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Ontowhat? Journey towards a sensor maintenance ontology

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The collection and use of sensor data is crucial for scientists monitoring and observing the Earth's environment. In particular, it enables the evaluation of real natural phenomena over time and is essential for the validation of experiments and numerical simulations. Assessment of data quality beyond statistics includes knowledge and consideration of sensor state, including operation and maintenance, e.g. calibration parameters and maintenance time windows. Today, maintenance metadata is often collected even digitally but not readily accessible due to a lack of standardization and findability. In the HMC project MOIN4Herbie, digital recording of FAIR sensor maintenance metadata is developed using the electronic lab notebook Herbie.

In information science, ontologies are a formalization of concepts, their relations and properties. Using ontologies allows to collect input which is right away fit for purpose as findable, machine-readable and interoperable (meta)data. Ontologies can ensure the usage of controlled vocabularies and organize the knowledge stored within for assessibility and thus reuse. Herbie relies on ontologies and vocabularies to generate user-friendly web-forms for collecting, validating and then provisioning FAIR (meta)data.

What is the challenge regarding ontologies within the MOIN4Herbie context? No ontology for sensor maintenance metadata has yet been developed that covers all aspects considered relevant for data quality assessment in marine science. Several industrial maintenance ontologies exist, but none is sensor specific. Therefore, a new task-specific ontology needs to be created. Furthermore, the domain experts in the project had heard of ontologies but had never used or developed one.

With this contribution we would like to disseminate the process of learning about ontologies from scratch and describe step by step our process from the idea to the first version of the final ontology. Starting with the basic definition of an ontology, we learned about ontology levels and competency questions. We collected and evaluated controlled vocabularies and ontologies related to sensor description and industrial maintenance. We developed competency questions and evaluated them in collaboration with our sensor experts. We visualised the competency questions in flowcharts and attached ontology terminologies to all features. We structured the reused ontologies and developed our own first draft of a maintenance ontology. We will share our experiences and are open to feedback!

Please specify "other"

In addition, please add 3 to 5 keywords.

Herbie, ELN, ontologies

Please specify "other"

For whom will your contribution be of most interest?

Data professionals who provide and maintain data infrastructure

Please assign yourself (presenting author) to one of the following groups.

Data professionals who provide and maintain data infrastructure

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