[DEMO] Towards Augmented Reality User Interfaces in 3D Media Production

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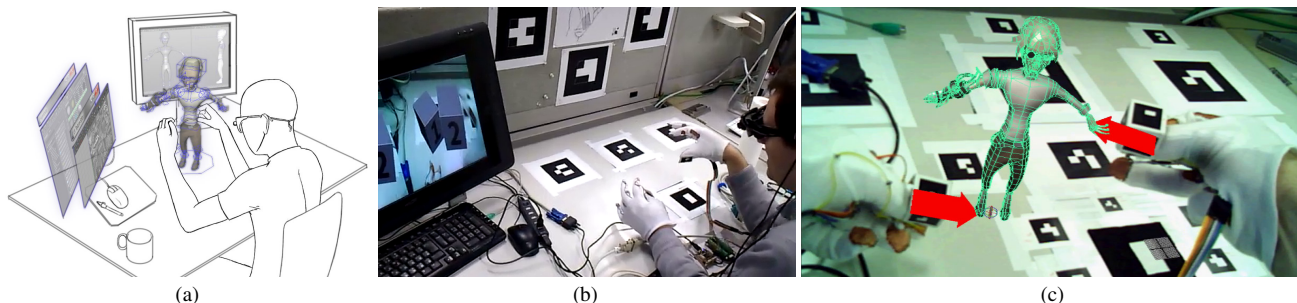Nara Institute of Science and Technology

Figure 1: We present an Augmented Reality User Interface approach, aimed at professional 3D design, based on empirical requirement analysis. (a) Illustration of the prototype system. (b) An artist working with the system. (c) View through the HMD.

ABSTRACT

For this demo, we present an Augmented Reality (AR) User Interface (UI) for the 3D design software Autodesk Maya, aimed at professional media creation. A user wears a head-mounted display (HMD) and thin cotton gloves which allow him to interact with virtual 3D models in the work area. Additional viewers can see the video stream on a projector and thus share the users view. Both head and hand positions are tracked from the HMD video stream, and an inertial measurement unit (IMU) and conductive materials on the gloves allow interaction with virtual objects. This system is built using Autodesk Maya — a professional 3D software package commonly used in the media industry — and aims to fulfill the requirements of professional 3D design work which we identified in our paper of the same title. While still an early prototype, it was already tested with media professionals to evaluate our approach.

1 BACKGROUND

Computer-generated imagery (CGI) content such as 3D-models and animations are commonly created with traditional 2D UIs such as mouse and keyboard. Even though the concept of using immersive 3D UIs for 3D design has been repeatedly suggested and AR 3D UIs have been shown to be excellent for 3D tasks thanks to correct spatial alignment, they are not commonly used by artists. We conducted a survey with media production professionals to gather information on the current work situation in the media industry. From this we identified a number of requirements which are difficult to achieve for AR UIs and thus usually neglected by UI designers.

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These findings are presented in our paper of the same title.

In order to validate our findings and stay focused on the real-life application of AR UIs for 3D design, we created a prototype system that aims to fulfill our requirements, which we present in this Demo Track. This AR UI that aims to provide sufficient functionality and appropriate UI design for professional 3D art.

While still an early prototype, it was already tested by media professionals who agreed to use the system and give feedback. While we did not yet perform a proper user study, staying closely in touch with professional artists helped us evaluate our approach and confirm our analysis of professional 3D design work.

2 DEMO DESCRIPTION

The user is wearing a video see-through HMD and tracked gloves, thus turning a empty work area (desk and wall) into an augmented work space for 3D design work. The virtual 3D content appears on the desk and can be edited directly with the hands. The 3D UI is quite extensive, providing many of the features required for professional 3D design. Additional spectators can view share the artists view on a projector.

The tracking is achieved in three ways. First, PTAM is used to track the HMD position in a unprepared environment. This allows a very quick set-up and a large, dynamically growing work area. Second, the position of the users hands are tracked from the stereo video stream. Finally, the orientation of the hands is tracked by IMUs which are attached to the thumbs of the gloves. These yield very precise and steady rotation measurements.

The glove buttons where realized by sewing conductive thread to cotton gloves and connecting the outputs to a Microcontroller (MC), which communicates with the PC via Bluetooth, thus making the gloves wireless.

The whole system was built in the form of a plug-in for the professional 3D design software Autodesk Maya. The plug-in can use the features of Maya to control the virtual content and thus can offer a great part of the features that 3D artists are used to and require for their work.