Synthesis of a web-based dimensional verification system for styling processes

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A design methodology is proposed for a web-based collaborative system applicable to styling processes in the distributed environment. By using the developed system, design reviewers of new products are able to confirm geometric shapes, inspect dimensional information of products through measured point data and exchange views with other design reviewers on the internet. Functional requirements for the design of this web-based dimensional verification system are suggested. ActiveX-server architecture and OpenGL plug-in methods using ActiveX controls realize the proposed system. Visualization and dimensional inspection of the measured point data are conducted directly on the web; conversion of point data into a CAD file or VRML form is not required in the styling process. Dimensional verification results and design modification ideas are uploaded through markups and/or XML files during the collaboration processes. The XML files, allowing information sharing on the web, are independent of the platform. It is possible to diversify the information sharing capability among design collaborators. The validity and effectiveness of the developed system are confirmed by case studies.

Keywords: activeX; collaborative system; dimensional verification; styling; viewer; web

1. Introduction

Mockups based on design sketches are widely used in car design and manufacturing processes. To obtain digital models from mockups, a digitization process via a layout machine (Figure 1) is required. In the conventional styling process of cars, digitized data are imported to a CAD system, and design requirements (distance and angular verification for ergonomics and esthetics, shape and size verification for functional performance, etc.) are verified on the CAD system. When the verified results are found to be inappropriate, the first mockup should be modified by stylists. Carving, verification and modification processes are then iterated to obtain a final mockup (Figure 2(a)). However, these are time-consuming and expensive jobs. Cost-effective and rapid verification and modification methods are required in the styling process. Using the internet collaboration method equipped with 3D viewing and dimensional measurement capability

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