



Human-Scale Virtual Environment for Product Design: Effect of Sensory Substitution

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Mots-clés	<p>haptic interaction [6], human performance [7], sensory substitution [8], virtual environment [9], virtual reality [10]</p> <p>This paper presents a human-scale virtual environment (VE) with haptic feedback along with two experiments performed in the context of product design. The user interacts with a virtual mock-up using a large-scale bimanual string-based haptic interface called SPIDAR (Space Interface Device for Artificial Reality). An original self-calibration method is proposed. A vibro-tactile glove was developed and integrated to the SPIDAR to provide tactile cues to the operator. The purpose of the first experiment was: (1) to examine the effect of tactile feedback in a task involving reach-and-touch of different parts of a digital mock-up, and (2) to investigate the use of sensory substitution in such tasks. The second experiment aimed to investigate the effect of visual and auditory feedback in a car-light maintenance task. Results of the first experiment indicate that the users could easily and quickly access and finely touch the different parts of the digital mock-up when sensory feedback (either visual, auditory, or tactile) was present. Results of the second experiment show that visual and auditory feedbacks improve average placement accuracy by about 54 % and 60% respectively compared to the open loop case.</p>
Résumé en anglais	
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