Recap: UW Seminar on MRS and Other Semantic Representations (KWLH)

Emily M. Bender
University of Washington

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Course inspiration and goal

- Semantics reading group with Luke Zettlemoyer in Summer 2012, comparing MRS to CCG-derived (or inspired) lambda calculus representations

- Seemed like it should be possible to map from MRS to the representations Zettlemoyer et al wanted

- ... and that finding out where that was non-trivial would be an interesting way to understand what aspects of meaning are and aren't represented in MRS

http://faculty.washington.edu/ebender/2013_575/

KWLH

Linguistics 575: KWLH paper

- What you already **know** (~1 page)
- What you **want** to learn (~1 page)
- What you **learned** (~3 pages)
- **How** you'll apply it in your research/studies (~2 pages)
- Write the 'K' and 'W' parts by 4/8 (as pdf, to CollectIt).
- Keep notes along the way for L and H.
- 'L' and 'H' parts due (with 'K' and 'W' prepended) 6/3 (as pdf, to CollectIt).

(NB: Got this idea from an education prof)

K:

- MRS (Copestake et al 2005) attempts to capture (part of) the invariant meaning (conventionally) associated with strings

- Building semantic representations compositionally constrains the form the representations can take

- Such ‘sentence-meaning’ is only one contributor to ‘speaker-meaning’, or the message that is communicated in an actual situation (Reddy 1993 [1979], Clark 1996)

- Different researchers use the term ‘semantics’ to refer to different things

W:

- What information is captured in MRS (from the ERG [Flickinger 2000, 2011]) that other representations miss?

- What information is captured in other representations that is not (yet) available in MRS (from the ERG)?

- More generally, what do we mean by semantics when we call the ERG's MRSs semantic representations?

Term project assignment

Term project specs

- Choose target representation (with associated annotated corpus).
- Parse representative sample of the corpus with the ERG (at least 100 items, ideally more)
- Develop translation procedure to map ERG-produced MRSs to target representations. (Can be rule-based or stochastic.)
- Measure:
  - How much information in target representations is not mappable from ERG/MRS
  - How much information in MRS is suppressed (not mapped)
- Analyze (by looking at the data in detail):
  - What kinds of information are carried across
  - What kinds of information are mis-matched

Term project write-up

Write up

- Describe target corpus (see corpus assignment)
- Describe mapping procedure
- Report on measurements of mappability (see evaluation plan)
- Report analysis of what is and isn't mapped
- Reflect on what the mismatches mean about semantics and meaning

Schedule of topics

4/1	What is meaning? What is semantics? The DELPH-IN ecology
4/8	The Conduit Metaphor, MRS
4/15	Target corpora presentations
4/22	LFG, GMB
4/29	Evaluation, evaluation presentations
5/6	Quantifier scope
5/13	Reading MRSs
5/20, 6/3	Term project presentations

Term project target corpora

- SOUR CREAM (recipes, Tasse and Smith 2008)
- GeoQuery (Zelle & Mooney 1993)
- Thai grammar MRSs
- JavaDoc corpus
- FrameNet (Ruppenhofer et al 2010) over MASC (Ide et al 2008)
- Gene Regulation Event Corpus (GREC, Thompson et al 2009)
- Abstract Meaning Representation (AMR, Banarescu et al 2013)
- Groningen Meaning Bank (GMB, Basile et al 2012): DRS
  - DRS > MRS
  - MRS > DRS
  - MRS & DRS > FOL

L: High level

- Given a task and an evaluation metric, NLP types really want to optimize on that metric; getting people to focus on error analysis instead takes work

- Human annotators applying semantic annotation schemes include lots of world knowledge
    - And there's a temptation to normalize in ways that seem perhaps unmotivated

- Tasks where the annotations map to instructions tend to be closer to speaker meaning but also to drop more of the sentence meaning (if the correct action can be taken without it)
    - Here at least the normalizations might be more systematic

- Unsurprisingly, compositionally derived representations are closer to sentence meaning

L: What's not in ERG MRS

- Multi-sentence representations (cf. GMB)
- More specific thematic role labels (cf. GMB, GREC, FrameNet); less frequently expressed participant roles (cf. FrameNet)
- Word sense (cf. GMB, AMR)
- Discourse relations (cf. GMB)
- Coreference resolution (cf. GMB, AMR)
- ... whatever "root selection" is meant to represent in AMR
- Biological concept annotations in GREC (e.g., *Repressor, Regulator, Gene*); entity types in AMR
- Apparently random denominalizations in AMR
- Comparison to SOUR CREAM, GeoQuery, JavaDoc was less fruitful for these questions

L: What's in ERG MRS but not (some) others

- Generalized quantifiers (not even in GMB or AMR)
- _d rels (focus_d, p_arg_d)
- *and*, *or* apparently not in GMB
- Scopal modifiers (GMB)
- Person/number/gender information (person/number in GMB, lexicalized in pronoun forms in AMR)
- Partial specification of scope

L: Other

- Relationship between our TAM features and GMB's temporal logic not yet clear

- Direction of semantic functor/argument structure reversed for modifiers in AMR, FrameNet

- Evaluating the mappings involved solving non-trivial alignment problems

- Bridging between string-based annotations and MRS raises several technical challenges (punctuation; finding whole XP from index)

H:

- Pointers on where to look for inspiration for including additional information in MRS (esp. discourse relations)
- Framing of presentations of MRS to broader computational semantics community (e.g., in ESD)
- Design of future seminars

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