

Discovering Fine-Grained Semantics in Knowledge Graph Relations

Motivation

- **Polysemous relations** between different types of entities in KGs
- Relations with **multiple semantics**, exhibit distinct meanings in different contexts
- Important for use cases, e.g., **Entity Classification, Search**

Yago
created

(writer, movie)
(player, movie)
(artist, movie)
(writer, fictional_character)
(artist, medium)
(writer, television)
(company, computer_game)

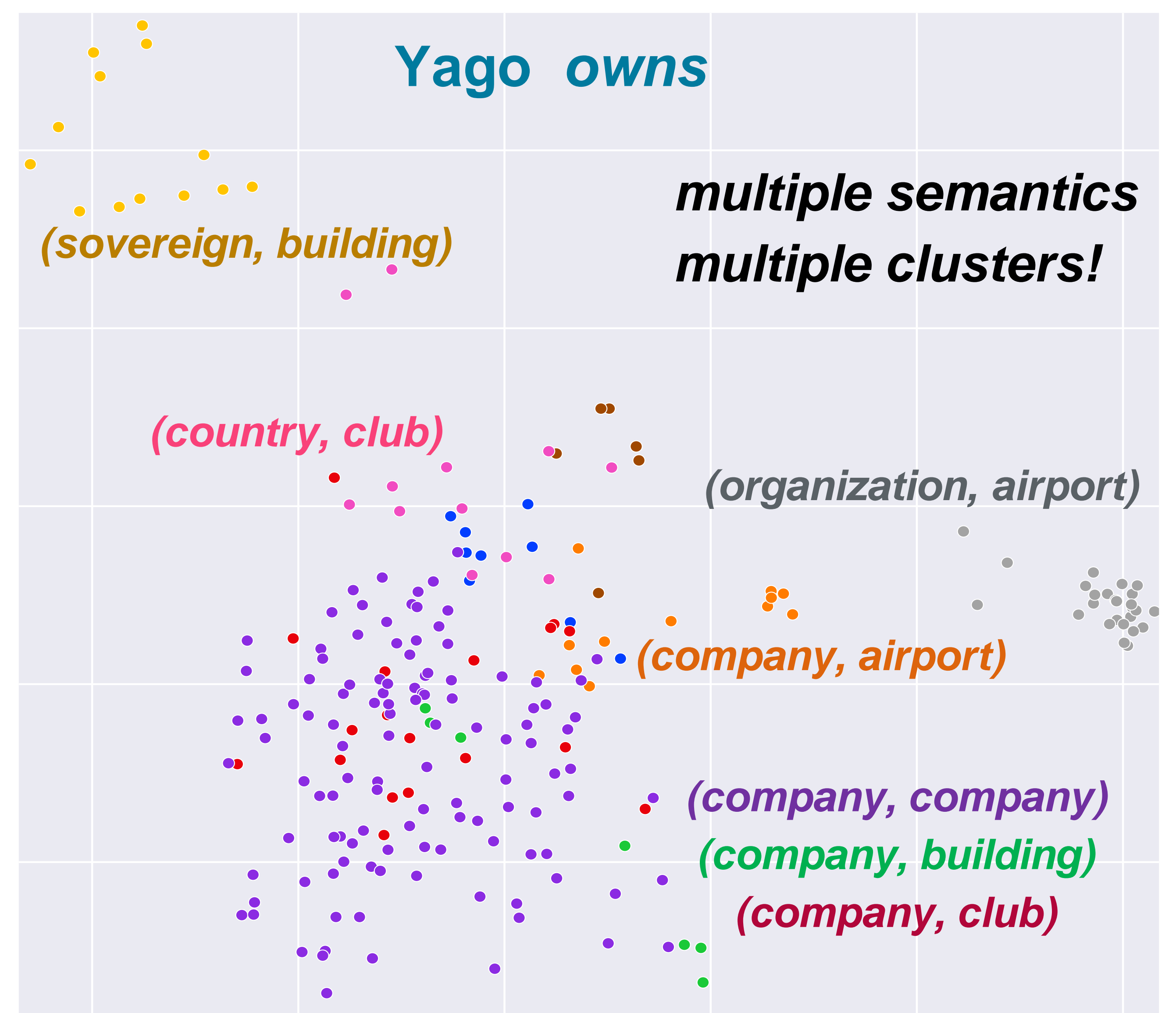
NELL

agentBelongsToOrganization

(politician, politicalparty)
(country, sportsleague)
(sportsteam, sportsleague)
(coach, sportsleague)
(person, charactertrait)
(televisionstation, company)

Method

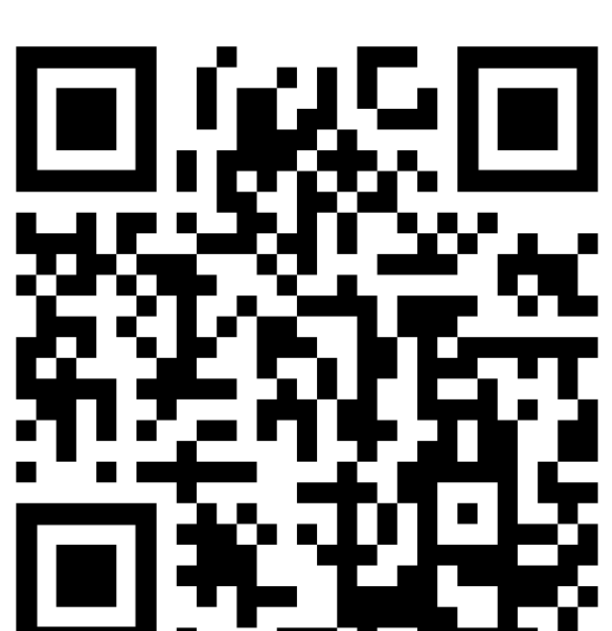
- **FineGReS** - Define fine-grained relation semantics, data-driven, scalable method
- Leverage knowledge graph embeddings for semantic vectors
- Broad spectrum of semantic distances between the different entity type pairs
- Find optimal sub-relation clusters, well-defined meaning
- Combine similar entity type pairs while separating the dissimilar ones



Dataset - relation	Count	FineGReS Sub-Relations
Yago- created	4	[(artist, medium)], [(writer, fictional_character)], [(company, computer_game)], [(writer, movie) (writer, television) (player, movie), (artist, movie)]
NELL- agentCompetes	5	[(company, person) (website, person) (person, person)], [(bank, bank)], [(person, company), (person, website)] [(animal, animal), (bird, animal)], [(mammal, politicsissue)]

Evaluation

- Sub-relations from **FineGReS** perform better than baselines
- **Better cluster quality** for sub-relations
- Improved performance for **Entity Classification** use case



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