SemEval 2019 Task 1: Cross-lingual Semantic Parsing with UCCA

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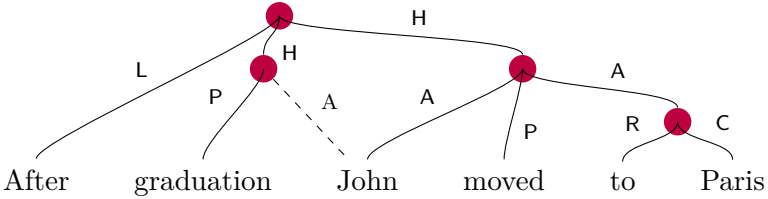
האוניברסיטה העברית בירושלים
THE HEBREW UNIVERSITY OF JERUSALEM

June 6, 2019

Universal Conceptual Cognitive Annotation (UCCA)

Cross-linguistically applicable semantic representation (Abend and Rappoport, 2013).
Builds on Basic Linguistic Theory (R. M. W. Dixon).
Stable in translation (Sulem et al., 2015).



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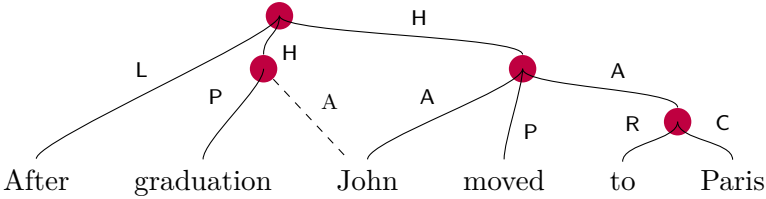

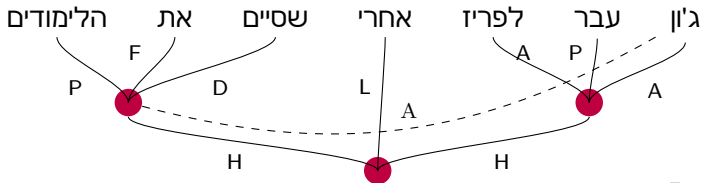

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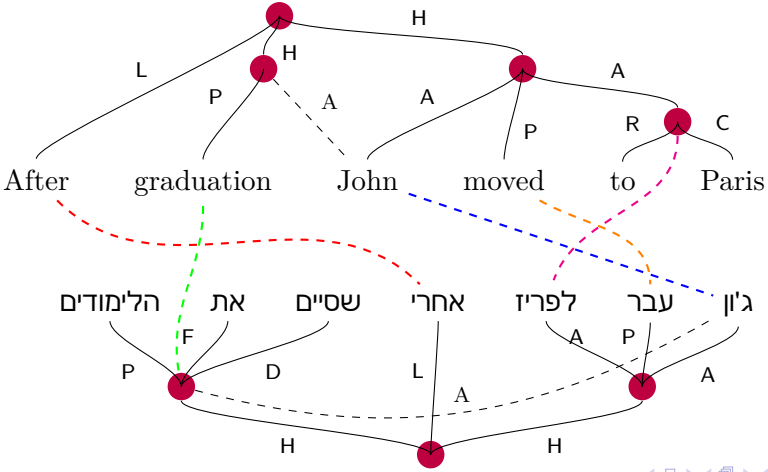
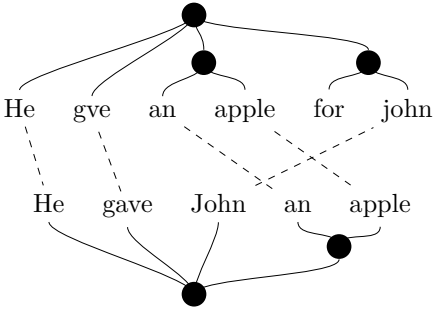
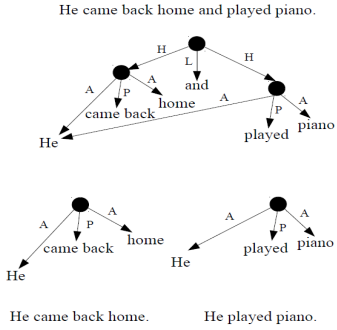


Applications

- Semantics-based evaluation of
  - Machine translation (Birch et al., 2016)
  - Text simplification (Sulem et al., 2018a)
  - Grammatical error correction (Choshen and Abend, 2018)
- Sentence splitting for text simplification (Sulem et al., 2018b).

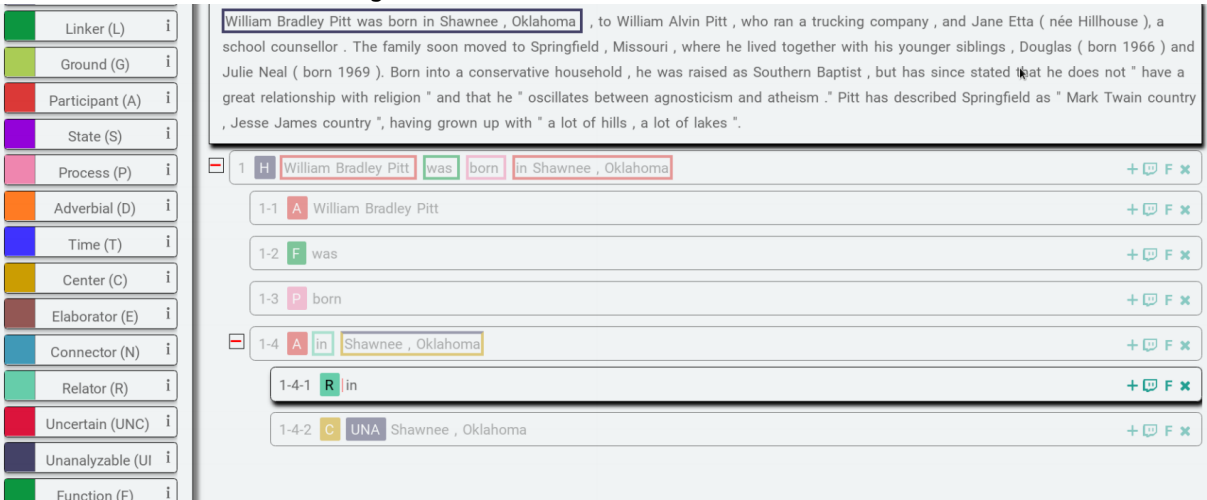




Universal Conceptual Cognitive Annotation (UCCA)

Intuitive annotation interface and guidelines (Abend et al., 2017).

`ucca-demo.cs.huji.ac.il`

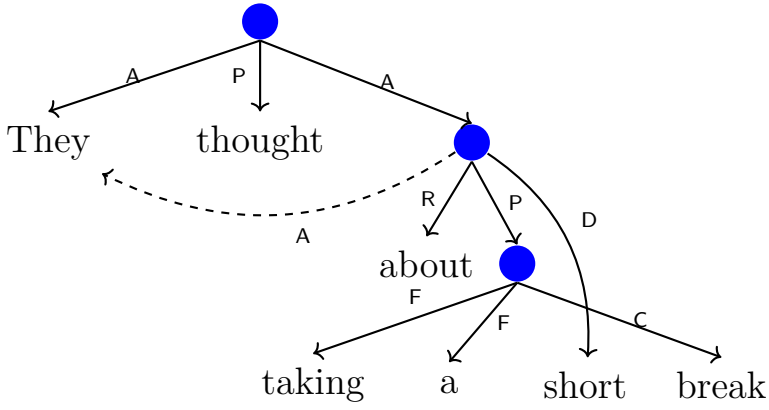


Universal Conceptual Cognitive Annotation (UCCA)

The Task: UCCA parsing in English, German and French in different domains.

Graph Structure

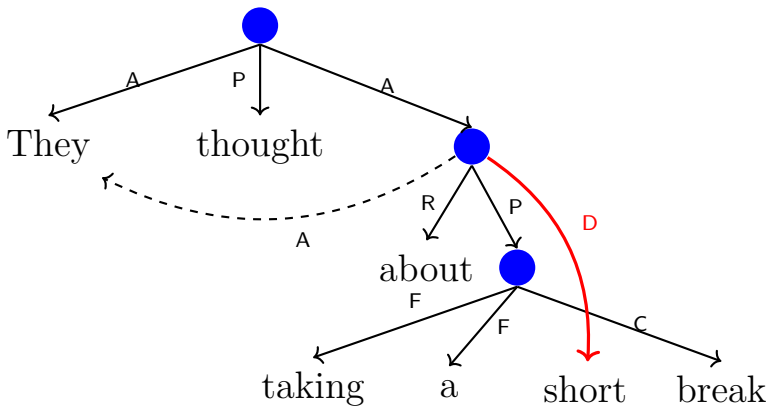
Labeled directed acyclic graphs (DAGs). Complex units are non-terminal nodes.



Graph Structure

Labeled directed acyclic graphs (DAGs). Complex units are non-terminal nodes. Phrases may be discontinuous.

A	Participant
C	Center
D	Adverbial
E	Elaborator
F	Function
G	Ground
H	Parallel scene
L	Linker
P	Process
R	Relator
S	State
U	Punctuation



Graph Structure

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Remote edges enable reentrancy.

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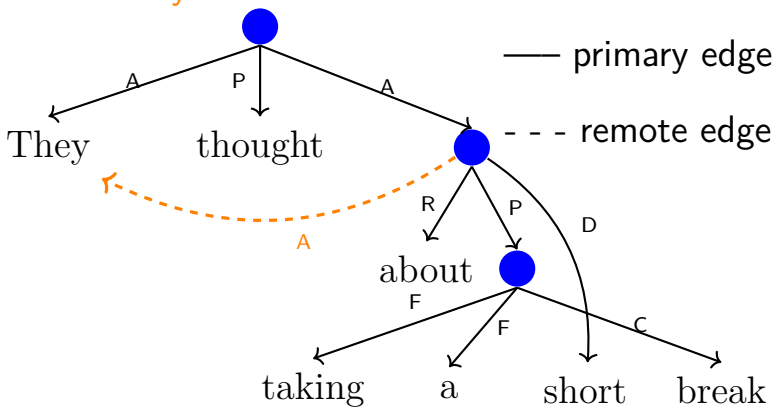
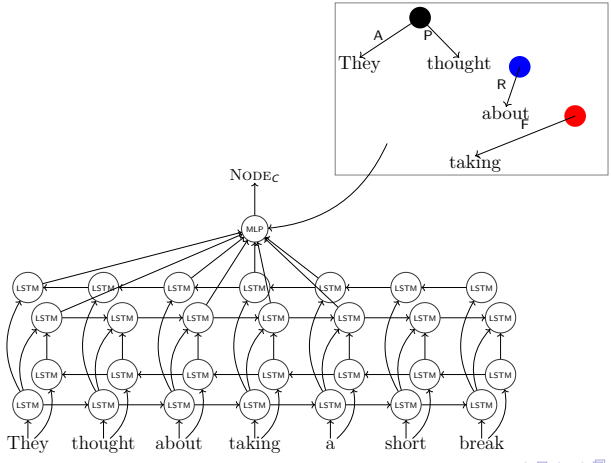


Baseline

TUPA, a transition-based UCCA parser (Hershcovich et al., 2017).
`bit.ly/tupademo`



Data

- English Wikipedia articles (Wiki).
- English-French-German parallel corpus from *Twenty Thousand Leagues Under the Sea* (20K).

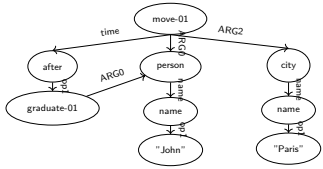
	sentences	tokens
English-Wiki	5,142	158,573
English-20K	492	12,574
French-20K	492	12,954
German-20K	6,514	144,531

Tracks

- English {in-domain/out-of-domain} × {open/closed}
- German in-domain {open/closed}
- French *low-resource* (only 15 training sentences)

Conversion

AMR



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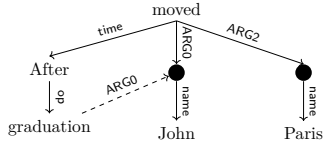
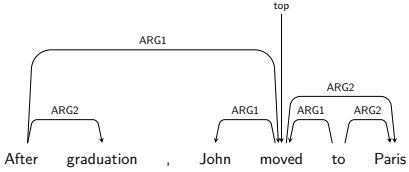


SDP



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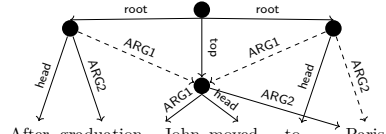
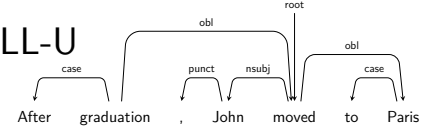


CoNLL-U



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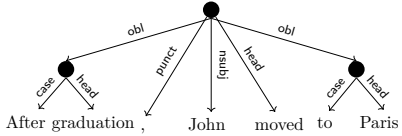
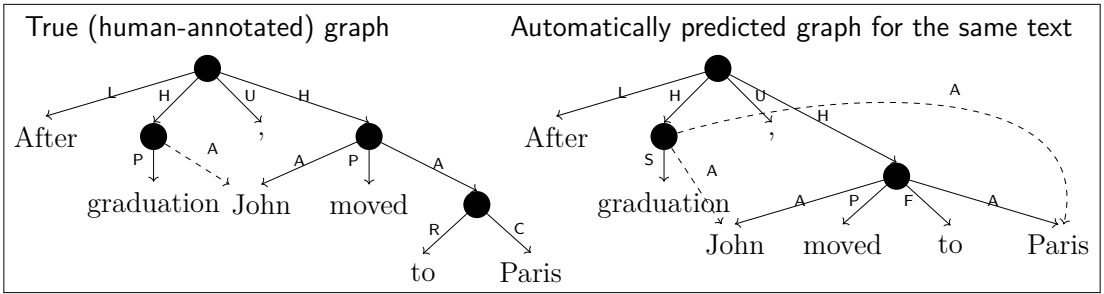
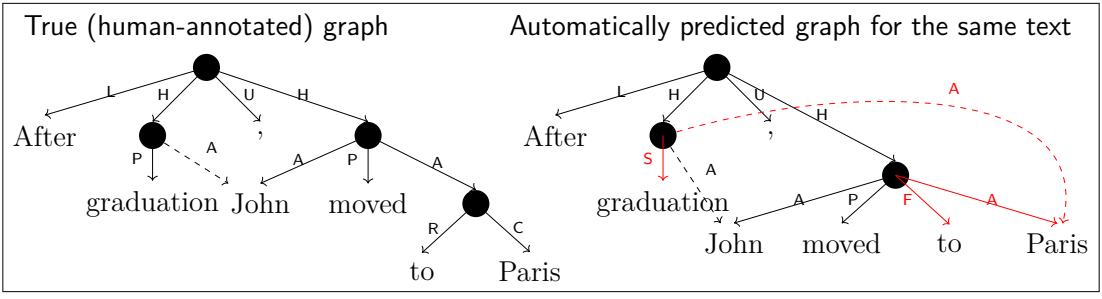


Evaluation



1. Match primary edges by terminal yield + label.
2. Calculate **precision, recall and F1** scores.
3. Repeat for remote edges.

Evaluation



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Primary

P	R	F1
$\frac{6}{9} = 67\%$	$\frac{6}{10} = 60\%$	64%

Remote

P	R	F1
$\frac{1}{2} = 50\%$	$\frac{1}{1} = 100\%$	67%

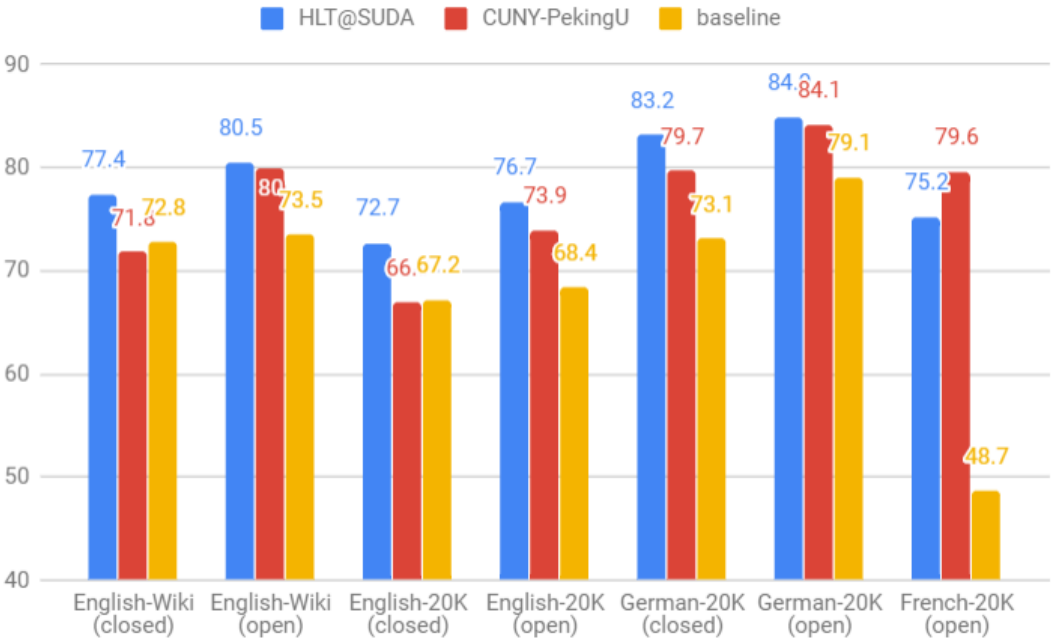
Participating Systems

8 groups in total:

- *MaskParse@Deskiñ* Orange Labs, Aix-Marseille University
- *HLT@SUDA* Soochow University
- *TüPa* University of Tübingen
- *UC Davis* University of California, Davis
- *GCN-Sem* University of Wolverhampton
- *CUNY-PekingU* City University of New York, Peking University
- *DANGNT@UIT.VNU-HCM* University of Information Technology VNU-HCM
- *XLangMo* Zhejiang University

Leaderboard

Track	1st place		2nd place		3rd place		baseline
English-Wiki closed	HLT@SUDA	0.774	baseline	0.728	Davis	0.722	0.728
English-Wiki open	HLT@SUDA	0.805	CUNY-PekingU	0.800	TüPa	0.735	0.735
English-20K closed	HLT@SUDA	0.727	baseline	0.672	CUNY-PekingU	0.669	0.672
English-20K open	HLT@SUDA	0.767	CUNY-PekingU	0.739	TüPa	0.709	0.684
German-20K closed	HLT@SUDA	0.832	CUNY-PekingU	0.797	baseline	0.731	0.731
German-20K open	HLT@SUDA	0.849	CUNY-PekingU	0.841	baseline	0.791	0.791
French-20K open	CUNY-PekingU	0.796	HLT@SUDA	0.752	XLangMo	0.656	0.487


HLT@SUDA
CUNY-PekingU
baseline
90
80
70
60
50
40
77.4
71.8
72.8
80.5
80
73.5
72.7
66
67.2
76.7
73.9
68.4
83.2
79.7
73.1
84.6
84.1
79.1
75.2
79.6
48.7
English-Wiki (closed)
English-Wiki (open)
English-20K (closed)
English-20K (open)
German-20K (closed)
German-20K (open)
French-20K (open)

Main Findings

- HLT@SUDA won 6/7 tracks:
  Neural constituency parser + multi-task + BERT
  French: trained on all languages, with language embedding

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  French: trained on all languages, with language embedding
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Surprisingly, results in French were close to English and German

- Demonstrates viability of cross-lingual UCCA parsing
- Is this because of UCCA's stability in translation?

Conclusion

- Substantial improvements to UCCA parsing
- High variety of methods
- Successful cross-lingual transfer

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Please participate in the CoNLL 2019 Shared Task:
Cross-Framework Meaning Representation Parsing
SDP, EDS, AMR and UCCA mrp.nlpl.eu

Evaluation Period: July 8–22, 2019

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