Master Thesis

Ontology Development for Sports Data with the MO|RE Repository

Interdisciplinary topic co-supervised by KIT IfSS (Institute for Sports and Sports Research)
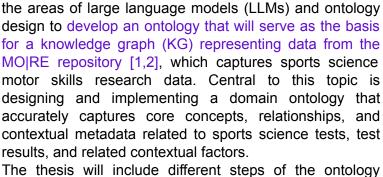

In collaboration with domain experts from the KIT IfSS team, the goal is to use state-of-the-art technologies from the areas of large language models (LLMs) and ontology design to develop an ontology that will serve as the basis for a knowledge graph (KG) representing data from the MO|RE repository [1,2], which captures sports science motor skills research data. Central to this topic is designing and implementing a domain ontology that accurately captures core concepts, relationships, and contextual metadata related to sports science tests, test results, and related contextual factors.

The thesis will include different steps of the ontology development process, such as expert interviews, exploring existing ontology design patterns (ODPs), formalizing and implementing a first version of the ontology, and evaluation. LLM-based tools such as knowledge extraction or concept elicitation will support the methodological framework. It is advised to use eXtreme Design (XD) to standardise the ontology design process and to use ODK [3] for the development.

Tasks

Task 1: Requirements analysis and basic ontology design

- Analyse, explore, and describe the MO|RE repository.
- Identify related research.
- Define the scope and requirements of the ontology.
- Collect and discuss best practices.
- Formulate competency questions.
- Apply relevant ontology design patterns.
- Implement the ontology in ODK.

Task 2: Evaluation

- Validate using competency questions.
- Collect feedback from domain experts.
- Test SPARQL queries.
- Create example data (A-Box).

Supervision

This thesis will be supervised by Prof. Dr. Harald Sack, M.Sc. Sarah Rebecca Ondraszek, Dr. Jörg Waitelonis, Dr. Anna Jacyszyn, Information Service Engineering at Institute AIFB, KIT, in collaboration with FIZ Karlsruhe, and Dr. Katja Keller, Dr. Claudia Niessner, IfSS, KIT.

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Sources

[1] MO|RE repository:
https://www.motor-research-data.de/
[2] "MO|RE data" project
https://www.ifss.kit.edu/more/english/index.php
[3] Ontology Design Kit
https://github.com/INCATools/ontology-development-kit