An Incremental Parser for Abstract Meaning Representation

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He described her as a genius
• Transition-based dependency parsing (Nivre, 2004)
Concept identification

The proposal

thing

ARG1-of

propose-01

The teacher

person

ARG0-of

teach-01

10 January 1989

date-entity

day

10

month

1

year

1989
I beg you to excuse me
I beg you to excuse me
I beg you to excuse me
Transition-based AMR Parser
The boy wants to believe the girl
The boy wants to believe the girl
The boy wants to believe the girl
The boy wants to believe the girl
The boy wants to believe the girl
Transition system

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Transition system

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Oracle

- Given the current configuration \((\sigma, \beta, A)\) and the gold-standard graph \(G = (V_g, A_g)\):

\[
T(G, \sigma, \beta, A) = \begin{cases} 
\text{LARC}(\ell) \\
\text{RARC}(\ell) \\
\text{RED-REENT}(\ell) \\
\text{REDUCE} \\
\text{SHIFT} 
\end{cases}
\]

- \((\text{English, AMR}) \implies \text{Transitions to obtain AMR}^* \text{ from English}\)
Evaluation
Fine-grained evaluation

- **Smatch.** Cai and Knight (2013)
  - Unlabeled. Smatch score after removing edge labels
  - No WSD. Smatch score while ignoring Propbank senses
  - Reentrancy. Smatch computed on reentrant edges
  - Semantic Role Labelling. Smatch computed on :ARG roles
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Fine-grained evaluation (cont’d)

- **Concepts.** F-score on the concept identification task
- **Negations.** F-score on :polarity roles
- **Named Entities.** F-score on :name roles
- **Wikification.** F-score on :wiki roles
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## Experiments

<table>
<thead>
<tr>
<th>Metric</th>
<th>JAMR ('14)</th>
<th>CAMR</th>
<th>JAMR ('16)</th>
<th>Ours</th>
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<tr>
<td>Smatch</td>
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<td>63</td>
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<tr>
<td>Unlabeled</td>
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<td>No WSD</td>
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<td>SRL</td>
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<td>60</td>
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</tr>
</tbody>
</table>

JAMR: Flanigan et al. (2014)

CAMR: Wang et al. (2015)
Software

- Online demo:
  http://cohort.inf.ed.ac.uk/amreager.html

- Source code for parser:
  https://github.com/mdtux89/amr-eager

- Source code for evaluation:
  https://github.com/mdtux89/amr-evaluation
Graph visualization for this demo is done using AMRICA.
AMREager’s source code can be found on github.

**DEMO**

**Sentence:**
The boy doesn't want to go.

Parse

# :snt The boy doesn't want to go.
# :alignments 1-2|0.1 3-4|0.0 4-5|0.6-7|0.2
(v2 / want-01 :polarity -
 :ARG0 (v1 / boy)
 :ARG1 (v3 / go-02))

http://cohort.inf.ed.ac.uk/amreager.html?sent=The+boy+doesn't+want+to+go.
Conclusions

- AMREager is a linear-time, left-to-right transition system
- AMR parsing akin to dependency parsing
- Fine-grained evaluation suite to assess AMR parsers