An Incremental Parser for Abstract Meaning Representation

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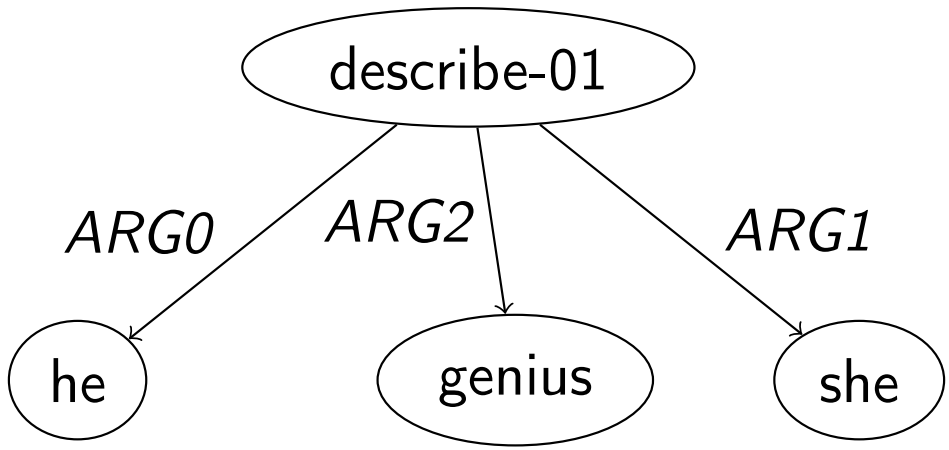
EACL 2017

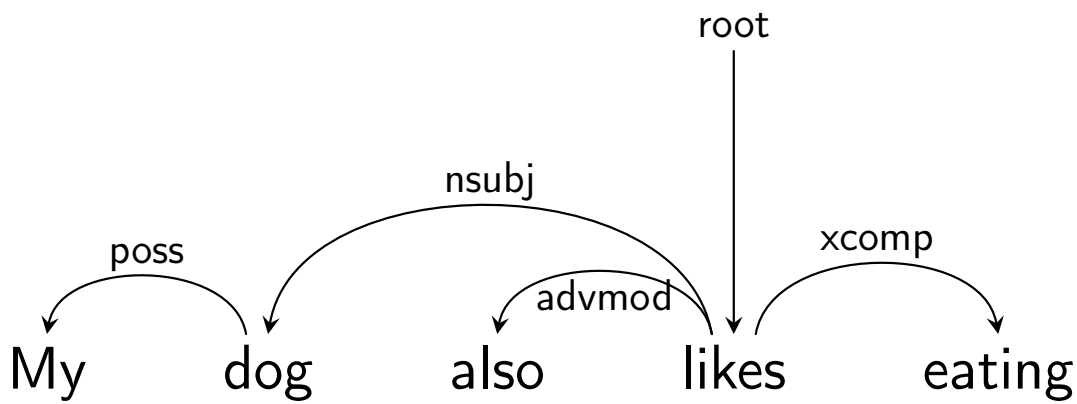
AMR

He described her as a genius



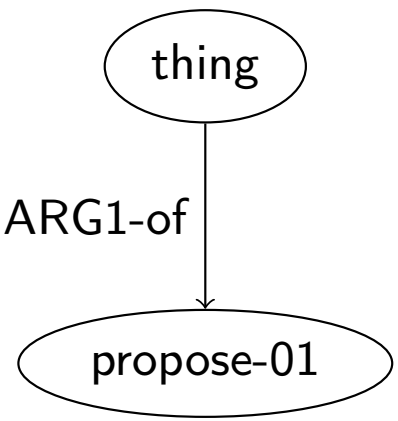
Dependency trees

- Transition-based dependency parsing (Nivre, 2004)

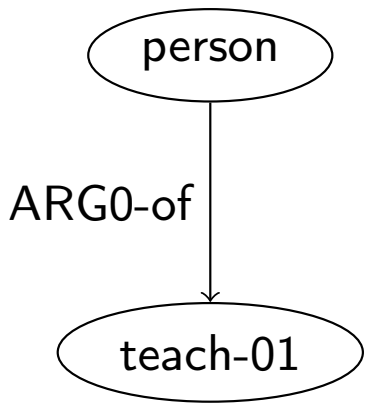


Concept identification

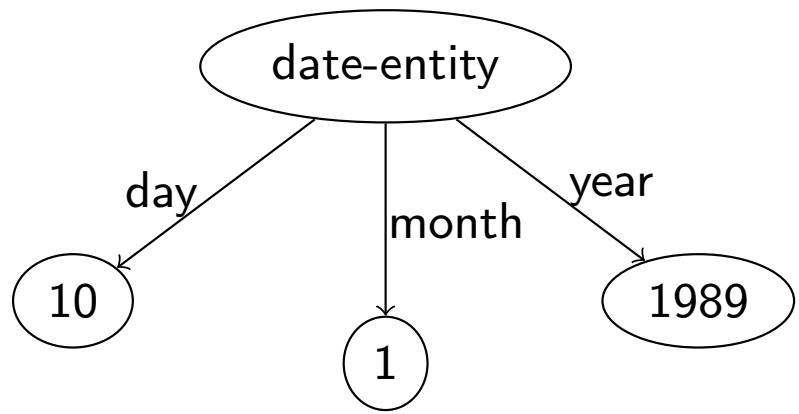
The proposal



The teacher

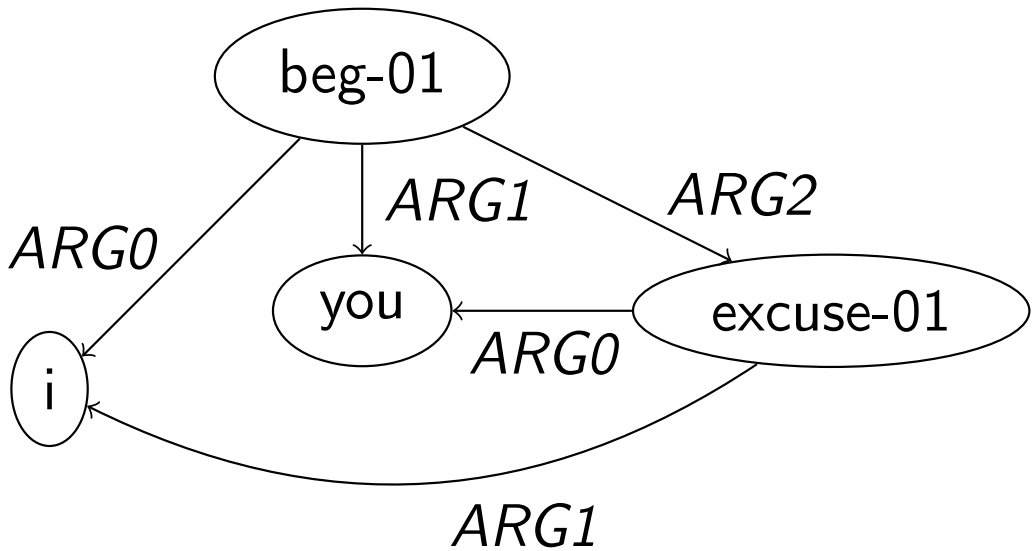


10 January 1989



Reentrancy

I beg you to excuse me



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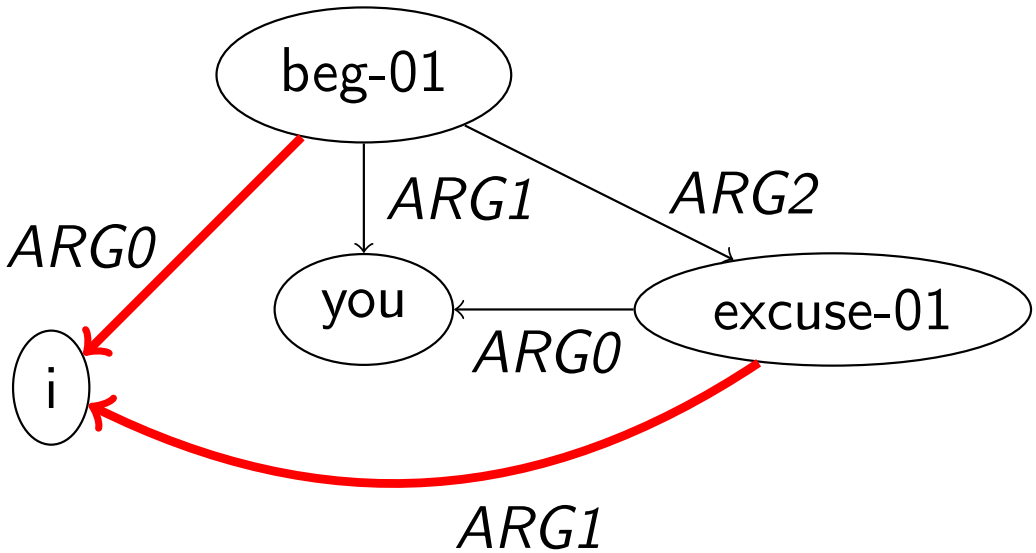

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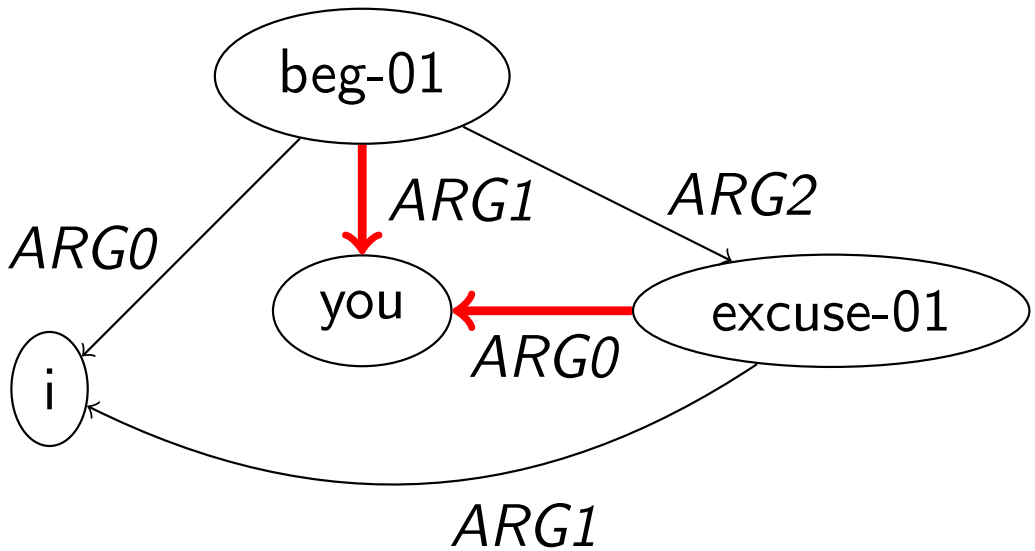


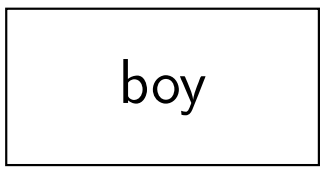
Transition-based AMR Parser

Transition system

~~*The*~~ ~~*boy*~~ *wants to believe the girl*

STACK

GRAPH



Transition system

~~*The boy wants*~~ *to believe the girl*

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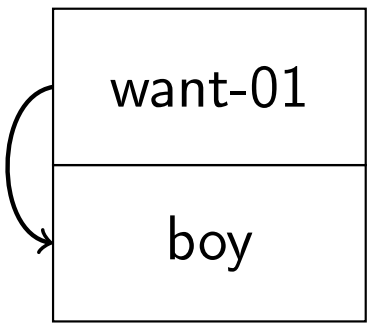

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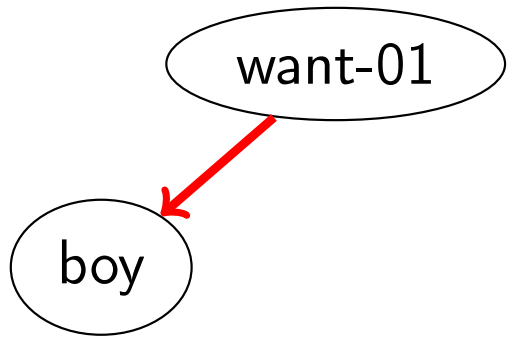

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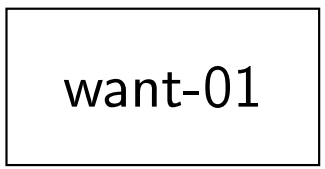

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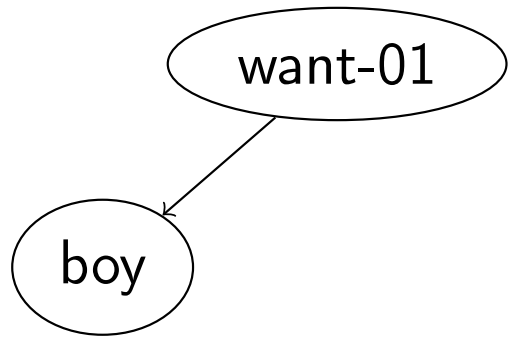

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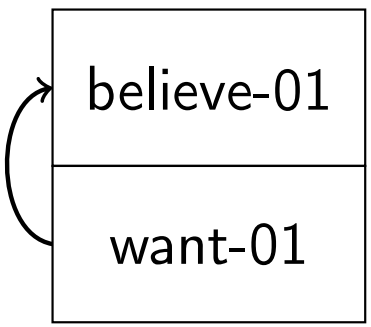

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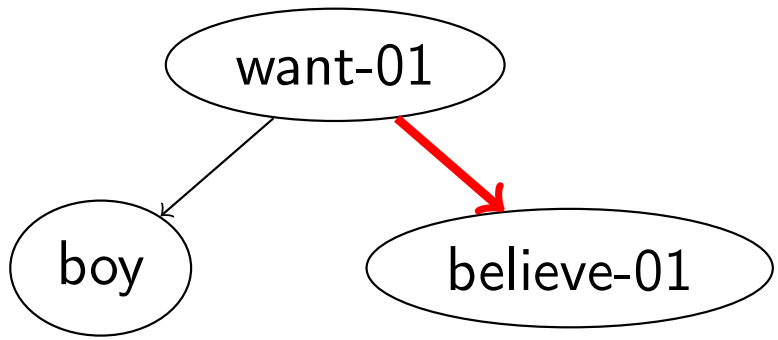

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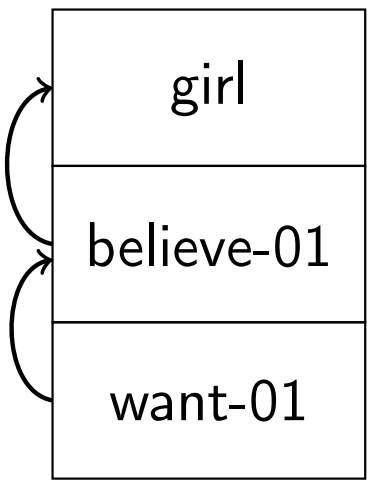

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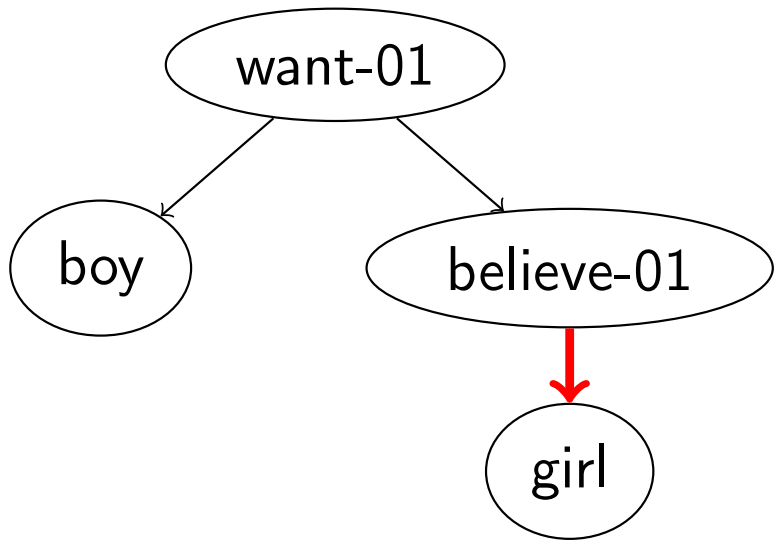

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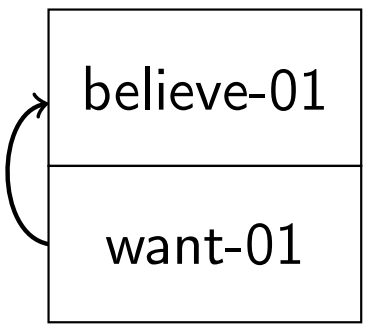

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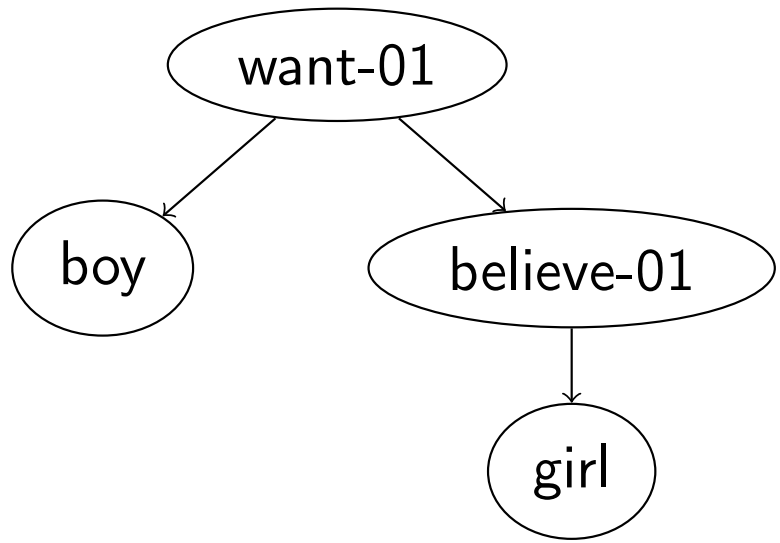

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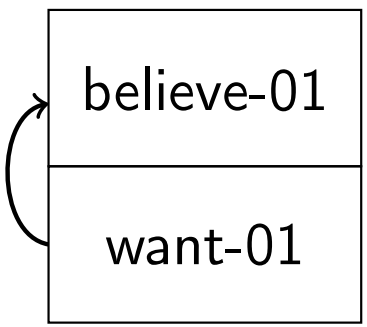

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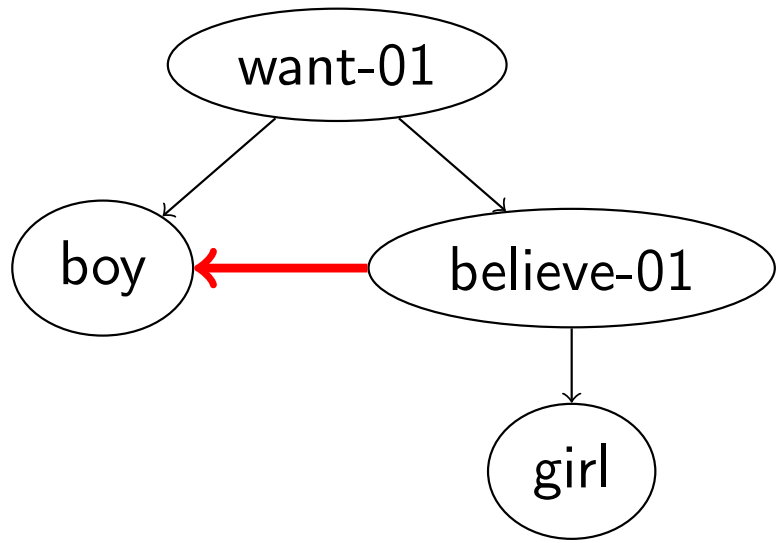

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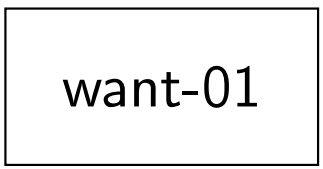

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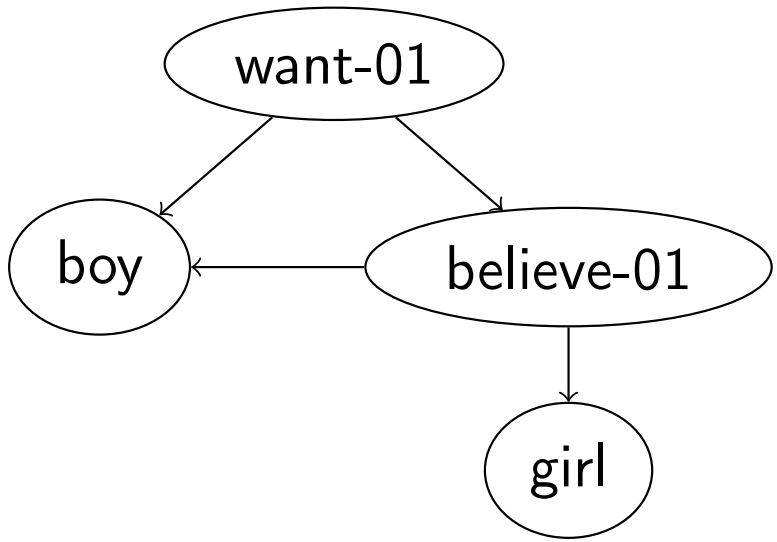

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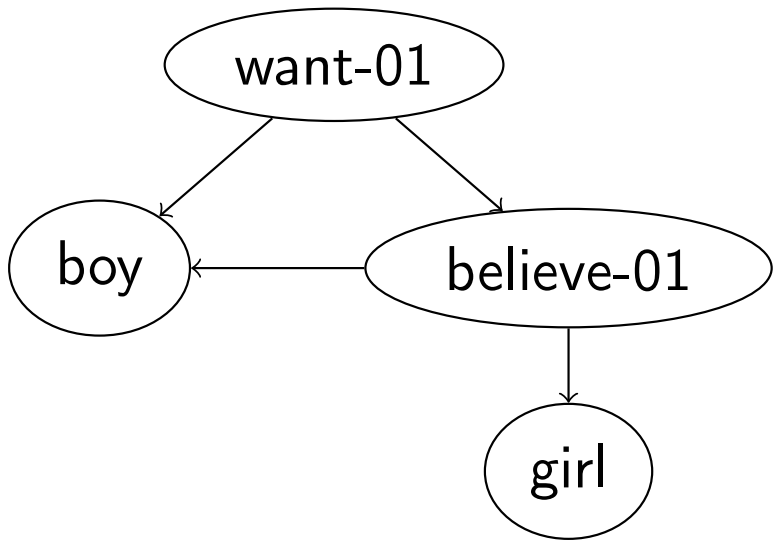

Oracle

- 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

Demo

the cohort ABOUT PEOPLE DEMOS DATASETS & CODE

Graph visualization for this demo is done using AMRICA.

AMREager's source code can be found on github.

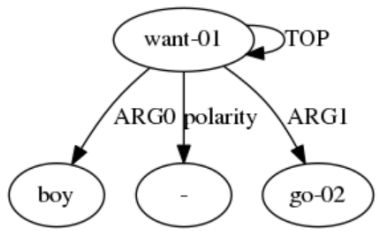
DEMO

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 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