

Automated Generation of Interactive Virtual Environments from CAD Assembly Data

Keywords: Virtual Reality, Computer-Aided Design, Process Automation

Overview

In recent years, an ever increasing number of industrial Virtual Reality (VR) applications has been investigated, developed and introduced. In the mechanical and electrical engineering industry, VR yields enormous potential for various tasks such as vocational training, assembly accessibility analysis, ergonomic considerations, and collision analysis. For all these applications, an interactive virtual environment must be implemented based on CAD assemblies of the respective machines and tools. So far, this is a laborious and time-consuming process. Being able to automatically generate a fully interactive virtual environment from CAD data would therefore massively reduce the overall effort required to implement these applications and thus increasingly foster the adoption of VR application in industry.



Tasks

Your task is to research on the state of the art on generating interactive virtual environments based on CAD assemblies. Based on your research and discussion with chosen industry experts, you conduct an initial feasibility analysis of the envisioned process. Furthermore, you design and implement a process that allows for automated generation of immersive virtual environments from CAD data. First, you devise a method to extract the required information from a CAD software. Second, you implement a process to automatically generate an interactive virtual environment from the extracted data. Finally, you analyze your process with respect to its reliability and evaluate the usability of the generated virtual environments. You will present your work in an intermediate and a final presentation to the ICVR lab. Additionally, you will summarize your results in a written report.

Work Packages

- Initial feasibility analysis based on scientific literature and discussions with industry experts
- Implementation of a process to automatically generate an interactive virtual environment based from CAD Data
- Evaluation of the implemented process and generated virtual environments
- Intermediate and final presentation
- Written report

Skills

- Programming Skills in C++ or C#
- Unity and/or VR experience
- Experience with CAD software
- Strong communication and interpersonal skills

Results

The results of this thesis need to be summarized in a written report and will be presented to the ICVR in a 20min talk.

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