

An Incremental Parser for Abstract Meaning Representation

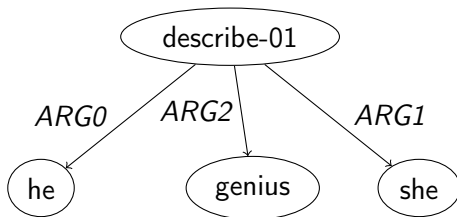
¹ Marco Damonte ¹ Shay B. Cohen ² Giorgio Satta

¹ University of Edinburgh

² University of Padua

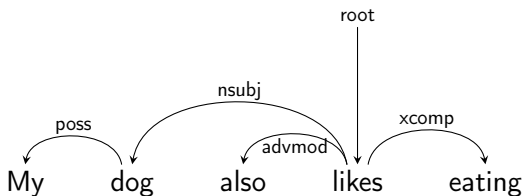
EACL 2017

He described her as a genius



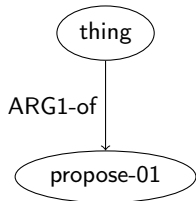
Dependency trees

- Transition-based dependency parsing (Nivre, 2004)

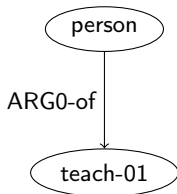


Concept identification

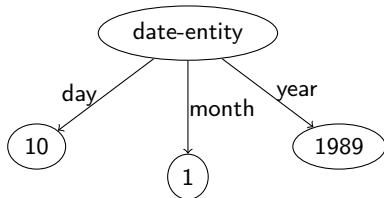
The proposal



The teacher

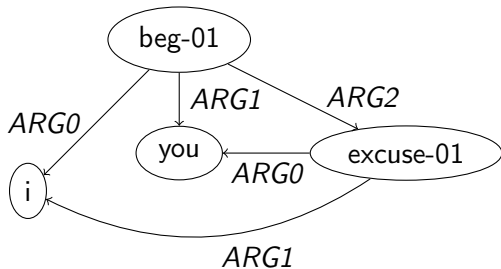


10 January 1989



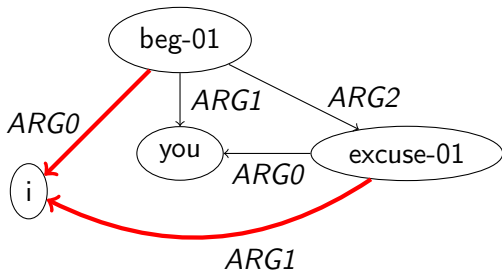
Reentrancy

I beg you to excuse me



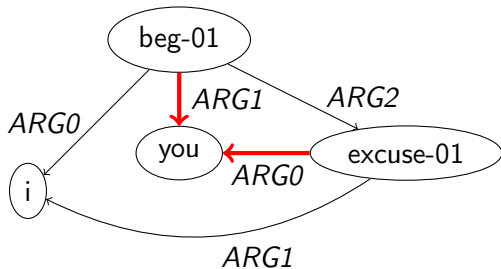
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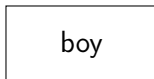


Transition-based AMR Parser

Transition system

The boy wants to believe the girl

STACK

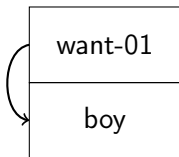


GRAPH

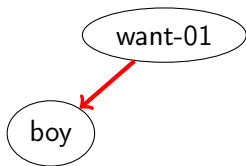
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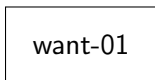
GRAPH



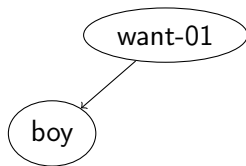
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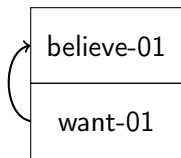
GRAPH



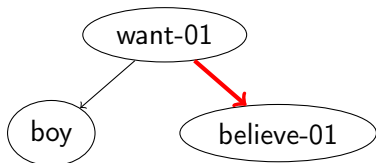
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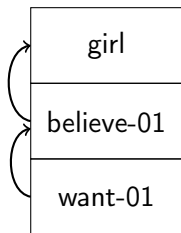
GRAPH



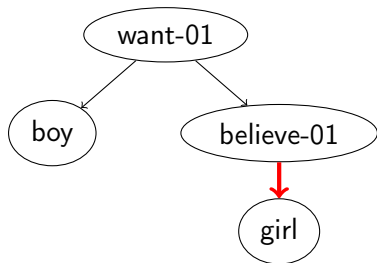
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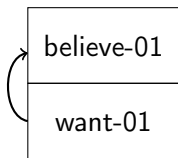
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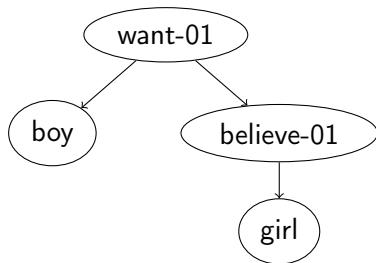
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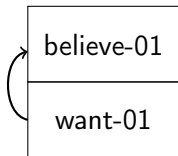
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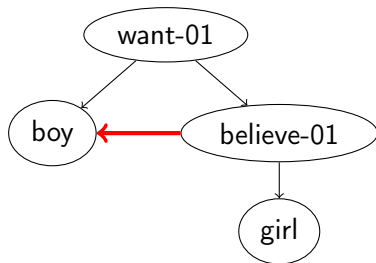
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STACK



GRAPH



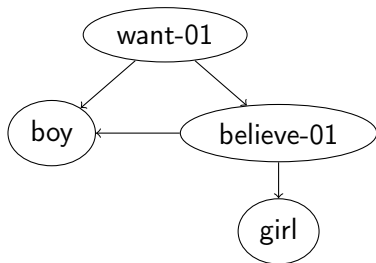
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STACK

want-01

GRAPH

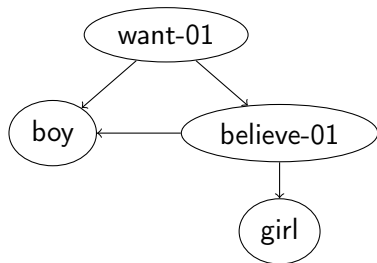


Transition system

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STACK

GRAPH



Oracle

- Given the current configuration (σ, β, A) and the gold-standard graph $G = (V_g, A_g)$:

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

- (English, AMR) \Rightarrow Transitions to obtain AMR* 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

Metric	JAMR ('14)	CAMR	JAMR ('16)	Ours
Smatch	58	63	67	64
Unlabeled	61	69	69	69
No WSD	58	64	68	65
NP-only	47	54	58	55
Reentrancy	38	41	42	41
Concepts	79	80	83	83
Named Ent.	75	75	79	83
Wikification	0	0	75	64
Negations	16	18	45	48
SRL	55	60	60	56

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](#).

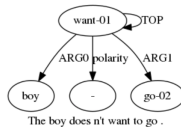
DEMO

Sentence:

The boy doesn't want to go.

Parse

```
# ::snt The boy does n't want to go .  
# ::alignments 1-2|0.1 3-4|0.0 4-5|0.0 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.>

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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