

Welp, E. G.; Labenda, P.; Bludau, C.

Usage of Ontologies and Software Agents for Knowledge-Bases Design of Mechatronic Systems

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Abstract

Already in [1, 2 and 3] the newly developed Semantic Web Service Platform SEMEC (SEMantic and MEChatronics) has been introduced and explained. It forms an interconnection between semantic web, semantic web services and software agents, offering tools and methods for a knowledge-based design of mechatronic systems. Their development is complex and connected to a high information and knowledge need on the part of the engineers involved in it. Most of the tools nowadays available cannot meet this need to an adequate degree and in the demanded quality.

The developed platform focuses on the design of mechatronic products supported by Semantic web services under use of the Semantic web as a dynamic and natural language knowledge base. The platform itself can also be deployed for the development of homogenous, i.e. mechanical and electrical systems. Of special scientific interest is the connection to the internet and semantic web, respectively, and its utilization within a development process. The platform can be used to support interdisciplinary design teams at an early phase in the development process by offering context-sensitive knowledge and by this to concretize as well as improve mechatronic concepts [1].

Essential components of this platform are a design environment, a domain ontology mechatronics as well as a software agent. The developed domain ontology mechatronics contains basic knowledge for the early development phases of mechatronic systems. Relevant product knowledge is implemented on the two levels of a system as well as a behavioural model. This knowledge provided can be processed by a software agent. Embedded in the Semantic Web Service Platform, both, ontology and software agent, play a major role to more effectively support engineers and developers by an improved knowledge-based design process. The contribution at hand focuses semantic web technology and especially an ontology mechatronics and its use in the development of mechatronic systems.