Interoperability of Second Language Resources and Tools

Elena Volodina¹, Maarten Janssen², Therese Lindström Tiedemann³, Nives Mikelić Preradović⁴, Silje Ragnhildstveit⁵, Kari Tenfjord⁶, Koenraad de Smedt⁶

¹ University of Gothenburg, Sweden; ² University of Coimbra, Portugal; ³ University of Helsinki, Finland; ⁴ Western Norway University of Applied Sciences, Norway; ⁵ University of Bergen, Norway
What is **Interoperability (of Language Resources)**?

*Ideal picture*
What is Interoperability (of Language Resources)?

Real-life picture
What is **Interoperability of Language Resources**?

*by Chiarcos, 2012*

- **Structural**
  - Annotations of different origin are represented using the same formalism (e.g. stand-off XML or RDF databases)

- **Conceptual**
  - Annotations of different origin are linked to a common vocabulary (terminological reference repository)

---

What is **Interoperability of Language Resources**?

*by Foulonneau & Riley, 2014*

- **Metadata**
  - Descriptions of the data; resource discovery in search engines, portals and registries. (+filtering?)

- **Technical**
  - Data aggregation

- **Content**
  - Comparable content of the resources – based on metadata

---

What is Interoperability of Language Resources?

by Ide & Pustejovsky, 2010

...a measure of the degree to which diverse systems, organizations and/or individuals are able to work together to achieve a common goal.

• For computers
  • **syntactic** interoperability (data formats, communication protocols, data exchange)
  • **semantic** interoperability (ability to automatically interpret exchanged information via a common information exchange reference model)

• For language resources
  • focus is rather on **semantic** interoperability, since syntactic ones are technically mappable via a trivial conversion

What is Interoperability of Language Resources? 

*by Ide & Pustejovsky, 2010*

- **Metadata**
  - characteristics of data expressed through a set of labels (syntactic dimension) and categories (semantic dimension)

- **Data categories and their semantics**
  - e.g. morpho-syntax, syntax, text typologies, etc.

- **Requirements for publication of data and notations**
  - common practices for creating, documenting and evaluating language resources, e.g. agreement on formats and access; encoding; copyright; etc.

- **Requirements for software sharing**
  - software formats, data formats, software integration platforms; possibility to combine different tools; evaluation of software; copyright

---

Interoperability of Second Language Resources and Tools

- Metadata
- Error taxonomies
- Tools
- User interfaces


Workshop on Interoperability of Second Language Resources and Tools

6-8 Dec. 2017 | University of Gothenburg, Sweden

CONTRIBUTION TO CLARIN GOALS
- Promotion of the interoperability of resources and tools in CLARIN by working towards common guidelines for L2 annotation and metadata
- Promotion of the integration of data, tools and services making L2 corpora compatible with corpus tools in CLARIN
- Creating and expanding the CLARIN network of experts in the area of L2 corpora and tools

INVITED TALKS and main program points

Towards standardization of metadata for L2 corpora:
Sylviane Granger, University of Louvain, Belgium

Program in a nutshell:
- Existing corpora
- Corpora under construction
- L2 infrastructures
- Metadata and ethics
- Error annotation
- Tools and software
- Happy user
- Developments on top of L2 corpora
- Discussion à la World café
- Social program

Participants and organizers

Organizers:
- Elena Volodina, Sweden
- Kari Tenfjord & Silje Ragnhildstveit, Norway
- Therese Lindström Tiedemann, Finland
- Nives Mikelić Preradović, Croatia
- Maarten Janssen, Portugal

Participants:
15 countries; 27 participants
L2 metadata
by Granger and Paquot, 2018

- Administrative
  - title, license, availability, ...
- Corpus design
  - L1s, L2s, size, mode, levels, guidelines, ...
- Annotation
  - type: POS, syntax, errors; tagsets, guidelines, tools, ...
- Text
  - mode, author, title, statistics, task types & instructions, ...
- Learner
  - age, gender, L1s, L2s, level, school, education, ...

L2 metadata
in present-day LCR projects

- Varied between L2 corpora
  - no track of various aspects, e.g. Tasks, guidelines, etc
- Restricted by laws and agreements
  - e.g. aggregated birth year spans in one corpus versus exact birth year in another
- Incompatible
  - e.g. Bosnian, Serbian and Croatian L2s separate in one corpus versus BSC in another

Examples: *Korp, Swedish edition*
Taxonomies are like underwear; everyone needs them, but no one wants someone else’s.

(From a presentation by Egon Stemle at CLARIN workshop on interoperability of L2 resources and tools)

### Error taxonomy

**an ideal**

- Same error classification approach across L2 corpora
  - e.g. based on linguistic description (phonology, orthography, morphology, ...) (Dobrić 2015)
- Same granularity
  - 22 tags versus 65 tags
- Theory-independent approach
  - (Tenfjord et al 2006)
- Piloting
  - test on project members first to avoid unreliable / confusing tags
- Annotation
  - e.g. normalization first, error code afterwards (Volodina et al. 2018)
- Annotation quality
  - documented inter-annotator agreement, etc. (Fort 2016)

### Error taxonomy

**in present-day LCR projects**
Example: ASK taxonomy in SweLL pilot

Beata
Statistiska Centralbyrån också i en undersökning år 2001 visar att stressrelaterade och

Elena
Statistiska Centralbyrån också i en undersökning år 2001 visar att stressrelaterade och

Julia
Statistiska Centralbyrån också i en undersökning år 2001 visar att stressrelaterade och

Gloss: Central Statistical Agency [...] also in a report from 2001 [shows (finite verb)] that stress-related and…

Error code explanations: INV: Non-application of subject/verb inversion, OINV: Application of subject/verb inversion in inappropriate contexts, O: other word (or phrase) order error.
Pluralism of formats and outputs, often inaccessible, or proprietary. Some examples:

- Feat (Hana et al 2010)
- TEITOK (Janssen 2016)
- SVALA (Rosén et al 2018)
- Falko-tools (Müller & Strube 2006)

**Tools**

*in present-day LCR projects*

- Accessible
- User-friendly
- Well-documented
- Accompanied by user manuals
- Collected in one repository for re-use
- Annotation quality

**Tools**

*an ideal*
Some tools

feat

```
  budu   se   vratit  domu
    |     |      |  |
    X    X    incorBase   |
  incorInf  formQuant0
  stylColl
    formQuant0
  domu
```

```
  budu   se   vratit  domu
    |     |      |  |
    X    X    incorBase   |
  incorInf  formQuant0
  stylColl
    formQuant0
  domu
```

```
  vratím   se   domu
    vbx     |     |
    cvf    X   |
    domu
```

```
  vratím   se   domu
    vbx     |     |
    cvf    X   |
    domu
```
Some tools

SVALA

- revert
- auto
- disconnect
- merge
- group
- deselect

Enter label...

- M-verb

He get to cleaned his son

M-verb

O M-verb

He got his son to clean the room

S-M

S-M
Various formats exist, but most of the search tools rely on xml format → need to have a TEI-conformant version of all corpora

- Search builder – varies between interfaces
  - Not all metadata is visualized or is made searchable

- Basic and advanced modes
- Selection of error types to be correlated with speaker features
- Metadata re-use & filtering
Some user interfaces

Swedish Korp

Search query & filters

Task description

Hits in KWIC format

Metadata

Statistics
Some user interfaces
Some user interfaces

**ANNIS**

<table>
<thead>
<tr>
<th>learner</th>
<th>von</th>
<th>20</th>
<th>in</th>
<th>Stadt</th>
<th>X</th>
<th>exestierte</th>
<th>Baugenossenschaften</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH1</td>
<td>von</td>
<td>20</td>
<td>in</td>
<td>Stadt</td>
<td>X</td>
<td>existierten</td>
<td>Baugenossenschaften</td>
</tr>
<tr>
<td>TH1Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CHA</td>
<td></td>
</tr>
<tr>
<td>TH2</td>
<td>von</td>
<td>20</td>
<td>in</td>
<td>Stadt</td>
<td>X</td>
<td>existenten</td>
<td>Baugenossenschaften</td>
</tr>
<tr>
<td>TH2Diff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CHA</td>
<td></td>
</tr>
<tr>
<td>EA_category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>G_Morphol_Wrong</td>
<td></td>
</tr>
<tr>
<td>EA_category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O_Graph</td>
<td></td>
</tr>
<tr>
<td>EA_category</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V_semdenot_word_fs</td>
<td></td>
</tr>
</tbody>
</table>
Prospects

• Non-trivial work, time-consuming, community depending
  • a lá Universal Tagset / Universal Dependencies

• Pluralism (in tools and formats) is healthy, BUT we need a common conversion mechanism, a lá transformators, between the pluralistic approaches

• Need for insights from several perspectives
  • Second Language Acquisition researchers, (learner corpora) linguists, teachers, language testing specialists
  • NLP researchers, software engineers, Systems developers
Follow-up

- **Suggestions for future:** [https://goo.gl/bW24Sq](https://goo.gl/bW24Sq)

- **Joint publication** in LCR 2018 post-conference volume (accepted, publication date 2019):
  - Egon W. Stemle (Italy), Adriane Boyd (Germany), Maarten Janssen (Portugal), Therese Lindström Tiedemann (Finland), Nives Mikelić Preradović (Croatia), Alexandr Rosen (Czech Republic), Dan Rosén (Sweden), Elena Volodina (Sweden). *Working together towards an ideal infrastructure for language learner corpora.*

- **CLARIN survey of L2 corpora:**
  - *L2 learner corpus survey – Towards improved verifiability, reproducibility and inspiration in learner corpus research.* By Therese Lindström Tiedemann, Jakob Lenardič and Darja Fišer. CLARIN 2018

- **COST action:** application is planned

- **Follow-up workshop:** is planned
References 1


References 2


- **Tenfjord, K., Johansen, H., & Hagen, J. E.** (2006). The" Hows" and the" Whys" of Coding Categories in a Learner Corpus (or" How and Why an Error-Tagged Learner Corpus is not "One Big Comparative Fallacy"). *Rivista di psicolinguistica applicata*, 6(3).

Thank you!

Our aim

Type C  Europlug fits all, more than 130 countries