



Commonsense Knowledge

- Text annotated with entity linking
- Entities **dbr:cat** and **dbr:tiger** appear in similar contexts.
- **Entity Embeddings:**
- $v(\text{dbr:cat}) \approx v(\text{dbr:tiger})$

Axiomatic Knowledge

species(**dbr:cat**)
mammal(**dbr:tiger**)
bird(**dbr:penguin**)
[...]

Instantiated atoms

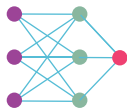
$\forall \mathbf{x} (\text{mammal}(\mathbf{x}) \rightarrow \text{animal}(\mathbf{x}))$

Universally quantified formul

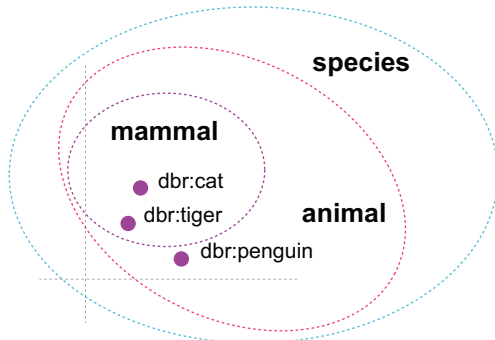


embedding

learning predicates with
commonsense and
axiomatice knowledge



LTN



After Training Inferences:

animal(**dbr:cat**) ?

$\forall \mathbf{x} (\text{species}(\mathbf{x}) \rightarrow \text{animal}(\mathbf{x}))$

Sub-symbolic commonsense knowledge

Sub-symbolic commonsense knowledge with learned predicates