

VMAP Standard and ontologies enabling interoperability and digitalization in the manufacturing domain

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Abstract

Standards and ontologies play a crucial role in making interoperability in the simulation domain. Moreover, ontologies provide a stable backbone for the knowledge graphs which can significantly facilitate digitalization in the manufacturing sector.

As a project partner in EU Projects ALABAMA¹, RESTORE², Pioneer³, BASE⁴, SmartEM⁵, GEAR-UP⁶, Fraunhofer SCAI is actively working on the standardization of data and semantic modelling using ontologies.

The VMAP⁷ Standard is a vendor-neutral interface standard designed to enhance interoperability in Computer-Aided Engineering (CAE) workflows. VMAP utilizes the HDF5 file format for efficient data storage and provides an open-source Input/Output (I/O) library to facilitate the integration of the standard into various CAE software applications. The standard is already being in service for more than four years and is successfully helping engineers to transfer data among the various simulation steps. VMAP has also enabled model validation by providing a standard format for measurement and monitoring data. Standard data formats like VMAP greatly assist in solving compatibility issues among various software, provide unified data format and hence enable interoperability.

The domain ontologies can largely help in building the semantic web for a specific field and then assist with knowledge management by enabling data integration, sharing and retrieval across various systems and organizations. They play an integral role in achieving interoperability in the system and across the workflows. With a common language, ontology can enable logical reasoning over datasets and support a consistent data representation. DOAM⁸, BATINFO⁹, MpCCI Ontology are some of the domain specific ontologies which are being used for semantic modelling.

The talk will provide a brief overview of the VMAP Standard and ontologies including the Common Information Model and how they can assist in digitalization efforts for the manufacturing sector.

¹ <http://alabama-project.eu/>

² <https://restoreeuproject.eu/>

³ <https://www.pioneer-project.eu/>

⁴ <https://www.base-digibattpass.eu/>

⁵ <https://smartem.store/>

⁶ <https://doi.org/10.3030/101178484>

⁷ <https://vmap-standard.org/>

⁸ <https://github.com/emmo-repo/domain-doam>

⁹ <https://github.com/BIG-MAP/BattINFO>