Semantic Web and Knowledge Graphs

Tools for Your Data-Management-Future!

Did you ever wonder how it should be possible to link and present all the experiments, the research data, the results, the knowledge and theories of your research field?

Of course, this cannot be done manually – you will need powerful computers for this task. There is just one problem: Computers do not really understand what they are reading… They do not understand the meaning (*semantics*) of the texts. How can we enable them to "understand" knowledge?

Semantic web technologies, e.g. knowledge graphs and ontologies, can be seen as means to represent and provide domain knowledge and relate things in the world in a semantic way.

The Semantic Web Stack provides standards, languages and protocols that allow domain knowledge to be modelled, published and retrieved by computer programs in an automated way. This enables knowledge to be processed and understood in a machine-readable way so that shared knowledge can be inferred and made explicit.

The Linked Open Data Cloud (LOD, a semantic web of linked data) enables knowledge to be made available and retrieved across domains in order to provide and use the corresponding data for one's own research purposes. In the implementation of the Semantic Web, the goal is to follow the FAIR principles, which make data **F**indable, **A**ccessible, **I**nteroperable, and **R**eusable.

This lecture aims at introducing the Semantic Web in a nutshell and to show the possibilities it offers:

- An overview of **applications** of Semantic Web technologies.
- **Elements or tools** (e.g. RDF/RDFS, OWL, SHACL, JSON-LD, SPARQL) of the Semantic Web stack.
- **Use cases** how the Semantic Web follows the FAIR principles and can be applied (e.g. Named Entity Recognition (NER), Question Answering, Semantic Search, Expert Systems, Knowledge Discovery)

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Friday, 21 July 2023, 11:00 am to 12:15 pm
Zoom

All interested colleagues are invited but registration is mandatory:

→ **https://go.fzj.de/sw**

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