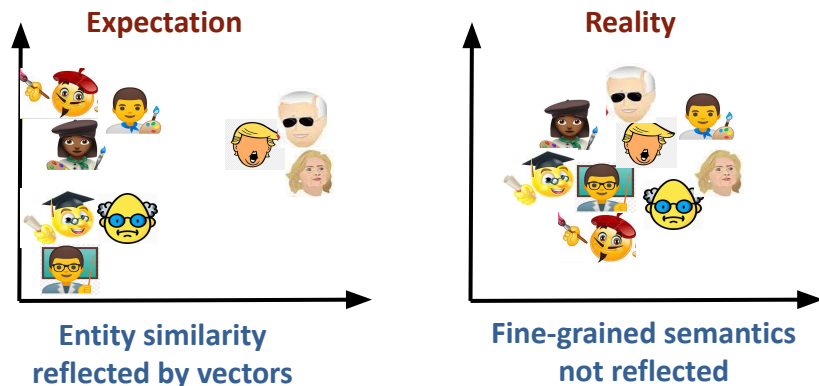# Do Embeddings Actually Capture Knowledge Graph Semantics?

Nitisha Jain, Jan-Christoph Kalo, Wolf-Tilo Balke, Ralf Krestel

Semantics in Knowledge Graph Embeddings

- Research Question - Can **latent vectors** express similarities between entities of **same type**?

- Experimental Analysis - **Entity Classification** (assign the entities to their types) and **Entity Clustering** (identify the entities belonging to the same type)

Expectation

Reality

Entity similarity reflected by vectors

Fine-grained semantics not reflected

Why Embeddings Fail to Capture Semantics

- Real-world entities often belong to **more than one** semantic type

- Most relations are neither unique nor indicative of any single class in particular: *bornIn*, *hasSpouse*..

Arnold Schwarzenegger (Q2685)

Austrian-American actor, businessman, bodybuilder and politician

Dataset Characteristics

- **Overlapping relations** among entities of different types
- **Generic and noisy links** - Hinders embeddings to encode **type-specific** characteristics

For further details check out our paper **N. Jain et al. ESWC 2021**

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