Text to SL translation

International workshop on Sign Language Translation and Avatar Technology (SLTAT)

Challenge 1: Symbolic translation

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Zoomed-out line

- Challenges
- What we do
SLs and translation

• **Statistical methods for automatic translation**
  – Automatic learning of word or phrase mappings [A]
  – LARGE corpus of aligned parallel texts needed [B]
  – Alignment: probabilistic models of sequences [C]

• **Translation between WrL and SL**
  – SL: under-resourced languages → issue with B
  – SL: spatio-temporal grammar, temporal rules (sequences) not sufficient → issue with C
  – WrL: all syntactic structures align with lexical sequence; SL: not everything produced necessarily in sync with a given articulator (multi-linearity) → issue with A
We need more linguistics!

• **Lexicon**
  – Usually phonetic descriptions with too little lexicography
  – Frozen, depicting, pointing signs all in same list
  – Often missing sign inflexion rules: context location, size...
  – Heavily focused on manual components

• **Grammar**
  – Semantic use of signing space is necessary
  – Spatio-temporal linguistic structures
    → what and how things synchronise

• **Translation**
  – Shallow translation and WrL-to-WrL models as they exist not looking good
  – Our question is: how far from semantic processing can we reasonably stay??
From corpus analysis to evaluation

We need more corpus!

- Under-ressourcedness: little morpho-syntactic knowledge but too little data to perform corpus studies and acquire it
- Corpora must be built...
  - Material from multiple signers, various genres, different SIs, etc.
  - Mocap and video data?
- ...and annotated
  - Big question: what and how to annotate?
  - Re-usability: non-partisan annotation
We need more evaluation!

- Output of the implemented systems:
  - Objective methods, e.g. recognition rates, reading back animations
  - Subjective methods, e.g. SL users spontaneous feedback
- But also what lies behind: what about the models?
  - Indicators: language coverage, ease of notation, implementation...
  - Question: how should we evaluate language/anatomic models?
LIMSI on lexicon modelling

• The Zebedee model [Filhol 2009]: sequence of time units specified with sets of geometric constraints

• Input used for GeneALS [Delorme 2009], corpus built ~ 2,000 signs

• Additional software for:
  – Searching through data base
  – Parsing, processing geometric objects
Overview, with description example of index pointing sign
- **NSCs** (finger may bend)
- **Context deps**, e.g. dir-verbs, iconic geometric features...

In essence:
- Sign variability is part of every sign's descr, accounted for on the first level
- Context dependencies enable to specify semantic interfaces
- Internal dependencies relevant to cognitive features, surface production only just “happens”
LIMSI on grammar modelling

- Corpus study (difficulty: what articulators? how fine a timeline?)

- Design of formalism (Azalee) for synchronising “sign parts”

- Rule/pattern finding (from annotation) and describing

- TODO here: most of it
LIMSI on evaluation

- Spontaneous feedback on virtual signing understanding: experimental protocol design by ergonomist [Devos 2009]

- Evaluation of Zebedee: 2,000 descr in DB [Filhol 2010] = (DictaSign concept list) U (IVT LSF dictionary)

- TODO for further evaluation on models:
  - transfer to (willing) linguists for expert feedback on linguistic validity of the approach to description
  - Put together the descr-to-anim pipeline to evaluate the output animations
LIMSI on corpora

- **Corpus building**
  - with DictaSign
  - [Segouat 2010]
  - Websourd-SNCF

- **Corpus annotation**
  - **Problem:**
    - what grids?? ← now *that* is *some* question
    - how objective can we get and still be useful/re-usable?
  - **Per se:**
    - FLS glossing on DictaSign corpus (Trevor, please react here)
    - Numerical (xy-coordinates of points on eyebrows) [Chételat 2010] vs. empirical (categories built on the fly) [Segouat 2010]
    - Signing space: tentative ways of annotating (re-)use of signing space locations or zones

- **TODO:** Signing space annotator, with (or inspired by) previous IRIT software VIES
Conclusion

Challenges

– Corpus building to better resource the target language and enable abstraction → more data to allow moving away from it!
– More linguistic input to inform models → crucial to include linguistics in language-related computer applications, and that linguists make the effort to... talk to “us”
– Still the question of evaluation...
Questions?

To be

or not to be.