$$\langle\, h_1,\ \left|\ \begin{array}{l} h_2\text{:\_but\_c}(\_, \_, h_5), h_8\text{:\_this\_q\_dem}(x_{10}, h_{11}, \_), h_{12}\text{:\_theory\_n\_of}(x_{10}, \_), \\ h_{14}\text{:\_would\_v\_modal}(e_4, h_{15}), h_{16}\text{:neg}(\_, h_{17}), h_{19}\text{:\_work\_v\_1}(e_{20}, x_{10}, \_) \end{array} \right|\ \{\, h_{17} =_q h_{14}, h_{15} =_q h_{19}, h_{11} =_q h_{12}, h_5 =_q h_{16}, h_1 =_q h_2 \,\}\,\rangle$$

Site Update: University of Oslo

Recovery from Post-Sabbatical Syndrome

Stephan Oepen

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University of Oslo, Department of Informatics

DELPH-IN Summit; June 16, 2016

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Site Update: University of Oslo

Recovery from Post-Sabbatical Syndrome

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DELPH-IN Summit; June 16, 2016

On Different Approaches to Syntactic Analysis into Bi-Lexical Dependencies

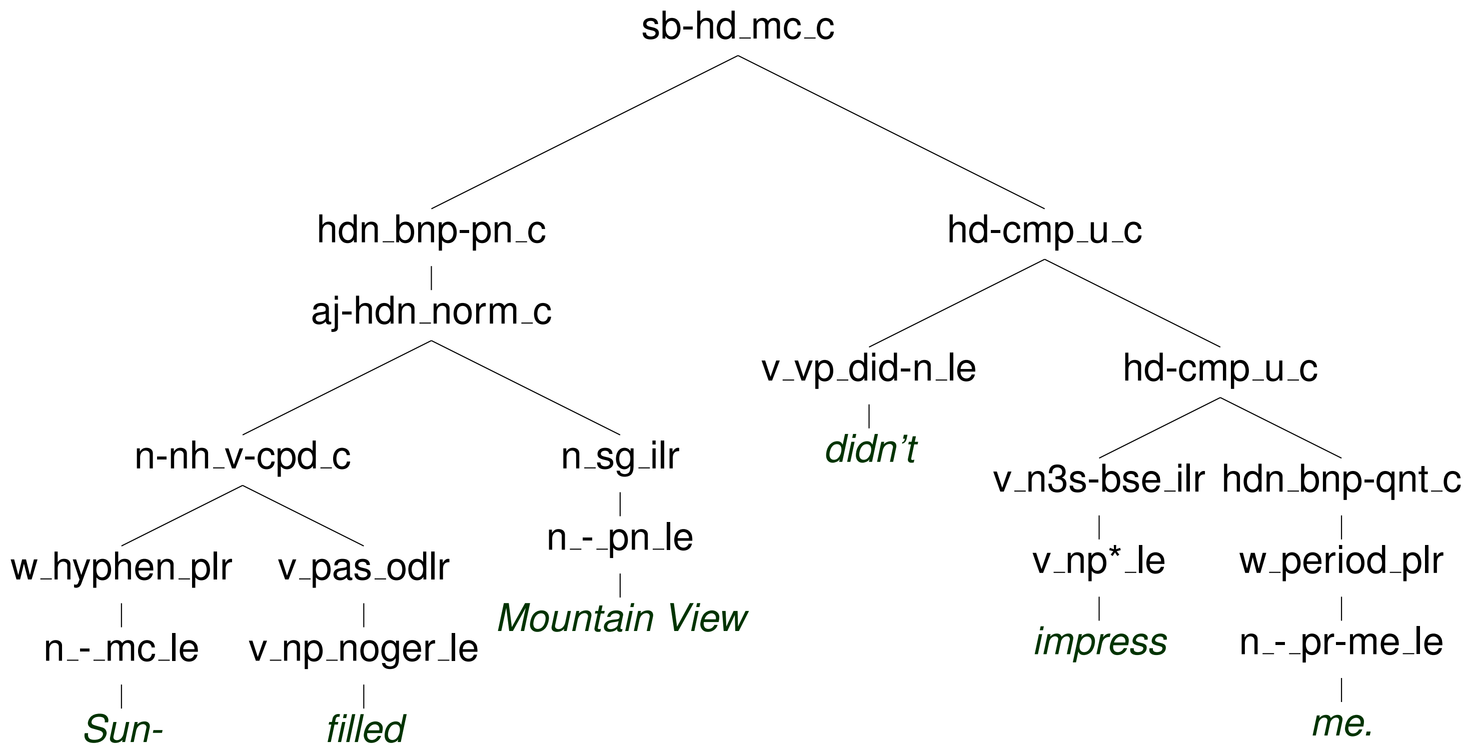
Angelina Ivanova♣, Stephan Oepen♣♢, Rebecca Dridan♣, Dan Flickinger♡, and Lilja Øvrelid♣

♣Department of Informatics, Universitetet i Oslo

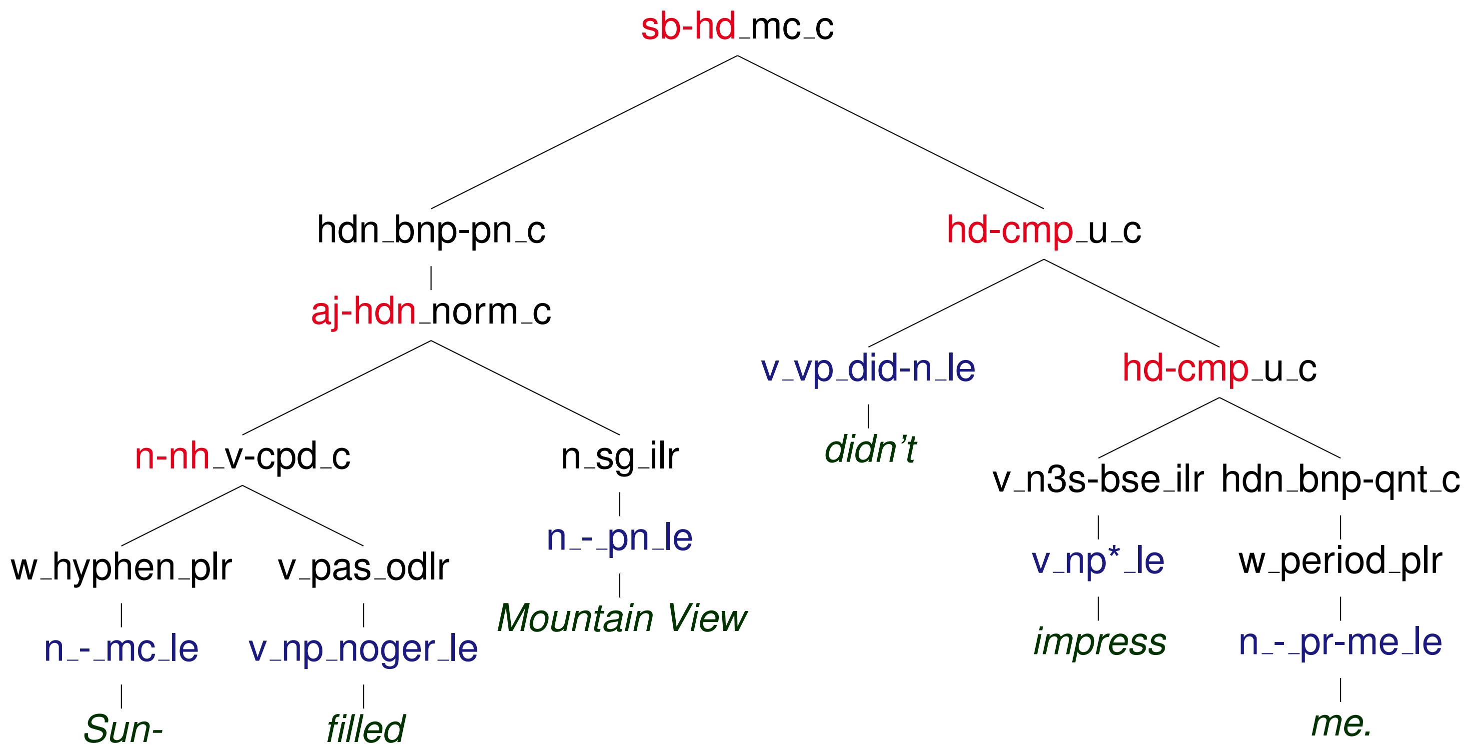
♢Department of Linguistics, University of Potsdam

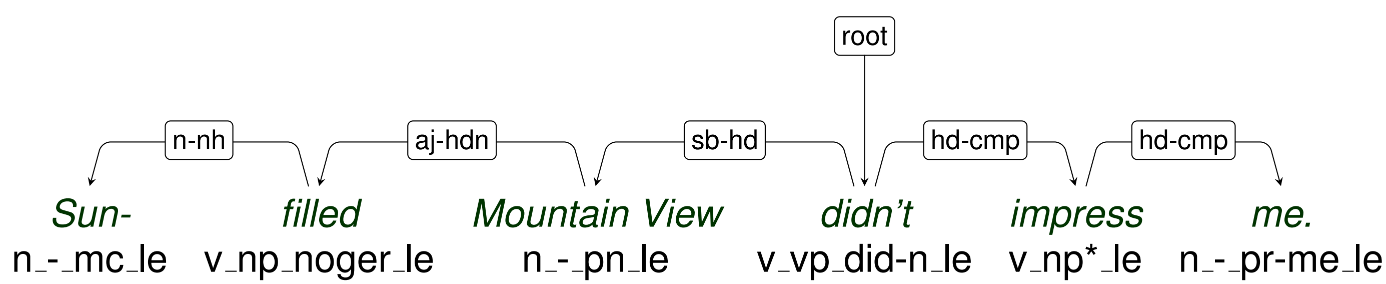
♡Center for the Study of Language and Information, Stanford University

Reducing HPSG to Bi-Lexical Dependencies

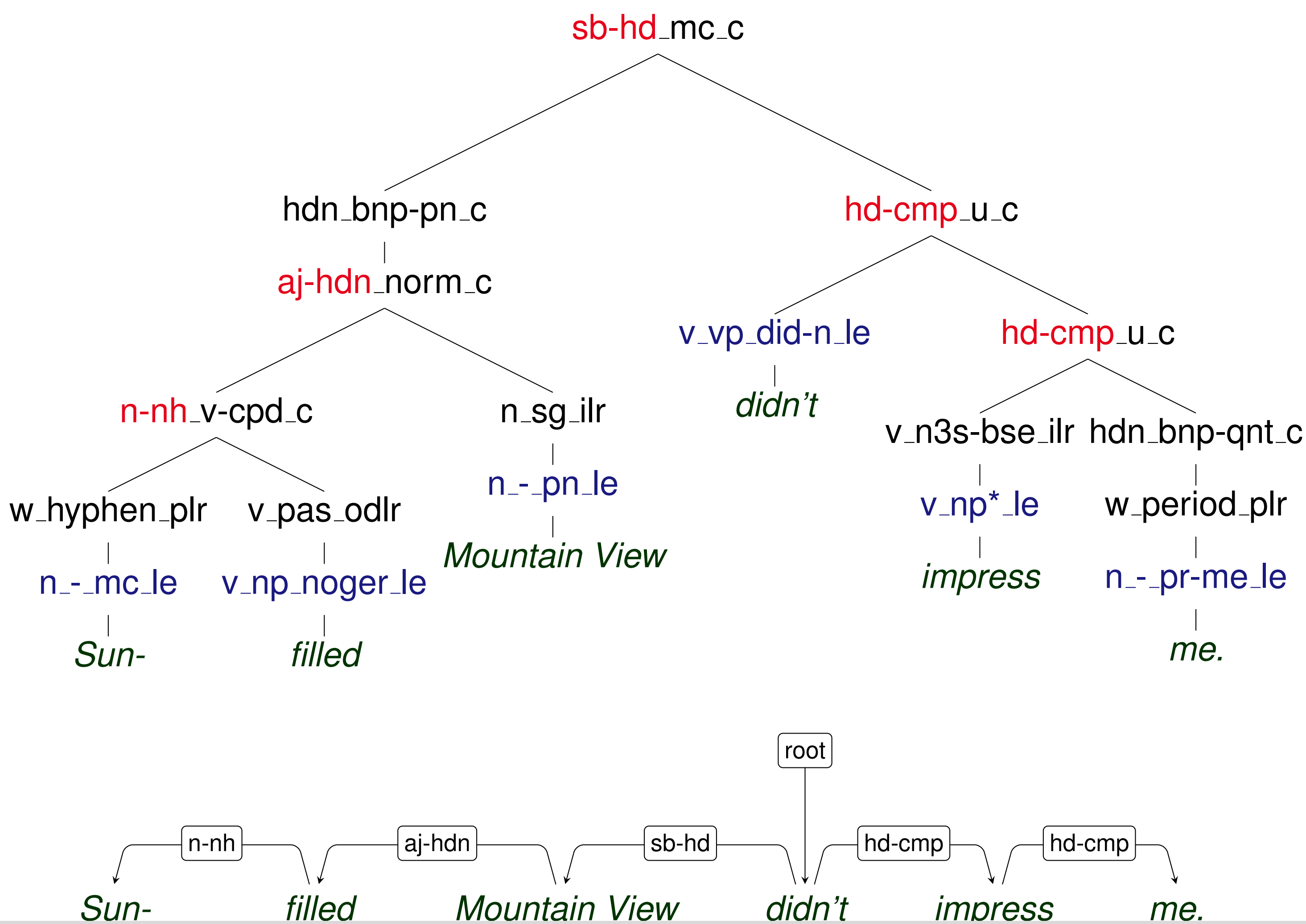


Reducing HPSG to Bi-Lexical Dependencies





Reducing HPSG to Bi-Lexical Dependencies



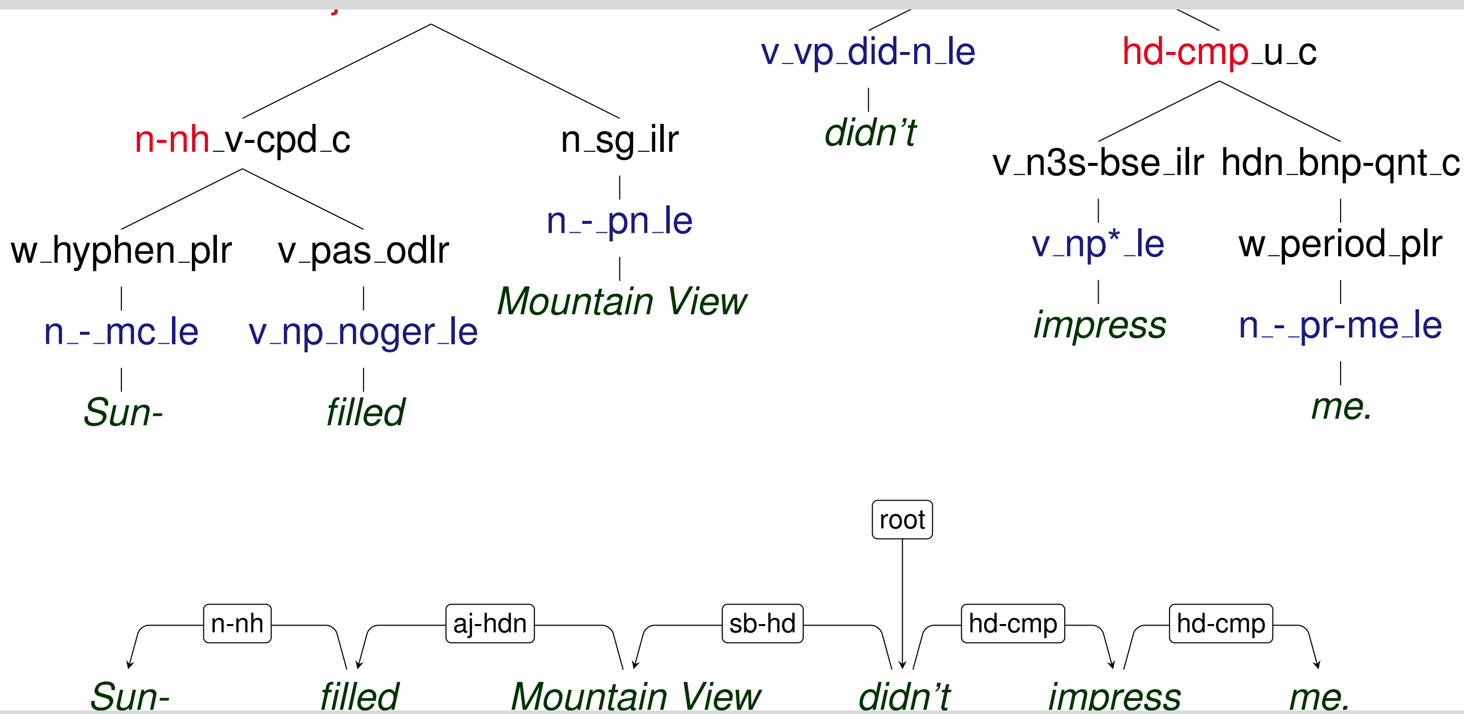
DT: Derivation Tree–Derived Bi-Lexical Syntactic Dependencies

Reducing HPSG to Bi-Lexical Dependencies

Ivanova et al. (2012) compare DT to CoNLL and SB:

→ very similar in linguistic granularity (distinctions made);

→ highest structural correspondence between CoNLL and DT.



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→ very similar in linguistic granularity (distinctions made);

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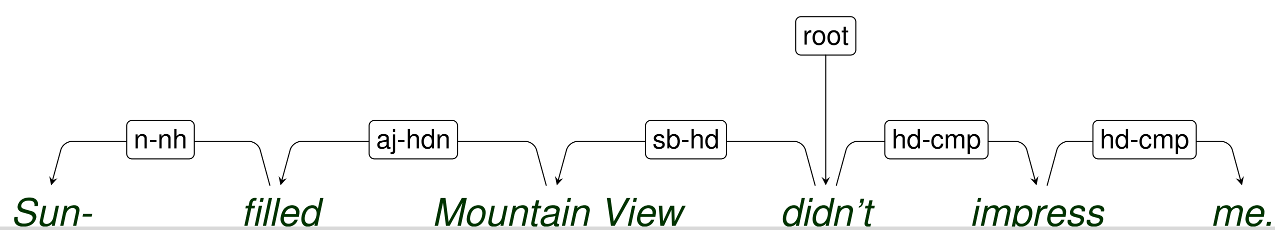
Ivanova et al. (2013) quantify 'parsability' of the schemes:

→ no substantive differences between DT, CoNLL, and SB;

→ transition-based parser of Bohnet & Nivre (2012) is best.



DT: Derivation Tree–Derived Bi-Lexical Syntactic Dependencies

In-Domain Results (WSJ Section 21)

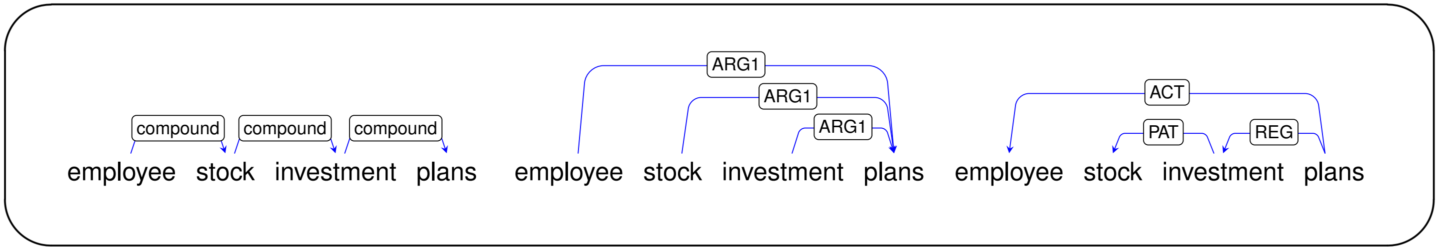
	Gaps	Time	TA_c	LAS_c	UAS_c
Berkeley	1+0	*1.0*	92.9	86.65	89.86
B&N	0+0	1.7	92.9	86.76	89.65
ERG_a	0+0	10	*97.8*	*92.87*	*93.95*
ERG_e	13+44	1.8	96.4	91.60	92.72

Observations & Comments

- Berkeley and B&N perform very similarly in terms of accuracy;
- also ERG_a and ERG_e comparable; much higher accuracy levels;
- six-fold speed-up in ERG_e at minor accuracy loss: now default;
- ERG_e comparable in speed to B&N; penalized for over-pruning.

Cross-Domain Results, Without Parser Adaptation

		Gaps	TA_c	LAS_c	UAS_c
CB	Berkeley	1+0	87.1	78.13	83.14
	B&N	0+0	87.7	77.70	82.96
	ERG_e	8+8	95.3	90.02	91.58
SC	Berkeley	1+0	87.2	79.81	85.10
	B&N	0+0	85.9	78.08	83.21
	ERG_e	11+7	94.9	89.94	91.26
VM	Berkeley	7+0	84.0	74.40	83.38
	B&N	0+0	83.1	75.28	82.86
	ERG_e	11+42	94.4	90.18	91.75
WS	Berkeley	7+0	87.7	80.31	85.09
	B&N	0+0	88.4	80.63	85.24
	ERG_e	4+12	96.9	90.64	91.76



SDP 2014 (SemEval Task 8)

Broad-Coverage Semantic Dependency Parsing

Stephan Oepen

Universitetet i Oslo & Universität Potsdam

Marco Kuhlmann, Yusuke Miyao, Daniel Zeman,
Dan Flickinger, Jan Hajič, Angelina Ivanova, Yi Zhang

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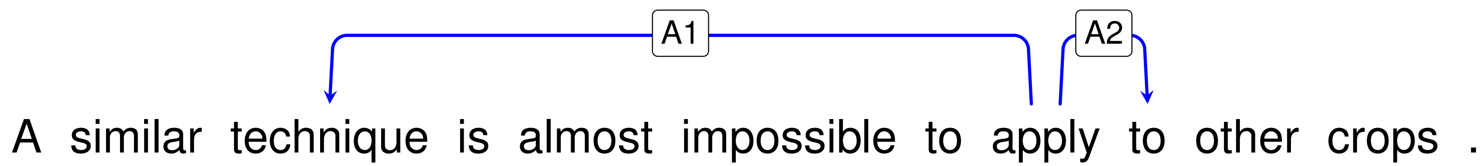
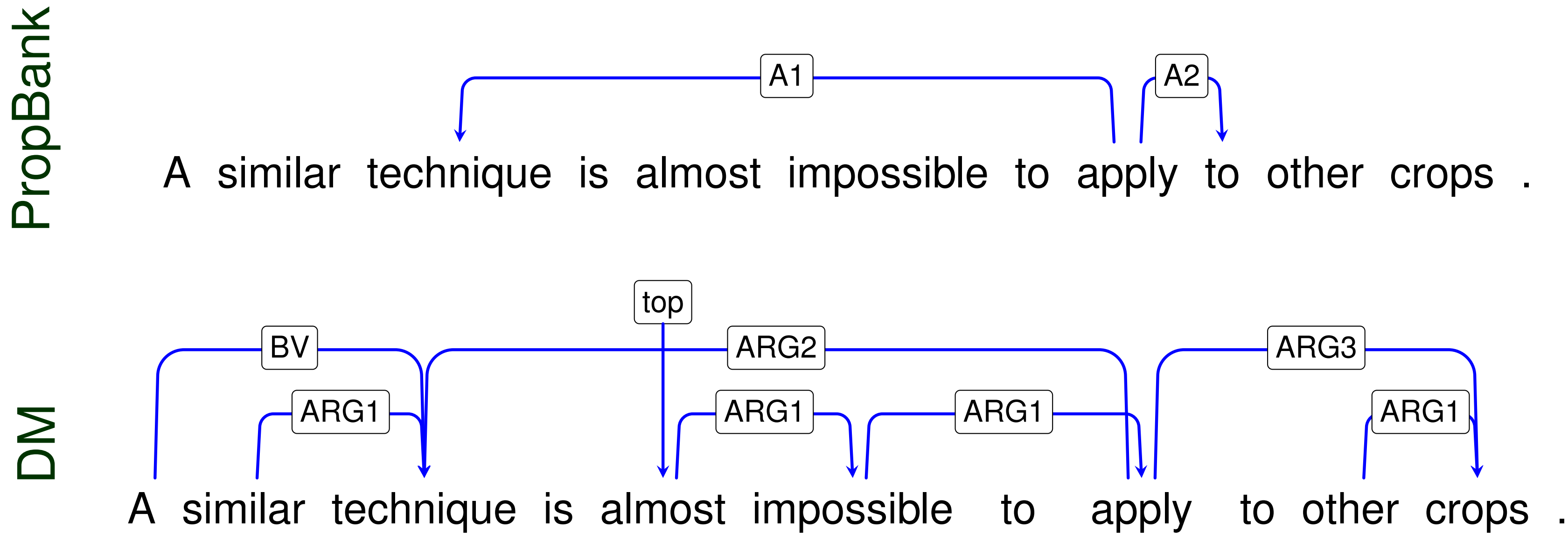
By Way of Introduction: Semantic Dependencies

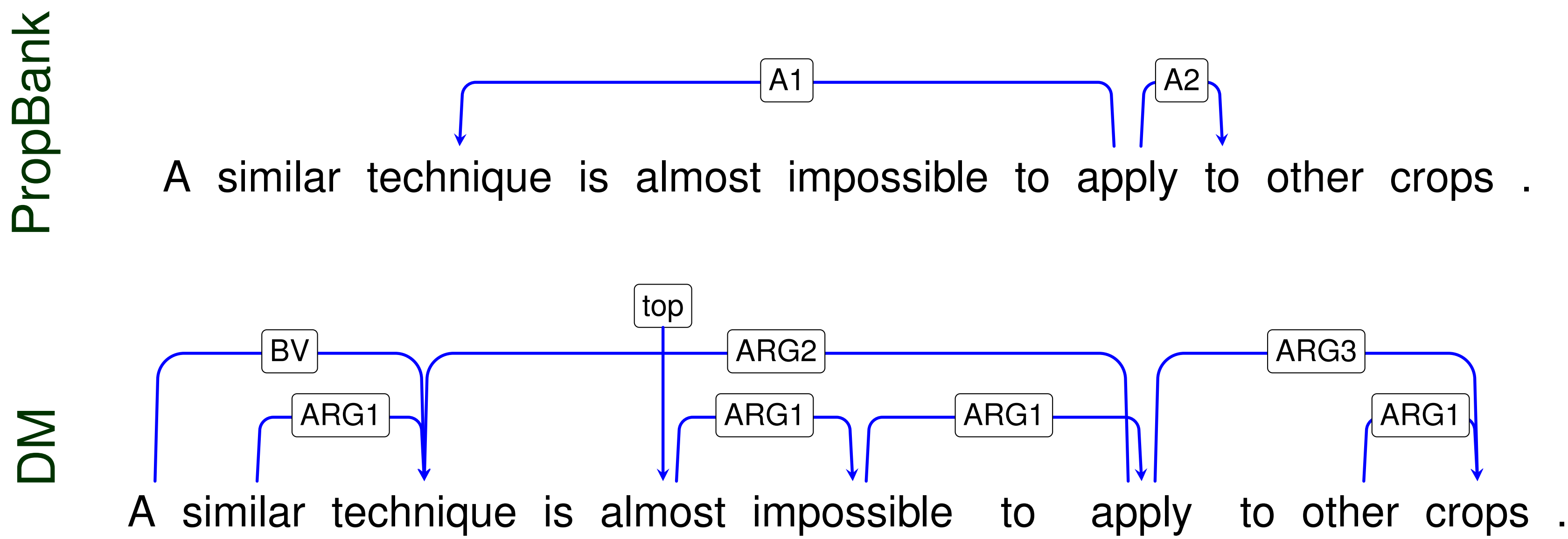
PropBank



By Way of Introduction: Semantic Dependencies



By Way of Introduction: Semantic Dependencies



High-Level Linguistic and Formal Properties

- Core *semantic* predicate–argument structure, or ‘Who did What to Whom?’
- argument sharing: graph re-entrancies; vacuous words: unattached nodes;
- designated *top* node (not root): semantic head, highest-scoping predicate.

A Glimpse at the SDP State of the Art

		DM				PAS				PSD			
	$\overline{\text{LF}}$	LP	LR	LF	LM	LP	LR	LF	LM	LP	LR	LF	LM
Peking	85.91	90.27	88.54	89.40	26.71	93.44	90.69	92.04	38.13	78.75	73.96	76.28	11.05
Priberam	85.24	88.82	87.35	88.08	22.40	91.95	89.92	90.93	32.64	78.80	74.70	76.70	09.42
Copenhagen-Malmö	80.77	84.78	84.04	84.41	20.33	87.69	88.37	88.03	10.16	71.15	68.65	69.88	08.01
Potsdam	77.34	79.36	79.34	79.35	07.57	88.15	81.60	84.75	06.53	69.68	66.25	67.92	05.19
Alpage	76.76	79.42	77.24	78.32	09.72	85.65	82.71	84.16	17.95	70.53	65.28	67.81	06.82
Linköping	72.20	78.54	78.05	78.29	06.08	76.16	75.55	75.85	01.19	60.66	64.35	62.45	04.01

A Glimpse at the SDP State of the Art

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Linkö[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	62.45	04.01

Observations

- Ensemble system (including graph parsers) best in ‘closed’ track;

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- exact match sentence accuracy a bit less encouraging: 9 – 38 %;

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Observations

- Ensemble system (including graph parsers) best in ‘closed’ track;
- high per-dependency scores: 76 – 92 F_1 for best ‘closed’ systems;
- exact match sentence accuracy a bit less encouraging: 9 – 38 %;
- parsers based on (only) tree approximations not fully competitive;
- PAS overall easiest to parse, (labeling) PSD is noticeably harder;

A Glimpse at the SDP State of the Art

		DM				PAS				PSD			
	$\overline{\text{LF}}$	LP	LR	LF	LM	LP	LR	LF	LM	LP	LR	LF	LM
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Pots[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]7.92	05.19
Alp[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]7.81	06.82
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Comparison

- graph adaptation of (‘syntactic’) TurboParser as best ‘open’ system;

		DM				PAS				PSD			
	$\overline{\text{LF}}$	LP	LR	LF	LM	LP	LR	LF	LM	LP	LR	LF	LM
Priberam	86.27	90.23	88.11	89.16	26.85	92.56	90.97	91.76	37.83	80.14	75.79	77.90	10.68
CMU	82.42	84.46	83.48	83.97	08.75	90.78	88.51	89.63	26.04	76.81	70.72	73.64	07.12
Turku	80.49	80.94	82.14	81.53	08.23	87.33	87.76	87.54	17.21	72.42	72.37	72.40	06.82
Potsdam	78.60	81.32	80.91	81.11	09.05	89.41	82.61	85.88	07.49	70.35	67.33	68.80	05.42
Alpage	78.54	83.46	79.55	81.46	10.76	87.23	82.82	84.97	15.43	70.98	67.51	69.20	06.60
In-House	75.89	92.58	92.34	92.46	48.07	92.09	92.02	92.06	43.84	40.89	45.67	43.15	00.30

A Glimpse at the SDP State of the Art

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Linkö												2.45	04.01

Comparison

- graph adaptation of ('syntactic') TurboParser as best 'open' system;
- (full) 'In-House' systems perform several F_1 points ahead of the field.

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	$\overline{\text{LF}}$	LP	LR	LF	LM	LP	LR	LF	LM	LP	LR	LF	LM
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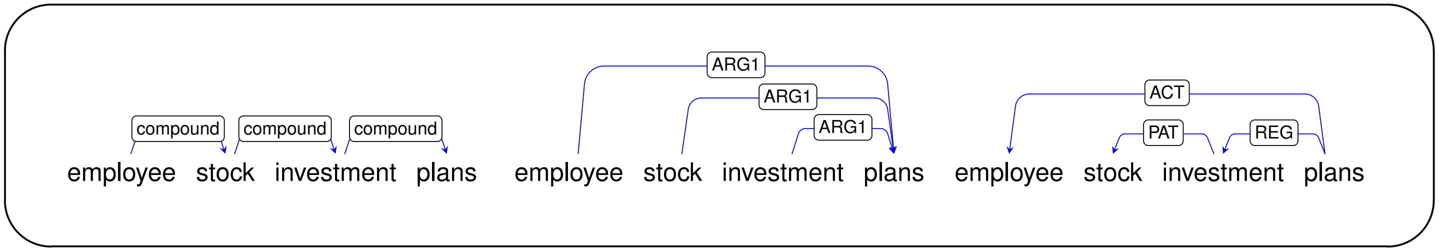

SDP 2016

Towards Comparability of Linguistic Graph Banks for Semantic Parsing

Stephan Oepen

Marco Kuhlmann, Yusuke Miyao, Daniel Zeman,
Silvie Cinková, Dan Flickinger, Jan Hajič,
Angelina Ivanova, Zdeňka Urešová

`sdp-organizers@delph-in.net`

Semantic Dependency Parsing: Getting the Data

May 2016: Through the Linguistic Data Consortium

- Most annotations derivative of existing LDC resources, e.g. PTB, CTB;
- `LDC2016T10` 'full' package: all representations, all languages.

Open Source Sub-Set

- English DM and Czech PSD are independent: free, public download.

`http://sdp.delph-in.net/`

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Ongoing Work: Beyond Bi-Lexical Semantic Dependencies

- Kuhlmann & Oepen (2016; CL): Relate to even more abstract graphs.