The goals of computational semantics: DELPH-IN and deep learning

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DELPH-IN 2019

Goals of semantics

Top-down vs. Bottom-up

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Top-down	vs.	Bottom-up
overarching		incremental

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"Bottom-up theories are intrinsically unfalsifable."

Goals of semantics

- Grounding
- Lexical meaning
- Sentence meaning

Grounding

- Goal: explain how language relates to the world

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- Goal: generalise to new situations

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→ Alex Kuhnle, Huiyuan Xie

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- Goal: capture vagueness
  - More natural for deep learning

Lexical Similarity

democracy	*water*	*happiness*
aubergine	*flood*	*joy*
computer	*law*	*cat*
earthquake	*lawyer*	*dog*

Lexical Similarity

Rank correlation on several lexical similarity datasets:

Model	SL noun	SL verb	SimVerb	MEN	WS sim	*WS rel*
Skip-gram	.40	.23	.21	**.62**	**.69**	*.46*
SVO Skip-g.	.44	.18	.23	.60	.61	*.24*
My work	**.46**	**.25**	**.26**	.52	.60	***.16***

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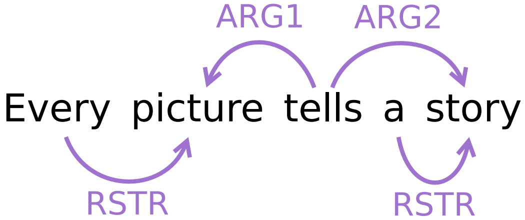
- Goal: model context dependence
  (specific usage vs. general meaning)

Dependency Minimal Recursion Semantics



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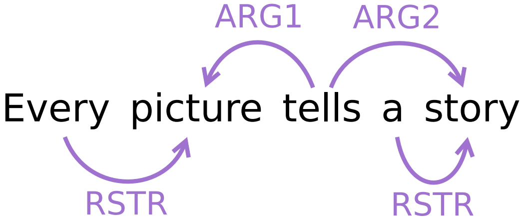

$$\forall x \exists y \exists z \; \text{picture}(x) \Rightarrow [\, \text{story}(z) \wedge \text{tell}(y) \wedge \text{ARG1}(y, x) \wedge \text{ARG2}(y, z) \,]$$

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→ Weiwei Sun, Michael Goodman

DELPH-IN and Deep Learning

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DELPH-IN and Deep Learning

- Complementary strengths
- Combine them to reach our goals!