MetaExp

Interactive Explanation and Exploration of Large Knowledge Graphs

Hasso Plattner Institut

1

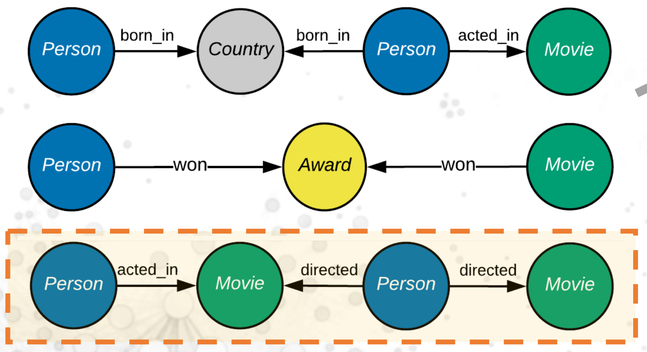
Meta-Path Retrieval and Storage

→ How do we **compute** and **store all** meta-paths?

Meta-path: sequence of nodes and edge labels
Intuition: Use meta-paths as summaries

- **Precompute** meta-paths on the entire graph **via the graph schema**
- **Discover** meta-path instances on-demand to create a **structural value**

meta-paths

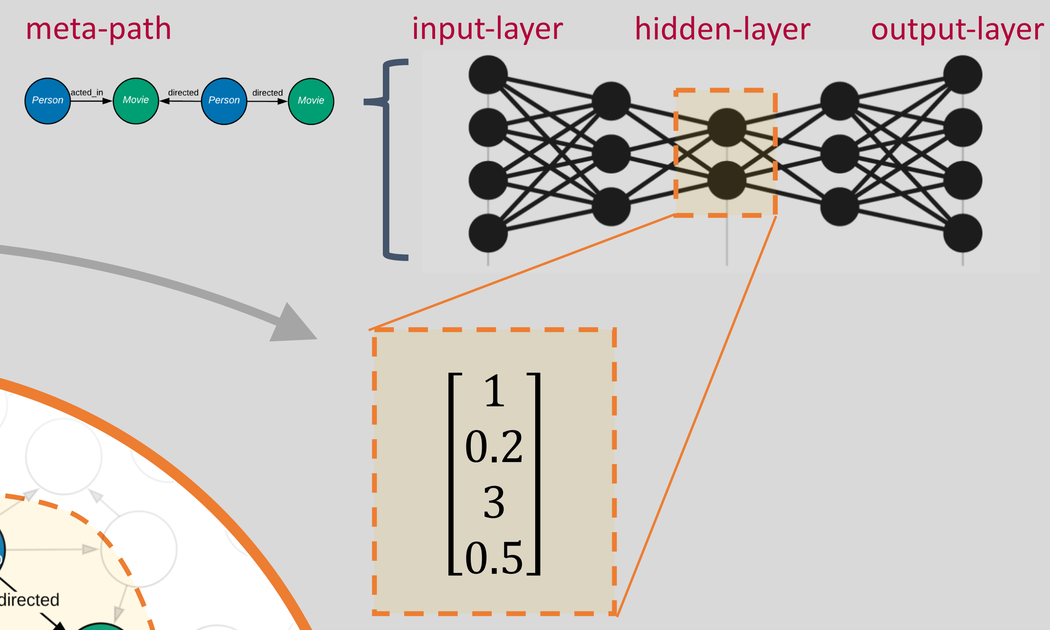


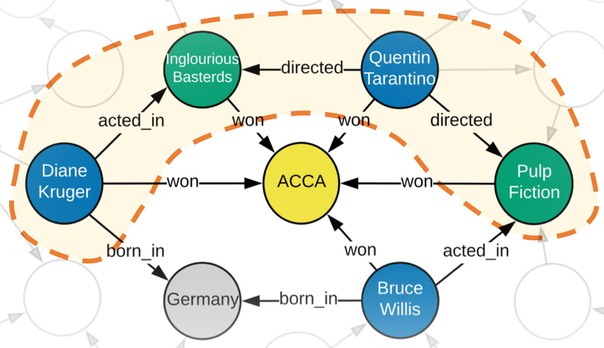
2

Representation Learning on Meta-Paths

→ How do we learn a **representation** for meta-paths?

- **Embed** meta-paths as vectors using neural networks based on node2vec and paragraph2vec
- **Improve** embedding when discovering new meta-paths





? How can a **domain expert** interactively explore large knowledge graphs?

Input: 2 Set of nodes

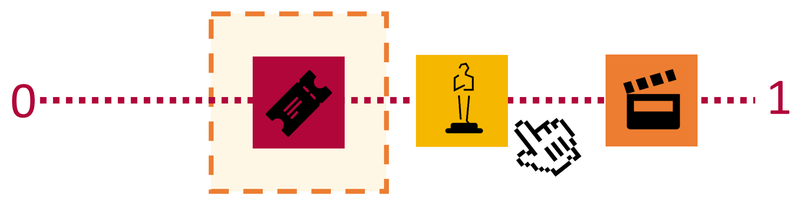
Diane Kruger

Pulp Fiction

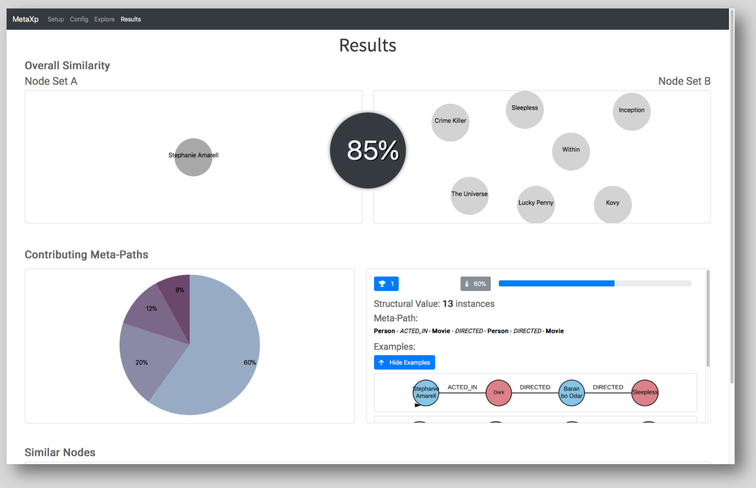
Input: Domain Knowledge

Output:
Similarity Measure

3



4



Explanation and Summary

→ How do we **explain** and **summarize** the Knowledge Graph given the acquired knowledge?

- **Break down** the score and **explain** how it is composed for specific comparison scenarios
- **Combine** the **domain value** $\rho(\mathcal{P})$ and **structural value** $s(\mathcal{P})$ into a combined similarity score:

$$\sigma(Q_1, Q_2) = \sum_{\mathcal{P} \in mp(Q_1, Q_2)} s(\mathcal{P}) \cdot \rho(\mathcal{P})$$

Active User Preference Learning

→ How do we learn the **domain knowledge**?

- User preferences modelled as Gaussian Processes
- Select k meta-paths with highest trade-off between **high uncertainty** and **diversity**
- Retrieve **domain values** for paths by presenting meta-path batches and **asking for ratings**:

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https://hpi.de/mueller/metaexp.html

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