DEANNA: Deep Answers for Naturally Asked Questions

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Motivation

- Natural language is more accessible to the average user. It also relieves the user from having to know the underlying schema.
- Knowledge bases contain crisp facts from which complex information needs can be answered, possibly by *joining* (⋈) these facts.

Goal

Automatically translate user's natural language questions to structured queries over knowledge bases

Who played in Casablanca and was married to a writer who was born in Rome?

DEANNA

```
?a actedIn Casablanca_(film) . ?a marriedTo ?w
?w isA writer . ?w bornIn Rome
```

Data

- A knowledge base with *instance & ontological* data

YAGO = Wikipedia + Wordnet

Triples of entities, classes & relations

```
Rome                  isA          city
city                  subclassOf   location
Roberto_Rossellini    marriedTo    Ingrid_Bergman
```

- Surface forms for entities, classes & relations

{'Rome', 'eternal city', 'Roma'} → Rome
{'Casablanca'} → Casablanca_(film)
{'Casablanca', 'Ad Dar al Bayda'} → Casablanca

{'play', 'star in', 'act', 'leading role'} → actedIn
{'play', 'perform'} → hasMusicalRole
{'married', 'spouse', 'wife'} → marriedTo

{'film', 'movie'} → movie

Challenges

- Detection and mapping of entities, classes & relations
- Joint disambiguation of entities, classes & relations
- Structured query generation

Construct a Disambiguation Graph

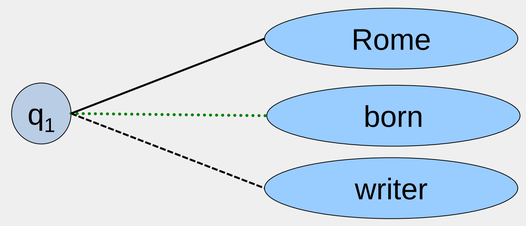
1. Detect candidate phrases

Rome | born | was born | Casablanca

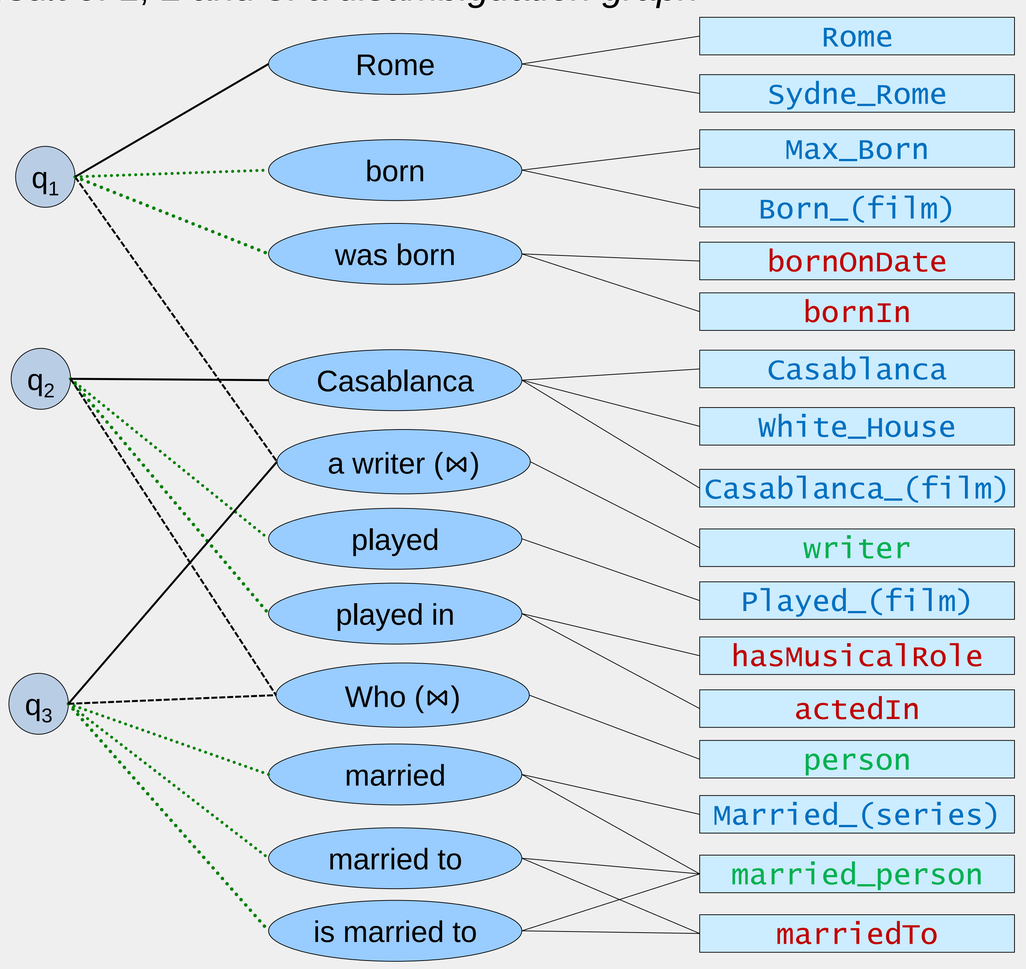
2. Map candidate phrases to (potential) semantic items

Rome → Rome, Sydne_Rome

3. Detect phrase-level triples (*q-units*) using dependency parsing



Result of 1, 2 and 3: a *disambiguation graph*



Perform Disambiguation

4. Joint disambiguation via a constrained dense subgraph computation using ILP.

Generate Query

5. Translate subgraph to structured query: classes are type constrained variables, joins expressed by common phrases between q-units.

More Information
Demo session 3: Thursday, 14:00-15:30 in Bellecour # -1
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