

An Architecture for VR-Based Virtual Prototyping of Human-Operated Systems

ABSTRACT: Virtual prototyping is a relatively new field which is significantly changing the product development process. In many applications, virtual prototyping relies on virtual reality tools for analysis of designs. This paper presents an architecture for a virtual prototyping system which was created for the analysis of automotive interiors. This flexible and open architecture allows the integration of various virtual reality software and hardware tools with conventional state-of-the-art CAD/CAM tools to provide an integrated virtual prototyping environment. This architecture supports the automatic transfer of data from and to parametric CAD systems, human modeling for ergonomic evaluations (first person and third person perspectives), design modifications in the virtual environment, distributed evaluations of virtual prototypes, reverse transfer of design modifications to the CAD system, and preservation of design intent and assembly intent during modifications in the virtual environment.