

Preserving Design Intent in Data Integration between Virtual Prototyping and CAD Systems

ABSTRACT: State of the art CAD/CAM technology enables the capture of user design intent through the use of assembly constraints, features, parameters, etc. However, due to the large size of the CAD models, engineers are using other virtual prototyping methods for visualization and complete assembly analysis. Constraint and parameter information is lost in the transfer of models from the CAD system to the virtual prototyping systems. In virtual prototyping systems, users typically have tools to modify the location of an assembly component. In order to maintain model validity, procedures need to be developed to transfer these modifications back to the CAD system while maintaining the design intent of the original CAD user. In other words, how do we take information about changes to absolute or relative location and orientation of a component and transform this to updated constraint and parametric information in the original CAD model? In this paper, we address this need to update the constraints and parametric information of a CAD model based on location and orientation changes communicated from a virtual prototyping system. After analyzing and categorizing the assembly constraints in a typical feature-based CAD system, we propose a methodology to decide what information needs to be updated, and a procedure to update the information – all based on the original design intent captured in the constraints. The results of a test case to validate the methodology are also presented.