD database to any bilingual dictionary designed for producing Estonian as L2

.. more in the future

- Course book corpus
  - Digitization of course books
  - Annotation of full texts and vocabulary lists
  - Due to time limitation no evaluation process of books/chapters
- Sentence selection
  - Combining rule-based approach with machine learning methods

References

- Gantar, P. & Kosem, I. & Krek, S. (2016). Discovering automated lexicography: the case of the Slovene database. In *International Journal of Lexicography*, 29 (2), 200–225. doi: 10.1093/ijl/ecw014
- Kallas, J. & Koppel, K. & Tuulik, M. (2015). Korpusleksikograafia uued võimalused eesti keele kollokatsioonisõnastiku näitel. [New possibilities in corpus lexicography based on the examples of the Estonian Collocation Dictionary.] In *Eesti Rakenduslingvistika Ühingu aastaraamat*, 11, 75–94. doi: 10.5128/ERYa11.05
- Kallas, J.; Kilgarriff, A.; Koppel, K.; Kudritski, E.; Langemets, M.; Michelfeit, J.; Tuulik, M.; Viks, Ü. (2015). Automatic generation of the Estonian Collocations Dictionary database. Electronic lexicography in the 21st century: linking lexical data in the digital age. Proceedings of the eLex 2015 conference, 11-13 August 2015, Herstmonceux Castle, United Kingdom. Ljubljana/Brighton: Trojina, Institute for Applied Slovene Studies/Lexical Computing Ltd, 1−20.
- Kilgarriff, A.; Rychly, P.; Smrž, P. & Tugwell, D. (2004). The Sketch Engine. In: G. Williams, S. Vessier (eds.) Proceedings of the XI Euralex International Congress. Lorient: Université de Bretagne Sud, pp. 105–116.
- Kilgarriff, A.; Husák, M.; McAdam, K.; Rundell, M. & Rychlý, P. (2008). GDEX: Automatically finding good dictionary examples in a corpus. In E. Bernal & J. DeCesaris (eds.) Proceedings of the 13th EURALEX International Congress. Barcelona: Institut Universitari de Linguistica Aplicada, Universitat Pompeu Fabra, pp. 425–432.
- Koppel, K. (2017). Heade näitelausete automaattuvastamine eesti keele õppesõnastike jaoks. [Automatic detection of good dictionary examples in Estonian learner's dictionaries.] In Eesti Rakenduslingvistika aastaraamat, pp. 53−71.
- Kosem, I.; Husák, M. & McCarthy, D. (2011). GDEX for Slovene. In Proceedings of eLex 2011, pp. 151–159.
- Kosem, I. & Gantar, P. & Krek, S. (2013). Automation of lexicographic work: an opportunity for both lexicographers and crowd-sourcing. In I. Kosem, J. Kallas, P. Gantar, S. Krek, M. Langemets, & M. Tuulik (eds.) Electronic lexicography in the 21st century: thinking outside the paper. Proceedings of the eLex 2013 conference, 17–19 October 2013, Tallinn, Estonia, 17–19. http://eki.ee/elex2013/proceedings/eLex2013_03_Kosem+Gantar+Krek.pdf
- Langemets, M.; Loopmann, A. & Viks, Ü. (2006). The IEL dictionary management system of Estonian. In G.-M. De Schryver (ed.) DWS 2006: Proceedings of the 20 Fourth International Workshop on Dictionary Writing Systems: Pre-EURALEX workshop: Fourth International Workshop on Dictionary Writing System. Turin, 5th September 2006. Turin: University of Turin, pp. 11–16.