Main Trends in Semantic-Research of Estonian Language Technology

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A short history of computational linguistics in Estonia

- History started before teaching of computational linguistics already in early sixties.
  - The first electronic computer in Estonia was established at Tartu University in 1959
- One of the first non-mathematical tasks the enthusiasts attacked was machine translation.
- A special program of mathematical and structural linguistics was started.
- Beginning of 70ties started to build an information retrieval system for legal texts in Estonian, and in the frames of this a thesaurus of legal terms was compiled.

A short history of computational linguistics in Estonia(2)

- Turn to artificial intelligence and, in the frames of this, to language understanding and human-computer interaction.
  - Language understanding system TARLUS
- And this was the actual beginning of the Research Group of Computational Linguistics.
- In 2006 started the National Program for Estonian Language Technology.

Structure of WordNet

- Wordnets have been developed for several languages (over 50 languages) in the world.
- The main idea and basic design of all wordnets in the project came from Princeton WordNet.
- Each wordnet is structured along the same lines: synonyms are grouped into synonym sets (synsets).
- Synsets are connected to each other by semantic relations:
  - like hyperonymy (is-a) and meronymy (is-part- of)
  - most of them are reciprocated (e.g. if koer (dog) has hyperonym loom (animal) then loom (animal) has hyponym koer (dog))

Estonian Wordnet

- For Estonian there are two concept-based thesauri available:
  - thesaurus compiled by Saareste has more of an historic value
  - the modern and most famous one is the Estonian Wordnet
- The creation of Estonian Wordnet was started within the project EuroWordNet (1997-2000).
- In 2006 started the project for increasing EstWN and is supported by Estonian National Programme on Human Language Technology.
- The number of concepts in thesaurus is more than 40 000 (nouns, verbs, adjectives, adverbs).
- There are 43 semantic relations used in Estonian WordNet.

Enlarging EstWN

- Enlarging manually and domain-specificly.
- Concepts from semantic fields like architecture, transportation, personality traits and so on.
- Since one person is dealing with one domain at the time, then it makes the relations between different concepts (in one domain) easier to determine:
  - The concept antique tempel has 1 hyperonym, 11 hyponyms,1 holo-part and 8 mero-part relations.
- Around 3000 noun synsets were automatically transferred from the Estonian Synonym Dictionary.
- Automatically we have included an amount of words which have been derived via suffixes ("Enriching Estonian WordNet with derivations and semantic relations" in Proceedings).

Metaphors, Multi-Word Units and Compounds in EstWN

- How to supplement metaphors and multi-word units (idioms etc) into EstWN.
- Metaphors and metaphorical meanings of words are a topical issue in linguistics and lexicology and they surely should be considered in building a thesaurus.
- In Estonian, compounds are almost always written as single words and therefore separated from multi-word expressions.
- Including compound words into wordnet-type thesaurus is a problem for Estonian language
- There the usage of Corpus of Estonian Written Language can be helpful, it is important to include at least the frequent ones.

Revision of Estonian Wordnet

- Revising of adverbs using a questionnaire type of mini-test
  - Sense granularity.
  - Clarity of definitions and examples.
- Revising the Taxonomies in EstWN
  - In EstWN word 'inimene' (person) is the word with most hyponyms, more than 800 all together.
  - Study presented solutions of how to decrease the amount of the persons hyponyms.

WSD Corpus of Estonian (1)

- The first project of creating Word Sense Disambiguation Corpus of Estonian started in 2001 within the Senseval-2 competition and this project lasted for a year.
- During the first stage around 110 000 tokens were manually annotated according to senses in Estonian WordNet.
- There were 43 morphologically analyzed texts of fiction from the Corpus of the Estonian Literary Language.
- Only nouns and verbs were the subject of annotation.

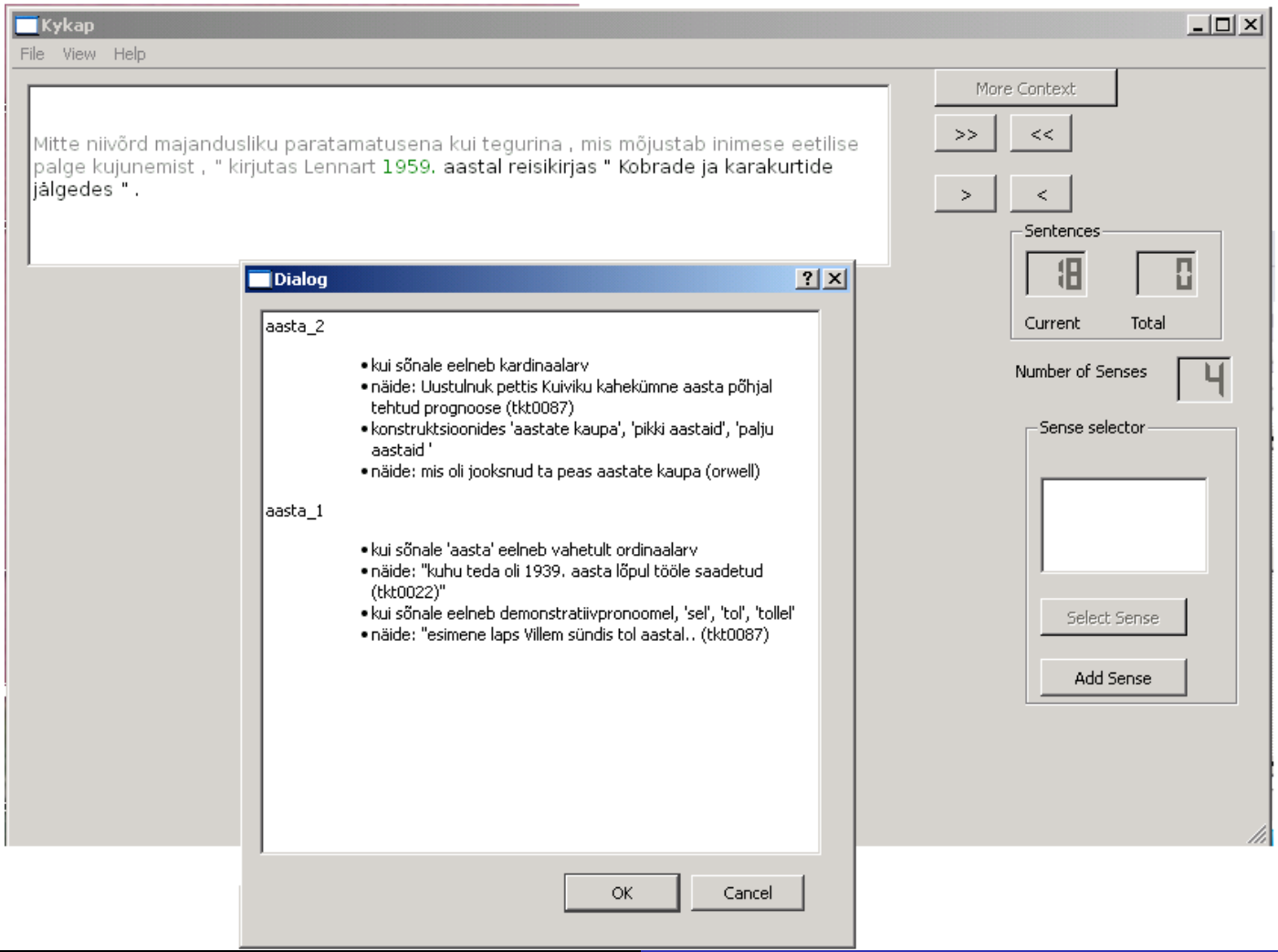
WSD Corpus of Estonian (2)

- The second project started in 2009.
- There are included newspaper texts, scientific texts, informational texts and legal texts.
- Texts come from morphologically disambiguated corpus of Estonian.
- We are now annotating nouns, verbs and also adjectives and adverbs, since these parts of speeches are now present in EstWN.
- We hope to reach to the total amount of words in the corpus of 500 000 by the end of 2010.

Annotation of Senses

- Firstly texts (of 2000 words) are pre-annotated.
  - Monosemous words.
  - Certain word forms.
  - "One sense per one collocation" word pairs.
- Secondly two human annotators tag the words which have not been tagged by the pre-annotation system or correct tags added by pre-annotation process.
  - Annotation tool KYKAP.
- And finally, third person solves the disagreements.

KYKAP


Kykap
File View Help
Mitte niivõrd majandusliku paratamatusena kui tegurina , mis mõjustab inimese eetilise palge kujunemist , " kirjutas Lennart 1959. aastal reisikirjas " Kobrade ja karakurtide jälgedes " .
More Context
>>
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Sentences
Current
Total
Number of Senses
Sense selector
Select Sense
Add Sense
Dialog
aasta_2
• kui sõnale eelneb kardinaalarv
• näide: Uustulnuk pettis Kuiviku kahekümne aasta põhjal tehtud prognoose (tkt0087)
• konstruktsioonides 'aastate kaupa', 'pikki aastaid', 'palju aastaid '
• näide: mis oli jooksnud ta peas aastate kaupa (orwell)
aasta_1
• kui sõnale 'aasta' eelneb vahetult ordinaalarv
• näide: "kuhu teda oli 1939. aasta lõpul tööle saadetud (tkt0022)"
• kui sõnale eelneb demonstratiivpronoomel, 'sel', 'tol', 'tolle'
• näide: "esimene laps Villem sündis tol aastal.. (tkt0087)
OK
Cancel

Semantic analysis of sentences

- For about 5 years working on a LT project called Semantics of simple sentences.
- One of the distant goals in natural language processing has been the semantic analysis of language.
- In addition to the recognition of structure of words and sentences, the computer could also understand the meaning of sentences (ultimately, of texts).
- More at 11.30 presentation: Semantic Analysis of Sentences: The Estonian Experience