

# **Knowledge Representation And Ontology Mapping Methods For Product Data in Engineering Applications**

**ABSTRACT:** This work seeks to create a semantic approach that uses ontologies for sharing knowledge related to product data in CAD/CAE applications and or integrating the design evaluation information that these applications individually provide. Our overall approach is coined OADE, Ontology-based Adaptive Design Evaluation. This paper reports on a piece of our ongoing work in this area. The key contributions of this paper include methods for the design of knowledge representation in product design and analysis, population of product data semantics, creation of ontology mapping methods and mapping representations, and mapping of product data semantics to the target application. The mapping method finds matching concepts between different ontologies based on three basic concept relation types: composition, inheritance, and attribute. A prototype implementation is being created using technologies such as OWL (representation tool), Jena (ontology builder), and Protégé (ontology editor) to demonstrate the approach for integrating a parametric CAD system, custom virtual assembly application, and an ergonomics engineering application. An example is given in this paper to illustrate how this approach can help integration between a product design application and an assembly simulation analysis application. The significance of this work is that it will provide the capability to create, share, and exchange knowledge for solving design evaluation challenges involving multiple applications and multiple viewpoints. A design decision can thus be described using the common concepts across the diverse entities.