

How is Brad Pitt related to Crete?

Using Good, Old-Fashioned AI to enhance knowledge graph link prediction

Project Description:

Today there are more and more enterprises using knowledge graphs to facilitate and enhance the functionality of their services and products. For example, Google uses a knowledge graph for its search engine's infobox, while Walmart and Amazon use knowledge graphs in product search and advertising. There are many publicly available knowledge graphs (DBPedia, Wikidata) that encode common knowledge, e.g., information about people, animals, countries, etc. and relationships among them. However, most knowledge graphs are incomplete and noisy. We thus aim at discovering missing facts. This problem is also known as link prediction. The goal of this project to compare different ways for link prediction: (1) Use of machine learning (ML) to discover missing: enhance current ML techniques with reasoning using ontological knowledge and rules, and/or (2) extract rules, which can then be used to derive missing information through reasoning.

Duties/Activities:

- Use reasoning methods to extract new data from a knowledge graph
- Use embedding-based methods to predict links in a knowledge graph (for subproject 1)
- Extract rules from a knowledge graph (for subproject 2)

Required Skills:

- Basic programming skills (Java, C/C++, python)
- Some machine learning background would be a plus

Preferred Intern Academic Level:

- Junior or Senior students

Learning Opportunities:

- Knowledge graphs / RDF
- First-order logic reasoning methods
- Embedding methods for link prediction
- Rule extraction techniques and tools

Expected Team Size: 1-3 (if there is only 1 student, he/she can choose between subproject (1) or (2))

Mentors

Name: Zoi Kaoudi

email: zkaoudi@hbku.edu.qa