

## Knowledge Representation and Ontology Mapping Methods for Product Data in Engineering Applications

*This paper presents a semantic approach that uses ontologies to share knowledge related to product data in CAD/CAE applications and for integrating the design evaluation information that these applications individually provide. Our overall approach is the ontology-based adaptive design evaluation, also coined as OADE. This paper reports a piece of our ongoing work in the area of knowledge representation and ontology mapping methods. Here we design ontologies for representing product design and analysis, instantiate a source ontology with the product data, create formal ontology mapping methods, and then apply these methods to transfer the product data from the source ontology to the target one. A prototype implementation has been created using technologies such as OWL (representation language), JENA (ontology API), and PROTÉGÉ (ontology editor) to demonstrate the approach for integrating product design and assembly simulation analysis applications. This work is significant because heuristic methods based on geometry attributes, composition, and inheritance for determining mapped concepts in engineering ontologies is still very new, and not much work has been done in this area. This work will lead to the ability to create, share, and exchange knowledge for solving design evaluation challenges involving multiple applications and viewpoints. \_DOI: 10.1115/1.3330432\_*