Graph-Based Meaning Representations:

Design and Processing

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Why Graph-Based Meaning Representation?

I reached into that funny little pocket that is high up on my dress.

$\not\rightarrow$ *Something is high up on my dress.*

PETE

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The Commissioner doesn't regret that the President failed to make him leave Athens before May 2.

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Cleo Condoravdi

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Entailment, for Example

- What types of information are at play in reasoning about entailment?
- Who did what to whom, when and where? Reference, veridicality, etc.

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$\rightarrow$ Logical inference or distributional approximation, both need structure.

Preview: Semantic Structure in Applications

I saw Joe's dog, which was running in the garden.
The dog was chasing a cat.

(Liu et al., 2015; Hardy & Vlachos, 2018)

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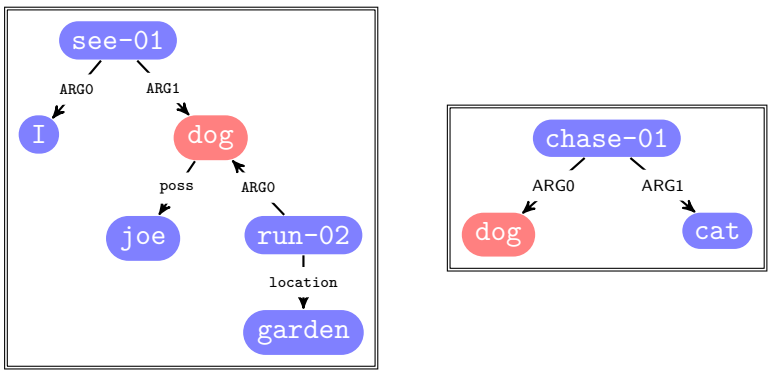
semantic parsing



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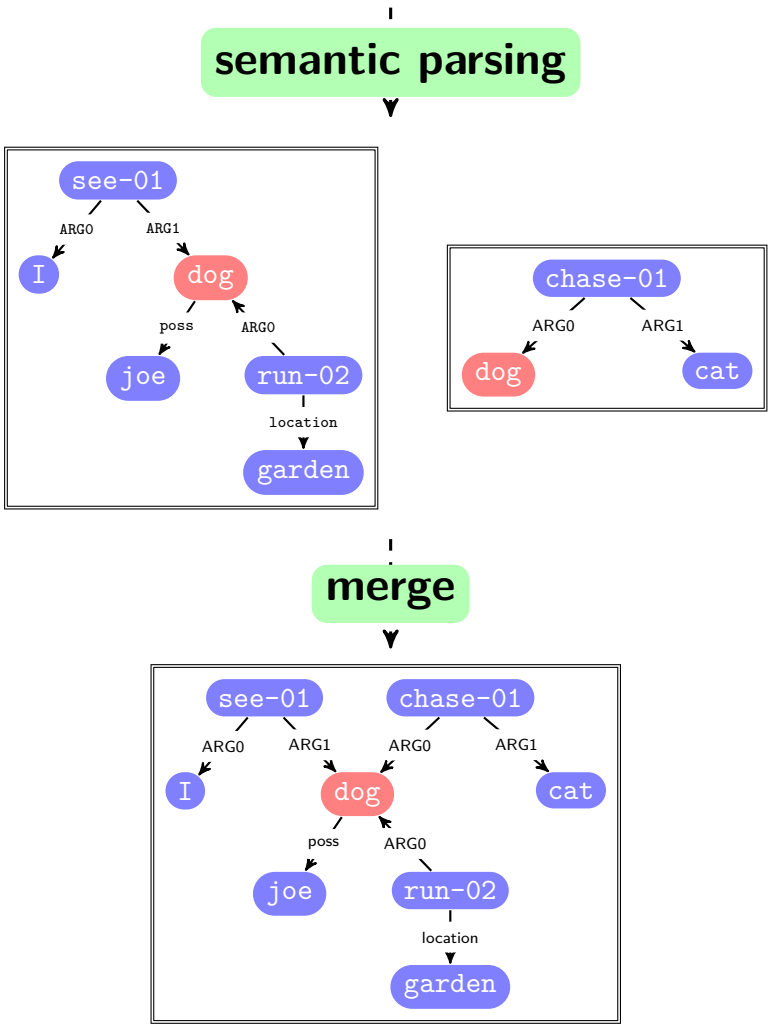

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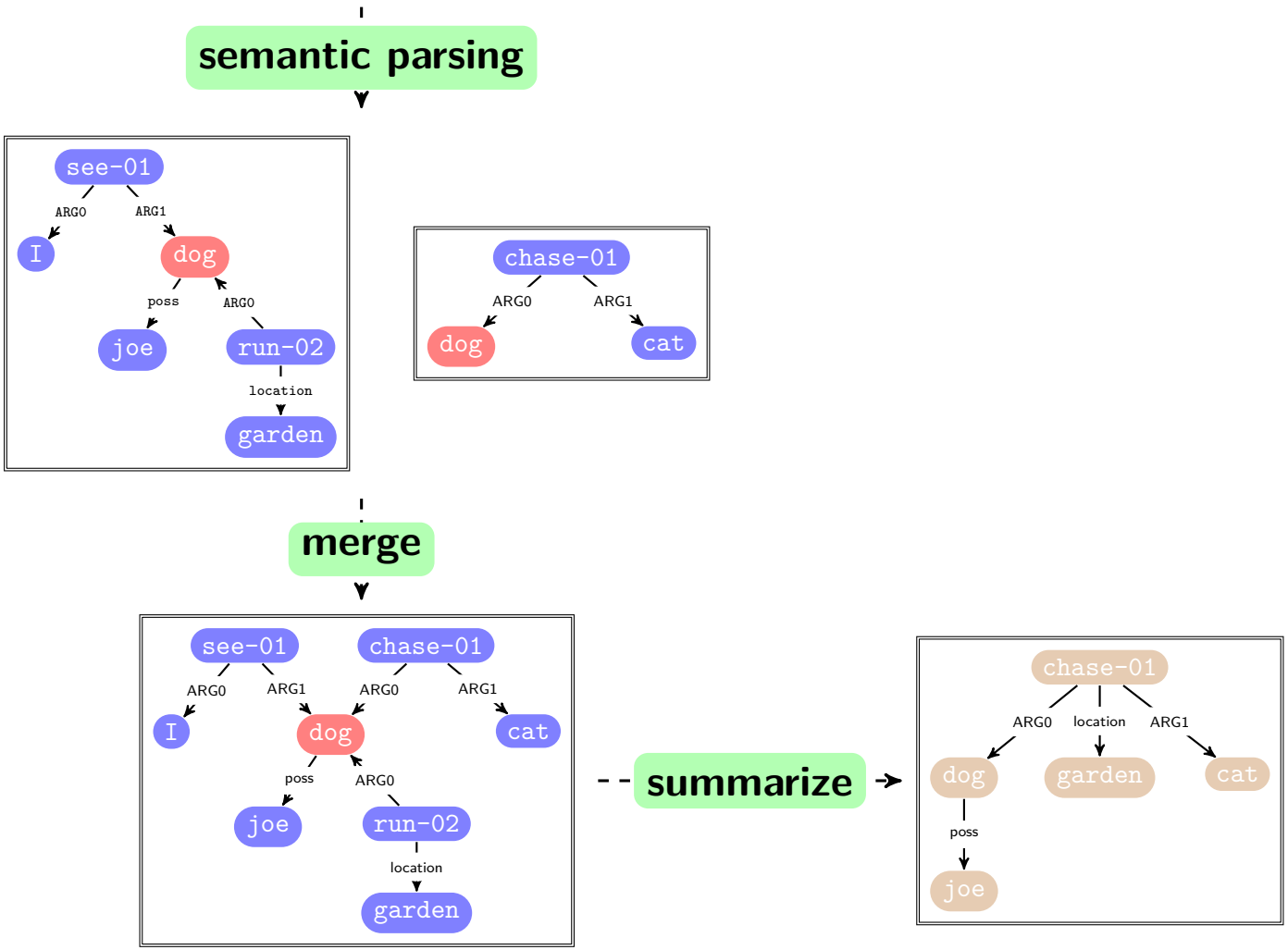

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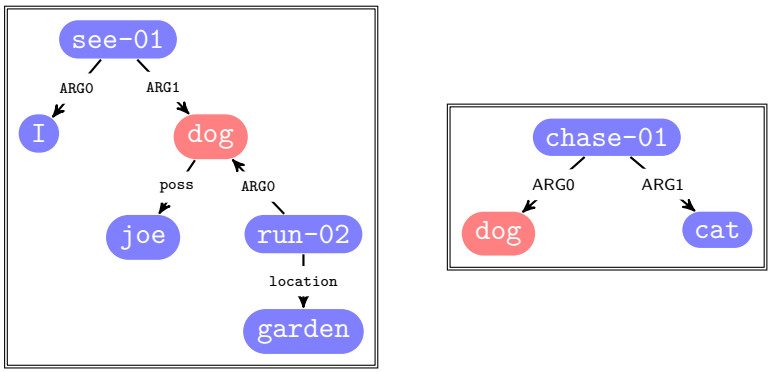
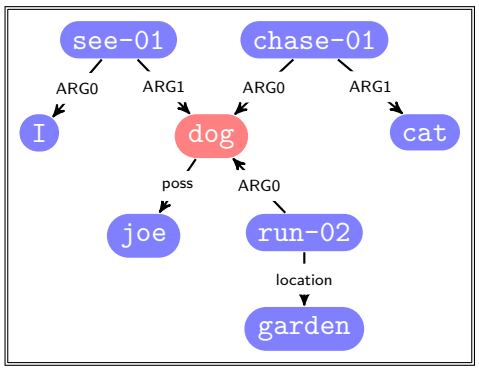


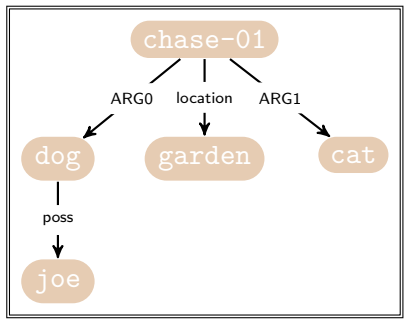
merge



summarize

Joe's dog was chasing a cat in the garden.

surface realisation



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High-Level Goals of the Tutorial

Graph-Based Representations of Meaning

- Vast, complex landscape of representing natural language meaning;
- diverse linguistic traditions, modeling assumptions, levels of ambition;
- some differences are superficial (e.g. terminology), others run deeper;

$\rightarrow$ clarify concepts and vocabulary; high-level survey of selected resources.

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Parsing into Graph-Structured Representations

- Cottage industry of parsers with outputs structures beyond rooted trees;
- distinct techniques, e.g. based on transitions, composition, 'translation';
- some framework-internal evolution: design reflects specific assumptions;

→ tease apart sub-tasks and families of approaches; review representatives.

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Fragmentation and 'Balkanization'

- Cross-Framework Perspective: Seek commonality and complementarity.

Outline: Our Game Plan

Foundations: Linguistic & Formal (0:30)

- Tease apart various ‘facets’ (layers) of meaning; common terminology.

Graph-Based Meaning Banks (0:45)

- Semi-superficial review of five English corpora with semantic graphs;
- highlight distinct design decisions and goals; contrast across schools.

Parsing into Semantic Graphs (1:00)

- Factorization-, composition-, transition-, translation-based techniques;
- graph similarity evaluation; cross-framework and cross-lingual parsing.

Outlook: Using Semantic Graphs (0:15)

- Example use cases: summarization, entity linking, machine translation.

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(Some) Time for Questions at the End of Each Block

1

Foundations: Semantics

2 Foundations: Basic Graph Theory

3

Semantic Graphbanks

4

Semantic Parsing Approaches

5

Using Semantic Structure

6 Conclusions Outlook